ANATOMY (PART-1): VULVA



Anatomy of Female – Reproductive Tracts

External genital organs
- Can be seen by naked eyes
- Called as VULVA

Internal genital organs
- → Cannot be seen with naked eyes
- → Need some instruments to see them.
- Role in Reproduction
- → Fallopian Tube
- → Uterus (lowerpart = cervix)
- → Vagina
- → Ovary

Accessory organs
- → Help at the time of intercourse
- Breast

External genital organ in female = called as VULVA/PUDENDUM

Parts included in Vulva:-

1. Mons Pubis (Mon veneries)
2. Labia Majora
3. Labia Minora
4. CLITORIS
5. VESTU BULE (6 openings)
6. SKENE glands
7. Bartholin glands

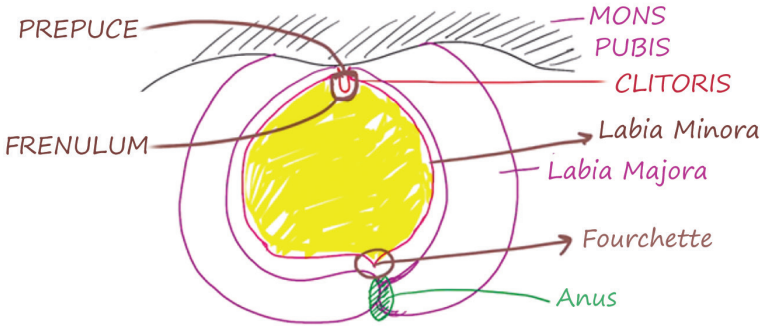
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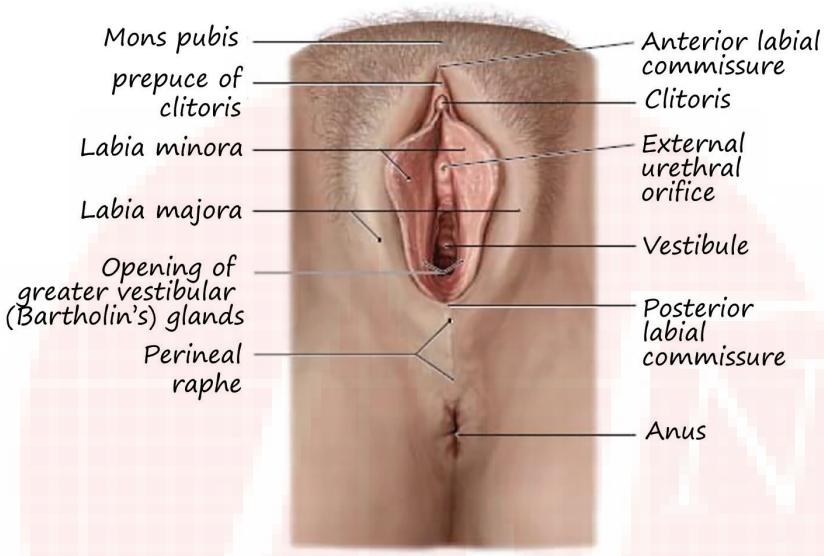
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→ Vulva is lined by KERTANISED stratified squamous epithelium (to protect vulva from getting injured)





MONS Pubis:- (Mon Venerum)

→ Lies directly above pubic bone

→ Fatty area (underlying adipose tissue)

→ After puberty → it is covered by Hair

Clitoris

→ 1.5 TO 2 cms in length

→ Erectile organ of females

→ Highly vascular

→ Homologous ↓

Females	Male	Origin
CLITORIS	PENIS	GENITAL TUBERCLE

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Labia Majora

→ Outer lips

→ Have:-

1. Fats
2. Hair follicles
3. Sebaceous glands
4. Sweat glands (called APOCRINE gland)

→ Posteriorly wheel labia majora meet called as

→ Homologous

Females	Male	Origin
Labia Majora	SCROTUM	Genital swelling

Labia Minora

→ Inner lips

→ In young females, are not visible as they are covered by Labia Majora

→ In multiparous females, are seen properly

Details

1. Paraurethral glands/skene glands: Homologous to PROSTATE glands of males
   → Vaginal opening:- Introitus: It is covered by thin membrane called HYMEN
   → Hymen has an opening through which menstrual blood comes out every month.
   → If there is no opening in Hymen
   such a hymen is called IMPERFORATE HYMEN
   ↓
   Menstrual Blood will not be able to come out
   ↓
   Called as CRYPTOMENORRHEA (concealed menses)
   → At time of intercourse:- Hymen is Ruptured
   → During childbirth:- Hymen is lacerated & later it is replaced by **CARUNCULAE MYRITIFORMIS**

Bartholin Gland:-

→ Size:- Pea sized glands

→ Number:- 2

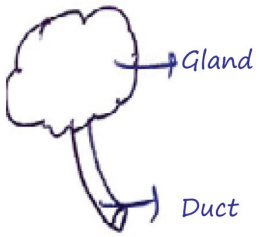
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→ Lining = Columnar epithelium

→ Function:- At time of Intercourse

↓

Produces Alkaline Mucus

↓

Helps in Lubrication

Homologous

↓

Females	Male
Bartholin gland/ Greater vestibular gland	Bulbouretheral gland (COWPER gland)

→ Labia Minora = goes anteriorly & cover the clitoris from above:- PREPUCE

It covers clitoris from below:- FRENULUM

→ Labia Minora of left & right side meet posteriorly. This area is called as FOURCHETTE

Labia Minora	Labia Majora
→ Hair absent → Fat absent → Sweat glands absent → Apocrine glands absent	→ Hair present → Fat present → Sweat glands present → Apocrine glands present

↓ ↓

→ Sebaceous glands present in Both

→

Females	Male	Origin
Labia Minora	PENILE urethra	Genital folds

Vestibule

→ Triangular area bounded by:-

Anteriorly:- CLITORIS

Sides:- Labia Minora

Posteriorly:- FOUR CHETTE

→ It has 6 openings

1 = Urethral opening

2, 3 = Paraurethral gland (Largest = SKENE glands)

4 = Vaginal opening

↓

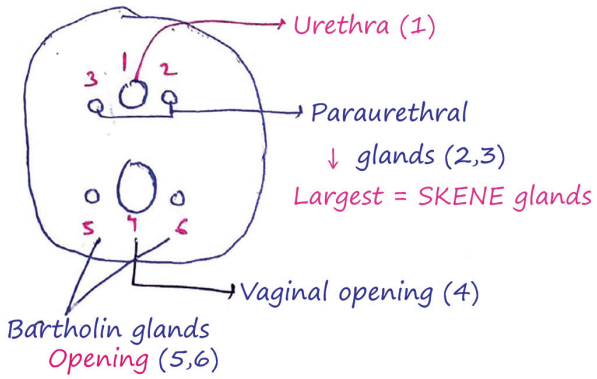
called as INTROITUS

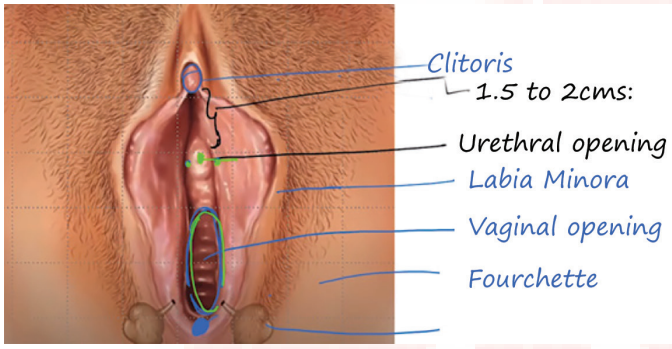
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5, 6 = Opening of bartholin glands





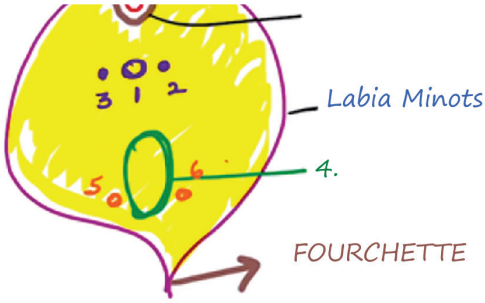
1=Urethral opening

2,3 = Paraurethral glands (largest = Skene glands)

4: Vaginal opening

⇓

Called as INTROITUS



5,6 = opening of of bartholin glands

Bartholin duct: Where does it open:-

In vestibule in the groove between vaginal opening (Introites) Labia minora at junction of anterior 2/3rd & posterior.

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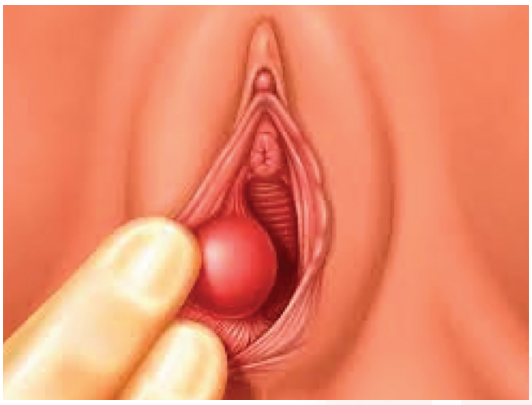
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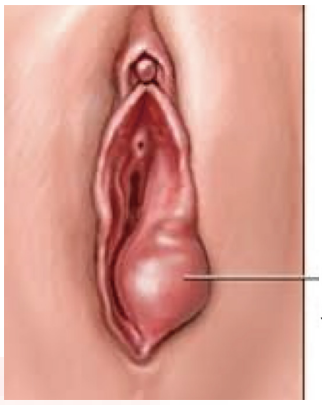
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If the duct of bartholin gland gets blocked

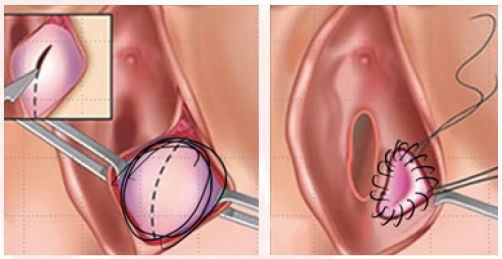
↓

It forms bartholin cyst





- Painful
- Location on Labia Minora
- Most common cause ↓ Infection (E. coli)
- Management ↓ MARSUPILISATION



→ Blood supply: VULVA internal pudendal artery

→ Nerve supply: Pudendal nerve

→ Lymphatic drain: Inguinal Lymph Nodes (Superficial + Deep inguinal lymph nodes)

Extra Edge

CLITORIS:- Lymphatic drainage

↓

Rosenmuller

or

Lymph node of CLOQUET

Student's Space

ANATOMY (PART-2) (PERINEUM)

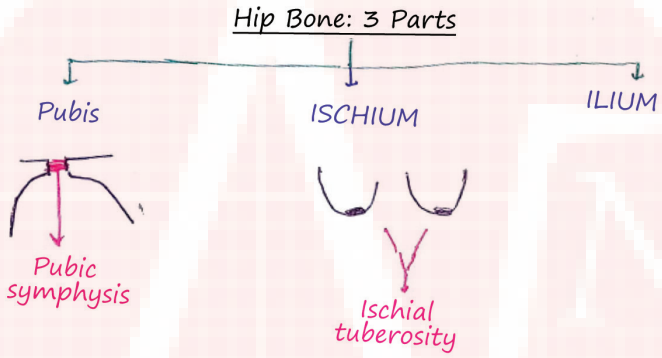
Explanation with pelvic bone model

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Perineum

Pelvic Bone:-
- 2 Hip bones (Innominate Bones)
- Sacrum
- Coccyx (Tail bone)



→ The cavity which lies between the pelvic bone is pelvic cavity (Contains female internal genital organs)

→ The cavity which lies outside the pelvic bone is called PERINEUM (contains external genital organ)

→ Pelvic cavity is separated from the perineum by PELVIC FLOOR

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Perineum:-

1. Anatomical Perineum

   Boundaries:-

   Anterior:- Pubic symphysis

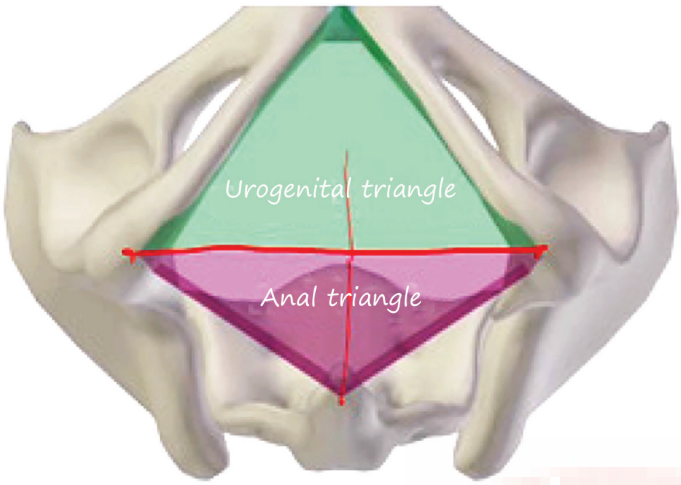
   Lateral:- Ischial tuberosity

   Posterior:- Coccyx

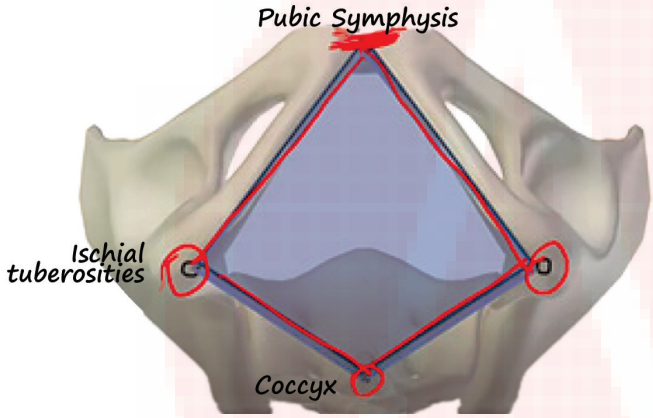
   Shape:- Diamond shaped

Perineum has 2 triangles
- UROGENITAL TRIANGLE
- ANAL TRIANGLE

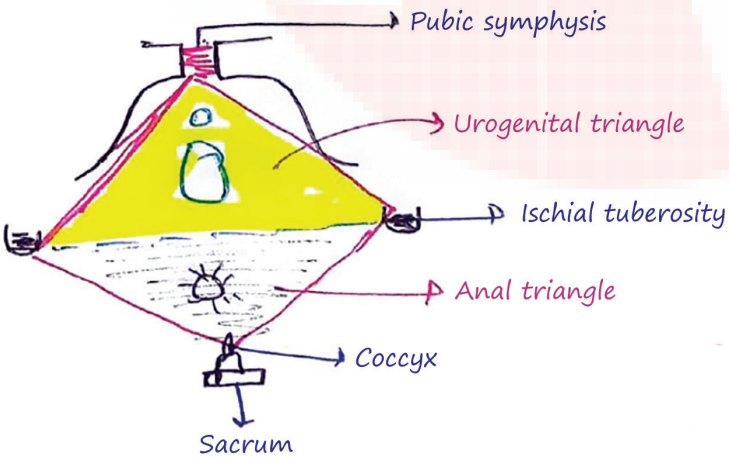
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Parts of anatomical perineum



Anatomical perineum boundaries



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2. Obstetrical Perineum:- It is that part of Anatomical Perineum which lies between vaginal opening and anal opening.
   - → Size = 4×4 cms
   - → Other name = PERINEAL Body

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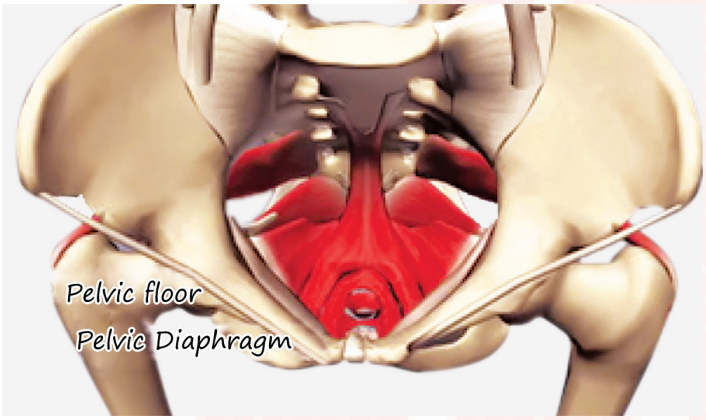
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Significance

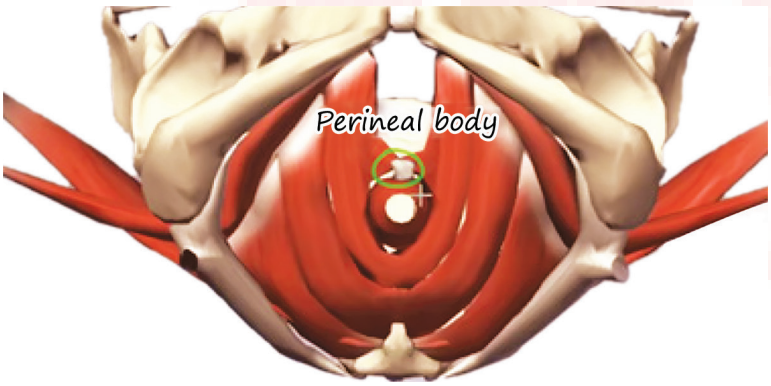
1. During delivery of fetal head Perineal support is given in this area.
2. Perineal tear:- Means tear in this area.
3. Episiotomy (surgically planned incision) is given in this area.

Pelvic Floor/Pelvic Diaphragm

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→ Role:- It separates the pelvic cavity from the perineum



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→ Pelvic floor/Pelvic diaphragm is formed by 2 muscles

Levator Ani Muscle

↓

Main

→ Fan shaped muscle which hangs like a hammock

→ **Left & Right side muscles:-** Meet in center

→ This muscle is thickest on the sides & it is thin in center

ischiococcygeus and muscle/ coccygeus

↓

→ Does not support uterus

→ It does not form a part of perineal body

→ It is not cut during episiotomy

Parts of Levator Ani

- Pubococcygeus
- Ilio coccygeus

→ **Role of Levator ani:-** It is the main support of uterus (it prevents prolapse)

→ It forms a part of perineal body.

→ It is cut during Episiotomy.

Muscles which form perineum

Muscles Perineum:-

1. Bulbospongiosus
2. Superficial Transverse Perenei muscle
3. Deep Transverse Perenei muscle
4. External Anal Sphincter muscle
5. Urinary sphincter muscles

} Muscles cut during Episiotomy
Muscles attach to perineal body/ muscles support uterus
1 to 5 + Levator ani muscle

Tip

All of following muscles are attached to perineal body except

or

All of the following muscles are cut during Episiotomy except

↓

Ans: **Ischiococcygeous/coccygeus**

Name muscles which support uterus/
Name muscles which are cut in Episiotomy/
Name muscles which are attached to Perineal Body

} Ischiococcygeous/coccygeus

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Mnemonic

B – Bulbospongiosus
L – Levator ani
E – External anal sphincter
S – Urinary sphincter
S – Superficial transverse perinei muscle
D – Deep transverse perinei muscle

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ANATOMY (PART-3)



Internal Genital Organs of Female:-

1. Gonads : Ovary
2. Fallopian Tube
3. Uterus → cervix
4. Vagina

} Located in Pelvic cavity

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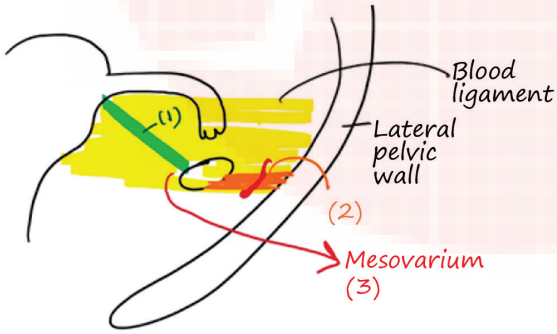
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Ovary

- → Female gonads
- → Develop from Genital Ridge
- → Number = 2
- → Size = 3 cm × 2 cm × 1 cm
- → Weight = 5-10 gm
- → Location = Ovarian fossa which lies in lateral pelvic wall
- → colour:- Pearly white
- → Shape:- ovoid in shape (almond shaped)

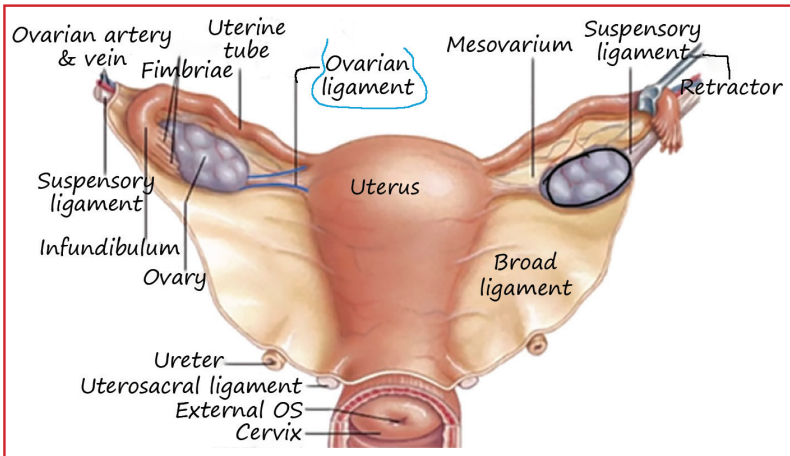
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Ligaments Related to Ovary



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1. OVARIAN LIGAMENT: Connect ovary to uterus.
2. Infundibulopelvic ligament/suspensory ligament of ovary

   ↓

   → Connect ovary to lateral pelvic wall

   → Ovarian vessels & nerves are present in this ligament

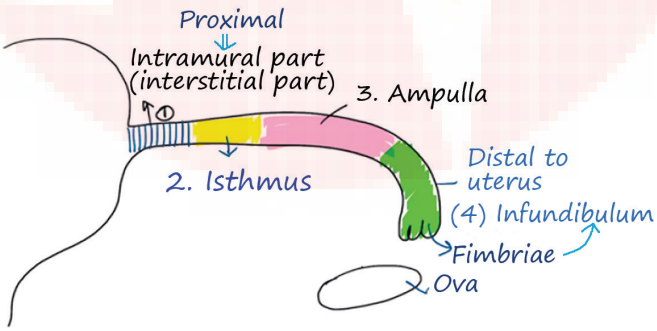
Ovary: Found behind the peritoneum
↓
RETROPERITONEUM

3. **MESOVARIUM:** Part of Broad ligament lying just anterior to ovary

Ovary → function → Oogenesis
Hormones = Estrogen, Progesterone

Ovary remove surgically → OOPHORECTOMY

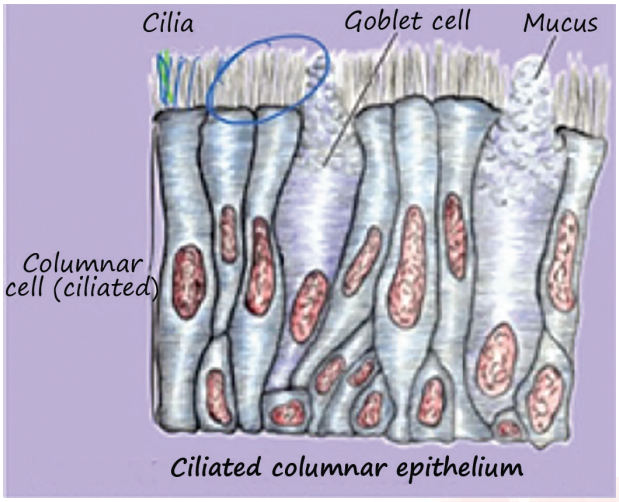
Fallopian Tubes/Oviducts/Uterine Tubes/Salpinx



→ Length:- 10-12 cms = 4 inches

→ Derived from:- Mullerian duct

→ Living of epithelium:- CILIATED columnar epithelium



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Peg cells are seen in:- FALLOPIAN Tube

→ Function of Cilia:-

1. To push sperm towards ova
2. When fertilization occurs then to push zygote towards the uterine cavity.

Clinical Concept:-
Few females in whom cilia become immotile (cannot move)
↓
Called KARTEGENER Syndrome
1. Sperms cannot move towards ova → INFERTILITY
2. Zygote cannot move towards uterine cavity & it implants in the fallopian tube
↓
Ectopic Pregnancy

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Parts of Fallopian Tube (from Medial to Lateral)

Intramural Part	Isthmus	Ampulla	Infundibulum
→ Interstitial Part → Medial most → 1.25 cms long → 1 mm wide → Narrowest Part of Tube ↓ Called as Anatomical Sphincter → It opens in uterus at CORNUA or Uterine angle	→ 2nd Part of Tube → 2.5 cms long → 2 mm wide → 2nd narrowest part → Called as Physiological Sphincter → In Tubal Ligation ↓ Isthmus is cut	→ 3rd part of tube → 5 cms long (longest) → 4 mm wide (widest) → Fertilization occurs in ampulla → Most common site for Ectopic pregnancy → Most common site for Genital Tuberculosis Infection	→ Most lateral part of tube → 1.25 cm long → Has finger like projections called as Fimbrae Width Infundibulum 2-3 mm Fimbriae = 6 mm → One of the fimbriae becomes very long & is connected to ovary ↓ Called as OVARIAN FIMBRIAE

Extra Edge

Tubal ligation

→ Permanent method of contraception in female



] Isthmus loop is made & cut
Pomeroy Technique

Clinical Concepts

1. SALPINGECTOMY → When you remove Fallopian Tube, the surgery of fallopian tube is called as salphingectomy.
2. Salpingo oophorectomy → Fallopian Tube + ovary removal
3. Salpingitis → Inflammation of Fallopian Tubes
   Tube Inflammation

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Key Concept:-

Ovary Remove
Hormones ↓ Estrogen ↓
↓
Menopause like symptoms
Where we do **Hysterectomy:-**

Uterus Removal

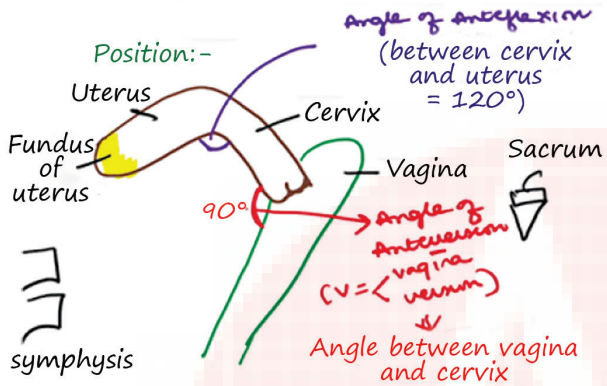
- If female's age <45 years
  ↓
  Do not remove ovaries
  ↓
  (Do only Hysterectomy)
- If female's age ≥45 years
  ↓
  Remove both ovaries & tubes
  ↓
  Do: Hysterectomy
  +
  Bilateral salpingo oophorectomy

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ANATOMY (PART-4) (UTERUS)

Uterus (Womb)



→ Shape:- Pear shaped/Pyriform shaped

→ Position:-

Note:-

1. Normal position of uterus in body is Anteverted & Anteflexed.
2. When uterus is anteverted
   ↓
   Fundus of uterus points anteriorly towards pubic symphysis
3. When uterus is RETROVERTED? (Few females)
   ↓
   Fundus points towards sacrum

Size of Uterus

	Length	Breadth (Width)	Thickness	Weight	Capacity
Non Pregnant	8 cm (3 inch)	5 cm (21 inch)	2.5 cm (1 inch)	60-80 gm	10 mL
Pregnant	35 cms	20 cms	12.5 cms	1000 gms	5 L (20 L maximum)
Puerperium	20 cms	12.5 cms	7.5 cms	1000 gms	

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Note:-

→ 6 weeks after delivery:- Length, Breadth, Weight, Thickness of uterus is almost same as non pregnant female.

→ Height of uterus immediately after delivery

↓

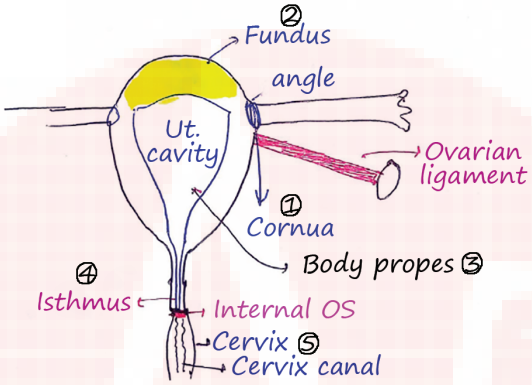
20 cms = 20 weeks pregnant uterus length

Level where it can be palpated = Just below umbilicus

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Parts of Uterus:-

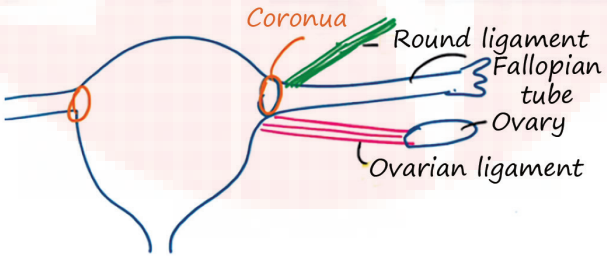


1. CORNUA:-

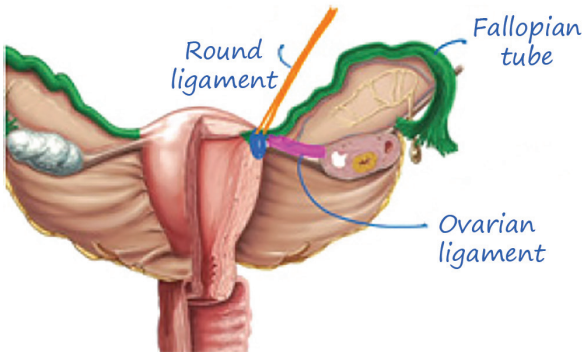
→ Uterine angles (Right Cornua
Left Cornua)

→ 3 tube structures are attached to cornua of uterus:-

From Anterior to Posterior:-



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R - Round ligament
T - Fallopian Tube
O - Ovarian ligament

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Q1. Most common cause of failure of female sterilization

↓

Identification of wrong structure

Q2. Uterine contraction during labor begins from cornua of uterus = It is called as pacemaker of contractions

2. Fundus:-

→ That part of uterus which lies above cornua of uterus



→ It does not have uterine cavity

→ It is dome shaped

If fundus of uterus is flat or it has a dimple = such a uterus is called ARCUATE uterus.



3. Body of Uterus

→ Part of uterus which lies below cornua.

→ It forms the major part of uterus.

→ Uterine cavity is present in Body of Uterus.

Shape	Length
↓	↓
Inverted Triangle	6-7 cms

4. Isthmus:-

→ Part of uterus which lies near internal os

Internal os:- Opening between uterus & cervix

→ It connects uterus to cervix

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→ Normal length = ½ cm (0.5 cm)

→ During pregnancy it plays an important Role

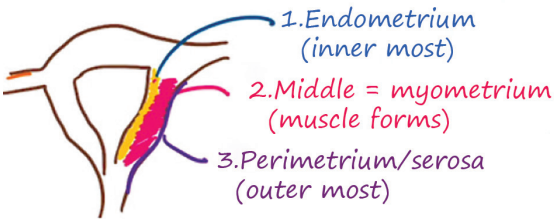
↓

It forms the lower uterine segment

During pregnancy length	During labor length
↓	↓
5 cms	10 cms

→ **Histology of Uterus:-**

1. Uterus has 3 layers:-



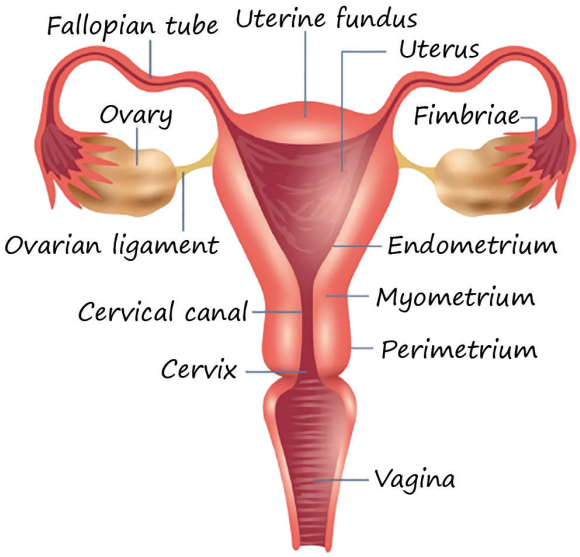


Figure: Female reproductive system

2. Uterus lining = Columnar Epithelium

What is LIVING LIGATURE?

In a pregnant uterus: Myometrium also has muscle fibres arranged in 3 layers

↓

In which the middle layers has fibres like a mesh with blood vessels in between

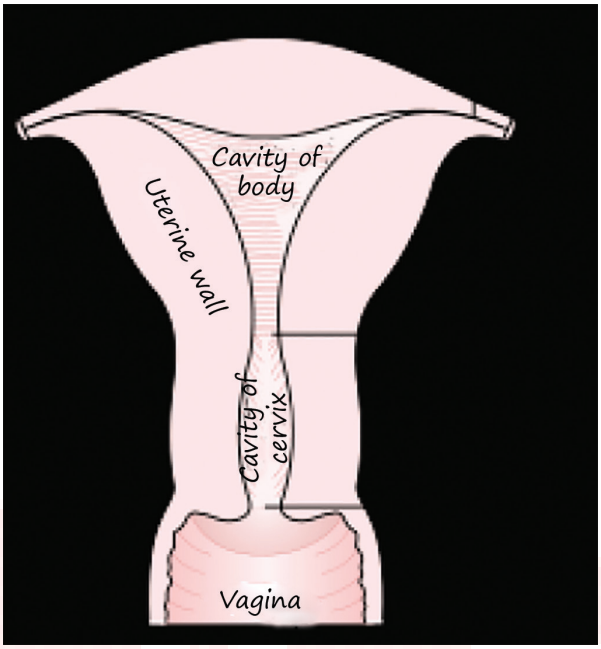
↓

After delivery when uterus contracts, the blood vessels get CONSTRICTED & Bleeding stops

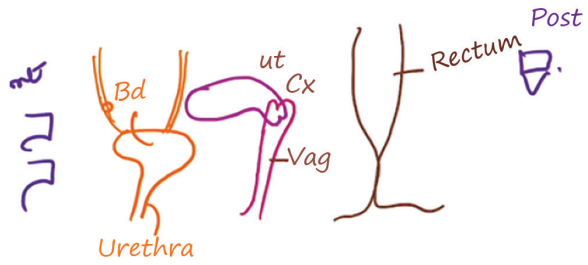
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Middle layer of Myometrium is hence called LIVING LIGATURE



Position of Uterus in Pelvis



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Position of Uterus

The column on left side:

Pushes the uterus towards Right side

↓

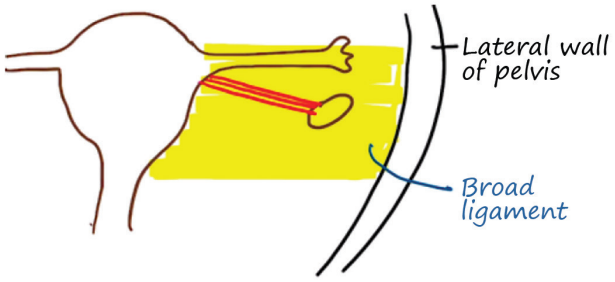
Therefore, uterus is slightly rotated towards Right side

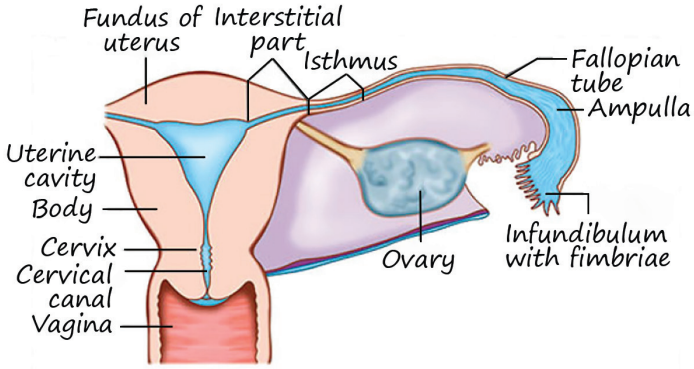
↓

This is called as Dextro rotation

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Peritoneum of Uterus





Broad Ligament

→ It is a misnomer: (Wrong Name)

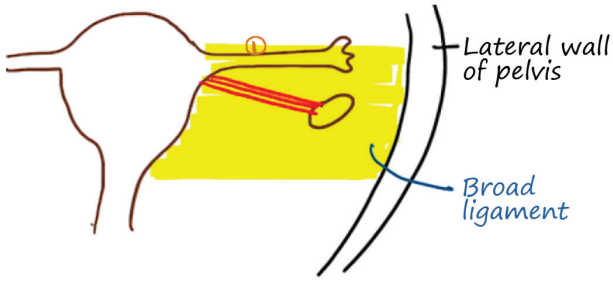
↓

Not a ligament

→ It is a thin fold of peritoneum which is attached from sides of uterus to Pelvic wall.

→ **It does not support the uterus**

→ **Parts of Broad ligament: 3 Parts**



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1. MESOSALPINX
Part which lies near the fallopian tube

2. MESOVUARIUM
Part which lies near the ovary

3. MESOMETRIUM
Part which lies near the uterus

Blood Supply of Uterus

Main: Uterine Artery (Branch: Anterior Division of Internal Iliac Artery)
Other: Ovarian Artery
Origin/Derived: Uterus is derived from mullerian duct

Clinical Concepts

1. Best investigation to see inside uterus:- HYSTEROSCOPY
2. Hysterectomy → To remove uterus.

2 Types

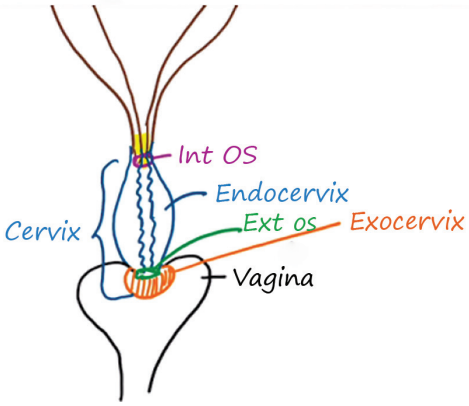
M/C

Uterus + Cervix Remove
↓
Total Abdominal Hysterectomy (TAH)

Rarely done:- Only Uterus Remove, not Cervix
↓
Subtotal Hysterectomy

Cervix

→ The lowermost part of uterus



→ Cervix has 2 parts:-

1. Endocervix:
   → Part of cervix which is near the uterus
   → Also called as supravaginal part of cervix.

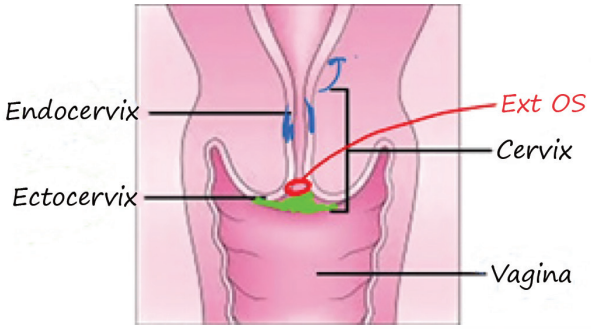
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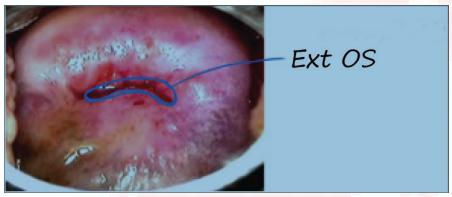
2. Exocervix/Ectocervix

→ Part of cervix inside the vagina:

→ It is also called as PORTIO Vaginalis.



External os:- Place where cervix opens into vagina.



Per Speculum → External os

- ○ ↓ Nulliparous
- ⬭ ↓ Multiparous

Shape of External os

(1) ○
→ Round/circular
→ Seen in nulliparous female

(II) ⬭
→ Transverse/slit like
→ seen in multiparous

Length of Cervix

Non Pregnancy	Pregnancy
2.5 cms	4-5 cms
(Endo Cervix = 1.25 cm)	
(Endo Cervix = 1.25 cm)	

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Important Point

→ Before puberty, the length of cervix is more than length of uterus

	Uterus: Cervix ratio Corpus: Cervix ratio
Before puberty	1:2
At puberty	2:1
Reproductive	3:1
Menopause female	1:1

→ **Cervix derived:-** Cervix is derived from mullerian duct

→ **Lining of Cervix:-**

→ Endocervix:- Columnar epithelium

→ Exocervix:-Stratified Squamous Epithelium

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Transformation Zone/Squamocolumnar Junction

1. This is the place where columnar epithelium of Endocervix changes gradually into squamous epithelium of Exocervix.
2. Location:- Near the External os.
3. Significance:- Most common site for cancer cervix

Cervical canal shape:- Cylindrical/Fusiform shape

Clinical Connect

Investigation: COLPOSCOPY

1. Vagina
2. Exocervix
3. External os
4. Transformation zone

What is not seen?
↓
Endo Cervix

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ANATOMY (PART-5)

Vagina

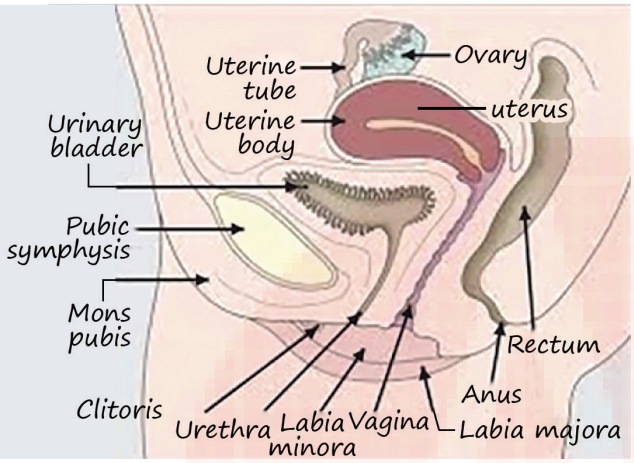
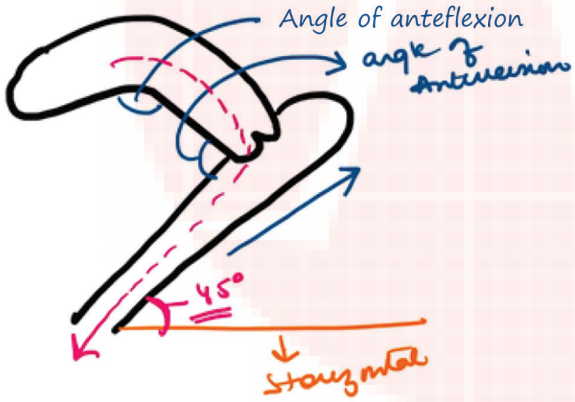


Figure: Angle of vaginal and direction



1. It is a fibromuscular hollow organ/canal
2. It connects uterus to vulva
3. Function:-
   - → Helps in passage of menstrual Blood
   - → Passage for birth of body → BIRTH canal
4. Vagina = direction = Upwards + Backwards
5. Vagina makes on angle of 45° with the ground when female stands

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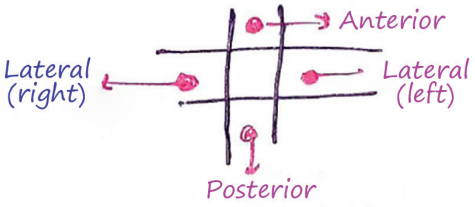
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→ Gross section of vagina = **H shaped** & it has 4 pockets



↓

Called as FORNIX (fornices)

→ Total there are 4 fornices:-

1. Anterior fornix
2. Posterior fornix
3. Left lateral fornix
4. Right lateral fornix

Deepest fornix: Posterior
Shallowest fornix: Anterior

→ Posterior wall (9 cm) of vagina is always longer than anterior wall (7 cm)

Posterior wall is 2 cm longer than anterior wall

→ Vagina has local Inhabitant Bacteria:-

Called as Lactobacillus acidophilus

↓

DODERLEIN Bacteria

Doderlein Bacilli

→ appear:- at Puberty
↓
Remain in vagina throughout reproductive age
↓
Disappear: at Menopause

→ Related to Estrogen levels

→ **Function:-** Converts the glycogen present in vaginal epithelial cells into lactic acid → Make vaginal PH acidic
↓

→ Less pathogenic organisms can enter vagina
↓

→ Natural defence mechanism

pH of Vagina in different Phases of Life

State	pH of Vagina	
Childhood	Slightly alkaline (6-8)	No Doderlein Bacilli
Puberty	Change alkaline pH to acidic pH	Doderlein Bacilli appears
Reproductive age	4-5 (acidic)	Doderlein Bacilli present
Menopause	Slightly alkaline (6-8)	Doderlein Bacilli disappear

In pregnancy=

No. of Doderlein Bacilli Increase (↑)
↓
Convert more of glycogen into lactic acid (↑)
↓
So acidity of vagina (↑)
↓
pH (↓) = 3.5

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At time of Menstruation

Menstruation Blood enters Vagina (PH = alkaline)
↓
therefore, pH of vagina also becomes alkaline (6-8)

→ Vagina is lined by non keratinized stratified squamous epithelium

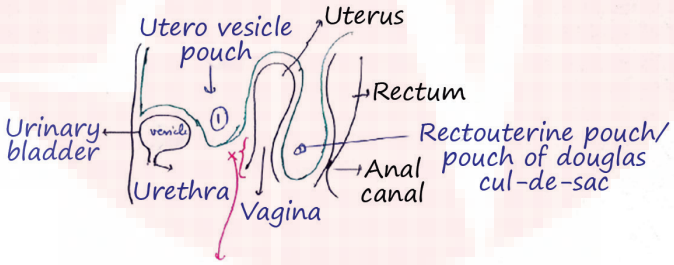
→ Vagina does not have any glands

What is vaginal discharge?

It is:-

1. Cervical discharge (most common)
+
2. Endometrial gland discharge
+
3. Bartholin gland discharge (only at time of intercourse)

Peritoneum



→ Anterior wall of vagina does not have peritoneum

→ Posterior wall of vagina has peritoneum

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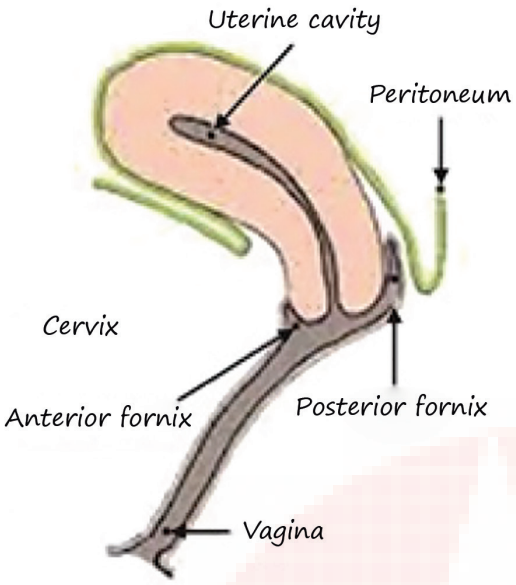


Figure: Vaginal fornix

Pouch of Douglas

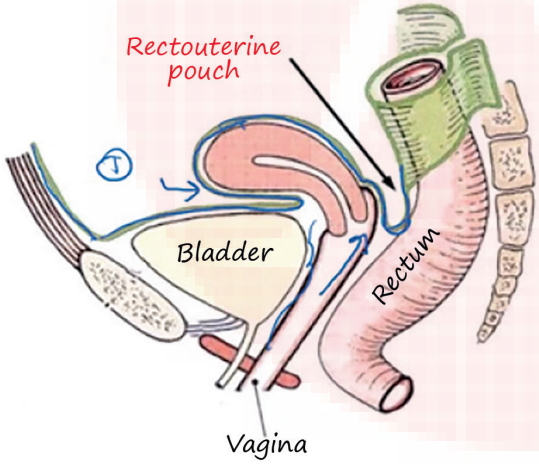


Figure: Pouch

- → Pouch between uterus & Rectum
- → In PID: **Fluid is present in Pouch of Douglas**
- → In Ectopic pregnancy:-

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If Ectopic pregnancy

↓

Blood is present in pouch of douglas

↓

Confirm: Take a syringe & pass it from the posterior fornix into the Pouch of Douglas

↓

Called as CULDOCENTESIS

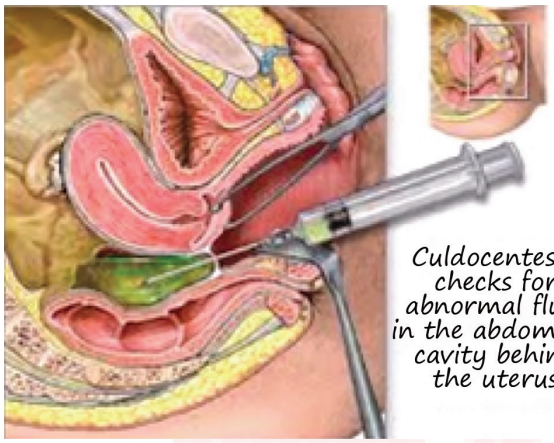


Figure: Culdocentesis

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Student's Space

Important Tables

Table 1: Lining Epithelium

Organ	Lining epithelium
VULVA	Keratinized stratified squamous Epithelium
VAGINA	Non keratinized stratified squamous Epithelium
EXOCERVIX	Same like vagina
ENDOCERVIX	Columnar epithelium
Uterus	Columnar Epithelium
Fallopian Tube	Ciliated columnar Epithelium (Have peg cells)
Ovary	Germinal Epithelium

Concept

→ Most common variety of cancer of any organ depends on its lining epithelium
For example, m/c cancer

- → Vagina = Squamous cell carcinoma
- → Uterus → Adenocarcinoma (columnar epithelium)
- → Fallopian Tube = Adenocarcinoma

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Table 2: Blood supply

Organ	Blood Supply
Ovary	Ovarian Artery (Branch = Abdominal Aorta)
Uterus	Main = Uterine Artery Branch of Anterior Division of Internal Iliac Artery also by ovarian artery
Fallopian tube	Medial Part: Uterine Artery Lateral Part: Ovarian Artery
Cervix	Descending Cervical Artery → Branch of Uterine Artery
Vagina	1. Descending Cervical Artery 2. Internal Pudendal Artery 3. Middle Rectal Artery
Vulva	Internal Pudendal Artery

Patient with Excessive bleeding after delivery (PPH)

↓

Medicines: fail

↓

How to stop bleeding?

↓

Bleeding is from uterus

↓

If blood supply of uterus is stopped

↓

Bleeding will stop

↓

ARTERIES ligated

Q1. Which arteries should you ligate in case of PPH (Post Partum Hemorrhage)?

↓

1. Uterine Artery
2. Ovarian Artery
3. Anterior division of Internal iliac Artery.

Table 3: Procedure to look inside

ORGAN	Procedure
Abdominal Cavity	Laparoscopy (Outer Uterus)
Uterus	Hysteroscopy
Cervix & Vagina	Colposcopy Exocervix + Vagina Seen Not Endocervix
Fallopian Tube	Salpingoscopy

Student's Space

EMBRYOLOGY RELATED TO GYNECOLOGY



Sex of fetus decided → Gene

Gene → Sex related region (SRY) present on Y chromosome **SRY gene**

→ Q. (Short arm of Y chromosome)

→ If

- SRY gene is present → **Male**
- If SRY gene is Absent → Y chromosome absent → **Female**

	Genotype/Karyotype	Sex
Baby	46 (XY)	Male
Baby	46 (XX) Y chromosome absent	Female

Case: Baby: 45(XO) → **Female**

Y Chromosome Absent

TURNER syndrome

Baby 47 (XXY) → **Male**

Y Chromosome Absent

Klinefelter syndrome

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Uptil 6 weeks of Intrauterine life

↓

Gonads develop from genital ridge ← Gonads: have the capacity to either become testis or ovaries.

After 6 weeks

If Y chromosome is present	If Y chromosome is absent
↓	↓
Gonads: Form testis	**Gonads:** Form ovaries
Testis are formed by 6-7 weeks	Ovaries formed by 7-8 weeks

Concept: Presence of ovaries: depends on absence of Y chromosome. But for proper development of ovary both X chromosomes are needed.

Case: Baby Turners syndrome (45 XO) Gonad: Y chromosome absent = ovary will develop but since only 1 X chromosome is present that is why ovary will not be properly developed: STREAK GONADS

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GERM Cells

1. Originate from Epiblast
2. Till 6 weeks: germ cells in male & female are same

↓

After that

Y chromosome is present	Y chromosome is absent
↓	↓
Sex = Male	Sex = Female
Germ cell = Spermatogonia	Germ cell = Oogonia

Ducts:

In early intrauterine life: In both males & females

↓

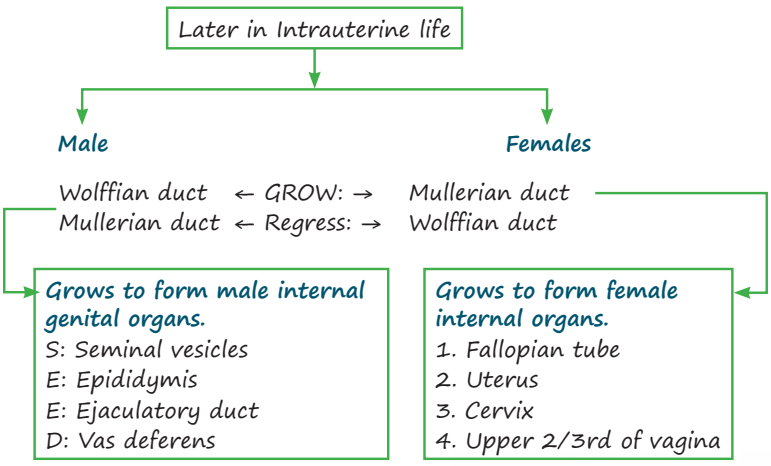
2 Pairs of ducts are present

↓

(i) Mullerian duct (Paramesonephric duct)

(ii) Wolffian duct (Mesonephric duct)

↓



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Important Points

1. Upper 2/3rd of vagina = Formed by Mullerian duct
2. Lower 1/3rd of vagina = formed by Urogenital sinus
3. Vaginal epithelium is derived from Endoderm of urogenital sinus
4. Ovary = formed from genital ridge

Case: If there is a female in whom both mullerian duct are absent. The condition is called as **Mullerian Agenesis.**

Absent	Normal
→ Fallopian Tubes → Uterus → absent ↓ (No Menstruation) ↓ Primary Amenorrhea → Cervix → Upper 2/3rd vagina ↓ These patients also get Renal anomalies as Mullerian ducts also form some parts of kidney.	→ Ovaries (Normal) ↓ Ovulation (Normal) → Lower 1/3rd of vagina normal

Homologous Organs: Are organs in male & female which have same embryological origin.

Eg: External genital organs.

Male	Female	Embryological origin
Penis	Clitoris	Genital Tubercle
Scrotum	Labia Majora	Genital swelling
Penile urethra	Labia Minora	Genital Fold

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Homologous Glands

Male	Female
→ Prostate gland	→ Skene gland (Para urethral gland)
→ Bulbourethral gland/Cowper gland	→ Bartholin gland (Greater vestibular gland)

Barr Bodies:

Calculate

↓

No. of X Chromosome – 1

	Karyotype type	No. of Barr Body
Males	46 (XY)	(1 – 1) = 0
Females	46 (XX)	(2 – 1) = 1
Turner Syndrome	45 (XO)	(1 – 1) = 0
Klinefelter Syndrome	47 (XXY)	(2 – 1) = 1

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DISORDERS OF MENSTRUATION

Characteristic of Normal Menstrual Cycle

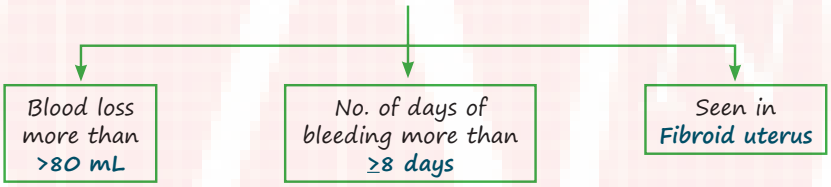
Normal Length:	21-35 days
Average Length:	28 days (15% females)
→ No. of Days of bleeding	2-7 days
→ Average days of bleeding	4-6 days
→ Normal blood loss	5-80 mL
Average blood loss	35 mL (best)
	50 ml (2nd best)

Atypical Uterine Bleeding (AUB)

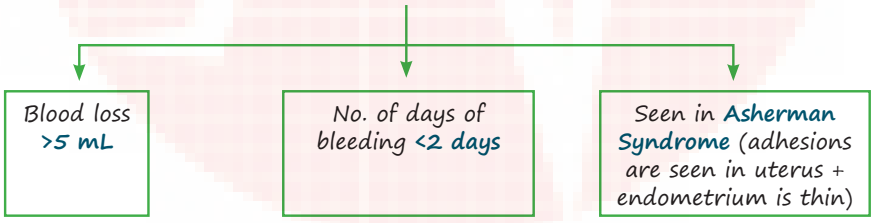
Any deviation from normal characteristic of menstrual cycle.

Types

1. MENORRHAGIA: Excessive bleeding



2. HYPOMENORRHEA: Less bleeding



3. POLYMENORRHEA: Short cycles (Frequent Menstruation)
   < 21 days
   Ovary congested
4. OLIGOMENORRHEA: Long cycles/Infrequent menstruation
   ↓
   ≥ 35 days
5. METRORRHAGIA:- Irregular Bleeding/Intermenstrual Bleeding
   ↓
   Seen in Polyp in uterus

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Q. Suppose a female is having excessive bleeding at irregular intervals what will it be called as:- Menometrorrhagia.

Q. A 25 years old female complains of intermenstrual bleeding she is a case of:- Metrorrhagia

What is AUB? & What is DUB?

↓	↓
Means excessive bleeding due to some cause (reason)/Pelvic Pathology	Excessive bleeding (without any Reason)/In absence of pelvic pathology
Eg: Fibroid, Polyp	It is a diagnosis of Exclusion

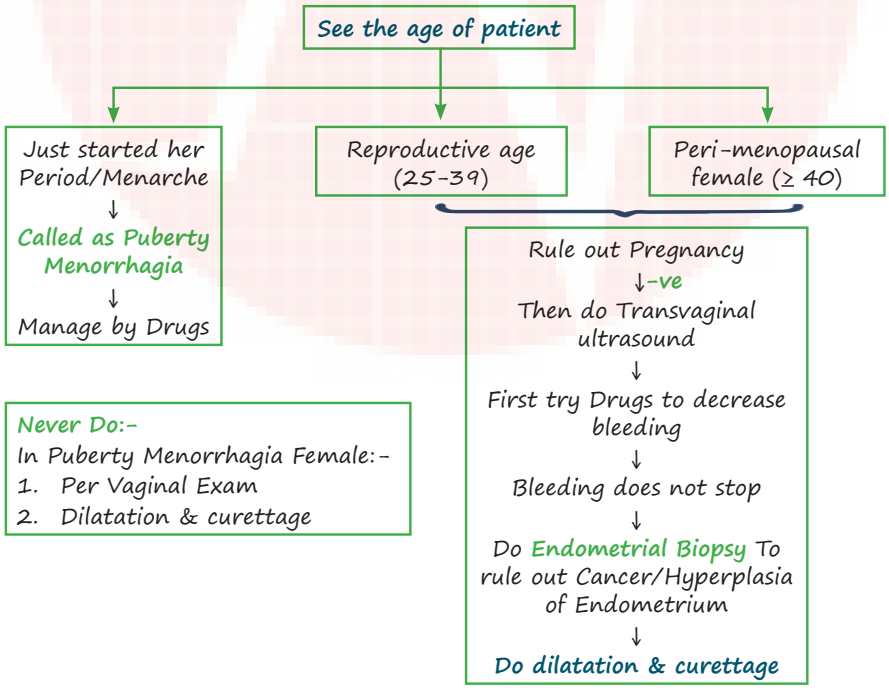
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Causes of AUB (Atypical Uterine Bleeding)

P - Polyp
A - Adenomyosis
L - Leiomyoma/Fibroid uterus
M - Malignancy
C - Coagulation Pathology
O - Ovulatory cause
E - Endometrial cause (Endometriosis)
I - Iatrogenic
N - Not yet identified

What to do when a female comes with excessive bleeding:-



Drugs used for Treating Excessive bleeding in any age group:-

1. TRANEXEMIC ACID
2. OCP's (Oral Contraceptive Pills) (Estrogen + Progesterone)
3. Progesterone

Surgical Option in females ≥ 40 years for treating Excessive bleeding:-

↓

Hysterectomy (Total Abdominal Hysterectomy)

↓

Uterus + Cervix Removed.

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PAIN during Menstruation: Dysmenorrhea

Dysmenorrhea

Primary Dysmenorrhea

→ There is no reason for pain

→ Seen in young females who will give history that since Menarche (onset of Menstruation) they have pain during menstruation.

→ Pain is centralized/suprapubic area
→ Starts 1-2 days before menstruation and subsides with onset of menstruation
→ Also called as spasmodic dysmenorrhea

Treatment:
→ NSAID's
→ OCP

Secondary Dysmenorrhea

There is some pelvic pathology causing pain.
→ **Most common cause = Endometriosis**
- Adenomyosis
- Fibroid
- PID

→ Seen in reproductive age female most common age > 35 years who says that earlier she did not have any pain during menstruation, but now suddenly pain has started.
→ Pain is localized.
→ Starts 4-7 days before menstruation & is not relieved with menstruation.
→ Also called congestive dysmenorrhea.

Treatment:
Treat the cause.

What is Mittelschmerz syndrome? -

→ Pain at the time of ovulation.
→ Patient with complain of cyclical pain in abdomen in mid of cycle.

DYSPAREUNIA: Pain during intercourse

If any female complains of Dysmenorrhea and Dyspareunia

↓

Always think of Endometriosis

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MENARCHE: Onset of menstruation in female

→ Age = 12-13 years

→ If menarche occurs in a female <10 years of Age = Precocious Menstruation

MENOPAUSE:

→ No more follicles in ovary

→ There is permanent cessation of menstruation.

Age- India = 47 years,
Worldwide = 51 years

If menopause occurs in female <40 years = premature menopause

Post-Menopausal Bleeding:

For menopause Diagnosis
↓
When a female does not have menstruation × 12 months
↓
In such a female any episode of bleeding after menopause
↓
is called as post-menopausal bleeding

Female comes with complain of Post-Menopausal Bleeding:

↓
Do TVS (Transvaginal Ultrasound)
↓
on TVS if Thickness of Endometrium is > 4 mm
↓
Do endometrial Biopsy

Student's Space

Amenorrhea

Absence of menstruation

Physiological
- → Before puberty
- → Pregnancy
- → Breast feeding
- → After menopause

Pathological

PRIMARY Amenorrhea
- → Means female has never menstruated
- → She has not attained menarche

Exact definition:
If a female does not menstruate by 13 years of age in absence of breast
or
If a female does not menstruate by 15 years of age in presence of breast

SECONDARY Amenorrhea
Means earlier female was menstruating normally but now there is no menstruation (for past 3 cycles (for females with regular cycles)
or
6 months (female with irregular cycles)
- → m/c cause of secondary Amenorrhea = Pregnancy

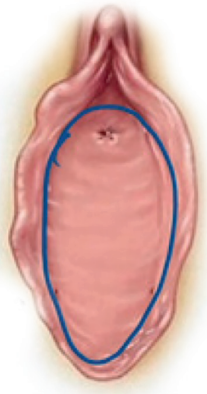
Other causes:
- → Hypothyroidism
- → Severe Anemia
- → PCOS/PCOD
- → Asherman syndrome
- → Stress, excessive dieting
- → Excessive physical exercise
- → ↑Prolactin levels

Ex: CRYPTOMENORRHEA – (Hidden menstruation) female menstruates normally but menstrual blood fails to come out after some obstruction in the passage.

Most common cause: Imperforate Hymen (no opening in hymen)

Student's Space

Hymen



Imperforate hymen

Imperforate Hymen

1. **Diagnosis:** Patient complains of pain in abdomen but no menstruation.
2. **Local examination:** Tensed, bluish and bulging hymen)

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Complication: Blood can collect in uterus (Hematometra) and vagina (Hematocolpos)

Treatment: Give crucitate (x) incision on Hymen

most common cause of Primary Amenorrhea = Turner syndrome (45×O)

2nd most common cause of Primary Amenorrhea = Mullerian Agenesis (46×x)

(Both mullerian duct are absent)

Best investigation in primary amenorrhea = Karyotyping

1°Amenorrhea best test - Karyotyping

2°Amenorrhea best test - Hormonal test

Some Important One liners:

→ Prostaglandin released during menstruation: PGF2

→ Menstrual bleeding is mainly: Arterial Blood

→ **Endometrium of uterus:**

→ Which layer of endometrium is shed at time of menstruation: Superficial layer.

→ Which layer of endometrium is responsible for regeneration of Endometrium in next cycle 4 zona basalis

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MENSTRUAL CYCLE (PART-1)

The monthly bleeding/cyclical bleeding which occurs in a female of reproductive age is called as **'Menstruation'**
→ Common language (periods)

Reproductive age 15-49 years

Menarche
↓
Onset of menstruation

Reproductive age 15-49 years

Menopause
↓
Permanent stoppage of menstrual cycle

Important points about menstruation:

- It is visible bleeding. The blood comes out from the vagina
  ↓
  Due to shedding of Endometrium
- Occurs generally at regular intervals
- It is Physiological
- Due to hormonal changes in Hypothalamic pituitary ovarian Axis

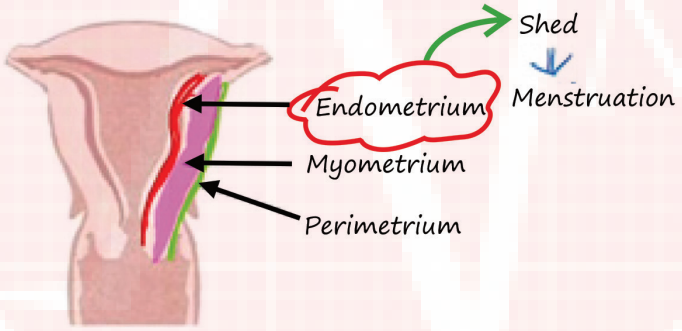


Figure: Layers of uterus

Hypothalamic Pituitary Ovarian Axis (HPO Axis)

Arcuate nucleus ← **Hypothalamus**
↓ Hormone release at time of Puberty
Gonadotropin releasing hormone (GnRH)
↓ (It is released from the hypothalamus in a pulsatile manner)
Acts on (anterior pituitary)

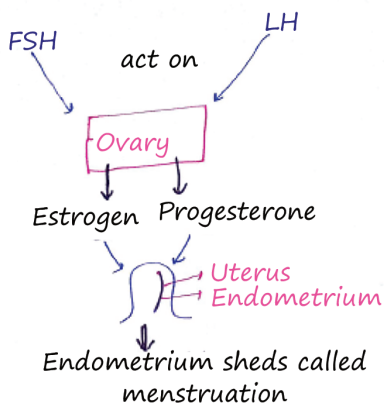
Pituitary
Anterior | Posterior

- Follicle stimulating hormone (FSH)
- Luteinizing hormone (LH)

Together called Gonadotropin

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Menstrual Cycle:

At the time of Puberty

↓

Hypothalamic pituitary ovarian axis becomes active

↓

Hypothalamus releases GnRH (Pulsatile manner)

↓

GnRH acts on Anterior pituitary

↓

First release FSH

↓

FSH acts on ovary

From the ovary it releases estrogen

Stimulate many follicles

↓

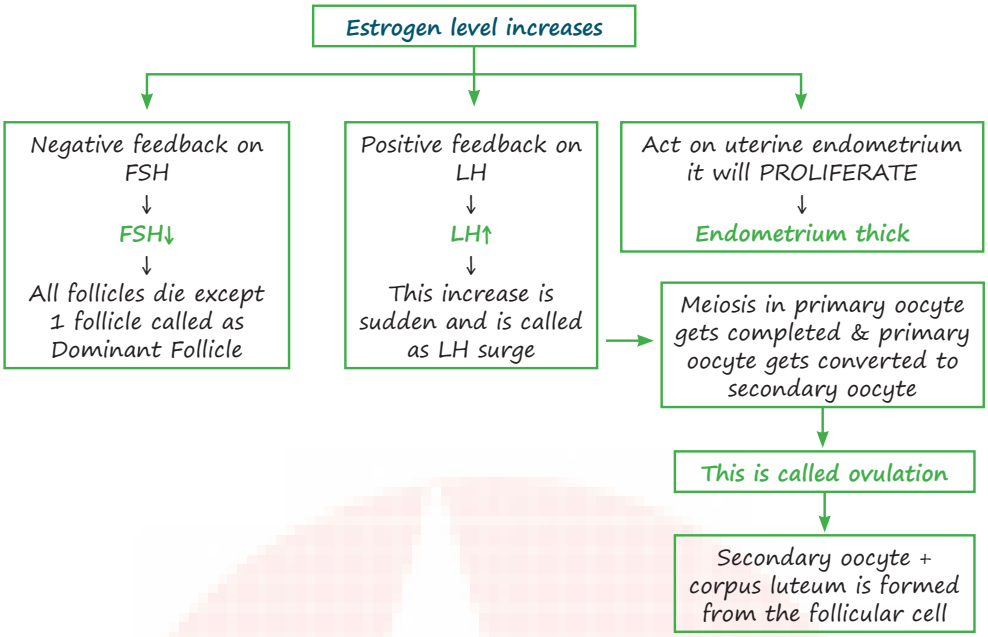
From follicles it releases Estrogen

Ovarian cycle is initiated by

↓

FSH

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Key Points:

→ Excessive estrogen
↓ lead
Very thick endometrium
↓ lead
Endometrial cancer/uterine cancer

→ This is the reason why estrogen is never given alone to any female who has uterus (as it can lead to uterine cancer)

→ Estrogen is always given along with progesterone to decrease risk of uterine cancer.

Q. Estrogen effect on → LH↑, FSH↓

Q. In menstrual cycle LH increases due to
or
In menstrual cycle LH surge occurs because of
} Estrogen

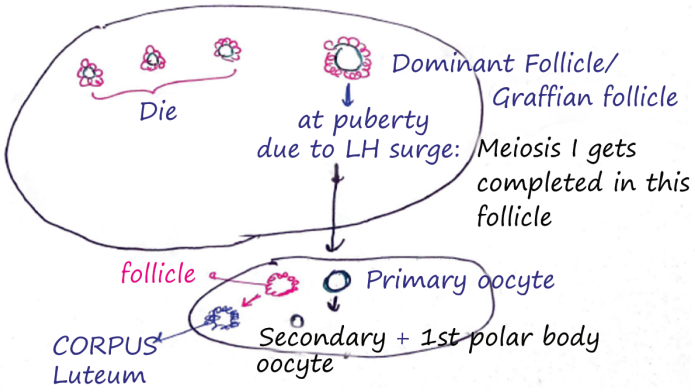
Q. Meiosis 1 is resumed because of which hormone?
↓
LH surge
or
Ovulation occurs because of = LH surge

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Q1. Corpus luteum is formed due to:- Ovulation

↓

due to LH surge

Q1. Corpus luteum is maintained by which Hormone= LH

Secondary oocyte + corpus luteum is formed from the follicular cells.

↓

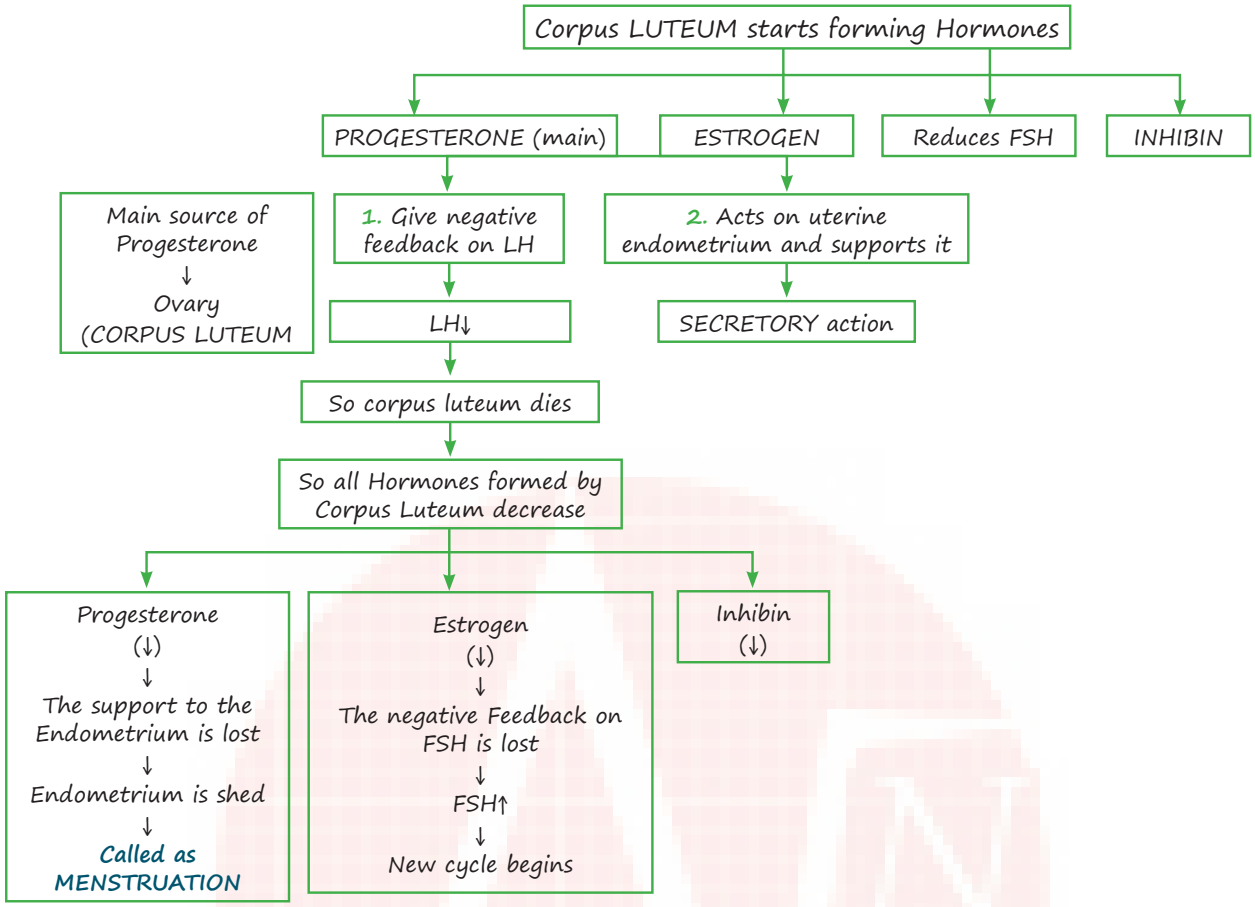
Increase in size

↓

Maximum size = 8 days after ovulation

↓

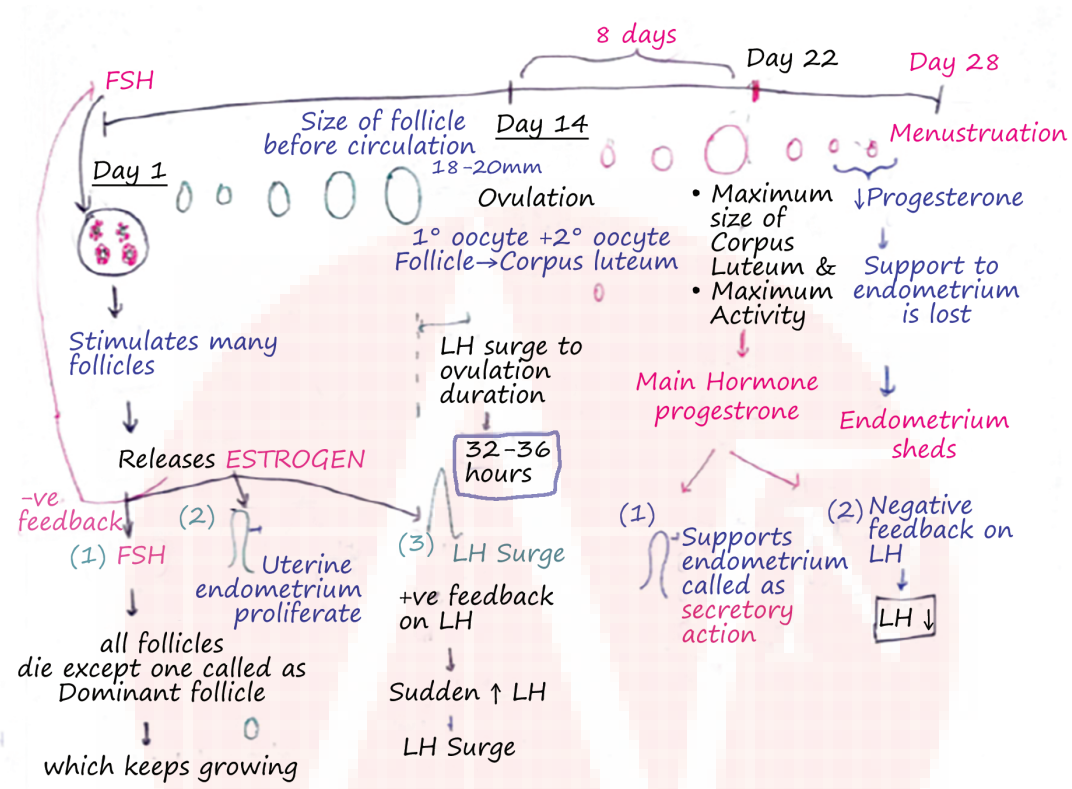
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MENSTRUAL CYCLE (PART-2)



Important one Liners

→ Ovarian cycle is initiated by: FSH

→ Estrogen is secreted by = Follicles/ovary

→ Which hormone proliferates the uterine endometrium = Estrogen

→ Estrogen effect on FSH = decreases (Negative feedback)

→ Estrogen effect on LH = increases (Positive feedback)

→ Estrogen is maximum on = Day 12 of cycle

→ LH surge is due to = Estrogen

→ Time internal between LH surge and ovulation = 32-36 hours (Best ans.)
2nd best (24-36 hours)

→ Size of follicle just before ovulation = 18-20 mm

→ Meiosis 1 is resumed due to = LH

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→ Maximum size of corpus luteum seen on:
→ Maximum activity of corpus luteum seen on:
} Day 8 after ovulation (Day 22)

→ All hormones released by corpus luteum: Progesterone, Estrogen, Inhibin.

→ Main hormone released by corpus luteum: Progesterone

→ Hormone which brings about secretory changes in Endometrium: Progesterone

→ Effect of progesterone on LH – ↓LH (negative feedback)

Corpus Luteum

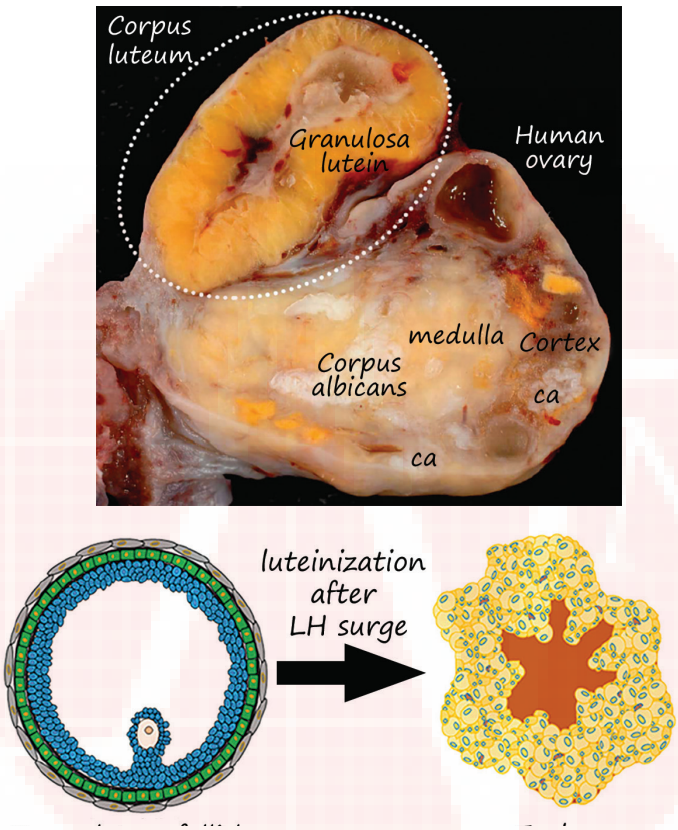
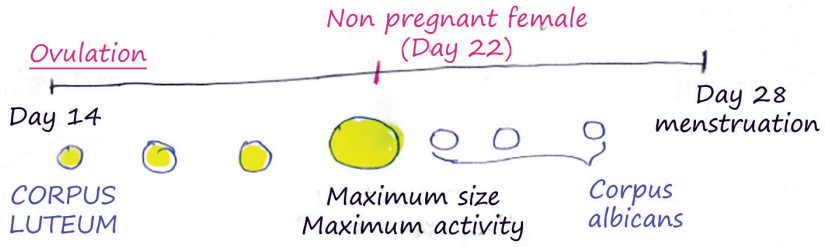
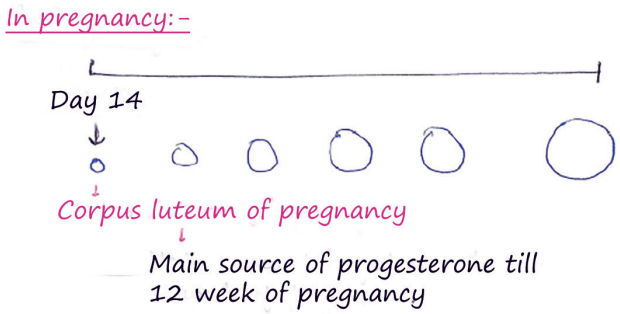


Figure: Corpus luteum

Student's Space

Fate of Corpus Luteum

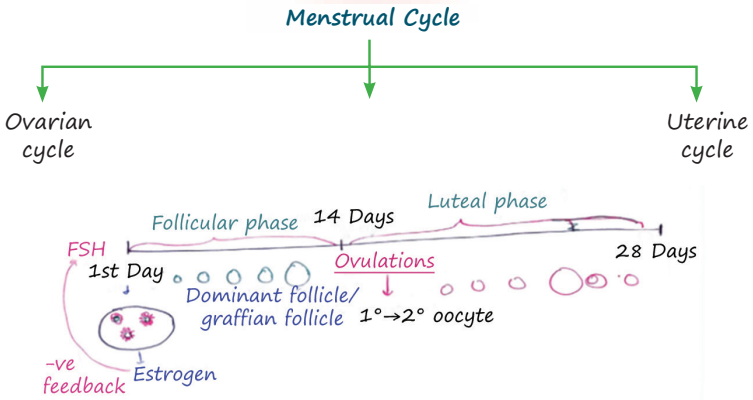




Corpus luteum in non pregnant female	Corpus luteum in pregnant female
→ Hormone which maintains = LH → Life span: 12-14 days	→ Hormone which maintains = HCG → Life span = 10-12 weeks

Progesterone

1. Source of progesterone in Non-pregnant female = Corpus luteum (ovary)
2. In a non pregnant female when will the levels of progesterone be maximum = Day 22 of cycle
3. Source of progesterone in pregnancy =
   uptil 12 weeks of pregnancy = Main source
   ↓
   Corpus luteum of pregnancy.
   After 12 weeks = Placenta
4. Which hormone maintains pregnancy: Progesterone



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Q1. Main hormone in first half of cycle = PREOVULATORY/FOLLICULAR PHASE

↓

ESTROGEN

Q2. Main hormone in second half of cycle (POSTOVULATORY/LUTEAL PHASE)

↓

PROGESTERONE

Key Concept

→ Time of luteal phase is always fixed = 14 days

→ Follicular phase can vary in different females

Q1. Day of ovulation: Calculate

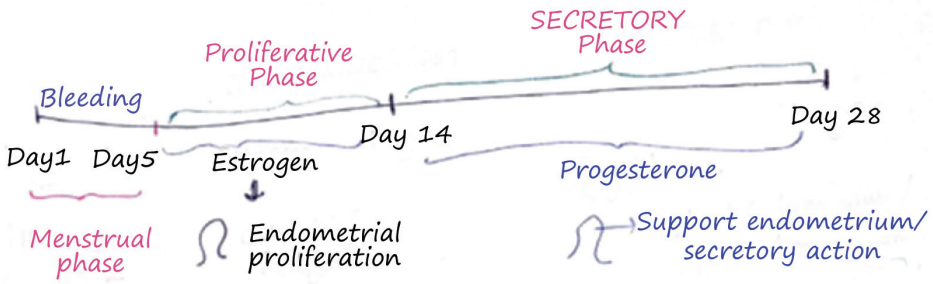
Length of cycle 14 = Day of ovulation

For eg: Cycle = 38 days: 38-14 = 24 day ovulation

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Uterine Cycle



1st half of cycle= Follicular phase = Preovulatory phase = proliferative phase

2nd half of cycle= Luteal phase = Post ovulatory phase = Secretory phase

Clinical Concept

→ For menstruation to occur: Initially progesterone level should be good so that it supports the Endometrium and then it should suddenly decrease



→ Pregnancy (9 months): No period (Amenorrhea)

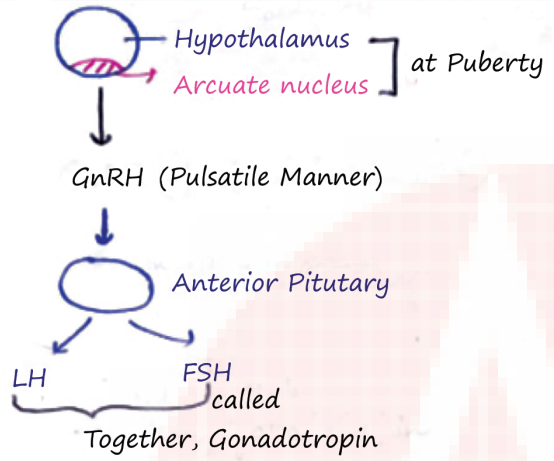


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HORMONES IN GYNECOLOGY

1. GnRH:- Gonadotropin Releasing Hormone



Factory = Made GnRH = (Synthetic GnRH) / (eg Leukrolide)

Synthetic GnRH

Pulsatile Manner
↓
Acts like natural GnRH
↓
↑LH
↑FSH
↓
↑Estrogen
↓
Uses
1. Delayed puberty
2. Ovulation induction

Continuously
↓
Acts opposite to natural GnRH
↓
LH↓
FSH↓
Estrogen↓
↓
Uses
1. Fibroid
2. Endometriosis treatment
3. Precocious puberty

2. LH & FSH (Combined name: Gonadotropin)

→ Release from Anterior Pituitary

→ Estrogen → ↓FSH

→ Progesterone →↓LH

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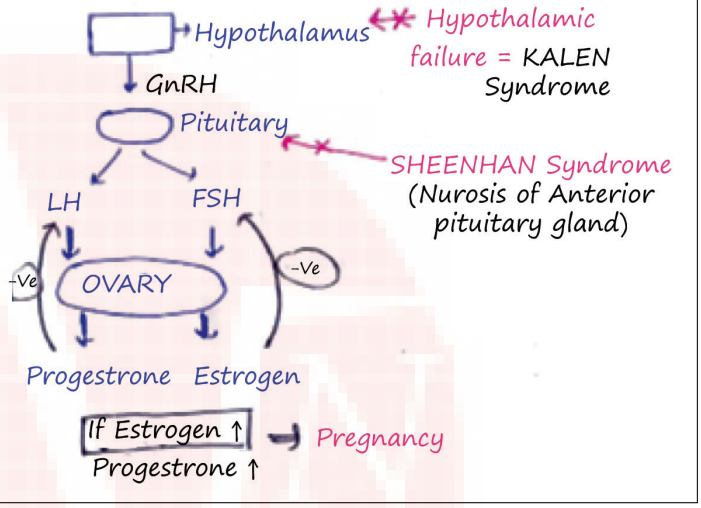
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Normal Female = FSH:LH ratio
= 1:1
In PCOS (Polycystic ovarian syndrome)
FSH: LH ratio
1:2 or 1:3
(LH↑↑↑)

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→ In a menstrual cycle what is the best time to check for LH & FSH: Day 2 or Day 3 of cycle.

FSH↑ & LH↑	FSH↓ & LH↓
Concept: → Estrogen has negative effect on FSH → Progesterone has negative effect on LH → If in any female – Estrogen & progesterone decreases ↓ LH ↑, FSH↑ **Eg.** 1. Menopause 2. Turner syndrome (ovaries = digenetic (non functional) ↓ ↓Estrogen, ↓progesterone ↓ LH↑, FSH↑	

Natural Estrogen

Source

1. Most important source = ovary → Follicular mass
2. From Puberty: Females ovary start producing — Androgens (eg (Testosterone)

Androgens
In adipose tissue (fatty tissue) — Enzyme: Aromatase
↓
Convert to Estrogen

3. Corpus luteum

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Types of Natural Estrogen = (4)

	Estrogen	Name	More common in
1	E_1	ESTERONE	In menopausal females
2	E_2 (m/c)	ESTRADIOL	In reproductive age In pregnancy most common
3	E_3	ESTRIOL	Most Specific estrogen in pregnancy
4	E_4	ESTETROL	-

Most Potent = $E_2 > E_1 > E_3 > E_4$
↓
Least Potent

Synthetic Estrogen

1. Most common synthetic Estrogen used in pill (OCPs) = ETHINYLESTRADIOL





2. Based on the amount of Estrogen, OCP's are classified as:

- High dose pills: Estrogen ≥ 50µg
- Low dose pills: Estrogen < 50µg (30-35µg) of Estrogen
- Very low dose pills: Estrogen is less than ≤ 20µg

Natural Progesterone

Source: Non Pregnant: Corpus Luteum
Pregnant → Corpus Luteum of pregnancy (10-12 week
→ Placenta (after 12 weeks)

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Progesterone is:

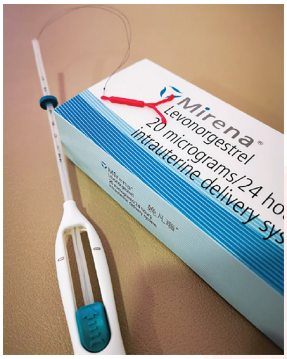
1. Main hormone for Menstruation
2. Hormone used — to delay periods; to during about periods
3. Main hormone during pregnancy

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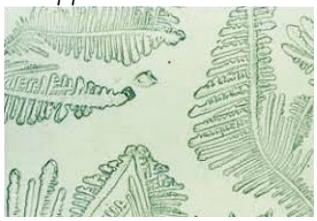
Synthetic Progesterone:- eg Levonorgestrel

- Estrogen + Progesterone → OCP's
- Progestogen only pill → MINIPILL
- Progesterone injection
- Progesterone → MIRENA

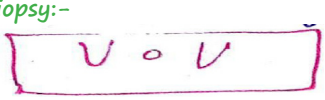






Actions of Estrogen	Actions of Progesterone
Actions on uterus:-  → Uterus endometrium → Proliferate	**Action on uterus:-**  → Uterine Endometrium → Support (called as secretory action)
Actions on cervix:- Cervical mucus: becomes thin, watery, abundant elastic (it can be stretched between fingers - called as Spinnbarkeit) → When seen under microscope → It gives a FERN like appearance   	**Actions on cervix:-** Cervical mucus becomes Thick Viscous Scanty Not elastic (cannot be stretched between fingers) → When seen under microscope no fern like appearance seen → **Ferning is about**

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Actions of Estrogen	Actions of Progesterone
Endometrial biopsy:-  Glands are straight, tubular simple	**Endometrial biopsy:-**  Glands are curved complex called as CORKSCREW gland & is filled with secretion
Estrogen ↑ High density lipid (good fat) ↓ Low density lipid (bad fat) → Estrogen is cardioprotective → Young female donot have heart disease	**Progesterone** ↑ High density lipid ↓ High density lipid → Androgens also have same action
Estrogen increases clotting factors ↓ So 1. Hormone replacement therapy or oral contracenptive pills should never be given to a female with thrombosis 2. Estrogen increases bone mass	**Progesterone:-** → It is a smooth muscle relaxant (uterine contraction decreases) ↓ It is used to prevent abortion & preterm labor → Progesterone increases the body temperature of a female by 0.2 to 0.5°c

Drugs Related to Estrogen

- Selective estrogen receptor modulator drugs (SERM) (Acts as estrogen agonist on some tissues & as estrogen antagonist on some other tissues)
  - SREM
    1. CLOMIPHENE citrate
       ↓ To being
       Use: Ovulation
    2. TAMOXIFEN
       Use: Breast cancer treatment
       Problem: Uterine cancer (Endometrial cancer)
    3. RALOXIFENE
       Use: Treatment of osteoporosis
       Problem: Hot flushes
- Drugs which decrease estrogen in body
  - **Dominos:** Danazol
  - **Pizza:** Progesterone
  - **Got:** GnRH (Continuous dose)
  - **Late:** LETROZOLE

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Drugs Related to Progesterone

The drug which decreases progesterone (progesterone antagonist)

MIFEPRESTONE (RU486) → Used for Medical Abortion

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FERTILIZATION AND IMPLANTATION (PART-1)

Fertilization: (00:04:55)

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Figure: Zygote formation

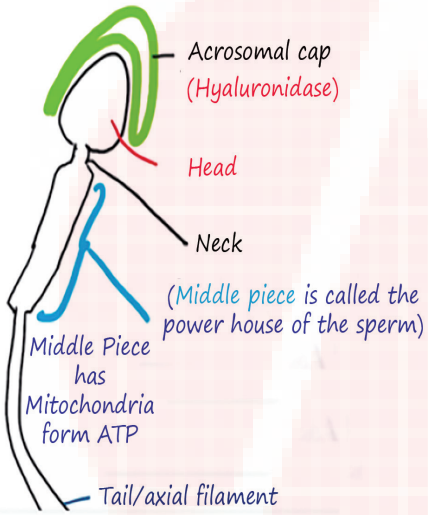


Figure: Parts of Sperm

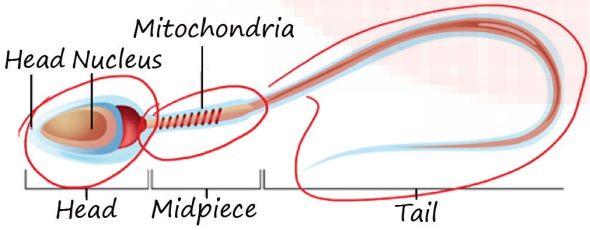


Figure: Sperm cell anatomy

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Sperm: Male Gamete: (00:08:42)

Student's Space

→ Chromosome no:- Haploid no. of chromosome

$$\left(\frac{\text{Diploid}}{2}\right) = \frac{46 \text{ (Human cells)}}{2} = 23$$

- 22 + X
- 22 + Y

→ Size: 50 microns

→ Fertilizable span:- 48 hours - 72 hours

22 + x
22 + y

→ Sperm is formed by:

- spermatogenesis
  - Begins at puberty
  - Time taken for spermatogenesis 70-75 days

→ What is process by which sperm released = **Ejaculation**

→ The process by which sperm attain capacity to fertilize ova ⇒ **Capacitation**

Capacitation: (00:14:34)

→ Ability of sperms to fertilize ova

→ Occurs in female reproductive tract

→ Begins in:- CERVIX

→ Majority of capacitation occurs in - Fallopian Tube

→ Time taken by capacitation → 2 to 6 hours

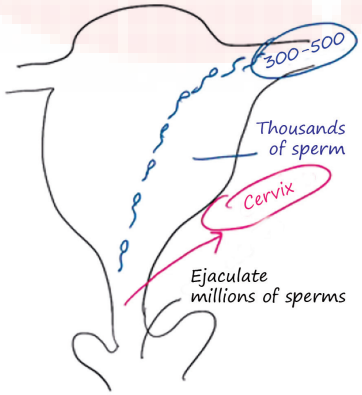


Figure: Capacitation

OOGENESIS: (00:18:49)

(Begins in Intrauterine life)

Oogonia (1 germ cell) → **Germ cell**
Derived from
EPIBLAST (Best answer)
ECTODERM (2ND BEST)

(46 xx)
(44 + xx) **MITOSIS**

Primary oocyte
(44 + xx) →
1. Till puberty the primary oocyte in arrested state remains in ovary
2. Primary oocyte get surrounded by follicular cells of ovary and this structure is called PRIMODIAL follicle.

Arrest is over at puberty
↓
due to LH Surge

Start **meiosis:-** gets arrested in **PROPHASE**

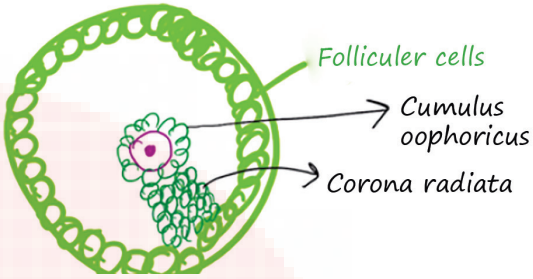


Figure: **PRIMODIAL follicle**

23x + (23 (x)
1st Polar Body
Secondary oocyte

→ Release of Secondary oocyte from Primary oocyte is called ovulation

Start undergoing meiosis II
But Meiosis II gets arrested in **METAPHASE**

Meosis II completed at the time of fertilization

Female Pronucleus

Second Polar Body Released

Coronona radiata

Structure of 2° oocyte

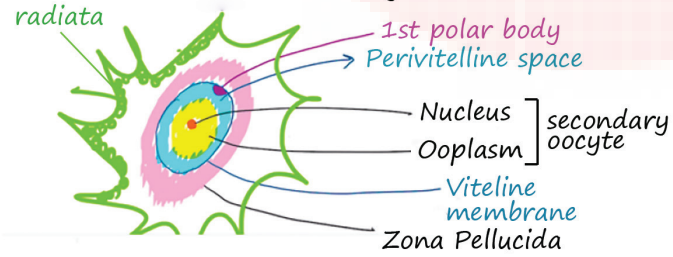


Figure: Sturcuture of Secondary oocyte

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Important Points on Oogenesis and Ova: (00:36:19)

→ Oogenesis = begins in intrauterine life

→ 1st meiotic division
- arrested = in PROPHASE
- arrest is over = Puberty

→ Ovulation - Release of secondary oocyte from primary oocyte

→ Ist polar body released at the time of ovulation

→ 2nd meiotic division
- arrested in METAPHASE
- arrest is over : at the time of fertilization

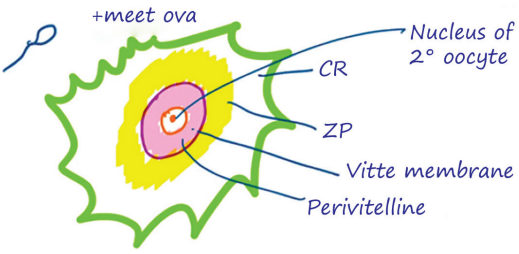
→ 2nd polar body released at the time of fertilization.

→ Size of ova = 120-130 microns (largest cell in body)

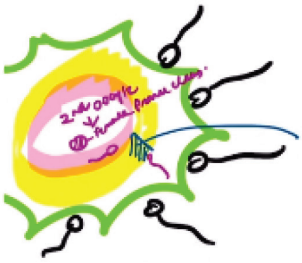
→ Fertilizable span of ova: 12-24 hours

→ Maximum number of follicles seen: 5th month of intrauterine life
(20 weeks of intrauterine life)

Fertilization Process: (00:40:24)



300-500 sperms attack to (Corona radiata)



⇓ Hyaluronidase released

⇓ CR

⇓ Zona Pellucida

⇓ Acrosomal reaction

ZP3 (ZP1, ZP2, ZP3)

Zona Pellucida → ZP3 (ZP1, ZP2, ZP3)

→ Zona pellucida → has protein receptor → ZP3 receptor

Student's Space

→ Function of zona pellucida:-

Allows entry of single sperm and **prevents POLYSPERMIA**

↓

SINGLE SPERM ENTERS ZONA pellucida
(with help of ZP3 receptors)

↓

Reach the perivitelline space

↓

2nd meiotic division is completed and
secondary oocyte

- Female Pronucleus
- 2nd Polar body release

→ **Sperm + Female pronucleus → meet → called as**

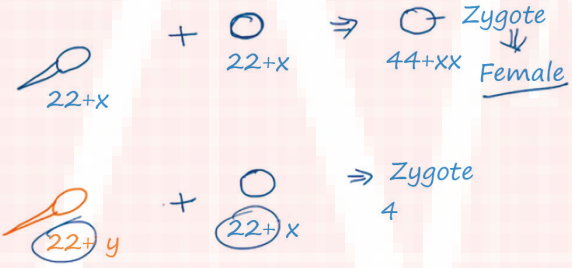
FERTILIZATION

↓

Single cell ZYGOTE

↓

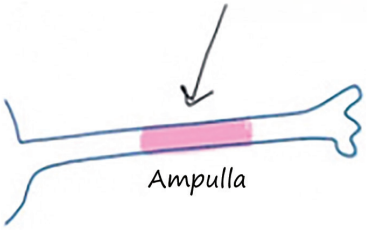
Sex decided



→ Sex of Body is decided by Father (sperm)

Important Point on Fertilization: (00:57:06)

→ Site of fertilization → Ampulla of Fallopian Tube → Zygote is formed



↓

Zygote (Single celled)

↓ After 30 hours of fertilization

4 celled Zygote ← Blastomere → 2 celled Zygote

↓

8 celled

↓

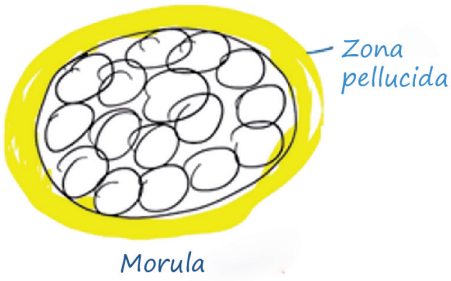
16 celled Zygote (MORULA)

→ When did fertilization happened = Day 14 of cycle

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Structure of Morula



Q. Early zygote from where does it get nutrition → Fallopian Tube

↓

3 Types of Cells

Ciliated columnar cells	Secretory cells	PEG cells
↓	↓	↓
Cilia pushes zygote towards uterine cavity	Provide nutrition to Zygote	Function not known

Q. Till how much time will Morula remain in fallopian tube = Till 3 days after fertilization

→ On 4th Day after fertilization → Morula enters the uterine cavity

↓

1. How does a Morula enter uterine cavity?
   - → Movement of cilia
   - → Peristalsis in tube
2. If Morula doesn't enter the uterine cavity and gets implanted in the tube then it is called:
   - → ECTOPIC Pregnancy
3. In which form does Zygote enter uterine cavity:-
   - → MORULA
   - → 16 celled stage zygote
   - → 16-64 cell staged zygote)
4. When does Morula enter Uterine cavity:-
   - → 4th day after fertilization
   - → 18th day of the cycle



Student's Space

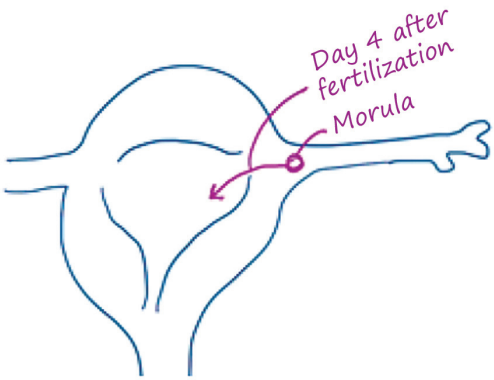


Figure: Morula entering uterine cavity

When Morula enters uterine cavity it gets filled with fluid

↓

Now Murula is called **BLASTOCYST**

↓

On Day 5 after fertilization: Zona pellucida is lost

Structure of blastocyst

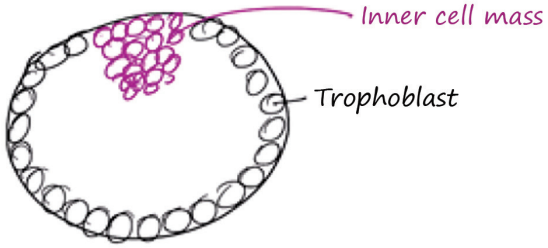


Figure: Structure of Blastocyst

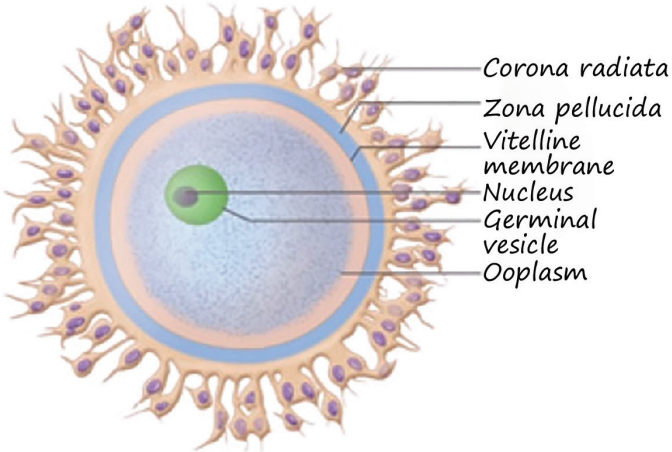
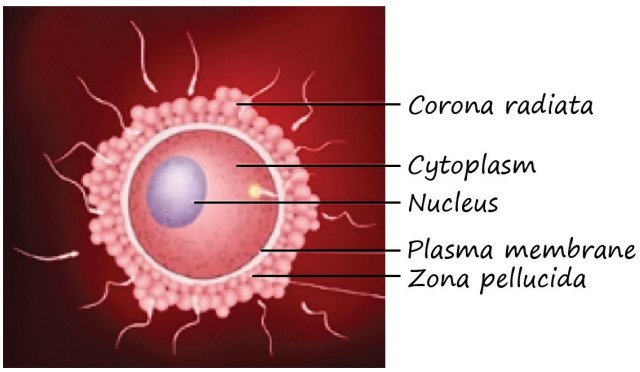


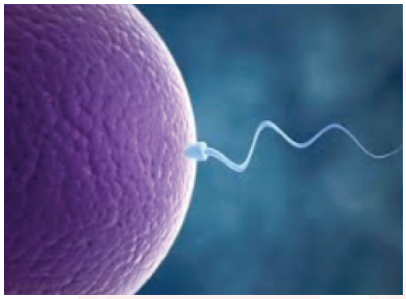
Figure: Image of Secondary Oocyte

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FERTILIZATION





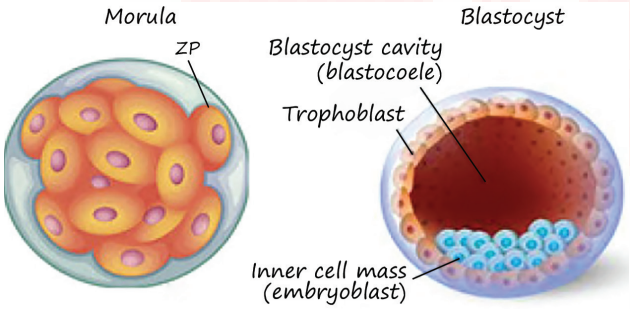


Figure: MORULA and BLASTOCYST

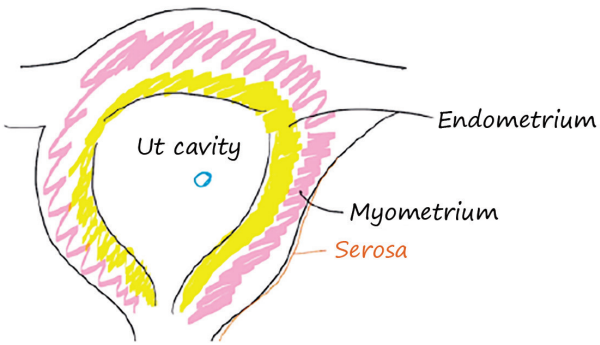


Figure of Uterus ⇒ Implantation

Student's Space

Implantation: (01:21:39)

Attaching of Blastocyst to the endometrium is called Implantation.

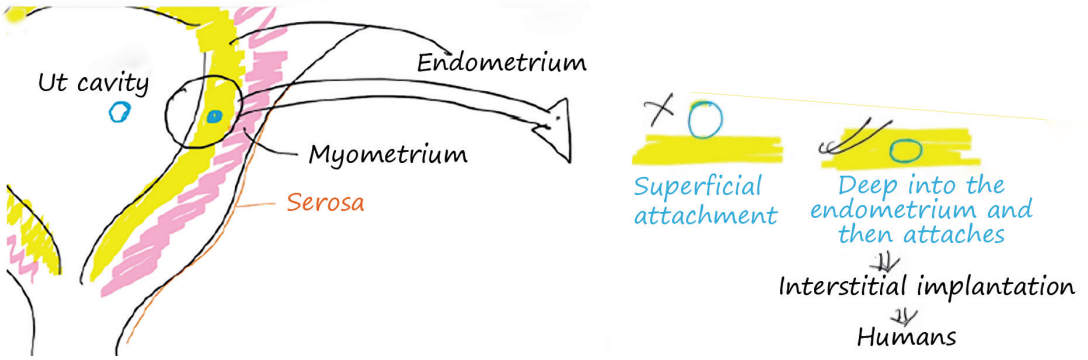
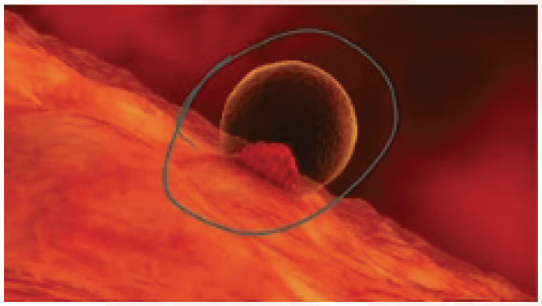


Figure: Interstitial Implantation

→ Type of Implantiation occurs in humans: INTERSTITIAL IMPLANTATION

→ **Means:-** Blastocyst goes deep inside the endometrium and then implants



→ **The limit of penetration of Blastocyst into the Endometrium is decided by**

↓

NITABUCH's LAYER

→ After implantation Endometrium is called

Decidua (Pregnant Endometrium)

↓

As it sheds after delivery

→ Which hormone converts Endometrium to Decidua

↓

Progesterone

Hormone Responsible for Decidual Reaction: PROGESTERONE

→ **Implantation occurs in form of - BLASTOCYST**

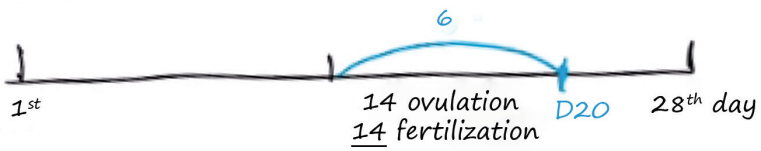
→ Implantation begins by: Day 6 after fertilization

Day 20 of cycle

Student's Space

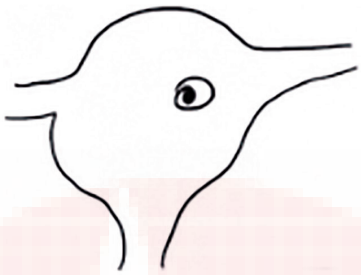
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→ Implantation is completed by: Day 10 after fertilization

→ Most common site of Implantation: Posterior wall of upper part of uterus (NOT FUNDUS)



→ At the time of Implantation in some female bleeding occurs

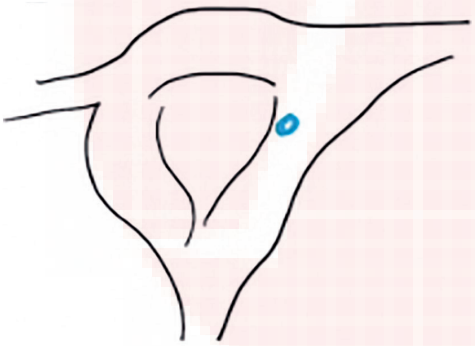
↓

HARTMAN SIGN

↓

Roughly corresponds to time of actual period

Due to eccentric implantation (i.e. it occurs on side of uterus)



1. PISKACEK Sign

   ↓

   asymmetrical enlargement of uterus in early pregnancy
2. Gestational sac on USG is visible on one side

   ↓

   eccentric

True gestational sac → ECCENTRIC (Seen in Intrauterine pregnancy)

Pseudo gestational sac → CENTRALLY LOCATED (seen in ectopic pregnancy)

Student's Space

FERTILIZATION AND IMPLANTATION (PART-2)

DECIDUA (0:36) Pregnant Endometrium is Decidua (00:00:36)

→ After implantation is complete

3 Types of Decidua

DECIDUA BASALIS
↓
→ The Decidua Which Separates Blastocyts from myometrium
→ Decidua which forms maternal side of Placenta

DECIDUA CAPSULARIS
↓
Decidua which separates Blastocyst from uterine cavity

DECIDUA PARIETALIS (Decidua Vera)
↓
Remaining endometrium of the entire uterus

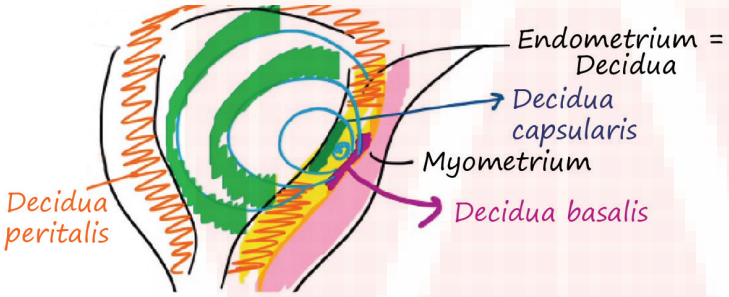


Figure: Uterus

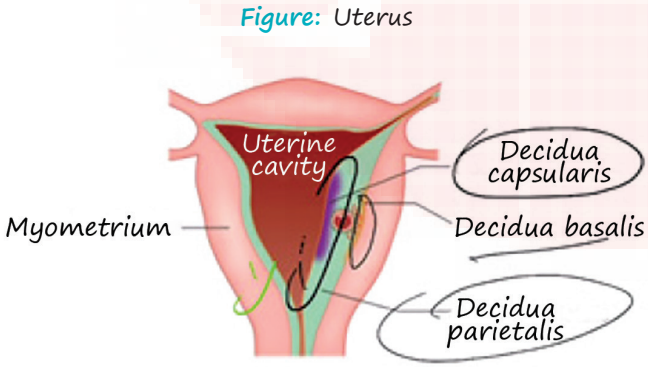


Figure: Decidua Types

Q1. When do Decidua parietalis and capsularis fuse with each other:- 14-16 weeks/4months

Q2. When is uterine cavity is obliterated: 14-16 weeks/4 months

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Further development of blastocyst

- Trophoblast
  - Day 8 after fertilization
    - Single cell layer → Cytotrophoblast
      - Near decidua basalis → Cytotrophoblast forms villi like structure → Chorion frondosum → Forms fetal side of placenta
      - Rest everywhere else it remain smooth → Form Chorion laeve → Forms Chorion (fetal membranes)
    - Multicellular layer → Syncytiotrophoblast → Hormone factory of placenta:- hCG, HPL
- Inner cell mass → Pluripotent stem cells
  - Day 8 after fertilization
    - Ectoderm (Day 7)
    - Endoderm (Day 8) → Bilaminar disc → On day 12 after fertilization 2 cavities will appear → Cavity formation → Days 14: 3rd layer mesoderm is formed

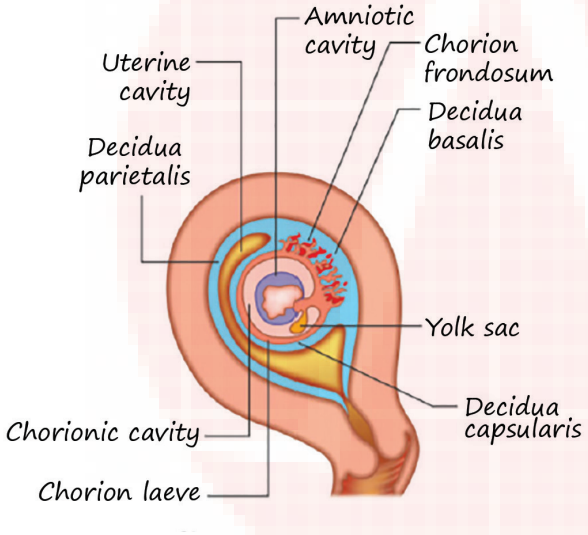


Figure: Decidua tramsueve sections (A)

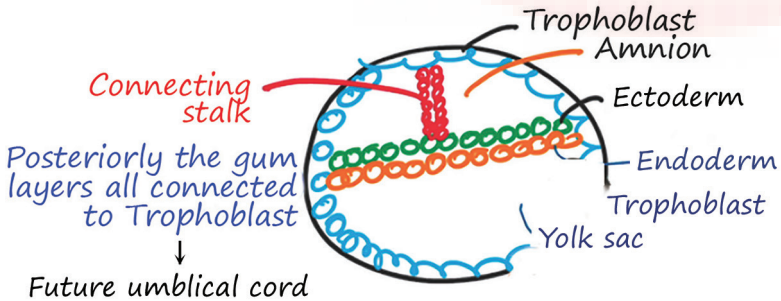


Figure: Connecting stalk formation

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Function of Cytotrophoblast

1. Forms fetal side of Placenta
2. Form CHORION (fetal Membrane)
3. If prevents pregnancy-Induced Hypertension (PIH)

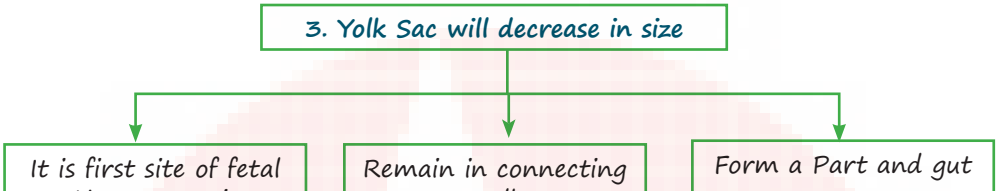
Posteriorly the gum layers all connected to Trophoblast

↓

Forms Future Umbilical Cord

Later on:-

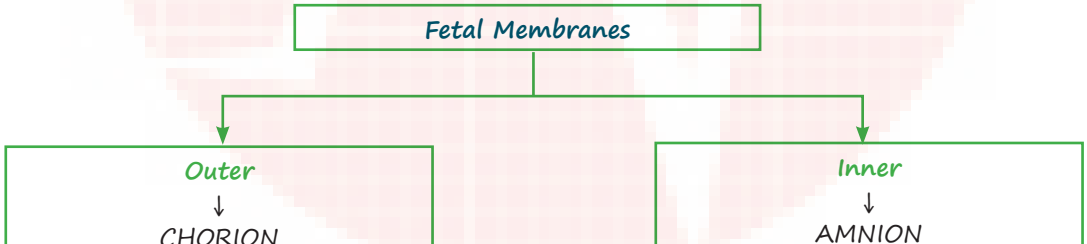
1. Connecting stalk - form umbilical cord.
2. Amniotic cavity increases in size

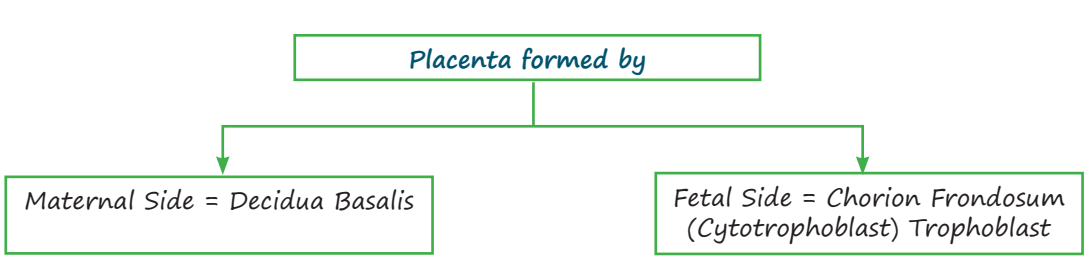


4. The entire fetus is formed by the 3 germ layers
5. Embryo looks like human: at 8 weeks

Single Liners (00:39:37)

→ Ecotdrem is formed by:- Day 7 after fertilization
→ Endoderm is formed by:- Day 8 after fertilization
→ Mesoderm is formed by:- Day 14 After fertilization
→ hCG and HPL formed by:- Synctiotrophoblast





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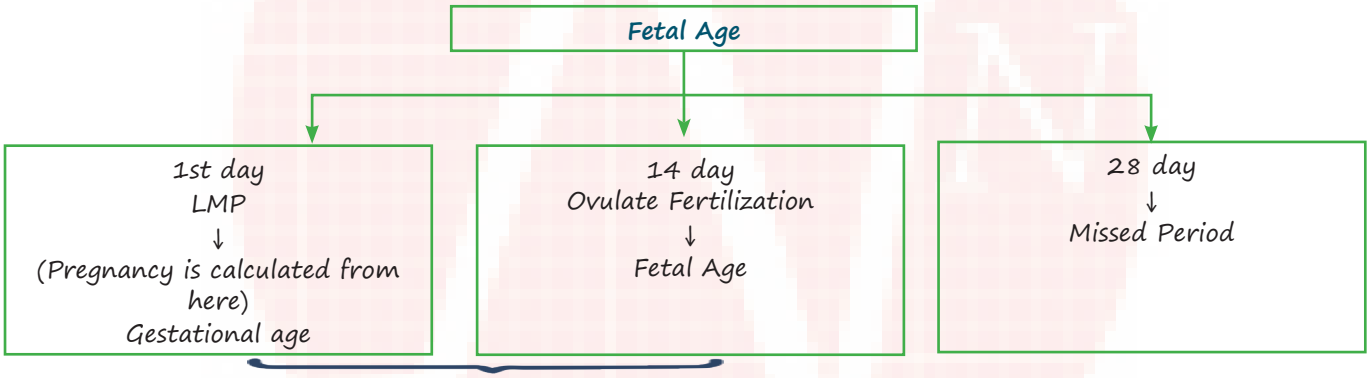
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Derivatives of Germ Layers (43:10)

	Ectoderm	Mesoderm	Endoderm
Linings	Oral mucosa lining Nasal epithelium lining Anal lining	Cavities lining (Peritoneal, Pericardial, Pleural)	Visceral lining (Bladder, Urethra, GIT, Respiratory lining
Organs	CNS PNS Pituitary Adrenal Medulla	Mnemonics CORONA= Adrenal cortex Hum = Heart Sabko= Suprarenal gland Kitna = Kidney Rulayega = Reproductive organ	GI Organs
Appendages	Epidermis of the skin Nails Hairs Sweat Glands Sebaceous glands	Bones Cartilage Muscle	X

Important concept - Gestational age = Period of Amenorrhea = Period of Pregnancy

Vs



Difference = 2 weeks

Fertilization Age + 2 Weeks = Gestational Age

Cardiac activity is seen on day 21 after fertilization or 5 weeks gestational age

Student's Space

PLACENTA (PART-1)



Human placenta can be described by the 3 terms:

1. Discoid	2. Deciduate	3. Haemochorial
Disc like in shape	Means It has to shed after delivery	It lies in contact with maternal blood.

Placenta has 2 surfaces

→ Placental surface

→ Maternal surface

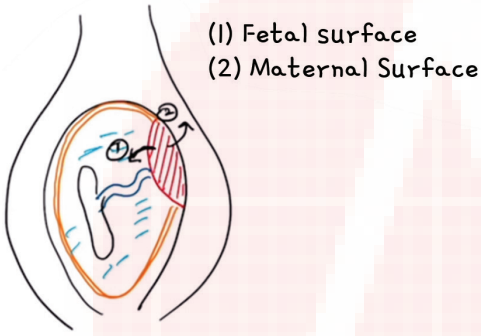


Fig. Placental & maternal surface

→ In a placenta maternal surface & fetal surface occupy the same area on uterus wall.

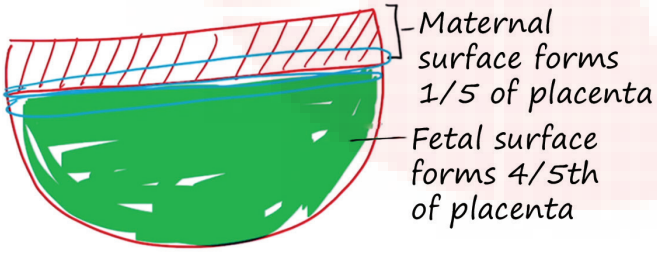


Fig. Division of placenta within Fetal & maternal Surfaces

→ Maternal surface forms 1/5 of placenta.

→ Fetal surface forms 4/5 of placenta.

→ Maternal surface is formed by DECIDUA BASALIS (also called Basal Plate)

→ Fetal surface is formed by Chorion frondosum (also called Chorionic Plate)

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How is Placenta Formed? (00:07:11)

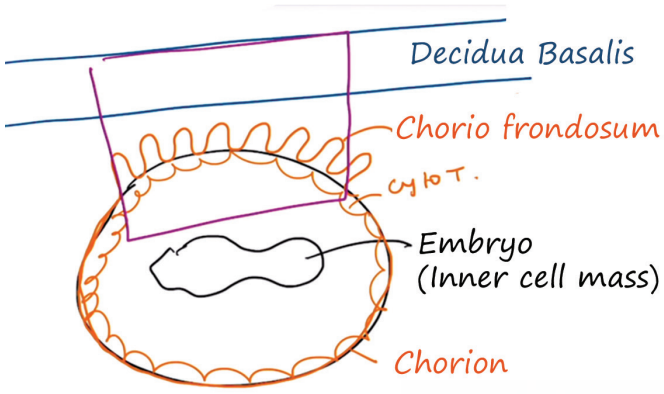


Fig. Placenta

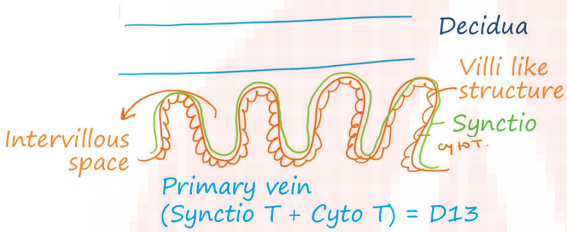


Fig. Primary villi formation (Day 13)

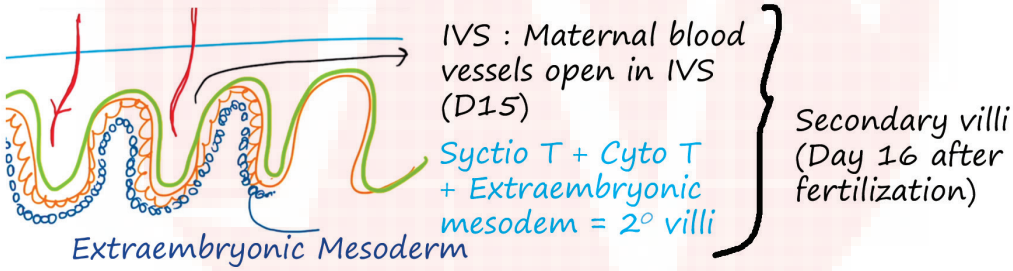


Fig. Secondary villi (Day 16 after fertilization)

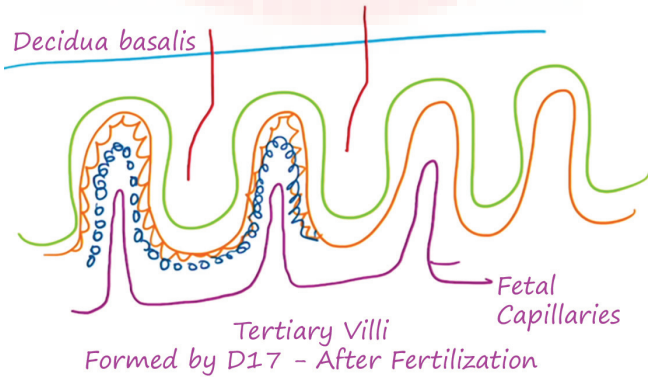


Fig. Tertiary villi (Day 17 after fertilization)*

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DuHa = D_{17} - D_{21}

Now = D_{17}

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Important Points: (00:19:21)

1. Placenta has a number of villi.
2. In between the villi = Intervillous space is present
3. In villi - volume of fetal blood = 350 mL
4. In Intervillous space there is maternal blood = 150 mL
   Total volume of Placenta = 350 ml + 150 ml = **500 mL**
   Weight of placenta = 500 g
5. How many spiral Arteries (maternal blood vessels) in intervillous space

   ↓

   120/(120 - 200)

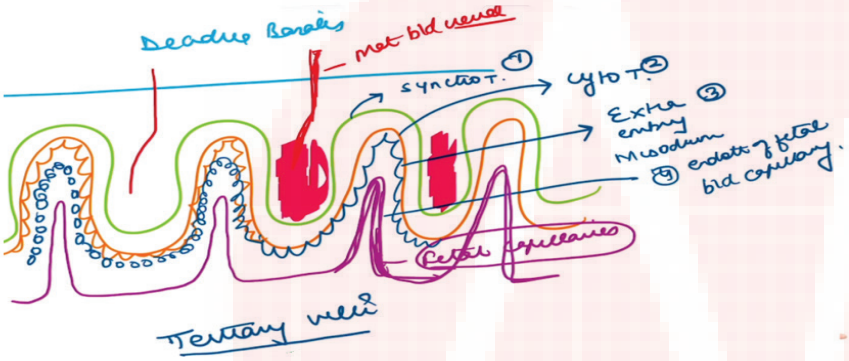


Fig. Layers separating fetal & maternal Blood

6. In placenta both maternal blood &fetal blood are present but they do not mix with each other.

   The structures which separate maternal blood from fetal blood. (From outside to Inside)

   1. Synctiotrophoblast
   2. Cytotrophoblast
   3. Extraembryonic mesoderm
   4. Endothelium of fetal blood capillaries.

   } Together they are called placental membrane/ Barriers.

7. Maternal blood vessels open in intervillous space on } Day 15 after fertilization (New concept)
   Uteroplacental circulation is established by } (Day 12 is old concept)
8. Primary villi is formed by : Day 13
   Secondary villi is formed by : Day 16
   Tertiary villi is formed by : Day 17
   1. Tertiary villi is formed by
   2. Fetal blood vessels open in villi by
   3. Feto-placental circulation is established by

   } Day 17
   Second best answer **Day 17 - 21**

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Important Concept (00:38:17)

→ Maternal blood in Intervillous space is rich in O_2, glucose

→ Fetal blood in villi it has CO_2 & excretory material from the fetus.

→ **Placenta transfers :** O_2 & nutrient from maternal blood to fetus & it transfers CO_2 & excretory products to the mother.

→ **↑Function of placenta:** Exchange of material (O_2, CO_2, nutrients, excretory products) between matemal blood & fetal blood.

Simple Diffusion	facilitated diffusion GLUT-1	Active Transport (against conctration gradient)	Direct transport
O2 CO2 Waste product Na+ Cl-	Glucose	Fe Ca Proteins water Soluble Vitamins	Fat soluble vitamins Lipids

→ O_2 is supplied to fetus at : 8 ml/kg/min

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Student's Space

PLACENTA (PART-2)



Placenta at Term

1. Weight of placenta at term: 500 g
2. Ratio of weight of placenta: wt of fetus at term
   500 g : 3 kg (3000 g)
   (1 : 6)
3. When is weight of placenta = Weight of fetus = 17 weeks of pregnancy
4. Placenta starts forming by: 6 weeks and completed by 12 weeks.
5. To locate the placenta best time to do USG is 3rd trimester
   - → Pregnancy = 40 weeks
   - → 1st trimester : 13 weeks + 6 days
   - → 2nd trimester : 14 weeks → 27 weeks + 6 days
   - → 3rd trimester : 28 weeks - 40 weeks

Clinical Question

1. A 22 year old pregnant o+: has previous H/O of placenta previa. She is 12 weeks pregnant now and is worried about again having placenta previa. As a nursing professional. What advice will you give regarding USG FOR LOCALIZATION OF placenta?
   a. Immediately
   b. 20 weeks
   c. 24 weeks
   d. 32 weeks

Ans: 32 weeks (3rd trimester)

→ **Histology:-** Placenta has **Hoffbacur cells** (Phagocytic cells)

Dimensions

Diameter 15-20 cm

→ Thickness
- → Average thickness = 2.5 cm
- → <axo,i, tjoclmess = 4 cm
- → It is thickest in centre

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It placenta is > 4 cm Thick. It is called PLACENTOMEGALY seen in:

→ Twin pregnancy

→ Diabetes

→ Rh negative pregnancy

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Term placenta

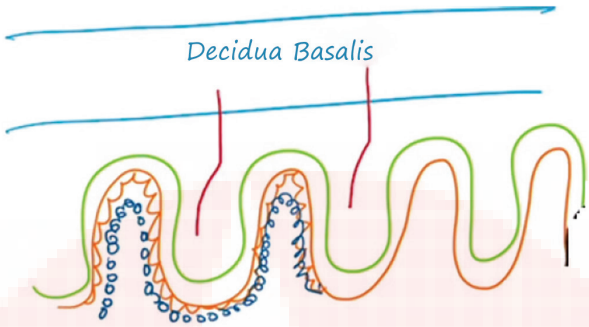


Figure: Term placenta

Figure: A and B (16:50) → (Maternal and Fetal Surface)

Maternal Surface	Fetal Surface
1. Formed by Decidua Basalis 2. Also called Basal Plate 3. Forms 1/5th of placenta 4. Dull red in colour 5. Membranes and cord are not attached 6. It has polygonal area called LOBES further divided into LOBULES/COTYLEDONS ↓ Called as functional unit of placenta	1. Formed by chorion Frondosum 2. It is also called chorionic plate 3. Forms 4/5th of placenta 4. Fetal surface is shiny, grey in colour 5. It has umbilical cord (attached to its centre) & membranes attached to it.

Cotyledon

1. It is functional unit of placenta
2. Total number = 15-20
3. What is a cotyledon? → That area of placenta, which has/stem villi and its all branches

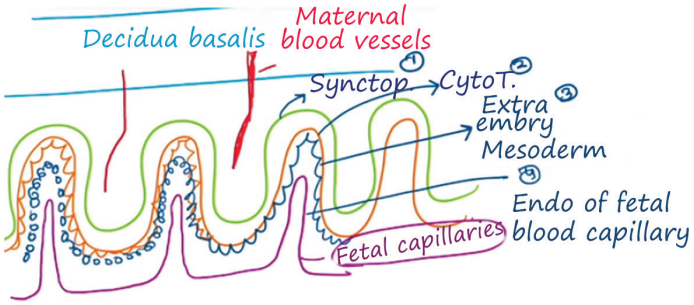


Figure: Cotyledon/new concept

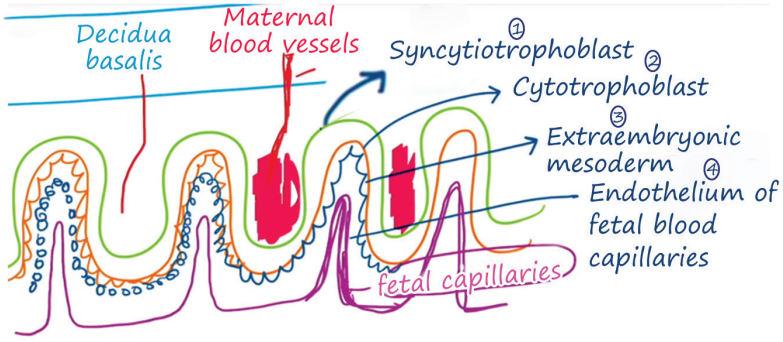
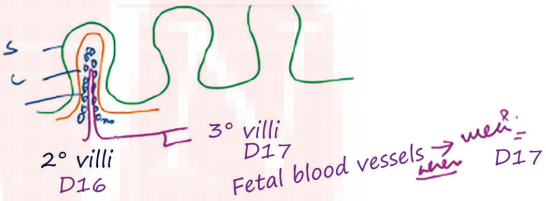


Figure: Cotyledon

Placental Circulation

Uteroplacental Circulation (mother → Placenta)	Fetoplacental Circulation (Fetus → Placenta)
1. It is present in Intervillous space 2. Volume of blood = 150 mL 3. Uteroplacental circulation is established by Day 15 after fertilization Q. Uteroplacental blood flow at term } 500-750mL/min Intervillous space blood flow at term Q. Uteroplacental blood flow at term:- 750 mL/min Q. In Intervillos space how many times blood is replaced in 1 min → **3-4 times** Q. How many spiral arteries (uterine arteries) open in Intervillous space:- 120 (Best answer) 120-200 (2nd Best answer)	1. Present in villi 2. Volume of fetal blood in villi = 350 mL 3. Fetoplacental circulation is established b Day 17 (Day 17-21) 4. Fetoplacental blood flow at term:- 400 mL/min 5. Fetoplacental circulation is through  *Figure:* (38.07) Fetoplacental circulation

Umbilical Vein	Umbilical Artery
→ Carrier oxygenated blood from placenta to fetus → O_2 saturation = 70-80% Pressure = 10 mm of Hg → **Rementant in adult:** Ligamentum Teres	→ Brings back deoxygented blood from fetus to placenta. → O_2 saturation = 50-60% → Pressure → 60 mm of Hg → **Rementant in adult:** Medial Umbilical ligament

Important One Liners

→ Ig which can cross placenta:- IgG

→ Ig which is present in breast milk/colostrum = IgA

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Important Concept:-

(Figure: 43:29) Nutrient transparot between mother and fetal blood

Suppose if there is any condition like (PIH) Pregnancy induced Hypertension;

↓

Maternal blood flow↓

↓

Uteroplanetal Insufficiently → Maternal blood flow in Intervillous space↓

↓

Less nutrients will reach fetus

↓

Less growth of fetus

↓

IUGR Intrauterine growth Restriction

Placenta at Term

1. Weight of placenta at term: 500 g
2. Ratio of weight of placenta : wt of fetus at term

   500 g : 3 kg (3000 g)

   (1:6)
3. When is the weight of placenta = weight of fetus = 17 weeks of pregnancy.
4. Placenta starts forming by : 6 weeks & completed by 12 weeks.
5. To locate the placenta best time to do USG is 3rd trimester

Pregnancy = 40 weeks

1st trimester = 13 weeks + 6 days

2nd trimester = 14 - 27 weeks + 6 days

3rd trimester = 28 - 40 weeks

Clinical Question:

1. A 22 year old pregnant lady has previous H/O of placenta Previa. She is 12 weeks pregnant now & is worried about again having placenta Previa. As a nursing professional. What advice will you give regarding USG for localization of placenta?
   a. Immediately
   b. 20 weeks
   c. 24 weeks
   d. 32 weeks

Ans. d. 32 Weeks (3rd trimester)

Histology (00:11:29)

Placenta has **Hoffbaeur cells** (Phagocytic cells)

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Dimensions (00:12:06)

Diameter	15-20 cm
Thickness	→ Average Thickness = 2.5 cm → Maximum Thickness = 4 cm → It is thickest in centre

→ If placenta is>4 cm Thick. It is called as **placentomegaly** seen in :-

- → Twin Pregnancy
- → Diabetes
- → Rh negative pregnancy

Term Placenta

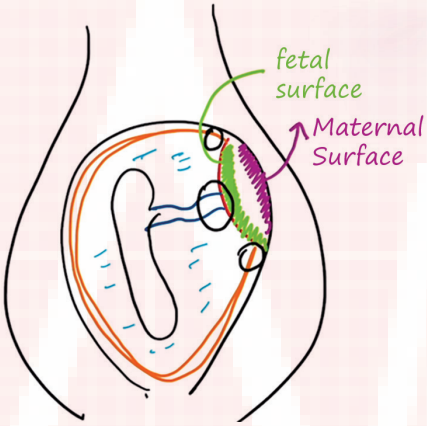
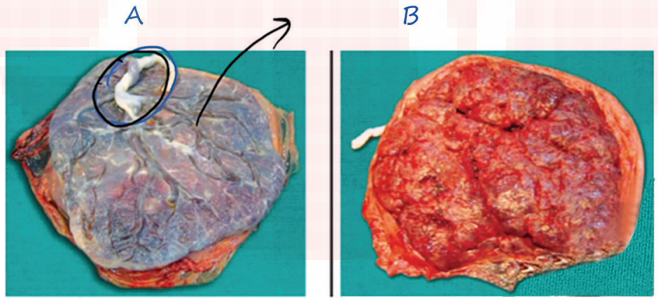


Figure: Term placenta



Figures A and B: A. Fetal Surface; B. Maternal surface

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Maternal surface	Fetal surface
1. Formed by Decidua Basalis 2. Also called Basal plate 3. Forms 1/5th of placenta 4. Dull red in colour 5. Membranes & cord are not attached. 6. It has polygonal area called LOBES further divided into **lobules/ cotyledons** ↓ Called functional unit of placenta	1. Formed by chorion frondosum 2. It is also called chorionic plate. 3. Forms 4/5th of placenta 4. Fetal surface is shiny, grey in colour. 5. It has umbilical cord (Attached to its centre) & membranes attached to it.

Cotyledon (00:22:32)

1. It is functional unit of placenta.
2. Total number = 15 - 20
3. What is a cotyledon? That area of placenta, which has/stem villi & its all branches.

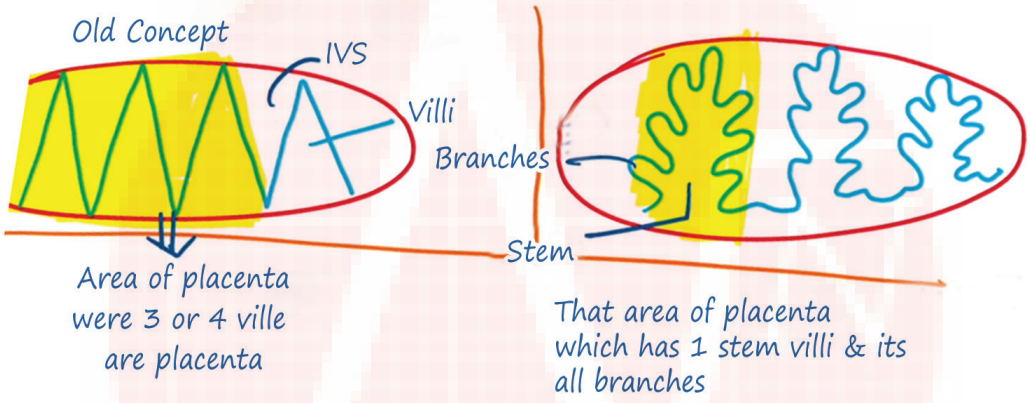


Figure: Cotyledon old/ new concept

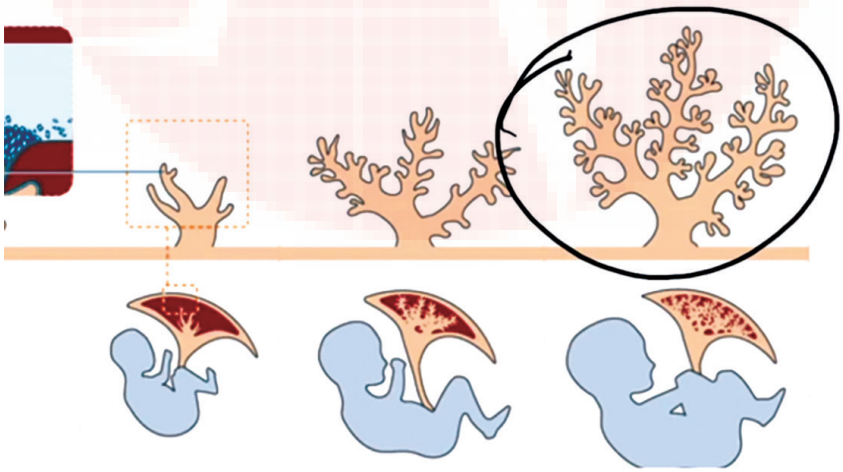
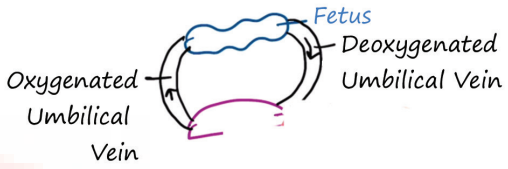


Figure: Cotyledon

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Placental Circulation (00:27:13)

Uteroplacental circulation (mother → placenta)	Fetoplacental circulation (Fetus → placenta)
1. It is present in Intervillous space. 2. Volume of blood = 150 mL 3. Uteroplacental circulation is established by Day 15 after fertilization Q. Uteroplacental blood flow at term Intervillous space blood flow at term Uteroplacental circulation (months → placenta)] 500 - 750 mL/min Q. Uterine blood flow at term:- 750 mL/min Q. In Intervillous space how many times blood is replaced in 1 min → 3 - 4 times Q. How many spiral arteries (Uterine arteries) open in Intervillous space: 120 (Best answer) 120 to 200 (2nd Best answer)	1. Present in villi 2. Volume of fetal blood in villi = 350 mL 3. Fetoplacental circulation is established by Day 17 (Day 17 -21) 4. Fetoplacental blood flow at term: 400 mL/min 5. Fetoplacental circulation is through.  Fig. Fetoplacental circulation

Umbilical vein	Umblical artery
→ Carries oxygenated blood from placenta to fetus. → O_2 saturation = 70 - 80% → Pressure = 10 mm of Hg → Remenant in adult: Ligamentum Teres	→ Brings back deoxygenated blood from fetus to placenta. → O_2 saturation → 50 - 60% → Pressure → 60 mm of Hg → Remenant : Medial Umblical ligament

Important one Liners: (00:41:44)

→ Ig which can cross the placenta: IgG

→ Ig which is present in breast milk/colostrum = IgA

Important Concept (00:42:33)

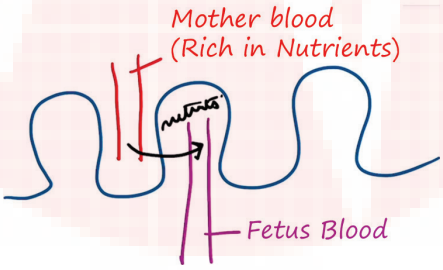
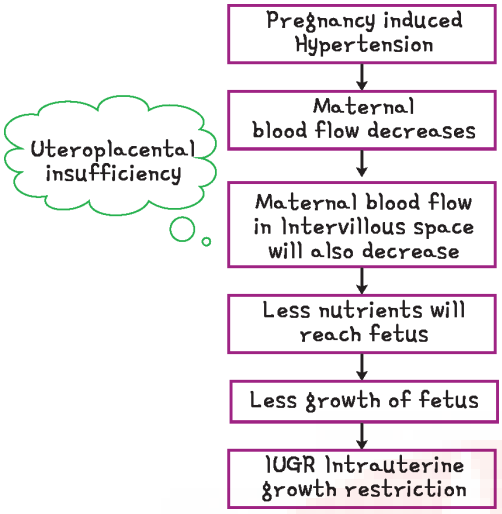


Figure: Nutrient transport between mother & fetal blood

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Suppose if there is any condition like (PIH)



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PLACENTAL ANOMALIES

Placental Anomalies (00:00:26)

Abnormality of size of placenta

Placentomegaly

→ Normal thickness of placenta = 2.5 cm (max 4 cm)

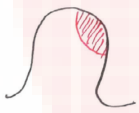
→ If thickness is more than > 4 cm:- **Placentomegaly**

→ Seen in:- (1) Twin
(2) Diabetic
(3) Rh negative Pregnancy

Small size of placenta

→ Seen in:- (1) Pregnancy induced hypertension or increased BP in mother
(2) IUGR

Abnormality of location of placenta



NORMAL

Located in upper part of uterus (Upper Uterine Segment)



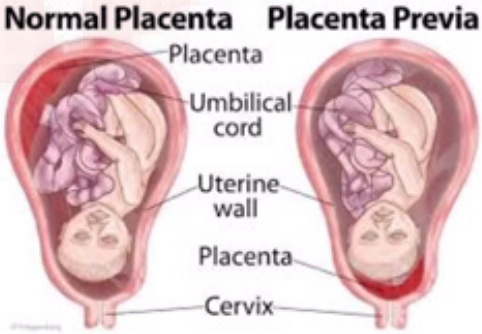
ABNORMAL

↓

If placenta is located in lower part of uterus.

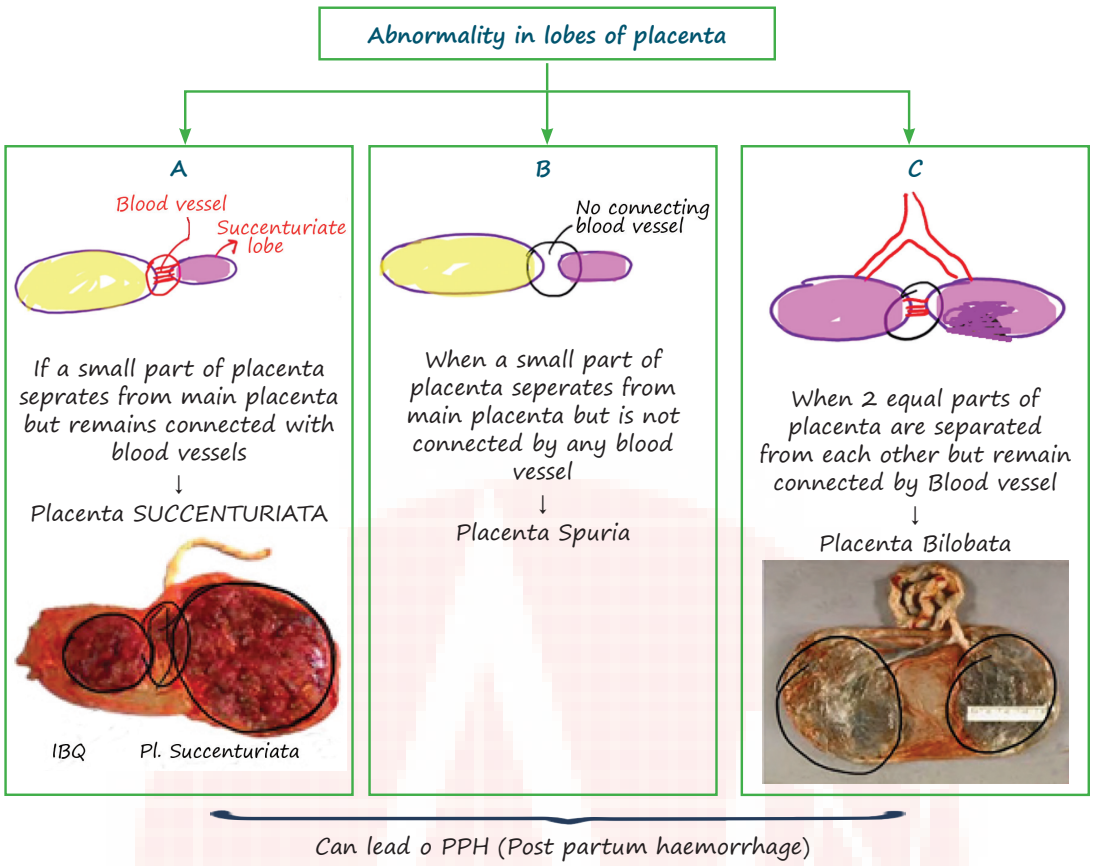
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Called placenta previa



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Can lead o PPH (Post partum haemorrhage)

Abnormality of Fetal and Maternal Surface (00:13:57)

Student's Space

NORMALLY:- Fetal surface and Maternal surface are equal and that is how placenta is disc shaped.

Suppose if:- Fetal surface is small and maternal surface is big. Then maternal surface surrounds fetal surface in form of ring called CIRCUMVALLATE PLACENTA.

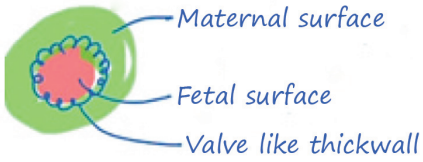


Figure: Circumvallate placenta

PROBLEM associated with it:-
(1) IUGR
(2) Fetal death
(3) Antepartum Haemorrhage

Not Seen:- Post Partum Haemorrhage

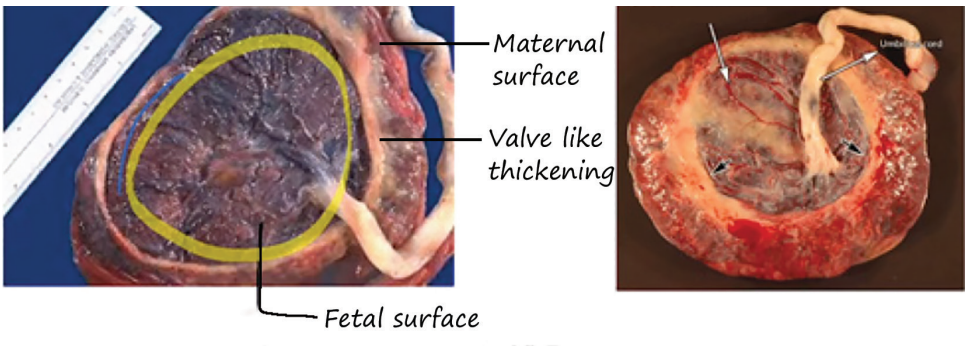


Figure: Circumvallate placenta

Abnormality of Chorionic Villi Attachment (00:22:37)

Normally placenta (Chorion villi) is attached to Endometrium (decidua)

↓

Endometrium is very weak

↓

That is why placenta separates early after delivery (Deciduate)

Now suppose if chorionic villi are not attached to endometrium, but enter to myometrium or serosa then placenta will not be easily removed after delivery and patient will continue to blood.

Student's Space

Morbidly Adhered Placenta (00:26:04)

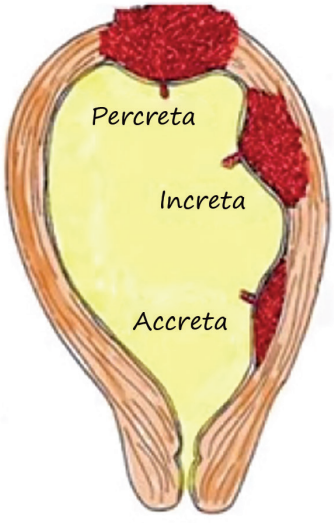
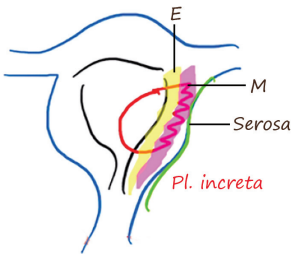
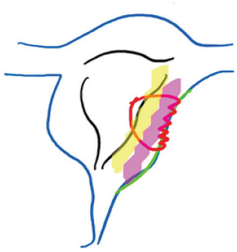


Figure: Placenta Aoerta, Increate, Percrata

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Types:-

A. Placenta Acerata (mc)	B. Placenta Increta	C. Placenta Percreta
Chorionic villi are superficially attached to myometrium ↓ 	Chorionic villi invade the myometrium (deeply attached) ↓ 	Chorionic villi are attached to serosa ↓ 

2 main reason why it happens:-

1. NITABUCH layer absent
2. Decidua Basalis absent

2 main risk factors:-

1. In present pregnancy if patient has placenta previa
2. If in previous pregnancy cesarean section was done.

2 main presenting features:-

1. Patient continues to blood after delivery (PPH)
2. Placenta does not separate after delivery

2 management:

1. Best management:- Hysterectomy
2. Patient refuse:- Leave placenta in uterus + antibiotics

Student's Space

Abnormality of Development Of Placenta (00:38:19)

→ Normally fetal side of placenta develops from chorion frondosum.

→ Chorion laevae forms fetal membrane: Chorion

Now Suppose: If placenta develops from both chorion frondosum and chorion Larvae

↓

Such placenta will cover whole of uturus and will be thin and membrane like

↓

Placenta Membranous

Umbilical Cord

→ Connects fetus to the placenta.

→ Also called:- FUNIS

→ Develops from:- Connecting stalk

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→ Length Range: 30-100 cm
Average: 40 cm (as per Dutta)

SHORT CORD
→ < 30 cm
→ **Problem:-**
→ Easily broken
→ Prevents version

LONG CORD
→ ≥ 100 cm
→ **Problem:-**
→ Can lead to cord Enlargement
↓
Fetal Distress
→ Cord prolapse



Figure: Umbilical cord

→ Average Diameter of Cord 1.5 cm
→ PH of Blood in Umbilical Cord:- 7.2
→ **Named Structures in CORD:-**
1. Folds of HOBOKON
2. Connective tissue:- Slippery called Wharton's Jelly

→ **False knot:-** Wharton Jelly collects at some places and appears as a knot

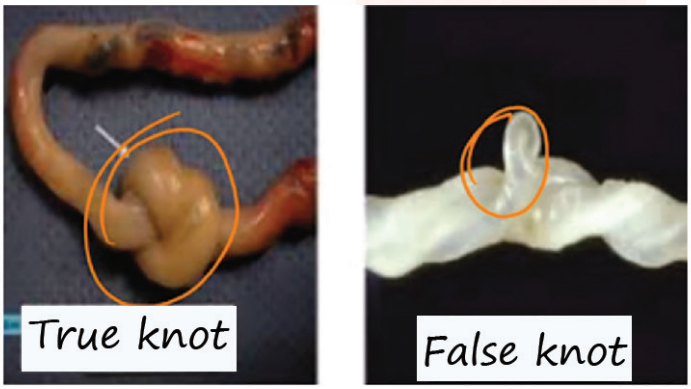


Figure: True and false knot

→ Normal attachment of cord to placenta:- Cord is attached to centre of fetal surface called Central attachment of cord.

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Abnormalities of Cord Insertion

1. **Marginal Insertion of Cord:-** When cord is attached to one side of placenta and not in centre called BATTLEDORE PLACENTA.

Normal attachment
Central attachment

Battledore placenta
Marginal Insertion of Cord:-



Figure: **A.** Normal Attachment; **B.** Battledore placenta

2. Velamentous Insertion of Cord:- When the cord is not directly attached to placenta. It attaches first to membranes and then to placenta.

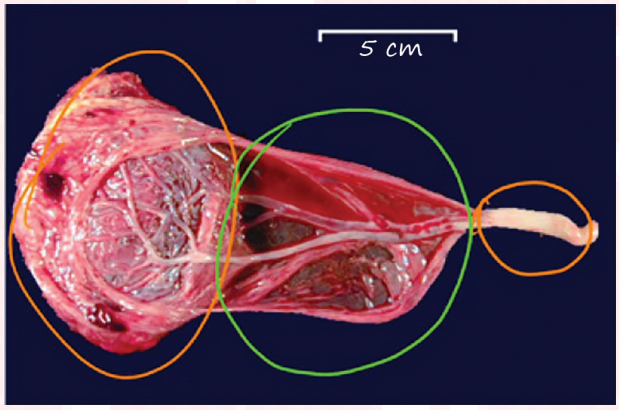


Figure: Velamentous placenta

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How velamentous insertion leads to vasa previa?

In velamentous insertion of cord, the cord is attached to membranes

↓

At the time of delivery, Membranes have to rupture

↓

Because cord is attached to membrane, so when membranes will rupture, cord will also rupture

↓

Umbilical cord has umbilical artery and umbilical vein

↓

So when cord rupture, Umbilical Artery and Umbilical Vein rupture

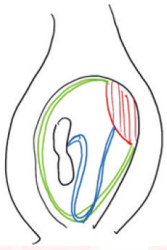
When umbilical Artery and Umbilical vein Rupture

↓

Patient bleeding

↓

It comes from fetus



In vasa Previa:- There is fetal blood loss

↓

Leads to fetal death and not to maternal death

Management:- Cesarean section

→ Can vasa Previa be diagnosed during pregnancy?

By Doppler

Student's Space

Cord Content (01:00:05)

→ Blood vessels at term:- **3 blood vessels:-** Right Umbilical Artery
Left Umbilical Artery
Left Umbilical Vein

→ Blood vessels before 20 weeks of pregnancy:-

4 Blood Vessels:- Right Umbilical Artery
Right Umbilical Vein
Left Umbilical Artery
Left Umbilical Vein

Left Umbilical Vein is Left Behind

Right Umbilical Vein disappears

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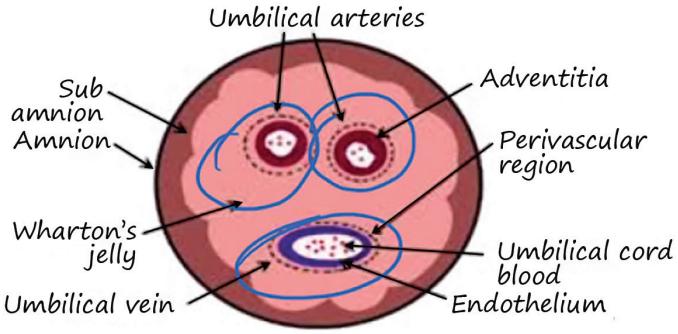


Figure: Cross section of Umbilical cord

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Abnormality of Vessels in Cord (01:04:07)

Single umbilical artery

Most common vascular abnormality of cord

Most common seen in:
- → Diabetic
- → Twin
- → Antepartum Haemorrhage
- → Preeclampsia

Associated with:-
1. CVS malformation in body
2. Renal malformation in body
3. Trisomy in body

After seeing a single umbilical artery investigation should be done
1. ECHO
2. USG
3. Karyotype

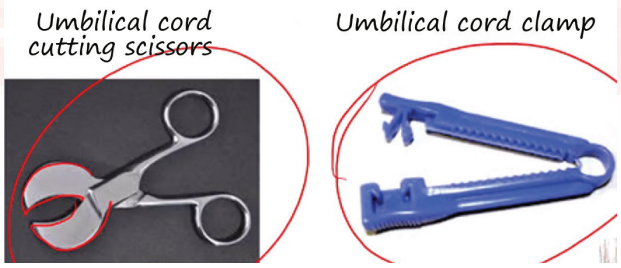


Figure: A. Umbilical cord artery; B. Umbilical cord artery scissors

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Fetal Membranes (01:10:48)

Amnion (Inner layer)	**Chorion** (Outer membrane)
Thickness (0.02–0.5 mm) → Inner layer → Shiny, Smooth → Formed by Ectoderm → No blood vessels, no nerve → More strong	→ Outer membrane → Rough, dull → Formed by Chorion laeve (Cytothrophoblast) → Blood vessels present

1. Which prostaglandin is present in membrane? (PGE_2)
2. When do membranes Rupture during labor?

   ↓

   After full dilation of cervix (10 CM)
   (i.e. at end of 1st stage of labour)
3. Premature Rupture of Membranes: (PROM)

   ↓

   When membranes rupture before labors begins
4. Preterm premature Rupture of Membranes (PPROM)

   ↓

   When membranes rupture before 37 weeks of pregnancy
5. When obstetrician Ruptures membranes

   ↓

   Called Artificial Rupture of Membranes (ARM) Amniotomy

   ↓

   So that process of labour becomes fast
   (**Why** = Because when membrane rupture PGE_2 is released)
   Labor fast = Term = AUGMENTATION of LABOR

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HORMONES FORMED BY PLACENTA & UMBILICAL CORD



→ 1 : 36 (Text) Placental Functions

Important Points

1. The most common site for synthesis of hormones in placenta:-
   ↓
   Syncytiotrophoblast
2. Hormones formed by placenta can be derived into 2 categories:-

Steroid Hormones	Protein/ Peptide Hormones
→ Estrogen	1. hCG (Human Chorionic gonadotropin)
→ Progesterone	2. HPL (Human Placental Lactogen)

hCG (Human Chorionic Gonadotropin):

1. It is glycoprotein hormone

hCG is the hormone with highest carbohydrate content

It has 2 subunits

- α (alpha subunit) → Now specific → Similar in hCG, LH, FSH & TSH
- β (Beta) Subunit → Is the specific subunit → In all pregnancy test βhCG subunit is tested

Functions of hCG:

1. To maintain corpus luteum of pregnancy
2. In males it acts as first stimulus for leydig cells to secrete testosterone.

In non-pregnant female corpus luteum is maintained by LH

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Q. hCG is functionally similar to:- LH

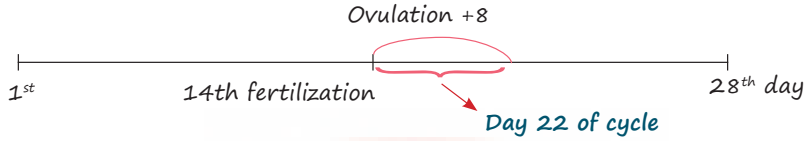
Q. hCG is anatomically similar to:- LH, FSH, TSH

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Some more Important Points on hCG:

1. When does synthesis of hCG begin?
   - → By 8 days after fertilization
   - → Day 22 of cycle
   - → 5-6 days before missed period



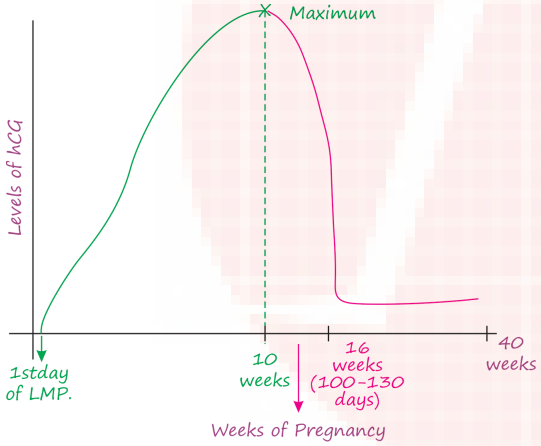
hCG is always present in Pregnant female
hCG is absent in None Pregnant female

→ After this:- In early pregnancy: The hCG levels double in every 48 hours.

↓

Reach maximum level

60-80 days of pregnancy/10 weeks of pregnancy



Missed Period: Time ⇒ 100 IU/L (mIU/mL)
60-80 days/10 weeks ⇒ 50,000-100,000 IU/L
↑
10^5 IU/L

→ After 10 weeks of pregnancy→levels of hCG start decreasing & reaches a **Minimum at 16 weeks of pregnancy (100-130 days)**

→ At this minimum level, it is maintained throughout pregnancy

*** When does hCG disappear**

- → From blood→2 weeks after delivery
- → From urine →2 days after delivery

Student's Space

Q. When does hCG disappear from blood after abortion?

→ After 2-4 weeks

Q. When does hCG disappear after hydatid mole evacuation?

→ Partial Mole → 7 weeks

→ Complete Mole → 9 weeks

***Site of synthesis of hCG** → syncytiotrophoblast

Other Important Points:

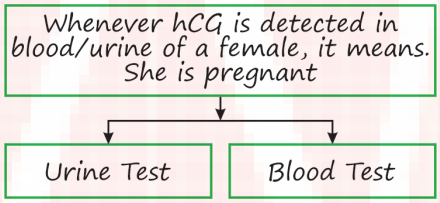
→ Doubling Time of hCG in early pregnancy 48 hours (24-48 hours)

→ Half-life of hCG = 36 hours

Increased hCG levels	Decreased hCG levels
High = hydatidiform mole **Court** = choriocarcinoma **Demands** = Down syndrome (Trisomy 21) **Riya's** = Rh negative pregnancy **(Hydrops fetalis)** **Testimonial** = Twins	**T** = Trisomy other than 21 Trisomy 13 - Patau syndrome Trisomy 18 - Edwards' syndrome **E** = Ectopic pregnancy **A** = Abortion

Uses of hCG:- Used in many tests

1. Down syndrome screening → Triple Test, Quadruple Test, Dual Test
2. For detecting/confirming pregnancy



Advantage → It can be done at Home → It can detect pregnancy before missed period	**Disadvantage:** It cannot be done at Home → Pregnancy can't be detected before missed period

Urine Pregnancy Test Kit (44:36)

Sample:- First voided urine of morning is preferable



* Test used in Urine Pregnancy kit: - **2 site SANDWICH immunoassay**

* Sensitivity:- **30-50 mIU/mL of hCG is present in Urine**

* Become positive (earliest) on:- **Day of Missed period**

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Blood Test

Most sensitive:- Radioimmunoassay (RIA)
Sensitivity:- 0.001 mIU/mL of hCG in blood
Earliest positive on:- 5 to 6 days before Missed period

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Important Points:

→ **Nausea & Vomiting during pregnancy/Morning sickness:-** is due to hormone hCG
→ **In twins & Hydatid mole:-** hCG↑
↓
↑Nausea & Vomiting
Hyperemesis Gravidarum

HPL (Human Placental Lactogen)
Also called as:- Human chorionic somatomammotropin (HCS)
Synthesized by:- Syncytiotrophoblast
Detected earliest by:- 3 weeks of pregnancy continuously increase.
Maximum levels seen at:- At 36 weeks of pregnancy
Aim of Hormone:- To provide glucose to fetus.
Functions:-

1. It brings about insulin Resistance in Mother **(↑ glucose)→(easily available for fetus)**
2. It brings about gluconeogenesis, increases fatty acid in Mother. This fatty acid is used by mother's body for energy & spares glucose for fetus.

No Role of HPL in lactation:- HPL has No Role in lactation

Important Most Common One Liners:

→ **Insulin Resistance in pregnancy is mainly due to:-** Human placental lactogen (HPL)
→ **Insulin Resistance is maximum between:-** 24-28 weeks of pregnancy →Because of insulin Resistance→ Pregnancy is a Diabetogenic state.
→ **Human Placental lactogen is marker of placental well being.**

Estrogen:

Placenta is an incomplete Endocrine organ.
↓**WHY?**
Because without helps of fetus, placenta cannot form Estrogen.
Adrenal gland of Fetus → form DHEA Sulphate
↓
It is used by
placenta to form estogen

→ Most common Estogen in pregnancy:- **ESTRADIOL = E2**

→ Most specific estrogen in Pregnancy:- **ESTRIOL = E3**

→ Estrogen which is measured in TRIPLE TEST:- **ESTRIOL= E3**

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Remember:

If there is any problem of fetus like:-

Fetal death
Down syndrome
Anencephaly

} All these conditions fetus will form less DHEA sulphate ↓ Less Estrogen

Student's Space

Concept:-

Why is there Post Terms Pregnancy in Anencephaly?

In Anencephaly (Neural Tube defect):-

1. Main problem:- Skull/cranium of fetus is absent
2. Additional problem:-

Adrenal gland absent
↓
Absent DHEA sulphate
↓
Placenta estrogen ↓
↓
It cannot signal to uterus
↓
Uterus doesn't contract
↓
Leads to post term Pregnancy

Estrogen of Mother (Role)

↓

At term:- It tells the uterus to start contracting

↓

Labor starts

Progesterone

Sources in Pregnancy

Early Pregnancy
Up to 6 weeks corpus luteum of pregnancy

Later in Pregnancy
6-8 weeks: Placenta takes over function of corpus luteum
≥ 8 Weeks of pregnancy:- Placenta

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Precursor of progesterone: - Placenta uses maternal LDL to form progesterone.

Important one liners on Progesterone

1. Progesterone is responsible for converting Endometrium to decidua **decidual Reaction**
2. Main hormone for maintaining pregnancy
   If levels of progesterone <25 ng → **leads to abortion**
3. Progesterone is smooth muscles relaxant in pregnancy,
   1. Relax blood vessels → Resistance decrease → BP decrease in pregnancy
   2. Constipation due to decreased peristalsis.
   3. Lower esophageal sphincter relaxes causing heartburn in pregnancy.

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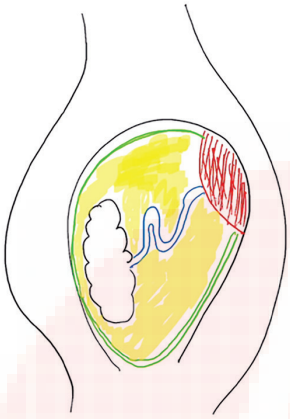
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AMNIOTIC FLUID - NORMAL & ABNORMAL (PART-1)

Amniotic fluid ⇒ Liquor amnii



Amniotic fluid→ Distends uterus→ So that fetus gets enough space to grow

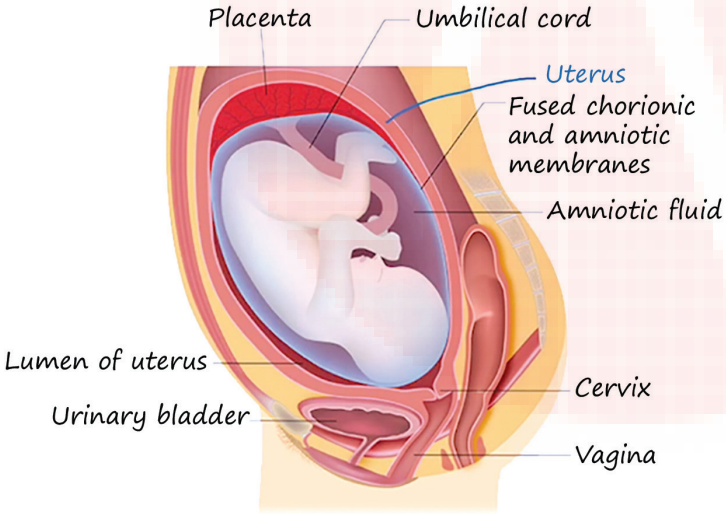


Figure: Amniotic fluid

1. Specific gravity → 1.008 to 1.010
2. pH of amniotic fluid
    1. Alkaline (between 7-7.5)
    2. 7.2
3. Osmolality of Amniotic fluid:- 250 mOsm/L

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4. Rate of amniotic fluid turnover:- 500 cc/hour
5. Amniotic fluid is replaced in every 3 hours

Volume of Amniotic fluid:-

→ At 12 weeks - 50 mL
→ Maximum amniotic fluid is seen between (36-38 weeks of pregnancy) → **Volume = 1 liter**
→ As pregnancy advances after 38 weeks, the volume of amniotic fluid decreases.
→ Volume of amniotic fluid at 40 weeks of pregnancy → 800 mL.

Concepts
→ If volume of amniotic fluid is less than 200 mL at term → OLIGOHYDRAMNIOS
→ If volume of amniotic fluid is more than 2 litres at term→ POLYHYDRAMNIOS

Source of Amniotic Fluid:-

→ Both from mother + Fetus

↓ Mother is main contributor in early weeks of Pregnancy

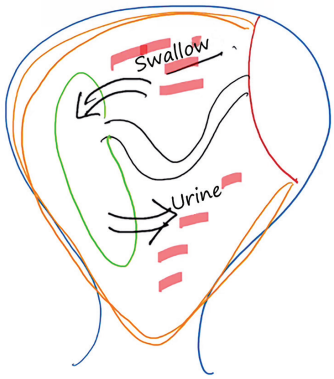
↓ Fetus is main contributor in later weeks of Pregnancy

Weeks of pregnancy	Major contributor
1. If pregnancy is <12 weeks	Ultrafiltrate of Maternal Plasma
2. If pregnancy is between 12 and 20 weeks	Diffusion from fetal skin
3. If pregnancy is ≥ 20 weeks	Fetal Urine

Q. Cornification of fetal skin occurs at:- after 20 weeks of pregnancy
Q. Overall major contributor of amniotic fluid:- Fetal Urine

Some Minor Contributors

1. Pulmonary fluid
2. Placental fluid



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Amniotic fluid is kept in balance as:- Fetus not only produces amniotic fluid but it also swallows it.

Q. Fetal swallowing movements begin by 10-12 weeks of pregnancy
Q. Fetal swallows 200-500 mL of Amniotic fluid per day

Suppose:

Fetus 1

Problem:- Kidney Problem (Renal agenesis)
↓
Urine less
↓
Amniotic fluid decreases
↓
OLIGOHYDRAMNIOS

Fetus 2

Problem:- Swallowing defect
↓
E.g. Esophagus atresia
↓
It will not be able to swallow
↓
POLYHYDRAMNIOS

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AMNIOTIC FLUID - NORMAL & ABNORMAL (PART-2)



Color of Amniotic Fluid

→ Colorless

→ At term:- STRAW COLORED

Abnormal colour of Amniotic fluid	Condition seen
1. Green coloured amniotic fluid ↓ amniotic fluid has got meconium	1. Fetal Distress 2. Breech or Transverse lie
2. Golden Yellow amniotic fluid ↓ BILIRUBIN	Rh incompatibility (mother = Rh -ve Fetus = Rh +ve)
3. Tobacco Juice colour amniotic fluid	Intrauterine death of fetus
4. Saffron colour/greenish yellow	Post-term pregnancy Post-maturity (≥ 42 weeks)
5. Dark coloured/Dark red	Concealed variety of Abruptio placenta

Functions of Amniotic Fluid

1. It distends the uterus
2. Gives enough space for the fetus to grow & move
3. It acts as a shock absorber.
4. It helps to maintain temperature of fetus.

Remember:- Amniotic fluid does not provide nutrition to fetus

Composition of Amniotic fluid:-

↓

99% water

1% solids

Assessment of Amniotic fluid:- By USG

→ On ultrasound the abdomen of female is divided into 4 quadrants.

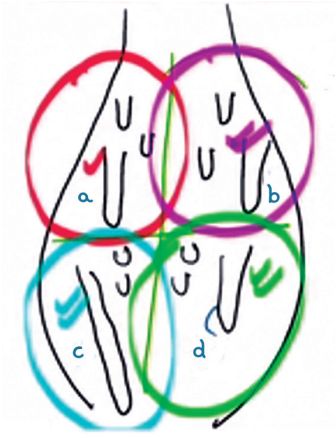
→ In each quadrant we see many pockets of amniotic fluid.



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→ The largest pocket of each quadrant is measured, i.e. (a+b+c+d) in figure

→ The sum of largest pocket of each quadrant is called as AMNIOTIC FLUID INDEX (AFI) Normal AFI is between **5 and 24 cm**

→ If AFI is <5 cm:- **OLIGOHYDRAMNIOS**

→ If AFI is >2.5:- **POLYHYDRAMNIOS**

Depth of single largest pocket:-

Another way to measure amniotic fluid is by measuring the size of largest pocket in the entire abdomen (Fig = Pocket)

↓

Depth of single largest pocket

Normal = 2-8 cm

If depth is <2 cm:- **OLIGOHYDRAMNIOS**

If depth is ≥8 cm:- **POLYHYDRAMNIOS**

OLIGOHYDRAMNIOS	POLYHYDRAMNIOS
→ Amniotic fluid = <200 mL → On USG → Amniotic fluid Index <5 cm → Single largest Pocket <2 cm → Most common course of mild Oligohydramnios ↓ Idiopathic	→ Aminoitc fluid >2 L → On USG → Aminiotic fluid Index ≥2.5 cm → Single largest Pocket ≥8 cm → Most common cause of mild polyhydramnios ↓ Idiopathic
→ Most common cause of severe Oligohydramnios ↓ Congenital Renal problem in fetus (e.g. Renal agenesis) HORSESHOE shaped kidney	→ Most common cause of severe Polyhydramnios ↓ Congenital swallowing defect in fetus **For example:** → Esophageal atresia → Duodenal atresia → Intestinal obstruction **Grades of Polyhydramnios:** Mild polyhydramnios = AFI = 8-11 cm Moderate Polyhydramnios = AFI = 12-15 cm Severe Polyhydramnios =AFI >16 cm

AMNIOTIC FLUID - NORMAL & ABNORMAL (PART-3)



OLIGOHYDRAMNIOS	POLYHYDRAMNIOS
Other causes of Olgophdroniuios:- 1. Post-term pregnancy (≥42 weeks) 2. Premature rupture of membranes 3. If mother's BP↑ (Hypertension, pregnancy Induced Hypertension [PIH]) 4. IUGR (Intrauterine growth restriction) of fetus 5. **Drugs:-** Prostaglandin synthetase Inhibitor (like indomethacin) ACE inhibitors 6. Amnion Nodosum 7. TRIPLOIDY	**Other causes of Polyhydramnios** 1. Cleft lip, cleft palate ↓ Fetus cannot swallow Aminiotic fluid 2. Twin pregnancy/Multifetal Pregnancy 3. **Maternal diabetes** ↓ Same glucose reaches to fetus ↓ Fetus glucose high ↓ Polyuria ↓ polyhydramnios 5. Neural tube defect of fetus like Anencephaly, spina bifida 6. Rh incompatibility 7. TORCH infection in fetus 8. TRISOMY 9. Thalassemia 10. CHORANGIOMA
Complications:- 1. Due to less space ↓ Fetal part do not grow properly ↓ **PULMONARY HYPOPLASIA** → Most common complication of oligohydramnios ↓ pulmonary hypoplasia 2. Limb amputation defect/limb reduction defect	**Complications:-** 1. Preterm Rupture of membranes 2. Preterm labor (<37 weeks) ↓ 3. Prematurity in body 4. Abruptio Placenta 5. Postpartum Haemorrhage 6. Subinvolution of uterus 7. Respiratory distress in mother:- (Because the uterus will push diaphragm up) 8. Increased chances of malpresentation (Breech/ Transverse lie) 9. Increased chances of CORD PROLAPSE



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OLIGOHYDRAMNIOS

3. Cord compression

↓

Umbilial vein gets compressed

↓

Leads to fetal distress

↓

Fetus passes meconium in amniotic fluid

↓

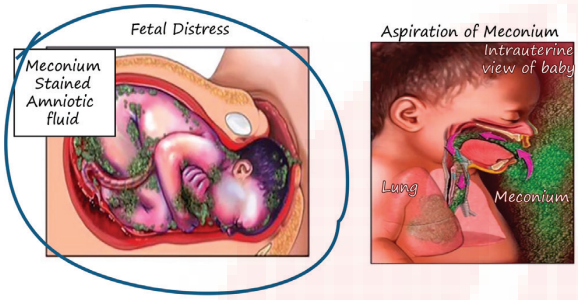
Amniotic becomes green in colour (Meconium stained)

↓

The meconium stained amniotic fluid is swallowed by fetus

↓

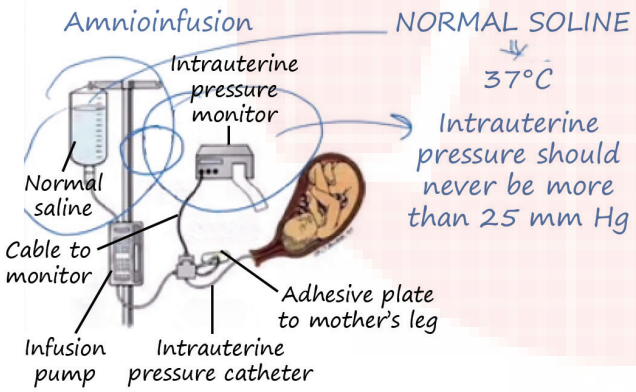
MECONIUM ASPIRATION SYNDROME



4. Can lead to post-term pregnancy

Treatment:-

AMNIOCENTESIS



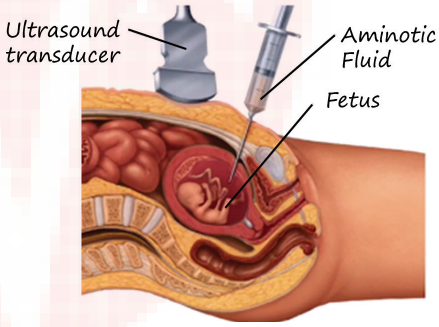
↓

With normal saline

1. Temperature = Normal soline = 37°C
2. During this procedure the intrauterine pressure should never be more than 25 mm Hg

POLYHYDRAMNIOS

Treatment:-





1. Amount removed per hour = 500 mL/hr)
2. Maximum how much amniotic fluid can be removed = 1500-2000 mL

Amniocentesis

* Done under Ultrasound guidance

OLIGOHYDRAMNIOS	POLYHYDRAMNIOS
	Roles of the Nurse:- 1. To explain the procedure to the patient 2. To explain risks associated with the procedure 3. Get consent form signed 4. Do a free abdomen examination to determine fetal position 5. Auscultate fetal heart sound 6. Give emotional support to patient 7. After the procedure again listen to fetal heart sound. 8. After the procedure explain to patient about symptoms → Hyperactivity of uterus → Vaginal discharge (Bleeding)/ Water discharge → Fetal movements

Q. Name a drug which can be used for managing polyhydramnios?

↓

Indomethacin

↓

Disadvantage:

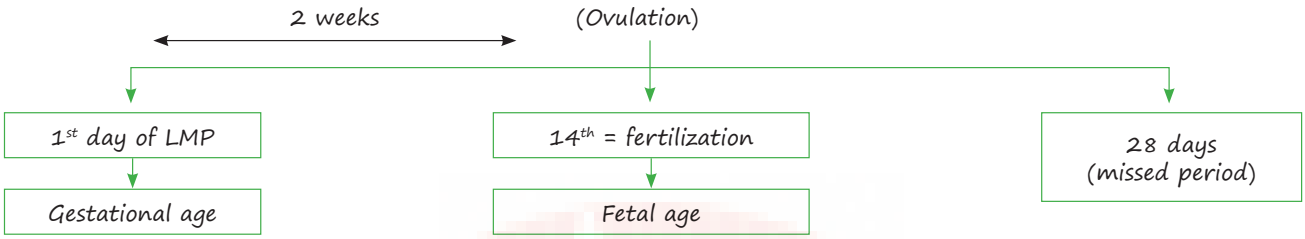
1. Lead to premature closure of ductus arteriosus
2. Effect of fetal kidney Contraindicated in Pregnancy

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FETUS (PART-1)





Fetal age + 2 weeks = Gestational Age

Gestational Age - 2 weeks = Fetal Age

→ All definitions given in Pregnancy are based on Gestational age

→ All events occurring in Pregnancy are based on Gestational age

Note:- There is only one definition which is originally based on Fetal age/day of fertilization
↓
GROWTH PERIOD

Growth Period

Growth period	Original definition (from day of fertilization)	Definition as per gestational age (to be answered only if asked)	Comment
1. Period of fertilized ova	From day of fertilization ↓ up till 2 weeks after that	**+2 weeks** 2 week gestational age +2 week -> 4 weeks gestational age	
2. Embryonic period	3 weeks after fertilization ↓ 8 weeks after fertilization	+2 5 weeks gestational age +2 10 weeks gestational age	**Most teratogenic period**
3. Fetal period	9 weeks after fertilization ↓ up till delivery	From 11 weeks of gestational age ↓ up till delivery	

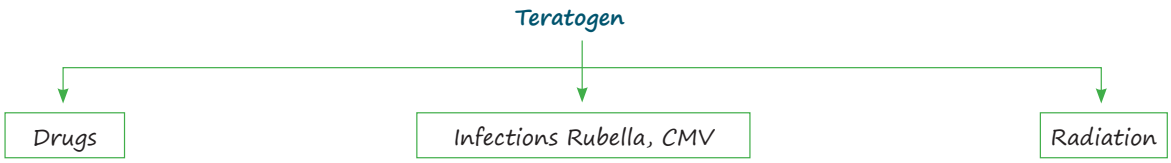
Teratogenic: Means any External exposure to the mother which can lead to congenital malformation in baby.

Most teratogenic period:-
Embryonic period
↓
→ 3 weeks to 8 weeks after fertilization
→ 5 Weeks to 10 weeks of pregnancy/ 1st trimester of pregnancy

Teratogen:- That external exposure which leads to congenital malformation in baby

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FDA classification of Drugs in Pregnancy:-

Category	Meaning	Example
Category A	→ Drug does not cause any fetal Risk → Human studies → Animal Studies → Safe in Pregnancy	Folic Acid Thyroxine
Category B	→ Drug does not cause any fetal risk → Human studies → Animal Studies	→ Paracetamol → Penicillin → Amoxycillin
Category C	→ Drug may cause fetal Risk → Animal studies → Human studies → Benefits of drug outweighs risk	Corticosteroids
Category D	→ Drug may cause fetal Risk → Animal studies → Human studies → Benefits of drug outweighs risk → Otherwise they are contraindicated	Antiepileptic drug (Phenytoin)
Category X	→ Absolutely contraindicated	→ Thalidomide → Isotretinoin

Radiation Exposure in Pregnancy

→ SI unit = Radiation = GRAY

→ Rad = old unit

→ 1 Gray = 100 Rad

→ 1 Rad = 1000 milli Rad

Fact:-

Pregnancy is exposed to 100 Gray Radiation

↓

50% of fetal cells will die

Pregnancy exposure to 200 Gray Radiation

↓

100% fetal cells will die

Student's Space

→ In pregnancy maximum permissible Radiation is 5 Rod

Investigation Safe	Investigation Not done but can be done	Investigation contraindicated
→ MRI → USG → Doppler	→ MRCP (magnetic resonance cholangiopancreatography) → PET scan:- (Positron Emission Tomography)	→ Contrast MRI → Gadolinium MRI → X-Ray → HSG → Intravenous Pyelography → Barium Enema → ERCP

→ **X-Ray:-** Radiation Exposure Chest = 0.1 - 0.2 Rad

Pelvis = 1 Rad

If by Chance in a pregnant female
X-ray is done during Pregnancy
↓
Next step:- Reassurance (MTP is not indicated)

Maximum Problem of Teratogenesis

↓

Is seen when organs are forming if at that time a female is exposed to drug/Radiation

↓

Maximum problem is at the time of organogenesis

↓

Congenital malformation of fetus

Fetus: ORGANOGENESIS

→ Most of fetal organs are formed between **8 weeks of pregnancy →20 weeks of pregnancy**

→ Except 2 organ system→

→ CNS
→ CVS
} start forming before 8 weeks

→ Which organ system is first to form? CNS

→ **CVS:** Starts forming at 5 weeks of pregnancy

↓

Cardiac activity will be seen on USG

Cardiac activity can be seen first on USG **5 weeks** at gestational age
or 3 Weeks after fertilization
or 21 days after fertilization

→ At this time Fetal Heart Sound cannot be heard.

When can Fetal Heart Sound be heard in Pregnancy?

- Doppler → 10 weeks
- Stethoscope → 18-20 weeks

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Earliest fetal heart sound can be heard in Pregnancy by: **10 weeks with Doppler**

Important Days in development of fetus:- Day is taken from day after fertilization

Days 7- Day 8	Day 7 → Ectoderm Day 8 → Endoderm
Day 14	Mesoderm
Day 17	Fetoplacental circulation was established
Day 21	Cardiac activity is seen on USG
Day 30	Neural Tube closure

Important weeks (From 1st day to Last menstrual Period)	Development
7 weeks	Fetal Body movement begins
8 weeks	→ Organogenesis begin → Ovaries & Testis are formed → Embryo starts looking like human
11 weeks	Fetal breathing movements
12 weeks (3 months)	→ Insulin secretion start → Thyroxine secretion begins → Urine production begins = **Urine output of fetus at term 650 mL/day** → Swallowing begins → External genitalia → Male → Female On USG-Sex of baby can be determined by 12 weeks (12-14 weeks)
16 weeks	1. **X-Ray:-** Fetal skeleton is visible (ossification of fetal bones) 2. Lanugo (small brown hair) appear
20 weeks	→ Lanugo covers entire body → Sebaceous glands of fetus form **Vernix Caseosa** → Fetus gut→ see Meconium ↓ → Green substance due to (oil pigment) BILIVERDIN → Degradation product of liver enzymes → When fetus is in distress ↓ → It passes meconium into Amniotic fluid
24 weeks (6 months)	→ Fetus starts hearing → **Surfactant appears** → Soapy material synthesized by type II pneumocytes → Decrease surface tension of lung → If it is less it leads to respiratory distress in baby after birth **Corticosteroid →↑surfactant production**
28 weeks	India: Baby becomes viable
36 weeks	1. Nail grow 2. Both testis descend in scrotum 3. Posterior fontanelle closes

Weight of fetus:

4 weeks	½ gm
8 weeks	2 gm
12 weeks	20 gm
16 weeks	100 gm
20 weeks	300 gm
24 weeks	600 gm
28 weeks	1200 gm

When is weight of fetus = 500 gm

= 22 weeks (22 × 7 = 154 days)

Period of viability:

→ Means the period beyond which if a fetus is born, it is capable of independent existence & can be saved.

→ Period of viability differs from country to country:-

- → India = 28 weeks
- → USA = 20 weeks
- → As per WHO = 24 weeks



Student's Space

Fetal lung Maturity:-

→ Fetus lungs: have Type II Pneumocytes

↓

Produce SURFACTANT **at 2 weeks but it is completely formed between 34 and 37 weeks**

(soapy material has phospholipids)

↓

Function:- To decrease surface Tension of lungs at time of breathing

Note:

→ If surfactant is less:

- → It leads to Respiratory Distress syndrome

→ Drug which increase production of surfactant:- Corticosteroids

→ When surfactant is completely formed (34-37 weeks) then lungs of fetus are said to be matured.

Lung Maturity Test:-

→ Most commonly Done:

Lecithin/sphingomyelin Ratio in Amniotic fluid

- ≥2 → Lungs of fetus are mature
- <2 → Lungs of fetus are Not mature

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Best Test:-

To look for phosphatidylglycerol in amniotic fluid

- Present in Amniotic fluid → Lungs of fetus are Mature
- Absent in Amniotic fluid → Lungs of fetus are not mature

→ Best test to determine fetal

→ Lung maturity in Diabetic mother→ phosphatidylglycerol

Bedside Test = Shake test/Bubble test

Amniotic fluid → Shake it → If bubbles are formed

↓

Soap is present

↓

Surfactant is present

↓

Lungs of fetus mature

Nile blue sulphate test:- → Take amniotic fluid

↓

Has fetal skin cells

Dye: Nile blue sulphate dye:-

Fetal skin cell → 

↓

Orange cells ≥50%

↓

Lungs of fetus are mature

Student's Space

Question of Nile blue Sulphate Test

1. Why it is done to know fetal lung maturity
2. It lung of fetus is mature:- When Nile blue sulphate dye is added to fetal skin cells

↓

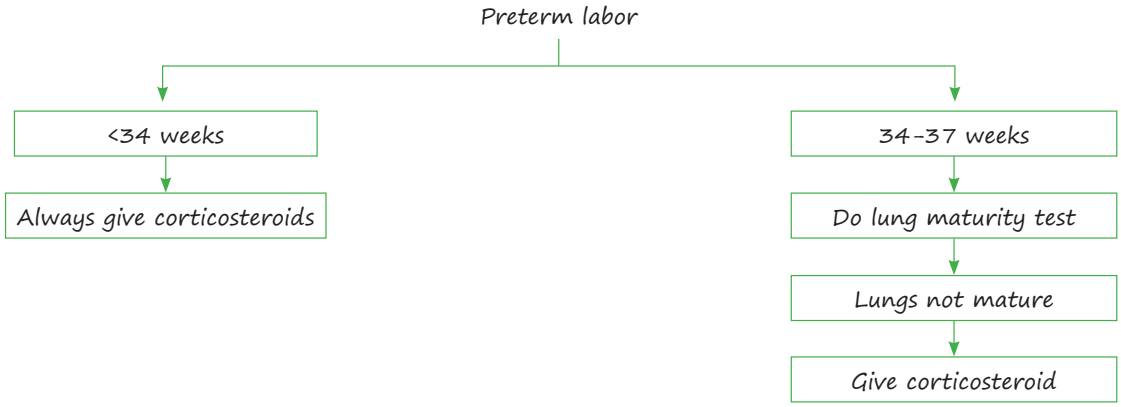
It appears - **ORANGE colur cells**

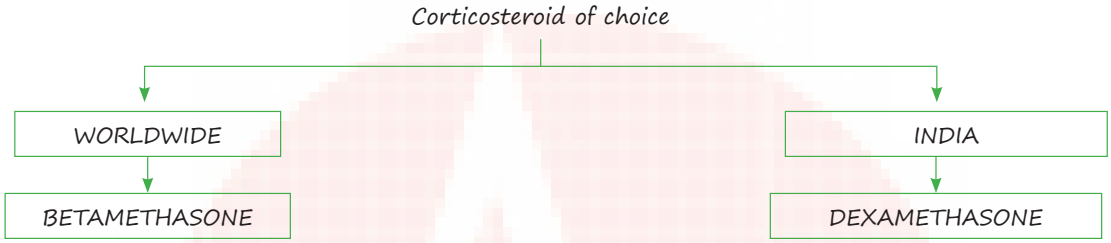
Drug given to accelerate lung Maturity of Fetus:-

↓

CORTICOSTEROIDS

Indication:





Dose = 2 injections **(im)**
(1) 12 mg
↓ **24 hours**
(2) 12 mg

Dose = 4 injections
(1) 6 mg
↓ **12 hours**
(2) 6 mg
↓ **12 hours**
(3) 6 mg
↓ **12 hours**
(4) 6 mg

→ Corticosteroid needs 24 hours to act
→ Corticosteroid is contraindicated in **CHORIOAMNIONITIS**

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FETUS (PART-2)



Fetal Hematopoiesis

Site of hematopoiesis	Time	Main Hb formed
1. Yolk Sac 1st site for hematopoiesis	≤6weeks until 6 weeks of pregnancy	Gower 1 Gower 2 PORTLAND Hb
2 Liver (Spleen)	6-20 weeks of pregnancy	Fetal Hb
3. Bone marrow	≥ 20 weeks	Adult Hb

Fetal Hb
- → $\alpha_2\gamma_2$
- → Resistant to Acid Alkali

Adult Hb
- → $\alpha_2\beta_2$
- → Hemolysis when acid or alkali is added

FORMS the Basis of 2 important Tests

APT Test/Singer Alkali Denaturation Test

It helps in differentiating between vasa previa & **(Fetal bleeding)** Placenta previa **(maternal bleeding)**

KLEIHAUER BETKE Test

It is used in Rh negative pregnancy to calculate the dose of Anti-D

APT test/ SINGER alkali Denaturation test:-

→ Reagent = KOH/NaOH (alkali)

→ Pregnant female bleeding:

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We don't know that she has placenta previa or vasa previa

↓

Next step

↓

To collect the blood coming out from mother's vagina & put it in a test tube



Add KOH

↓

If color of blood doesn't change after adding KOH

↓

Hb is resistant to alkali

↓

HbF Fetal haemoglobin

↓

Fetal Blood

↓

Vasa previa



Add KOH

↓

Color of blood becomes brown hemolyzed

↓

There is adult Hb

↓

This is maternal Blood

↓

Placenta previa

Student's Space

→ To diagnose vasa previa during pregnancy

↓

Best Test:- DOPPLER USG

→ To diagnose vasa previa at time of bleeding

↓

Best Test:- singer alkali denaturation Test

→ To differentiate between vasa previa & placenta previa

→ To differentiate between HbF & HbA Best test

} (Singers Alkali Denaturation Test)

Fetal RBC	Maternal RBC
Large Life span = 90 days	Small Life span = 120 days
At the time of Birth	Baby : Hb → 16-18 g/dL → HbF → 75-80% ; HbA → 20-25%

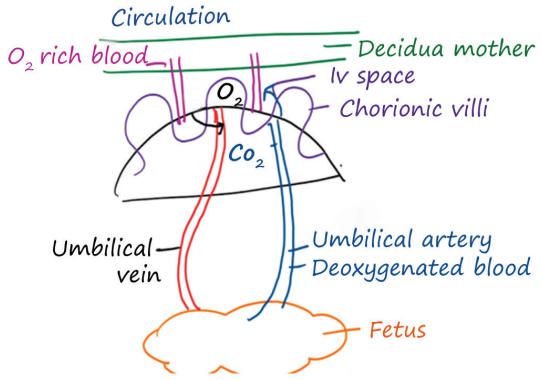
By the time baby becomes 6 months old

↓

99% hB = HbA

<1 % Hb= HbF

Fetal Circulation

Fetal Circulation	Adult Circulation
→ Site of oxygenation is placenta  Figure: Fetal circulation	→ Site of oxygenation is lungs
→ Oxygenated blood is carried from placenta to fetus ↓ umbilical vein → Deoxygenated blood is carried from fetus to placenta ↓ umbilical artery → Both sides of heart work parallelly	→ Oxygenated blood is carried through arteries → Deoxygenated blood is carried by veins → Both sides of heart work in series

Fetal circulation	Adult circulation
→ There are 3 shunts (By pass)	→ No shunts

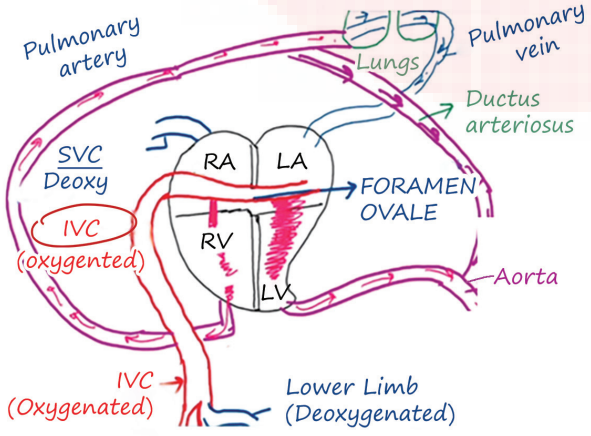


Figure: Fetal circulation shunts

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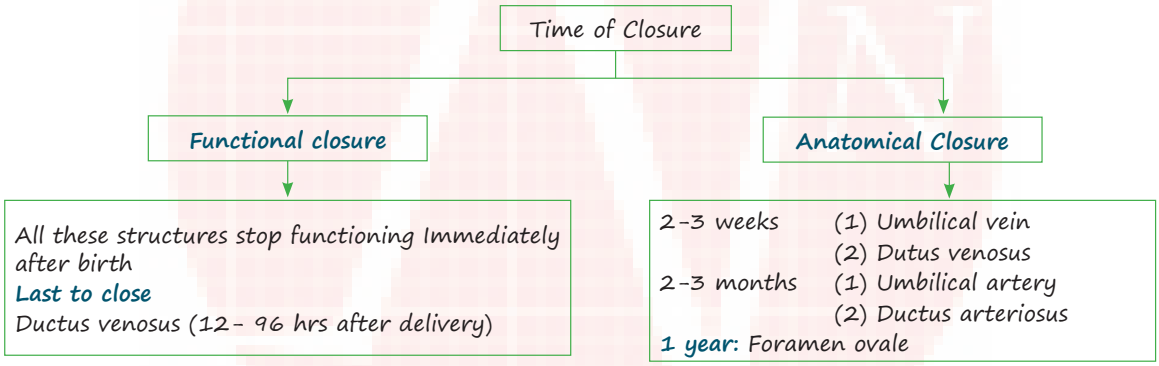
Shunts	
1. Ductus venosus	Connect umbilical vein to IVC (Inferior vena cava)
2. Foramen Ovale	Connects RA to LA
3. Ductus arteriosus	Connects pulmonary artery to the aorta

At the time of birth

1. Lungs start functioning
2. Placenta stops functioning

Changes at time of birth

1. Lungs: Become site of oxygenation
2. Following structures close:
    1. Umbilical artery
    2. Umbilical vein
    3. Ductus arteriosus
    4. Ductus venosus
    5. Foramens ovale



Fetal structure	Adult remnant
1. Ductus arterious	Ligamentum arteriosum
2. Ductus venosus	Ligomentum venosum
3. Foramen ovale	Fossa ovalis
4. Umbilical vein	Ligamentum teres
5. Umbilical arteny	→ Proximal part: Superior vesical artery → Distal part: Medial umbilical ligament

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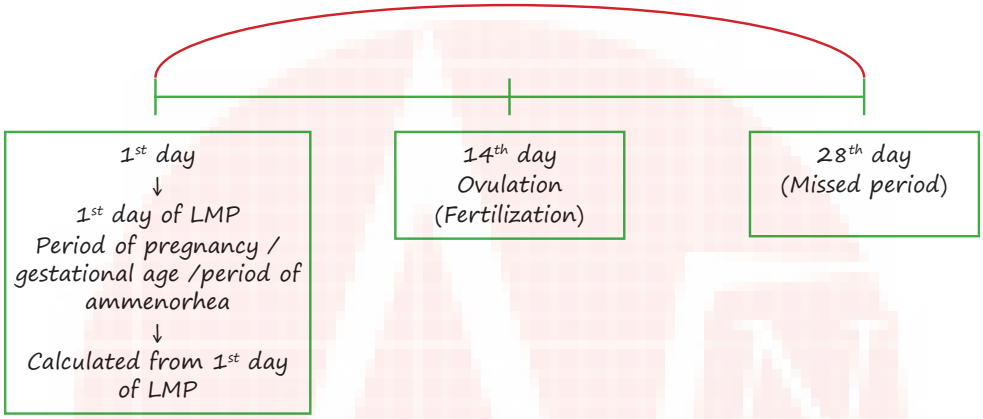
BASICS OF PREGNANCY (PART-1)



→ **Total duration of pregnancy:**

Months = 9 months + 7 days
Weeks = 40 weeks
Days = 280 Days

} Calculated form 1st day of last menstrual period (LMP)



→ How to calculate 'Expected date of delivery'(EDD)?

Using NAEGLE formula

1st day of LMP = add 9 months + 7 days = EDD.

Case 1: Calculate EDD if LMP is August 15th 2020?

↓ + 9 ↓ + 7
May 22

EDD = 22nd May 2020

→ What% of female will deliver on exact EDD?

→ Only 40% females deliver on their exact EDD. 50% females deliver either 1 weeks before or 1 week after their EDD.

Student's Space



Some Important definitions:

1. **Period of viability:** It is that period after which if delivery occurs fetus is capable of Independent existence.
   - → Period of viability differs from country to country.
   - → Period of viability depends on medical facility in that country.

In US = 20 weeks
In India = 28 weeks
WHO = 24 weeks

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2. ABORTION	IUD	STILLBIRTH
↓ Death of fetus before period of viability ↓ WHO definition Death of fetus when weight of fetus is< 500gms	↓ Death of fetus after the period of viability ↓ WHO definition Death of fetus when weight of fetus is> 500gms	↓ Death of fetus during the process of delivery.

Q. When is weight of fetus = 500 gms
Ans: **22 Weeks/154 days**

3. **Preterm delivery:** Delivery at <37 weeks is preterm
4. **Post-term delivery:** Delivery at ≥ 42 weeks is post-term (42 × 7 = 294 days)
5. **Term delivery:** Delivery between **37 weeks → 41 weeks 7 days** is term delivery

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Let Talk about:

GRAVIDA: It is the total number of times a female becomes pregnant (irrespective of outcome of pregnancy)

1. Present pregnancy is included
2. Abortion/ectopic pregnancy/molar pregnancy /intrauterine death (IUD)/stillbirth
3. Twin are taken as single pregnancy

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WHO is?

→ **NULLIGRAVIDA:** (No + Pregnancy) any female who has never become pregnant.

→ **PRIMIGRAVIDA:** A female who has conceived for first time

→ **MULTIGRAVIDA:** Any female who has become pregnant more than once is called multigravida.

→ **ELDERLY PRIMIGRAVIDA:** Age of female ≥35 years & 1st time pregnancy.

Parity:

→ It is then number of pregnancy which has gone beyond the period of viability

→ If female is currently pregnant, then her current pregnancy is never include in parity

→ In parity twin pregnancy taken as 1, except if we are counting the number of living children.

→ India period of viability = 28 weeks

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Who is?

→ NULLIPARA: None of pregnancy was viable pregnancy

→ PRIMIPARA: Any female who has 1 viable pregnancy

→ MULTIPARA: Female in whom >1 pregnancy is viable pregnancy

→ GRAND MULTIPARA: Female who has ≥ 4 viable pregnancy.

PRIMIGRAVIDA female = (1^{st} time conceive)

↓

Delivery

↓

After delivery PRIMIPARA

Wow write Gravida & parity using **GTPAL system:**

G_x → No. of times female has conceived

P_a → No. of term pregnancies (37 weeks → 41 weeks + 6 days) +

B → No. of preterm delivery (< 37 weeks) +

C → No. of abortions. +

D → No. Living children at Present (Twins = 2, Triplets = 3, Death = 0), No. of Abortions

G → Gravida

T → Term

P → Preterm

A → Abortion

L → Living children

Case 1:

A 32 weeks pregnant female come for antenatal checkup. While collecting data. She informs the nurse that. She has a 5 year old Son. Who was from vaginally at 38 weeks. 2 twins daughters born at 34 weeks. Both of them are 3 years old. 1 year back she had a son who was born at term but died later due to diarrhea?

$G_4P_{2+1+0+3}$

Case 2:

Savita is 39 weeks pregnant. She has a baby girl born at 39 weeks. A second baby born at 38 weeks and history of 1 abortion.

$G_4P_{2+0+1+2}$

An easier way of writing Gx Pm+n GRAVIDA

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G_x → No. of times a female has conceived

P_m → No. of pregnancy which has gone beyond period of viability

n → No. of abortion

Q. G_3P_{1+2} means?

G_3 No. of times female has conceive = 3

P_{1+2} = 1 Pregnancy has gone beyond period of viability, have 2 abortions.

The Entire duration of Pregnancy: Divided into 3 Trimesters:

→ 1st TRIMESTER: 1st day of LMP → 13 weeks + 6 days

→ 2nd TRIMESTER: 14 weeks→ 27 weeks + 6 days

→ 3rd TRIMESTER: ≥ 28 weeks → 40 weeks

Symptoms & signs in first Trimester:

Symptoms:

U = ↑ Urinary frequency (seen in pregnant female in 1st & 3rd Trimester)

Are = Amenorrhea

My = Morning sickness (Nausea & vomiting pregnant female due to HCG)

Best = Breast discomfort

Friend = Fatigue

If there is excessive vomiting during pregnancy which leads to weight loss in female

↓

Hyperemesis gravidarum

↓

Excessive hCG

↓

High - H. mole (molar pregnancy)
Court - Choriocarcinoma
Demands - Down syndrome (trisomy 21)
Riya's - Rh incompatibility
Testimonial - Twin pregnancy

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BASICS OF PREGNANCY (PART-2)

Signs in First Trimester:

Earliest sign: Goodell sign → softening of cervix } at 6 weeks of pregnancy

Non pregnant female = Tip of nose

Pregnant female = Lips.

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Hegar sing:

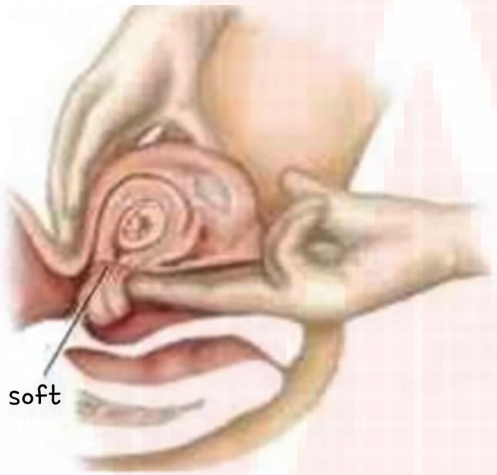


Figure: Hegar sigh

Become positive at 6-10 weeks of pregnancy

It is based on the fact that
↓
The lower part of uterus (Isthmus) is empty and soft in early pregnancy
↓
So on Bimanual palpation with one hand inside the vagina and other hand behind uterus
↓
Fingers of both hand seem to be touching each other.

Become positive at 8 week of pregnancy

- → **PISKACEK sign:** Unequal growth of uterus in early pregnancy. It is due to lateral implantations.
- → **OSIANDER sing:** Pulsation felt in lateral fornix of vagina.
- → **PALMAR signs:** Irregular contraction of uterus in 1st trimester
- → **CHADWICK/JACQUIEMIER sign:** Bluish discoloration of vagina or cervix during pregnancy.

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Size of uterus in first trimester

→ At 6 weeks: Size of uterus: Hens egg
→ At 8 weeks: Size of uterus: Cricket Ball
→ At 12 weeks: Size of uterus: Fetal heads size

In first trimester fetal heart sound can be heard by: Doppler (at 10 weeks of pregnancy)

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Second Trimester

Symptoms:

1. Uterus will progressively enlarge
   → **In First term** = uterus enlarge was intrapelvic organ
   → **At 12 weeks** = height of uterus is at the level of Pubic Symphysis
   → **In Second term:** Uterus becomes abdominal organ
2. Quickening:
   ↓
   Perception of fetal movement by the mother for first - time in pregnancy

PRIMIGRAVIDA: At 18 week (18-20)
MULTI GRAVIDA: At 16 weeks 1 16-18)

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Signs:

BRAXTON HICKS Contraction:

4 charateristics

1. SPORADIC /Infrequent
2. NON RHYTHMIC
3. PAINLESS
4. Don't lead to dilation of Cervix

→ At time of Braxton Hicks Contraction Intrauterine Pressure: Usually <8 mm of Hg (5-25 mm Hg)
→ It can be felt after: (16 weeks of Pregnancy)
→ Not felt in: Abdominal pregnancy (Ectopic Pregnancy)
→ Later on it becomes: Converted into false labor Pains.

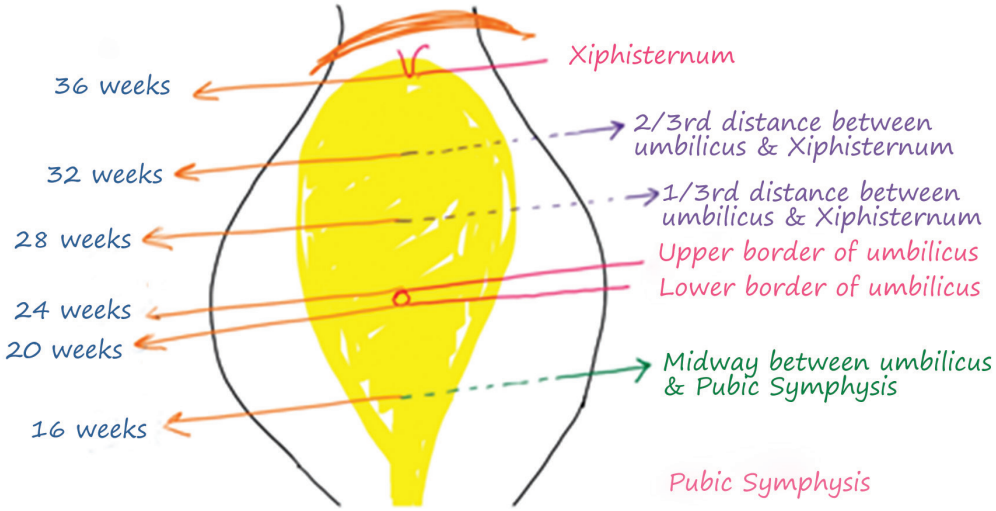
Event	Time
Fetal Heart Sound can be heard by Stethoscope	18-20 weeks
Fetal movements can be felt per abdominally	16-18 weeks
Fetal parts can be feel Per abdominally	20 weeks

THIRD TRIMESTER

Symptoms:

→ Urination frequency returns

→ Lightening/Welcome sign: Seen after 36 weeks of pregnancy.



At 36 weeks of Pregnancy

↓

Mother will have lot of Respiratory discomfort

↓

After 36 weeks head of fetus goes down into pelvis

↓

Height of Uterus decreases at 40 weeks & become same as 32 weeks

↓

Mother will be relieved from Respiratory discomfort

↓

Called as Lightening / Welcome sign

Q. What is being done in image below?



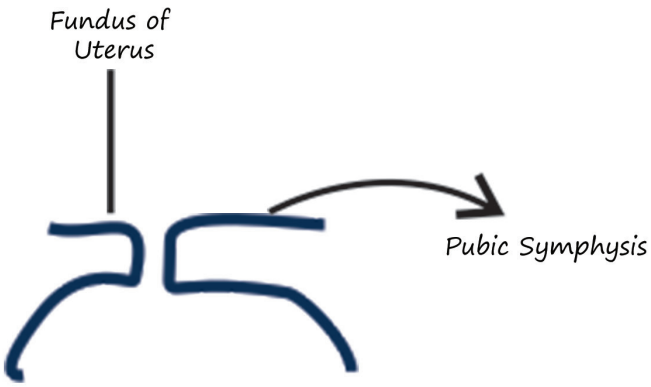
Figure: Symphysis fundal height

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How to measure?

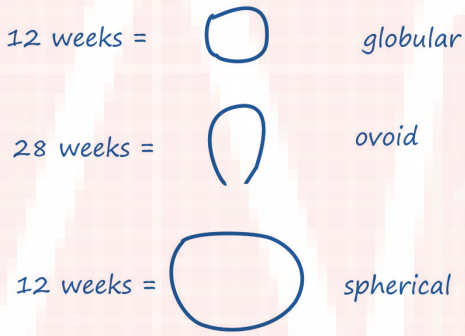


Prerequisite: To empty the bladder

Significance:

After 24 weeks: Symphysis Fundal Height in centimeters (cm) Corresponds to gestational age with slight Variation.

Shape of Uterus:



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Signs in Pregnancy

Seen & felt by Patient
↓
PRESUMPTIVE SIGN
↓
- → Breast discomfort
- → Amenorrhea
- → Fatigue
- → Chloasma
- → Breast Enlargement
- → Linea Nigra
- → Striae gravidarum

Felt by examiner but not 100% diagnostic
↓
PROBABLE SIGN
↓
- → Osiander sign
- → Goodell sign
- → Piskacek sign
- → Hegar sign
- → Palmar sign
- → Braxton Hicks contraction

Felt by examiner & 100% diagnostic that patient is pregnant
↓
DEFINITIVE SIGN
↓
1. Evidence of Pregnancy on USG
   - → Cardiac activity
   - → Gestational sac
   - → Fetal pole
   - → Fetal part
2. If Fetal Heart sounds are heard
   - → Doppler
   - → Stethoscope
3. If fetal Parts are felt Perabdomen / Fetal movement
4. If on X-Ray fetal skeleton can be seen. (16 weeks of pregnancy) (x-ray is contraindicated in Pregnancy)

Pseudocyesis/False Pregnancy

↓

When a female assumes she is pregnant but actually she is not pregnant:

None of the definitive signs of pregnancy are seen.

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ANTENATAL CARE



Objectives of Anenatal Care

WHO: Says: "Health for All"
↓
Health during Pregnancy
↓
Need for essential Obstetric care during Pregnancy (continued Risk assessment)

- Identify high risk female
- Identify any Pregnancy related complication
- Preventive Care
- Educate female Regarding
  - → Changes in Body
  - → Complication
  - → Answer her fears & concerns

Antenatal Visit: Number

IDEALLY:

→	Up to 28 weeks	= 1 visit every 4 weeks
→	28-36 weeks	= 1 visit every 2 weeks
→	≥36 weeks	= 1 visit weekly
	Total:	12-15 visits

↓

Not possible for every pregnant female

Not possible for every pregnant female

- WHO
  Earlier = Minimum (3)
  Recently = (8)
- Government of India (GoI)
  ↓
  Minimum number of Antenatal Visit = (4)



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WHO: Minimum number of antenatal visit

GOI
(4)
1st visit: 8-12 weeks
(Registration visit)
2nd visit: 24-26 weeks
3rd visit: 32 weeks
4th visit 36-38 weeks

2016 modification of WHO
↓
(8) minimum-visit / contact
↓
with any Health care person

1st = 1st Trimester
2
3 } 2nd Trimester
4
5
6 } 3rd Trimester
7
8

Procedure at first visit:

- → Obstetric score (Gravida, Para)
- → EDD calculate, period of Gestation calculation
- → Detailed history & Clinical Exam
  - → History of Present Pregnancy
  - → H/O Past Pregnancy
  - → Menstrual History
  - → Past medical/surgery/Drug History
  - → Family History
  - → Personal History (smoking/alcohol)

Clinical Exam:

- → Build (height & weight) = 4 feet 10 inches less
  ↓
  (chances of Cephalopelvic disproportion)
- → Nutritional status
- → Specifically pallor
- → **Edema**: Some edema is normal during pregnancy
  ↓ mild
  Pitting edema
  ↓
  Specifically in ankles
- → Physiological Edema → Subsides by Rest

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- → Pathological Edema
  - → Does not subside after rest.
  - → Above ankle also.
- → Pulse rate.
- → Blood pressure

During pregnancy: BP is Normal & is on lower side → BP decreases in pregnancy → 2nd trimester more in diastolic Previous in comparison to systolic BP

Due to Progestrone → Smooth muscle relaxant ↓ ↓Peripheral Vascular Resistance

Any time BP >140/90 mm Hg

↓

Hypertension in pregnant Female

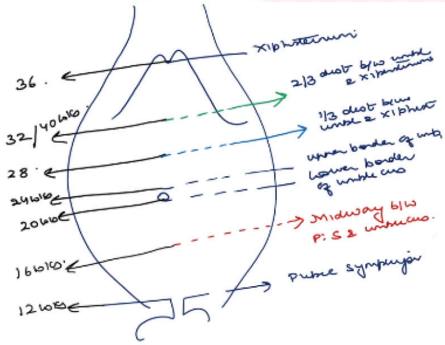
- → **Thyroid check for goitre:** (Hypothyroidism is seen in pregnancy due to Iodinedeficiency in developing countries)
- → Breast Examination.
- → Auscultate = Heart + Lungs

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Obstetric Examination:

Per Abdominal Examination: Check Fundal Height of uterus

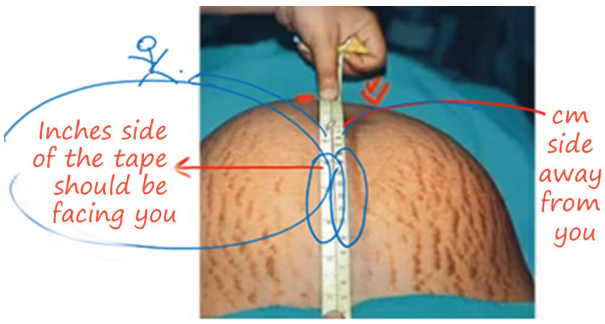
- → Bladder should be empty
- → Lying in dorsal position with hip & knee flexed
- → Use = ULNAR border of hand to assess fundal height
- → Start from pubic symphysis & then go upwards
- → Wherever uterus is felt. = Make 'X' Mark



Symphysio Fundal Height Measurement:

- → Measured with measuring Tape
- → One end = Pubic Symphysis & other side on 'X' mark
- → Measured in cm
- → Patient's legs straight (extended)

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Symphysio Fundal Height is very important after 24 weeks:

After 24 weeks:
→ Symphysio fundal Height in cm (centimeter)
→ Corresponds to the number of weeks upto 36 weeks

Fetal Heart Sound

- By Hand Held Doppler ↓ As early as 10 weeks it can detect FHS
- By stethoscope ↓ By 18-20 weeks Definitively= 22 weeks



Do: Per speculum examination
↓
To see the Cervix

Per Vaginal Extermination:

→ Can be done in Early pregnancy when uterus is intrapelvic organ to diagnose pregnancy
→ To assess size of uterus
→ To rule out pelvic Pathology.

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Contraindicated:

In case of Ante Partum hemorrhage

→ Any bleeding per Vaginal

→ H/O Previous abortion.

→ On USG = Low lying placenta

→ If patient complains of leaking of fluid from vagina.

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Investigation Done in 1st Visit:

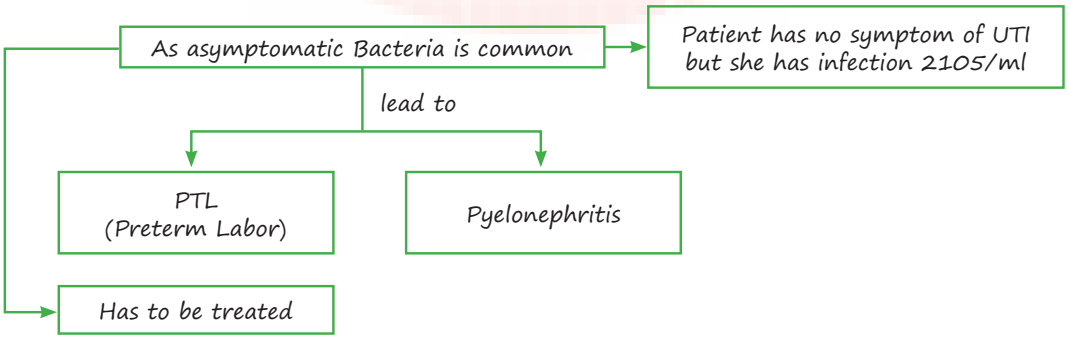
1. Hb & Hematocrit = in every trimester
   ↓
   <11 gm Anemia in Pregnancy.

   Anemia is most common Indirect cause of Maternal Mortality
2. Blood glucose = **75 gm & 2 hours GTT** → If negative
   ↓ after 2 hours ↓
   <140 mg/dl = Normal Repeat at 24-28 weeks
   <140 mg/dl Gestational Diabetes
   >200 mg/dl = overt diabetes
3. Screening for syphilis: VDRL
4. HIV testing → **But it is "opt out" approach**
   → Routine
   → Council the patient to get it done.
5. Urine Routine Microscopy (In every visit):-
   → Pus cells
   → RBC cast
   → Sugar } Dipstick method
   → Protein }

If urine Routine microscopy - shows pus cells

↓

Do a culture sensitivity



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→ **Routine USG in Pregnancy:** 1st Trimester

USG

↓

Dating Scan

↓

Best for assessing gestational age of fetus
(Parameter used - Crown Rump length)

Special Investigation: (Not a part of Essential Care)

→ Serum TSH

→ Screening for Thalassemia trait

→ NESTROFF test

→ Done in UP, Haryana, Punjab Routinely done in medical Colleges.

→ Screening for sickle cell Anemia

→ Done in Central India

→ Down syndrome screening:

→ Done if patient can afford in all female irrespective of age of mother

→ Antibody for Rubella Immunity:

→ Done in Preconception period,

If Female has

Antibodies Present (+nt)
↓
Immune to Rubella infection
↓
Previously Rubella vaccine/
Previously Rubella infection

Antibodies (Absent)
↓
Give Rubella vaccine (Patient is not pregnant)
Pregnancy C/I X at least 1 month
↓
Patient is Pregnant: Cannot give Rubella vaccine during pregnancy:
Advise: Avoid crowded places in first Trimester, avoid going parks, etc.

In subsequent visits:

→ Ask for complaints

→ Ask about fetal movement

→ BP

→ Urine

→ Routine

→ Microscopy

→ Hb in each trimester (Anemia in pregnancy, Hb <11 gm/dL)

→ Obstetric examination to assess fetal growth

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At 18 to 20 weeks:

Anomaly scan (Not normal for routine USG)

or

TIFFA (Level 2 USG) (Targeted Imaging for Fetal Anomalies)

If only one USG has to be done: Best is: on Anomaly scan = 18-20 weeks

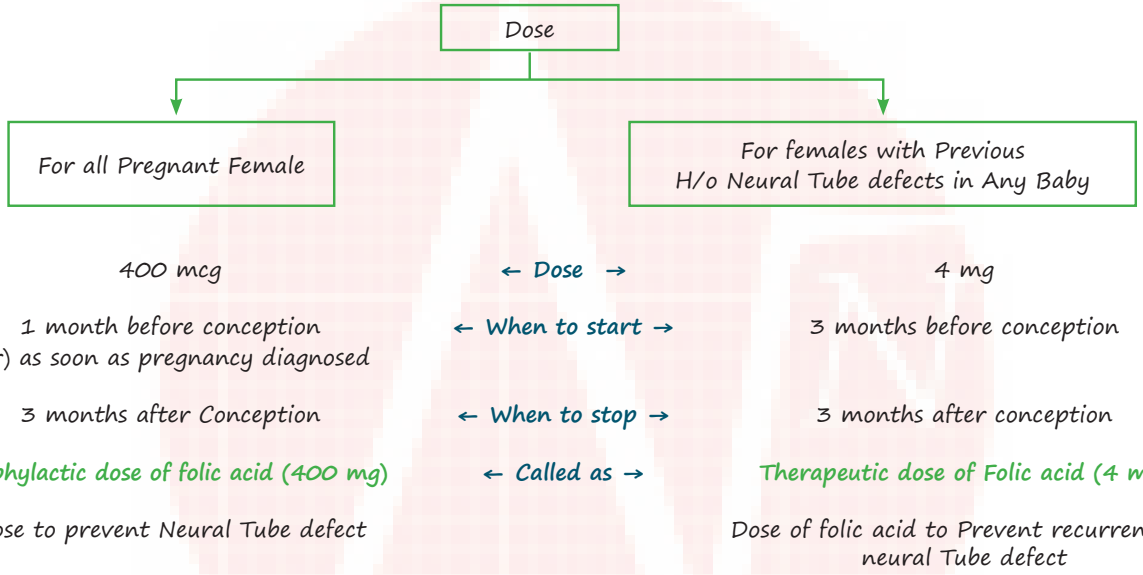
↓

as organogenesis is complete

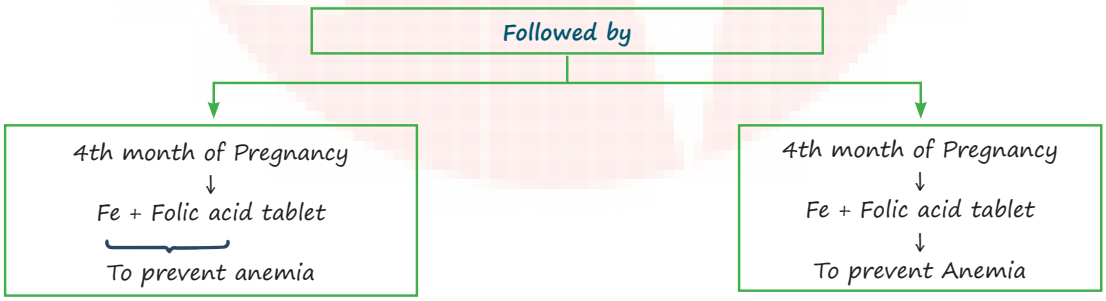
Advice to Pregnant female:

→ Folic acid supplementation

1. Given to all Pregnant female to prevent Neural Tube defects



Risk of Recurrence of NTD = 5% in Next Pregnancy



Fe supplementation in Pregnancy:

→ Total amount of Iron needed in Pregnancy = 1000 mg

Duration of Pregnancy = **280 days.**

Per day = **4-6 mg/day**

→ 1st term (x)

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→ 2nd term
→ 3rd term
} 6-7 mg/day

Only 10% of dietary iron is absorbed = Diet = **60-70 mg/day**

↓

Impossible

↓

So Iron supplementation is mandatory in pregnancy

Government of India: Fe + Folic acid = Free of cost

Anemia Mukt Bharat Programme

Fe = 60 mg
+
Folic acid = 500 mcg
} Every pregnant female should take 1 tab/day

When to start: 4th month of pregnancy (2nd trimester)

↓

Continued *180 days (6 months)

(Continues it throughout pregnancy)

+

Give it for 180 days after delivery (to Replenish Iron stores)

RDA of Folic Acid in Pregnancy: 500 mg

RDA of calcium in Pregnancy: 1000 mg (New 1200 mg/day)

RDA of Iodine in Pregnancy: 250 mg

RDA of vit D in Pregnancy: = 10 mg (400 IU)

(**Remember:** Vits D should not be taken in 1st trimester

↓

Congenital malformation)

→ **Extra calories: 350 kcal/day**
  → Required in 2nd/3rd Trimester
  → Not in 1st trimester
→ **Non Pregnant:**
  → Total Calories = 2200 kcal/day
  → Pregnancy = 2550 kcal/day
→ **Protein :**
  → Non Pregnant = 1 gm/kg/day
  → Pregnancy: = 1. 2-1.5 gm/kg/day

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Immunization in Pregnancy

General Rule: All Live vaccines
↓
C/I in Pregnancy
All Killed Vaccines
↓
can be given in Pregnancy

- Absolutely safe
  - **H** = Hepatitis
  - **I** = Influenza
  - **T** = Tetanus
  - **Rabies** = Rabies
- Absolutely C/I
  - Mumps
  - Measles
  - Rubella
  - Small pox
  - Chicken pox
  - HPV vaccine

Pregnancy is Contraindicated X 1 Month

→ Generally not given but can be given in Epidemic/ Pregnant female travelling to Endemic area:
  → Yellow fever
  → Cholera Vaccine
  → Polio Vaccine

→ **Tetanus Immunization:-** Tetanus Toxoid & Diptheria Toxoid

1st dose (Td_1):	Early in pregnancy (1st visit it self)
	↓ after
2nd dose (Td_2):	4 weeks

T_d Booster: (In 3rd Trimester): If pregnancy occurs within 3 years of last Pregnancy & 2 Td doses were received. (No need to give Td_1, & Td_2)

Dose: 0.5 ml IM

Site: Upper arm.

WHO now recommends: Tetanus + Diphtheria Toxoid to be given in together in all pregnant females

Antenatal advice:

→ **Sleep:** Minimum = 10 hours
  → 8 hours night
  → 2 hours day/time

→ **Position:**

Not lie in supine position
↓
Gravid uterus
↓
Presses on IVC
↓
Venous return ↓
↓
Mother's BP ↓
Supine Hypotension Syndrome

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Advice: Left Lateral or Right Lateral Position.

Oral Hygiene:

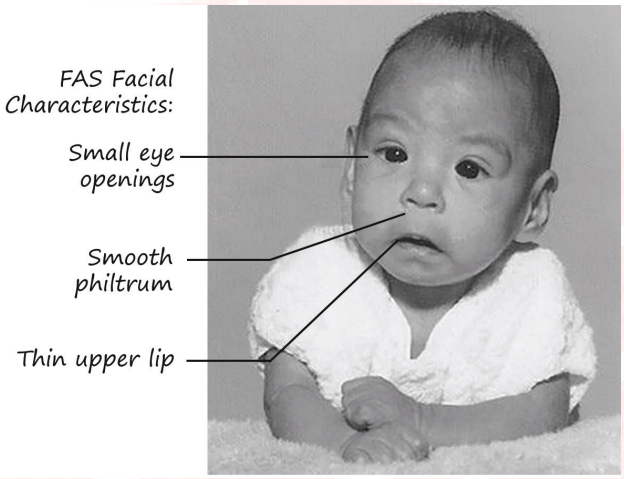
→ No infections
→ As infection → Preterm Labor.
→ Report if fever occurs

Advice: Quit smoking & Alcohol

↓ ↓

IUGR **Fetal Alcohol Syndrome**

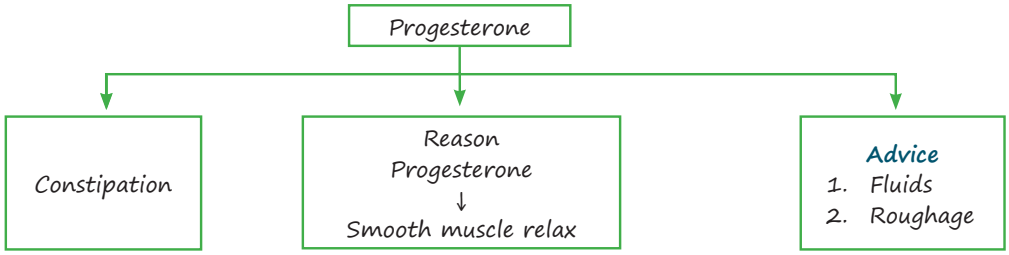
→ IUGR
→ Facial dysmorphia
→ CNS Abnormality



Sexual Activity:

→ Coitus is not contraindicated
→ H/o Bleeding in pregnancy
USG = low lying placenta
↓
Sexual activity is C/I

Bowel Habit:



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Warning signs of Pregnancy: Patient should be advised to Report Immediately:

1. Leaking of fluid from vagina
2. Fever (especially if it is high grade)
3. Bleeding
4. Painful uterine Contraction
5. Decreased fetal movements

Slight increase in temperature is Normal during pregnancy = Why?
Progestone = Body Temperature ↑

Minor ailment	Advice
1. Nausea / vomiting in Pregnancy /morning sickness ↓ → Due to hcg → Peaks = 8-10 weeks → Subside = within 16 weeks 2. Heart Burn ↓ due to Progesterone ↓ Lower esophageal sphincter relax	→ Avoid liquids with food → Before getting out of bed eat Biscuit → Avoid tea & coffee **Drug:** Vit B6 + Doxylamine (Bed time) → Avoid spicy food → Small frequent meals → Head up position - Rest → Drug → Antacid's
Backache → Due to lordosis → Faulty posture → Weight gain **MC from 2nd Term onwards** → Calcium stones fare for pregnancy	→ Calcium supplementation (500 mg Tab, **1. OD, 2. BD**) → Vit D supplementation ↓ Never in 1st trimester TERATOGENIC → **Advice** = Not take calcium & Iron together **Better:** → F_2 = Day Time → La = Bed time → Postural advice
Leg cramps Due to (1) ↓ calcium (2) ↑ Lactic acid (3) Varicose veins	→ Calcium supplement → Elastic stocking → **Extension of knee & Dorsiflexion of foot.** 

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Minor ailment	Advice
Dizziness & syncope Mainly due to IVA compression	→ Patient should lie in Left lateral position
Vaginal discharge	→ Ask about associated symptoms → Do per speculum examination → If Infection (+): Treatment done (Preferred) **[1st trimester → Local Treatment]** **Fungal:** Clotrimazole pessary **Bacterial vaginosis** → Metronidazole pessary **Trichomonas:** Miconazole pessary



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USG IN PREGNANCY



METHODS

1. **Transabdominal Scan (TAS)**
   - → Use in 2nd trimester & 3rd trimester
   - → Probe Frequency:- 3.5 MHZ
   - → If used in early pregnancy→ **A full bladder is needed for proper visualization,**
2. **Trans Vaginal Scan (TVS)**
   - → Commonly used in 1st trimester and as all structures can be seen I week earlier than Transabdominal scan
   - → Probe frequency -5-7 MHZ
   - → Bladder should be empty for TVS.

TAS (Transabdominel Scan) **2 varieties**

Level 1/Routine Usg
→ Done between 10-14 weeks.
It is done to know:
1. Number of fetus
2. To document pregnancy
3. To know gestational age

Level II
TIFFA (Targeted Imaging for Fetal Anomaly/Targeted scan)
↓
→ Can detect all congenital malformations.
→ Done between 18-20 weeks

Only few Anomalies can be detected:
→ Anencephaly
→ Limb Reduction defect

In Pregnancy :- Schedule USG
1. Initial scan: At Booking (10-14 weeks) = TVS (Prefer)
2. Targetted scan:- At 18-20 weeks
   If needed: 3rd trimester scan
   1. To localize placenta
   2. Check fetal growth
   3. High risk Pregnancy



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Q. Best Investigation to detect congenital Malformation :
Best Answer:- TIFFA (Targeted scan)
Level II Scan

Q. If in pregnancy: - USG has to be done only once
At what Time: 18-20 weeks.

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Remember: Usg is absolutely safe in Pregnancy.

USES of Ultrasound:

1. To tell number of fetus: Singleton, Twin, Triplet, quadruplet.
2. It confirms pregnancy: Best test to confirm pregnancy = USG

Sign	TVS	TAS
Gestational Sac (1st sign of pregnancy)	4 weeks	+ 1 week
Yolk Sac	5 weeks	+ 1 week
Cardiac Activity	5-6 weeks	+ 1 week

→ Cardiac activity appears in 5 week of gestational Age.

→ Cardiac activity can be earliest seen: 5 weeks

1st sign of Pregnancy on USG: Gestational sac.

Gestational Sac → can be seen in both

Intrauterine pregnancy & Ectopic pregnancy

- **Intrauterine pregnancy** ↓ True gestational sac (located eccentrically on one side)
- **Ectopic Pregnancy** ↓ Pseudo gestational Sac (located in centre)

Very Important Point:

Mean sac diameter ≥ 25 mm & there is no cardiac activity

↓

Blighted oven

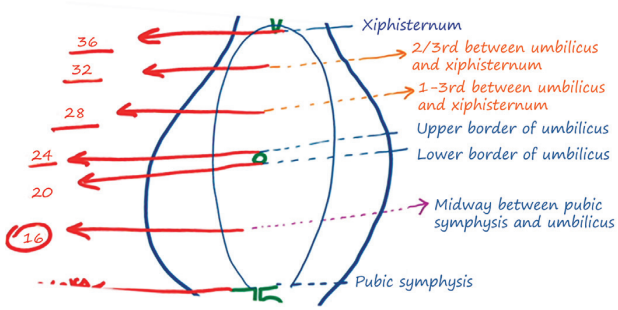
↓

(Pregnancy stopped at Stage of fertilized ova)

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To know gestational age: 2 methods

Clinical method



→ At 36 weeks of pregnancy uterus is at the level of xiphisternum

↓

It will push the diaphragm up

↓

Patient will have lot of Respiratory discomfort.

→ **After 36 weeks:** The head of fetus goes down into the pelvis. (Engagement)

↓

So height of uterus will decrease & at 40 weeks height of uterus is equal to height of uterus at 22 weeks

→ Because at 40 weeks = Head of fetus goes down into fetus.

↓

So height of uterus decreases

↓

So mother's Respiratory discomfort decreases

↓

She feels light. This is called **Lightening / WELCOME sign**
(38-40 week of Pregnancy)
(Late Third Trimester)

USG

Trimester:	USG Parameter used to detect Gestational age
1st Trimester:	CROWN Rump length (CRL)
2nd Trimester:	Biparietal diameter (Head circumference)
3rd trimester:	Femur length

→ The earlier you do the USG in Pregnancy - More accurate it tells about gestational age

→ Best USG parameter to detect fetal age / gestational age
= Crown rump length

→ Best time in Pregnancy to detect gestational

→ Age→ **1st Trimester**

1. CRL is (Crown Rump length) is measured from Vertex to corcyrax
2. CRL + 6.5 = weeks of pregnancy
3. CRL + 42 = Days of pregnancy

Defects that can be detected on USG

Level 1 USG

↓

→ Normal usg

→ It can detect very few congenital malformation:
- → Anencephaly
- → Spina Bifida

} **Neural Tube defect**

- → Limb Reduction defect

Level 2 USG

↓

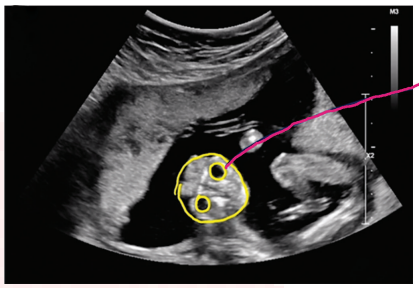
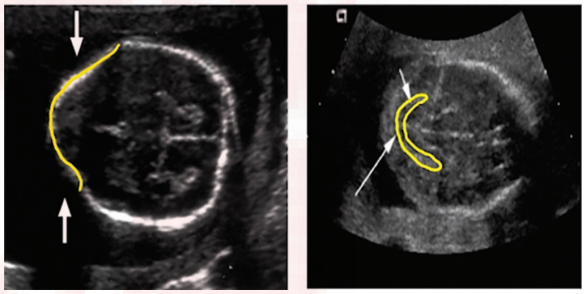
Targeted Scan

↓

Can detect all congenital malformation

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Signs on USG	Congenital Malformation
1. Increased Nuchal Translucency (1st term)	1. Down Syndrome 2. Turner Syndrome 3. Congenital Heart defect
2. Absent Nasal bone → Shoot femur → Short humerus } 2nd trimester → Increased Nuchal skin fold thickness	Down syndrome
3. Frog eye sign Mickey mouse sign	 Figure: Anoncephaly
4. Lemon sign Banana sign	SPINA BIFIDA. Lemon sign Banana sign 

→ For growth of fetus: on USG there is only a parameter

↓

Abdominal circumference (Fetal)

In any Trimester

Formulas used to calculate weight of fetus:

1. Hadlock formula
2. Shephard formula
3. Johnson formula

→ Best USG Parameter to ascess the growth: Abdominal Circumference

→ Best USG Parameter to detect Macrosomia; abdominal circumference.

Lets Revise:

→ Hormone Responsible for fetal growth: Insulin & Insulin like growth factors.

ANENCEPHALY

→ It is a neural Tube Defect.

Problem → Main:- Skull/cranial vault of baby is absent (Brain of Baby is exposed)- such babies cannot survive

-Associated problems:

- Adrenal glands of fetus are absent
- Swallowing defect

1. Polyhydramnios
2. Preterm labor
3. PROM
4. Post partum
5. Haemmorhage

DHEA-sir not formed
↓
Placenta cannot form estrogen
↓
Estrogen cannot Signal to uterus to contract
↓
Can lead to Postterm pregnancy

→ Most common in female fetus

→ It has chances of Recurrence:

If previous 1 NTD baby - 5%

If previous 2 NTD baby = 10%

Therefore

Dose of Folic acid is increased in females who have History of Previous Neural Tube defect Baby

How to diagnose Anencephaly?

New concept
↓
→ Screening = USG (level 1)
→ Diagnosis = (Level 2)

Old concept (NOT DONE NOW)
Screening = Maternal Blood Levels of AFP

Because if baby has any NTD, then level of AFP will be raised in Mother also

Test ≥ 15 weeks
Best time → 16-18 weeks
Diagnostic: Amniocentesis.

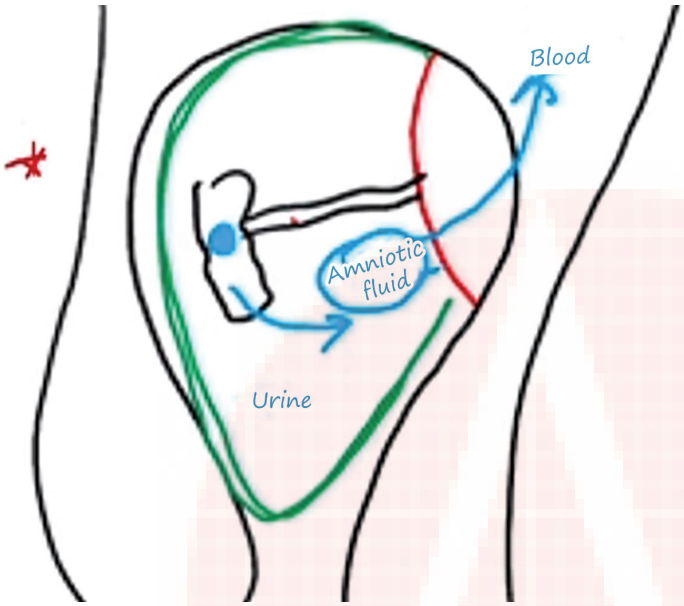
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Alpha Feto Protein (AFP)

→ Glycoprotein, produced by Fetus

- **Initially** Yolk sac
- **Later** Liver



Fetus = NTD

↓

↑AFP

↓

Urine = Amniotic fluid

↓

Mother Blood

→ **Maximum levels of AFP seen:-** Fetal Blood

→ In maternal blood it can be detected: ≥ 15 weeks of pregnancy
Best time (16 - 18 weeks of pregnancy)

→ Unit of measurement: Multiple of Meridian = MOM

→ Normal mother Blood = <2.5 MOM
(Abnormal = ≥ 2.5 MOM)

AFP & NTD/ Anencephaly
→ In NTD: levels of AFP are increased
→ **Best Biochemical Marker to diagnose Arecephely:** ACETYLCHOLINESTERASE

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Condition where

AFP increased	AFP decreased
→ Neural Tube defect → Abdominal wall defect → Pilonidal Sinus → Sacrococcygeal Teratoma	M - Molar Pregnancy A - Abortion D - Down Syndrome Diabetes (mother)

USG for Anencephaly:

1. Anencephaly can be diagnosed by Level I USG / Routine USG
2. Earliest Anencephaly can be detected on USG on 14 weeks of pregnancy
3. Best time Anencephaly can be detected on USG -14 weeks of pregnancy
4. Sign of USG of Anencephaly → Mickey mouse sign ↓
   Frog eye sign →



Prevention of Anencephaly /NTD:

↓

By giving Folic acid to mother

↓

Dose

To prevent NTD in a pregnant female who has never given birth to a NTD baby ↓ 400 mcg/day (PROPHYLACTIC DOSE)	To Prevent recurrence of NTD in a Pregnant female who earlier has had never given birth to a baby with NTD ↓ 4 mg/day (THERAPEUTIC DOSE)

When to start Folic Acid ?

Ideally: Folic acid should be given 1 month before conception and continue for 3 month after conception.

→ If female does not come for advice before planning pregnancy

↓

Then start Folic acid from the day Pregnancy is diagnosed.

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DOWN SYNDROME



Number of chromosomes in Human

↓

46 chromosomes/23 pairs

↓

44 are autosomes & 2 sex chromosomes
(22 pair autosomes + 1 pair of sex chromosomes)

→ Males: 22 pair + XY

→ Females: 22 pair + XX

46 = is called Diploid number

→ **Human cells are diploid except:**

Gametes

- Male gamete (Sperm) (23)
- Female gamete (Ova) (23)

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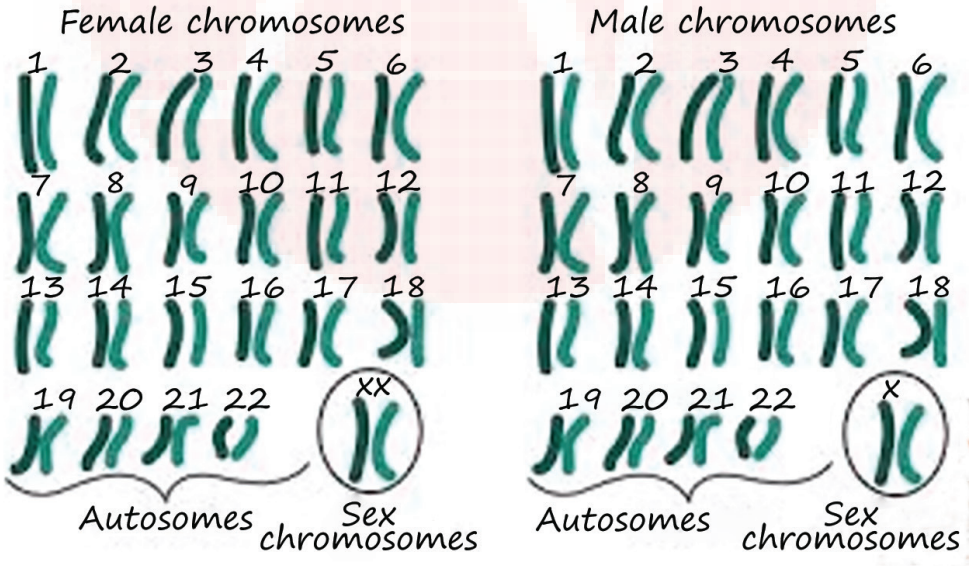
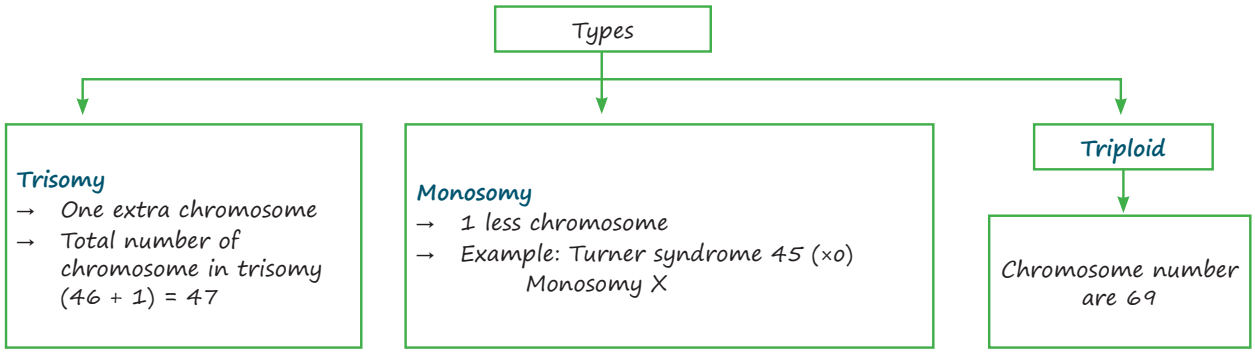


Figure: Chromosome

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What is Aneuploidy? Means defect in chromosome number

Aneuploidy:



Except: Trisomy 18

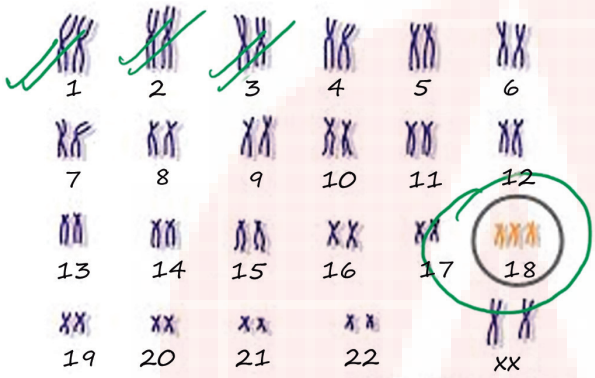


Figure: Trisomy 18

EDWARD syndrome

↓

Most common trisomy

Trisomy 13 (Patau syndrome)

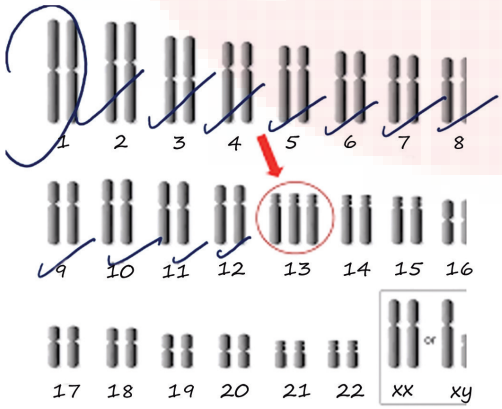


Figure: Trisomy 13 (Patau syndrome)

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Trisomy 21 (Down syndrome)

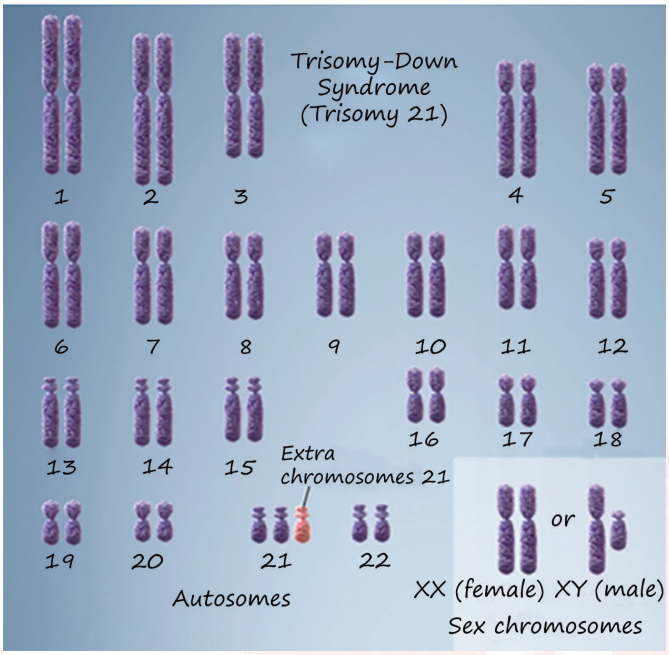


Figure: Trisomy 21 (Down syndrome)

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Important Trisomy

- → Most common trisomy: Trisomy 18
- → Trisomy 18 = Edward syndrome
- → Trisomy 13 = Patau syndrome
- → Trisomy 21 = Down syndrome

Down Syndrome: As maternal age increases above 30 years chances of Down syndrome in baby also increase

Screening for Down syndrome

↓

Why=?? Because Down syndrome babies have increased chances of mental retardation

In whom to do screening? All pregnant females irrespective of their age should be screened for Down syndrome **(Universal screening)**

When any pregnant female comes: You should 1st do screening test

↓

If screening test is positive

↓

Then do diagnostic test

Except: If pregnant female gives history of Down syndrome in this case directly do diagnostic test.

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Screening can be Down in:

1st Trimester	2nd Trimester
1st day of LMP → 13 weeks + 6 days	14 weeks → 27 weeks + 6 days
A. Biochemical Test ↓ Dual Test	A. Biochemical Test/ Blood Test ↓ Triple Test Or Quadruple test
B. USG	B. USG
If both are done it is called: Combined Test	

If both 1st trimester and 2nd trimester screening is done it is called INTEGRATED Screening

1st Trimester: Biochemical test/Blood Test

Dual Test: Mother blood

1. hCG level ↑
2. PAPPA level (Pregnancy associated plasma protein A) ↓

Remember: In Down syndrome all **BIOCHEMICAL** markers decrease except **(hCG Inhibin)**

1st Trimester Ultrasound

→ Measure nuchal translucency

→ It is the translucent area (Black) below the neck in the region of cervical spine



Figure: Nuchal translucency

→ If nuchal translucency is ≥3 mm it is abnormal and indicates:
1. Down syndrome (MC reason of ↑NT)
2. Turner syndrome
3. Cardiac malformation

→ Best time to measure nuchal translucency on USG is: 11-13 weeks

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2nd Trimester screening

A. Biochemical Test / Blood test

1. TRIPLE Test :- Mother blood

1. hCG	↑
2. Alpha Feto protein (AFP)	↓
3. Unconjugated Estriol (E_3)	↓

Down syndrome

Other name for Triple Test:

BART test

Kettering test

If in Triple Test, also measure levels of INHIBIN A

It is called as Quadruple test.

→ In Down Syndome ↑ Inhibin

Result of Quadruple Test in Down Syndrome: -

1. AFP ↓
2. E3 ↓
3. hCG ↑
4. Inhibin A ↑

B. SECOND TRIMESTER: USG findings which indicate that baby may have Down syndrome

1. Nuchal Skin fold Thickness→ Do not confuse with nuchal translucency

   ↓

   If it is ≥5 mm →Then it is Abnormal
2. Absent Nasal Bone
3. Short femur
4. Short humerus

NOTE:

If screening test (any) is Positive

↓

Do confirmatory Test

↓

Is called KARYOTYPING

(For Karyotyping: We need Fetal cells)
→ VIABLE

Fetal cells can be observed by:

1. Chorionic villi sampling
2. Amniocentesis
3. Cordocentesis

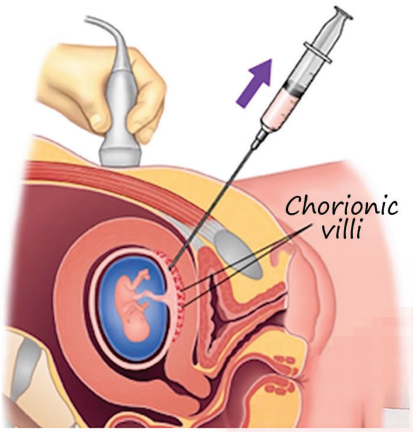
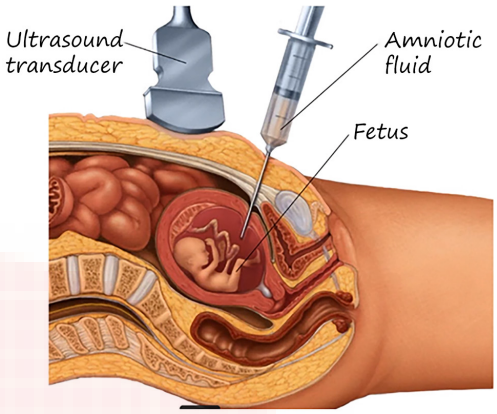
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Chorionic villus sampling	Amniocentesis
→ Sample: Chorionic villi → Study Material:- TROPHOBLAST → Test can be done: ≥10 weeks → Best time to do test: 11-13 weeks (first trimester)	→ Sample: Amniotic fluid. → Study Material: Fibroblast Amniocytes → Test can be done: ≥15 weeks. → Best time to do test: (16-18 works) Second Trimester
 Figure: Chorionic villus sampling	 Figure: Amniocentesis
→ **Advantage:** Gives faster result (24-48 hrs) → **Disadvantage:** Chances of fetal loss (1%)	→ **Advantage:** 1. Chances of fetal loss is less (1 in 300 procedures) 2. Safer 3. Used for knowing fetal lung maturity
	Amniocentesis is done later in Pregnancy 1. Lung maturity of fetus 2. Fetal Infection 3. Polyhydramnios treatment → **Disadvantage:** Result comes late (7-10 days)

→ Most common complication of Chorionic villi sampling: Fetal loss/Abortion (1 in 100)

→ Most common complication of CVS done before 10 weeks: Oromandibular limb defect of fetus.

Remember:

Both CVS & Amniocentesis can tell about:

1. Defect in chromosomal Number
2. Inborn error of Metabolism (Ex- cystic fibrosis).
3. Hemoglobinopathy in fetus (Ex- Sickle cell Anemia)

But they cannot tell about:

Structural defect in fetus

↓

So USG is done for Structural defects.

Cordocentesis/Per Umbilical Blood Sampling

→ Sample → Fetal Blood → taken out from Umbilical Vein as close to placenta as possible

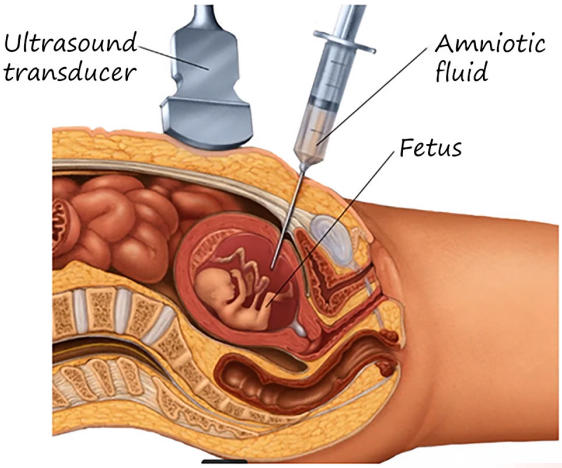


Figure: Cordocentesis/per umbilical blood sampling

→ Study material: Fetal RBC

→ Disadvantage → Maximum fetal loss late (3 in 100 procedures)

→ Not used → for Karyotyping

→ **Use:**

If we want to know the Hb of fetus.

↓

Rh isoimmunization

→ Time: ≥18 weeks

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MATERNAL ADAPTATION IN PREGNANCY (PART-1)



Weight gained in Pregnancy

Total weight gained in Pregnancy = 10-12 kg (11 kg)
1 kg = 2.2 lb
} 24 lb (Pounds)

- Weight shed off after delivery
  Reproductive weight gained
  (5-6 kg)
- Net weight gained
  (5-6 kg)

Factors on which weight gained during pregnancy depends on:

1. Socioeconomic status
   Low Socioeconomic status
   ↓
   Less weight gained
   High Socioeconomic status
   ↓
   More weight gained
2. **Parity**
   Weight gained in 1st pregnancy is more than weight gained is subsequent pregnancies
3. **Prepregnancy weight**
   Obese female gain more weight during pregnancy
4. **Associated Pregnancy conditions**
   Twin
   Polyhydramnios
   Diabetic

Smoking does not affect weight gain in pregnancy

Weight gain: Can also be a marker for some pathological conditions in pregnancy. For example:

More weight gain	Less Weight gain	Rapid weight gain
1. Diabetes in pregnancy ↓ I. Baby = weight more (macrosomia) II. Polyhydramnios 2. Twin pregnancy 3. Post-term pregnancy	IUGR in fetus	Normally weight gain should be <0.5 kg/week or <2 kg/month **But if it is more than >0.5 kg/week) or >2 kg/month. Earlier it was the criteria for diagnosing PIH**

Nursing Implication:

At every antenatal visit: Weight of pregnant female should be measured & documented

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Total amount of water Retained in Pregnancy: (6.5 L)

1. **Edema in pregnancy**
   - → It is physiological
   - → More in lower limbs
   - → Subside on taking rest.
   - → Earlier edema was one of the criteria to diagnose PIH -(Now it is not)

2. **Na^+ & K^+ concentration decreases in pregnancy**

3. **Plasma osmolality decreases in Pregnancy**

1. Extra Colories required in Pregnancy: +350 kcal/day
2. Extra Calories required in Lactation: + 600 kcal/day
3. Total Iron required/day (RDA): 60 mg/day
4. Folic acid: RDA in pregnancy: 500 mcg/day
5. Vitamin D: RDA in pregnancy : 10 mcg/days (40 IU/day)
6. Iodine RDA in pregnancy: 250 mcg/day
7. Calcium RDA in pregnancy: 1200 mg/day

→ Basal Metabolic Rate increases in pregnancy by:- **10-20%**

Progesterone

1. **Main Hormone during pregnancy**
2. Responsible for sustaining pregnancy
3. If pregnancy is less in pregnancy
   ↓
   leads to abortion

- → It is responsible for amenorrhea of pregnancy
- → Progesterone has negative feedback on LH
  ↓
  LH levels are low in pregnancy

Smooth muscle Relaxant
- → Oesophageal sphincter relax
  GERD↑ in pregnancy
- → Intestine Relax
  ↓
  Constipation
- → Vasodilation
  ↓
  Peripheral Vascular Resistance (↓) in pregnancy
- → Relaxes Ureter
  ↓
  Urinary stasis in pregnancy

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ESTROGEN: Increased in Pregnancy

Most common Estrogen in pregnancy = E_2 (Estradiol)
Most specific. Estrogen in pregnancy = E_3 (Estriol)

- Estrogen has a negative feedback on FSH → **FSH↓** In pregnancy
- Estrogen↑ Clothing factors (pregnancy is Hypercoagulable state)
- **Congestion in mucosa**
  - → Nasal mucosa congested
  - → Gums congested → Bleeding
  - → Bladder mucosa congested

In pregnancy

Progesterone ↑
Estrogen ↑
LH = ↓
FSH = ↓

There is Insulin Resistance in Pregnancy:

- So that mother does not utilize glucose → ↑glucose → It reaches to fetus
- → Due to hormone - HPL (Human Placental Lactogen)
- → Maximum = 24-28 weeks of Pregnancy
- Pregnancy is a diabetogenic state

Changes in Genital Tract during Pregnancy:

1. CERVIX

1. Bluish discoloration → CHADWICK sign/ JACQUMIER sign (8 weeks)
2. Soft cervix → GOODELL sign → (6 weeks)
3. Cervical canal will be closed by a thick mucus plug At the time of labor dilates → This mucus plug is released along with blood. This is called show.
4. Length 4-5 cm

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2. Agina

(Lactobacilli)

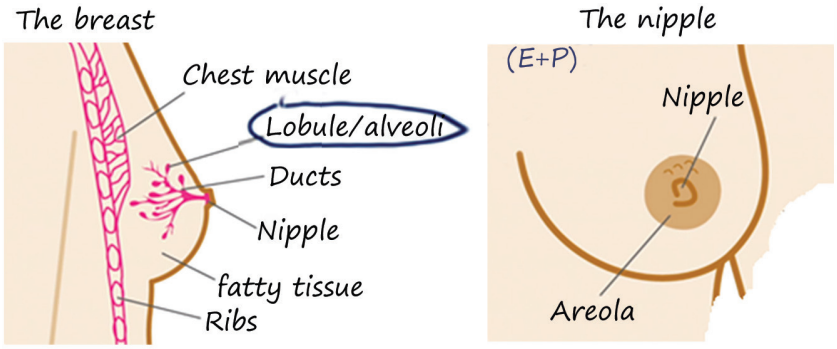
1. Bluish discolouration
↓
CHADWICK sign

Doderlein bacilli
↓
It converts the glycogen present in vaginal epithelium into lactic acid
↓
PH of vagina acidic

2 No. of Dorderlein Bacilli increases in Vagina
↓
↑conversion of glycogen into Lactic acid
↓
↑Lactic acid
↓
↑Acidity

Non pregnant female PH of Vagina = 4.5
PH of vagina in Pregnant female: (3.5)
↓
Because of acidity Pathogenic bacteria
Cannot survive & so chances of Infection are less.

3. Changes of Breast during Pregnancy



- → Breast is made of ducts & Lobules. Milk is synthesized in lobules & ducts carry milk from Lobules to nipples.
- → During pregnancy lobules increase due to action of Estrogen & Progesterone (mainly progesterone)
- → Ducts Increase due to Estrogen.
- → Size of nipples increase & becomes darker in pregnancy.
- → Areola becomes more dark & its size increases during pregnancy & Secondary areola can be seen during pregnancy.
- → Modified sebaceous glands called MONTGOMERY TUBERCLE becomes very prominent & its number increases (5-15 in each breast)

COLOSTRUM

Yellow colored fluid

- → Can be squeezed from breast at **12 weeks of pregnancy**
- → Initially it is thin
- → It becomes thick & Yellow at 16 weeks

- → Rich in vitamins, immunoglobulins

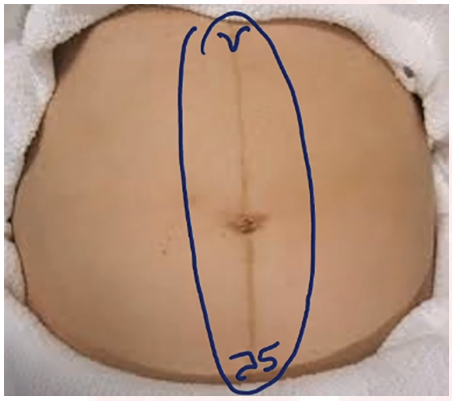
Colostrum has everything more than Breast milk except:

- **K:** Potassium
- **F:** Fat
- **C:** Carbohydrate

} These are less in colostrum as compared to Breast Milk

Skin Changes in Pregnancy

1. Linea Nigra



- → A Brown black line which extends from xiphisternum uptil pubic symphysis
- → It is due to melanocyte stimulating hormone
- → Disappear after delivery.

2. Striae Gravidarum





- → They are seen below the umbilicus, Breast, Thigh
- → In ongoing pregnancy: It is pink in color (STRIAE GRAVIDARUM)
- → Stretch marks of previous pregnancy appear silvery white,

↓

STRIAE ALBICANS

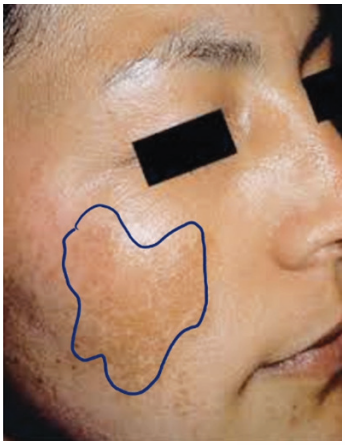
- → Strech marks are seen whenever abdomen stretcher, e.g. (obesity, edema)

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3. Chloasma Gravidarum (Pregnancy Mask)



→ Butterfly shaped, diffuse patchy areas.
→ Seen on forehead, cheeks
→ Disappears after delivery

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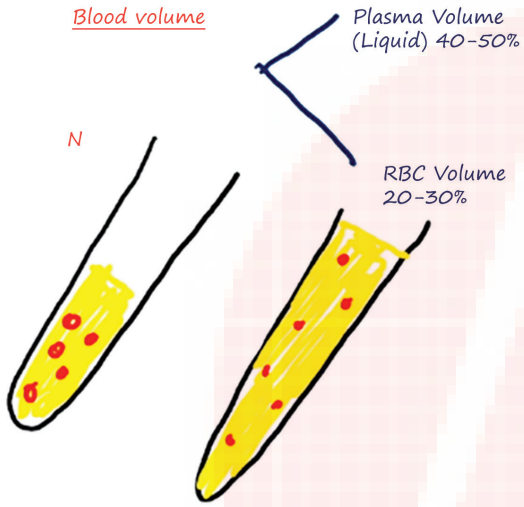
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MATERNAL ADAPTATION IN PREGNANCY (PART-2)



Changes in Hematological System During Pregnancy

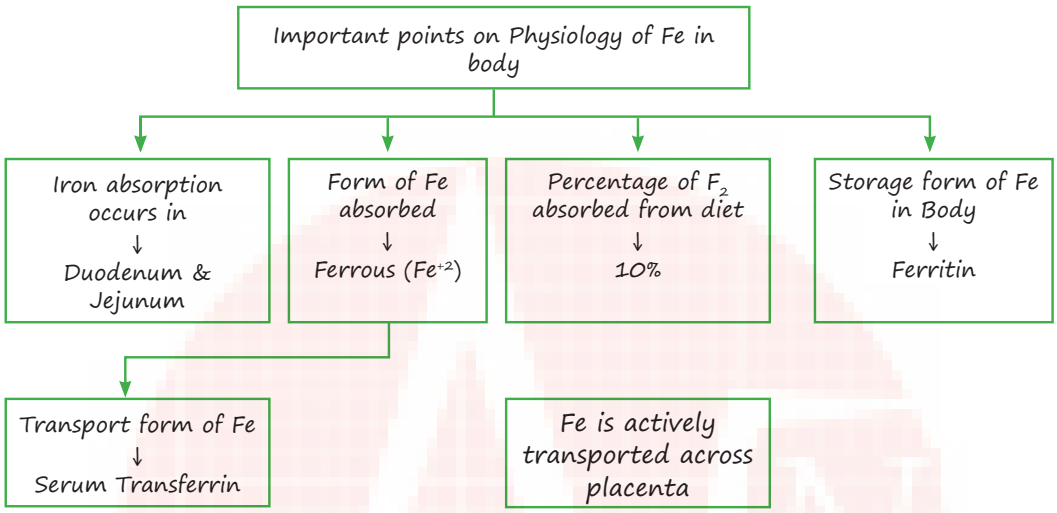
Increase in pregnancy (↑)	Decrease in Pregnancy (↓)
→ **Blood volume** → Plasma volume (↑40-50%) → RBC volume (&20-30%)  	Liquid component of blood increases more than solid component. ↓ So there is Hemodilution during pregnancy ↓ Blood Viscosity↓ Hematocrit/Packed cell volume = ↓ in pregnancy **Note:** In pregnancy there is Physiological Hemodilution ↓ There is Physiological Anemia in pregnancy ↓ In all pregnant female = Hb concentration decrease in pregnancy ↓ (In physiological Anemia Never Hb goes below- 11 gm/dL)
→ **RBC has Hb** RBC volume increase in pregnancy ↓ Hb mass/Amount of Hb (gm) → **WBC count** (Upto 80,000/mm³)	→ Hb concentration = g/dL → Platelet count ↓ called as benign gestational thrombocytopenia
→ Total Plasma Protein (gm) Globulin ↑	Plasma protein concentration (gm/dL) Albumin ↓
Normally Albumin: globulin 1.7: 1 Pregnancy Albumin: Globulin (1:1)	
→ **All clotting factors increase** in Pregnancy Pregnancy is a Hypercoagulable state clotting Factor (S. Fibrinogen) ↑ ↓ ESRA↑ (normal 10 mm Pregnancy go until 40 mm)	→ Except: Factor 11, 13
→ All Inflammatory mediators ↓ → ESR → C-Reactive Protein	

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Increase in pregnancy (↑)	Decrease in Pregnancy (↓)
→ Humoral Immunity	→ Cell mediated Immunity
Constant in Pregnancy → Bleeding Time → Clotting Time → Level of clotting Factor: become normal 2 weeks after delivery	

Changes in Iron Metabolism in Pregnancy:



During Pregnancy:

→ All Parameters of Fe metabolism decrease:
  → S. Ferritin
  → S. Fe
  } = ↓ (decrease)

Except: (The 2 'T's)
→ Serum Transferrin (↑)
→ Total Iron Binding capacity (↑) (TIBC)

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Iron Requirement in Pregnancy:

1. Total amount of Fe- needed in Pregnancy: 1000 mg
2. Out of this amount needed by fetus 300 mg
3. Daily requirement of Fe in Pregnant female = $\frac{1000}{280}$ = 4-6 mg/day

Note: Daily Requirement of Fe in Nonpregnant female: 1 mg/day

This Fe requirement is not constant in Pregnancy
→ 1st Trimester: 1-2 mg/day

→ 2nd Trimester: **4-6 mg/day**

→ 3rd Trimester: **6-7 mg/day**

Since only 10% of dietary iron is absorbed hence to fulfill the body's need of 4-6 mg/day

↓

Pregnant female will have to take 60 mg of Iron in diet

↓

This is practically Immposible

↓

Hence, Fe supplementation is mandatory during pregnancy

Anemia Mukt Bharat Programme:

↓

Government of India supplies
Fe + Folic acid tablet free of cost

Prophylactic dose of Iron

600 mg
Ferrous sulphate

500 mcg

Because In India most common anemia in pregnancy is Fe + Folic acid deficiency Anemia

↓

called as DIMORPHIC Anemia

Recommendation:

These tablets (Fe + Folic acid) should be taken from 4the month of Pregnancy

↓

Daily

↓

Throughout pregnancy (Ideal) (for at least = 180 Days during pregnancy)

+

for 180 days after delivery (To Replenish iron stores)

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Dose of Folic acid in Pregnancy

Role

Prevents Neural Tube defects
↓
Dose in all pregnant female is: 400 mcg/day
→ She should start 1 month before conception & until 3 months after conception
→ Suppose pregnant female
Who has history of NTD baby
↓
In such female → Dose of Folic Acid
↓
4 mg/day
↓
Therapeutic dose of Folic acid

Included in Anemia Mukt Bharat
↓
500 mcg/day
↓
from 4th month of pregnancy & throughout pregnancy

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MATERNAL ADAPTATION IN PREGNANCY (PART-3)



Changes in CVS during Pregnancy

Increase	Decrease
Output = Heart Rate x Stroke Volume ↑ ↑ ↑ → When cardiac output starts Increasing: ↓ 5th week of pregnancy → When is cardiac output maximum during pregnancy: Dutta: 30-34 weeks of pregnancy Williams: 28-32 weeks of pregnancy Q. Overall when is Cardiac output Maximum/When are chances of Heart Failure maximum ↓ Bertan: Immediately after delivery (+70%) ↓ 2nd best 2nd stage of Labor (+50%) ↓ 3rd best 28-32 weeks (William) or 30-34 weeks (Dutta)	Main hormone in pregnancy ↓ Progesterone ↓ Smooth muscle Relaxant ↓ Peripheral Vascular Resistance↓ ↓ Blood Pressure↓ → BP ↓ → Systolic BP ↓ → Diastolic BP↓ → Mean Arterial Pressure ↓ $MAP = \frac{\text{Systolic} + 2\ (\text{Diastolic BP})}{3}$ → Maximum decrease in BP → Seen in diastolic BP → Second Trimester → Supine position

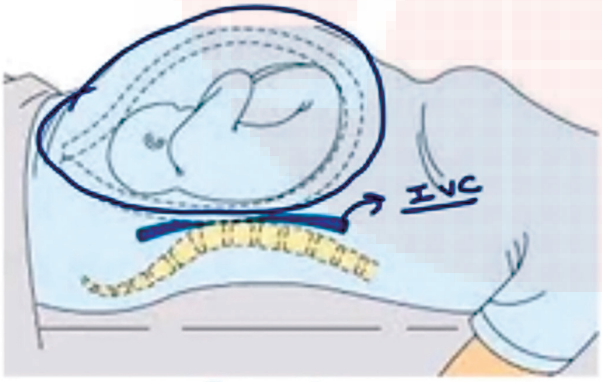


Figure: Fetal compression IVC in supine position

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Pregnant female in late 3rd Trimester
↓
Lies supine
↓
Pregnant uterus presses on Inferior Vena cava
↓
So venous return (↓) decreases
↓
Cardiac output of mother decreases

BP↓
↓
Supine Hypotension Syndrome

Volume of blood going to fetus decrease
↓
Fetal distress

So, we advice pregnant female not to lie in supine position. Maximum lie should be in Left Lateral Position.

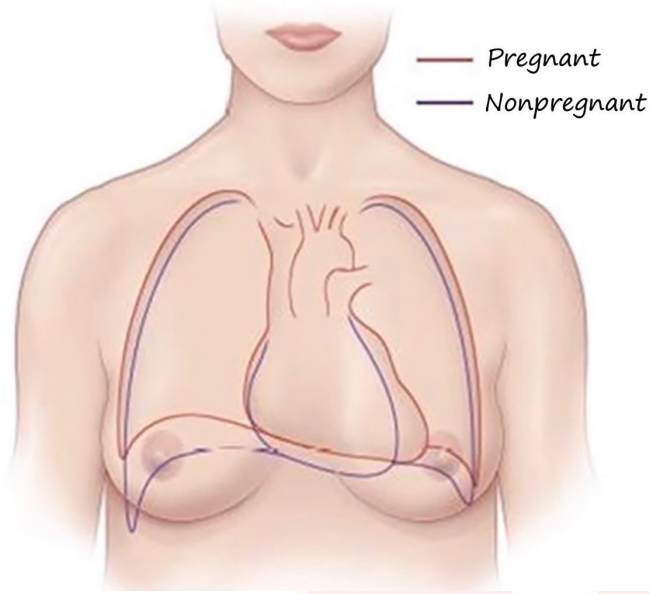
Changes in Clinical Indicators of Heart during pregnancy:

1. Pulse Rate ↑
2. Blood Pressure ↓
3. Juglar Venous Pressure – Normal
4. S_1 = Loud + splitting prominent
   S_2 = Normal in pregnancy
   S_3 = Normal S_3 is not easily heard but in pregnancy it is easily heard. Called as Gallop Rhythm
5. **Murmurs:** There are 2 murmurs which are Normal in Pregnancy
   ↓
   1. Systolic murmur
   2. Continuous murmur = Mammary murmur
      ↓ ↓
      Heard because of Increase blood flow in Internal Mammary vessels. $2^{nd}/3^{rd}$ Left Intercostal space

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6. **In pregnancy:** Uterus rushes the diaphragm up because of which heart rotates upwards & outwards (Left hand side) during pregnancy

- Palpitations felt in pregnancy
- Apex Beat is heard in 4th ICS, 2.5 cm lateral to mid clavicular line
- ECG = Left Axis deviation

7. Ou X Ray it appears as Mild cardiomegaly

Indicators of Heart Disease in Pregnancy:

1. Cyanosis
2. Hemoptysis
3. JUP (Juglar Venous Pressure) = sed.
4. S_2 = loud & splitting prominent
5. S_4 is heard
6. Diastolic Murmur
7. Marked Cardiomegaly on X-Ray
8. Any Arrhythmia

Q1. Most common cause of Heart Disease in pregnancy

- In Developed countries → Congenital Heart disease → (Atrial septal defect)
- In Developing country → Rheumatic Heart disease → (Mitral stenosis)

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Q2. Most common heart disease in pregnancy → Mitral stenosis

Q3. There are certain Heart disease in which pregnancy is contraindicated:

1. Pulmonary Hypertension
   - → Primary .
   - → Secondary, e.g. EISENMENGER syndrome
2. MARFAN syndrome with Aorta Involved

→ Coarctation of aorta:

- → Increase chances of maternal - mortality

Advice: MTP (Medical Termination of Pregnancy)

→ Best Time to do MTP in heart disease patient = Before 12 weeks

→ Best Method to do MTP in Heart disease patient = Suction Evacuation

→ Which heart disease has worst prognosis/highest maternal mortality Rate? EISENMENGER Syndrome.

→ Which heart disease has best prognosis in pregnancy?

↓

Congenital Heart disease

→ What is best Mode of delivery in a heart disease patient ?

Vaginal delivery using FORCEP /vacuum

→ In which condition Cesarean section is done

1. When Aorta is involved e.g.:
   - → Coarctation of aorta
   - → Arotic stenosis
   - → Arotic aneursyn

Heart disease patient, she has Post Partum Haemorrhage (PPH) after delivery
Injection Methyl Ergometrine is Contraindicated

Anticoagulants en Pregnancy

Warfarin		Heparin
Strong Anticoagulant	ADVANTAGE	Doesn't cross placenta ↓ Doesn't lead to fetal malformation
It can cross the placenta & lead to fetal malformation	DISADVATASE	Weak Anticoagulant

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Period of gestation	Anticoagulant of choice
→ 1st trimester (<12 weeks)	Heparin
→ 13 weeks → 36 weeks	Warfarin
→ ≥ 36 weeks	Heparin (Why: Because heparin is a weak anticoagulant & patient can deliver anytime)

→ When patient starts having labor pain → Stop Heparin

→ 12 hours after vaginal delivery or 24 hours after Cesarean section → Start Heparin/Warfarin.

→ Warfarin is not contraindicated in breast feeding.

→ Suppose patient is on warfarin at time of delivery → Do Cesarean section

Most common heart disease in Pregnancy: MITRAL Stenosis

INCLUDE BEFORE THE TOPIC OF ANTICOAGULANTS IN PREGNANCY

In pregnancy treatment
↓
Surgery = Balloon Valeriloplasty
(In 2nd Trimester) (between 14-18 weeks)

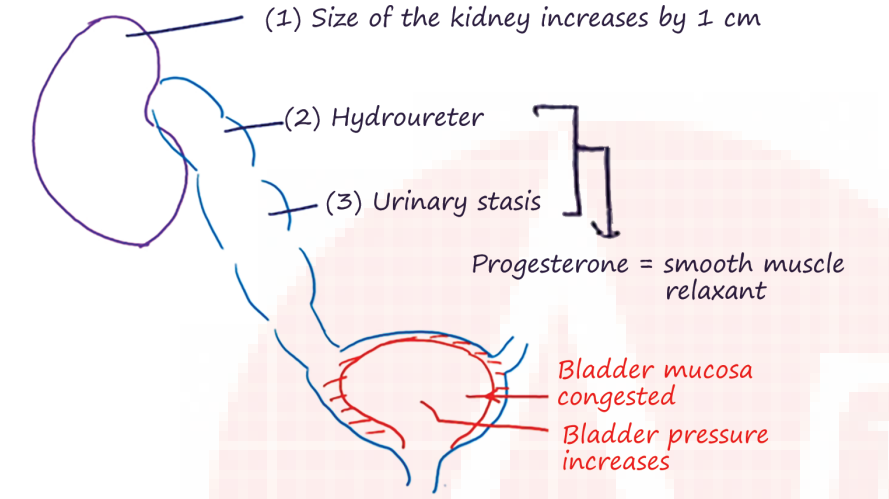
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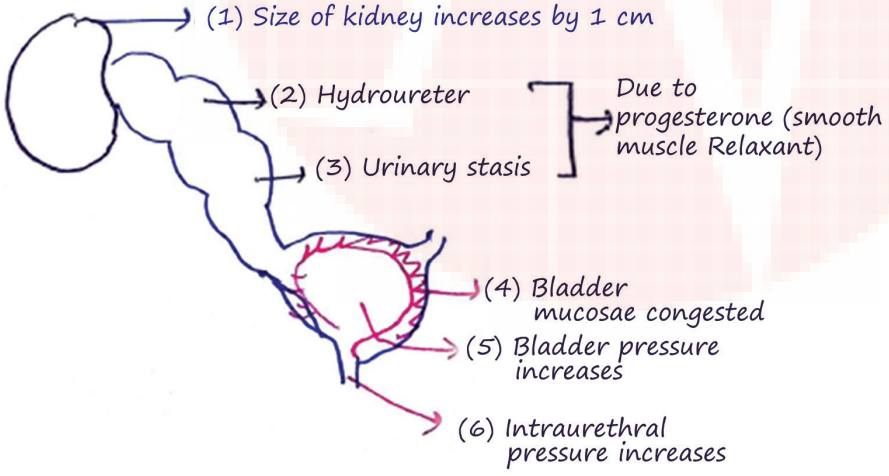
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MATERNAL ADAPTATION IN PREGNANCY (PART-4)



Changes in Renal system during pregnancy





→ **Due to urinary stasis**

↓

↑chances of UTI

→ **Urinary frequency↑**

→ 1st trimester

→ 3rd trimester

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Changes in Renal Physiology:

Blood volume in pregnancy
↓
↑ Renal Blood flow
↓
↑ GFR (Glomerular Filtration Rate)
↓
(Filtering capacity ↑)

- Increased Excretion of
  - → Urea
  - → Uric acid
  - → Creatinine
- **Serum urea**
  Serum Uric Acid → Deceases (↓)
  Serum creatinine

Changes in Respiratory System during Pregnancy:

- → 2 cm = Transverse diameter of Chest Increases by 2 cm
- → 4 cm = Diaphragm pushes the lungs up by 4 cm
- → 6 cm = Circumference of chest Increase by 6 cm

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Subcostal Angle:

- → Normal = 68°
- → Pregnancy = 103°

Parameters which increase in Respiratory system:

- → IC = Inspiratory capacity
- → TV = Tidal volume
- → MV = Minute Ventilation

} ↑

Parameters which Remain Normal

I R V = 1. Inspiratory Reserve Volume
(R) R : = 2. Respiratory
V.C = 3. Rate vital capacity

Although:

Respiratory Rate remains Normal in pregnancy but depth of Respiration increases.
↓
More CO_2 is flushed out
↓
Respiratory Alkalosis during Pregnancy

Changes in SI system:

1. GERD↑
2. Constipation
3. Vomiting (morning sickness)



All liver enzymes decrease in pregnancy except **Alkaline phosphatase**

↓

↑as it is also produced by placenta

Changes in Endocrine system in Pregnancy:

- Adrenal Hormones ↓ ↑in Pregnancy
- **Pancreas** ↓ Insulin
  - Insulin Resistance in Pregnancy
  - Insulin secretion↑
- Pituitary glands ↓ All Pituitary hormones Increase in pregnancy except: LH (↓) FSH (↓)

Changes in Thyroid gland in Pregnancy:

α-subunit of hCG is similar to TSH

↓

Stimulate Thyroid

↓

Total T_3 ↑

Total T_4↑

But: Thyroid binding globulin also increases in pregnancy.

That is why — Free T_3 = Normal, Free T_4 = Normal } → Pregnant females = Euthyroid

→ Iodine requirement in pregnancy /day: - 250 mcg/day

→ Most common cause of Hypothyroidism during pregnancy in developing countries: Iodine deficiency

→ Most common cause of Hypothyroidism during pregnancy in developed countries: Hashimoto's Thyroiditis.

→ Fetus starts producing the thyroxine by: 11-13 weeks of pregnancy

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But, it majorly depends on mother's
Thyroxine for its Brain development
So, if there is undiagnosed Hypothyroidism in Pregnant female
↓
Fetus will get less thyroxine
↓
Mental Retardation in fetus

Q. Mrs Reena, diagnosed case of Hyhothyroidism. She is on Thyroxine & she conceives. What should be advices?

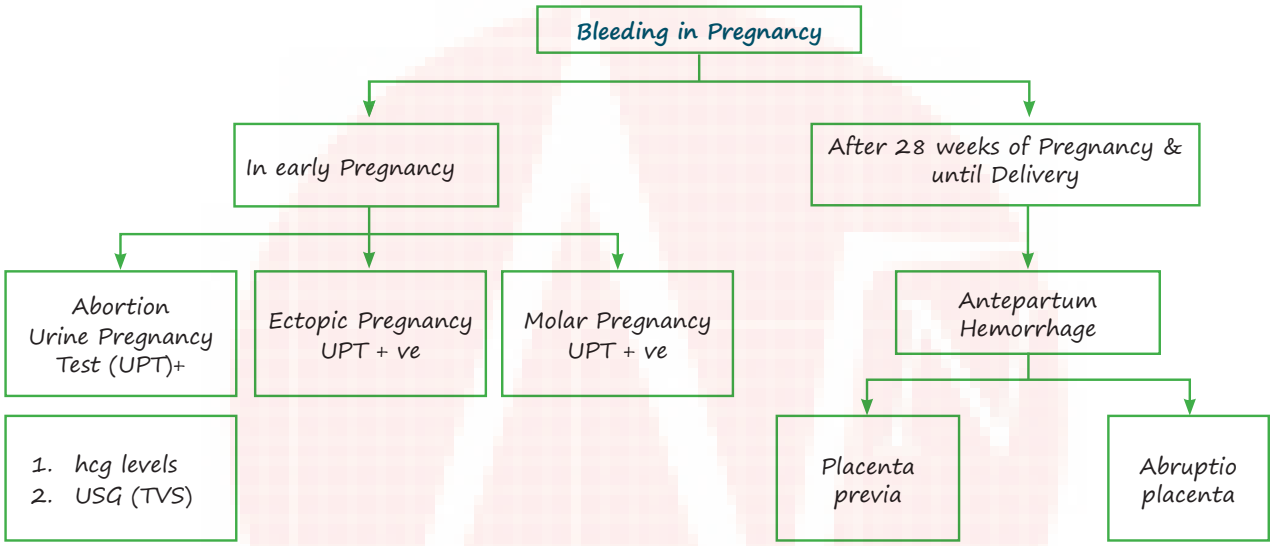
Advice: During pregnancy from the day of conception, Increase her dose of Thyroxine by 30-40%

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ABORTION (PART-1)

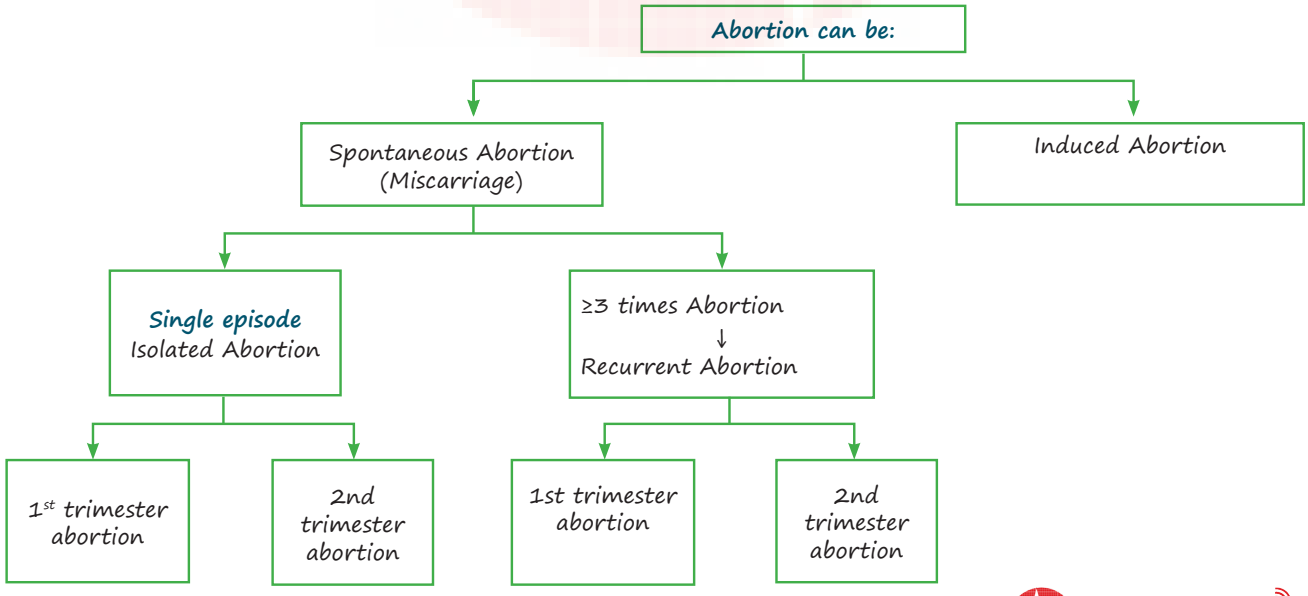


ABORTION (PART-1)



ABORTION

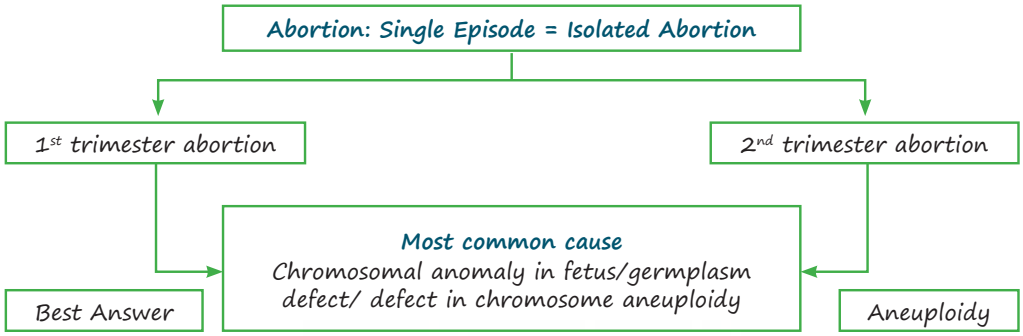
Any pregnancy loss at ≤ 20 weeks or as per WHO
Death of fetus with weight < 500 gms
= ABORTION



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→ 2nd **Best Answer** Trisomy

→ 3rd **Best Answer** Monosomy X

→ 4th **Best Answer** Trisomy 16

Other causes of isolated abortion:-

→ Trauma

→ Infection: TORCH can lead to single episode of abortion

→ Endocrine causes:

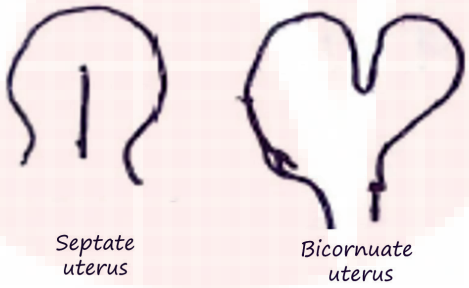
  → Diabetes

  → Hypothyroidism, Hyperthyroidism

  → PCOs

  → Decreased progesterone levels

→ Uterine Malformation:



→ Uterine fibroid: Most common fibroid leading to abortion (submucous fibroid)

Q1. Can Torch infections lead to isolated single episode of abortion? - Yes

Q2. Can Hypothyroidism lead to isolated abortion? - Yes

Q3. Can Hyperthyroidism lead to isolated abortion? - Yes

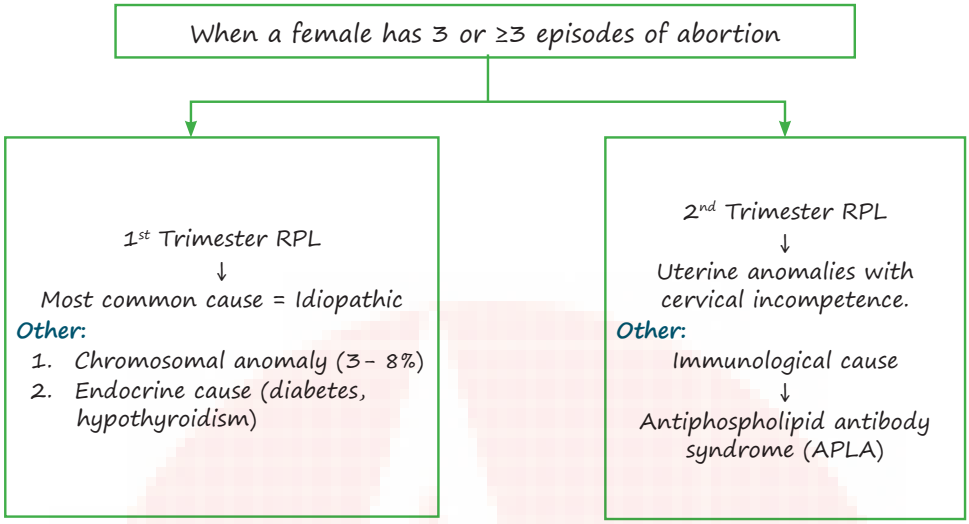
Q4. Most common fibroid leading to abortion/Recurrent abortion. - Submucous fibroid.

Q5. Most common uterine malformation leading to abortion/Recurrent abortion. - Septate uterus.

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Recurrent Abortion/Recurrent Pregnancy loss (RPL)



Important one liners:

1. Most common chromosomal anomaly which leads to single episode of abortion:- Aneuploidy
2. Most common chromosomal abnormality which leads to recurrent abortion:- Balanced translocation of chromosome
3. Hypothyroidism can lead to recurrent abortion
4. Hyperthyroidism does not lead to recurrent abortion
5. **Infections like Torch infections don't lead to recurrent abortion**

Q. What investigations should be done in patient coming with history of recurrent abortion?

Remember:- Investigation for recurrent abortion should begin after 2 episodes of abortion.

Investigations which are done	Investigations not done
1. Karyotyping of parents 2. Fasting & post prandial blood sugar 3. TSH, T3, T4 4. USG = (TVS) 5. Phospholipid Ab testing in mother	↓ Torch test

→ Most common malformation leading to recurrent pregnancy loss = Septate uterus

→ Most common fibroid which leads to abortion/recurrent abortion = Submucous fibroid

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CERVICAL INCOMPETENCE

Definition:

Painless, sudden dilatation of Internal Os

↓

Leading to rupture of membranes

↓

Expulsion of fetus

→ Most common time of abortion:- 2nd trimester

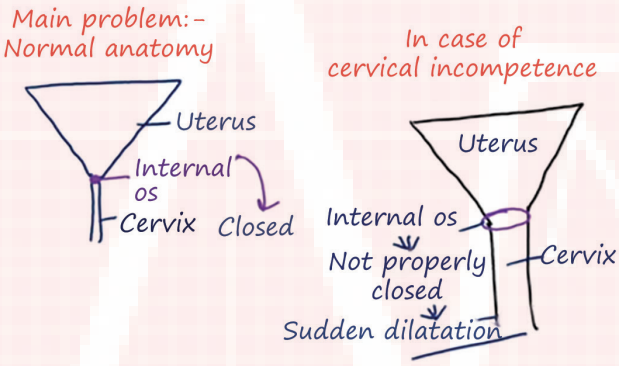
→ Most common type of abortion:- Recurrent abortion

} In cervical incompetence

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Main Problem:



Management of Cervical Incompetence

Management of Cervical Incompetence:

↓

Put a stitch around the internal os to tighten it

↓

Called os Cerclage surgery

→ Surgery is called as:- CERCLAGE Surgery

→ Route of surgery:- Vaginal

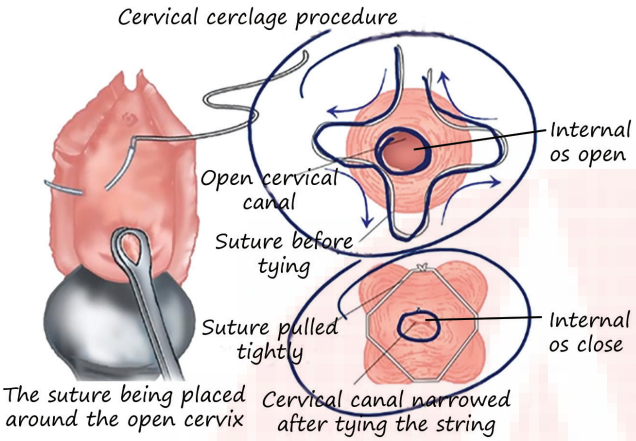
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Method of Doing Cervical Cerclage

→ MC Donald cerclage (Purse string suture is applied)

→ Shirodkar Cerclage



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→ Time to do surgery:-14-18 weeks

→ Time to remove suture:- at 37 weeks of pregnancy

or

Earlier if patient goes into preterm labor

Diagnosis of Cervical Incompetence

1. HISTORY = ≥3, painless, Recurrent 2 trimester abortions
2. USG:
   - → USG can diagnose cervical incompetence during pregnancy.
   - → Length of cervix:-
     - → As cervix dilates it becomes short
     - → ≤2.5 cms in pregnancy = at <20 weeks
   - → Dilation of internal os:
     - → If ≥ 2 cms

Pregnant female with cervical length ≤ 2.5 cms
Dilatation of internal os/cervix = ≥ 2 cms
} On USG

<20 weeks
↓
Cervical Incompetence
↓ Management
Cerclage surgery

<20 weeks
↓
Preterm Labor
↓ Management
Corticosteroid
+
Tocolytics

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Contraindication of cervical cerclage:-

1. Membranes rupture
2. Dilatation of internal os ≥4 cms
3. Infection → Chorioamnionitis
4. Gross congenital anomaly of fetus

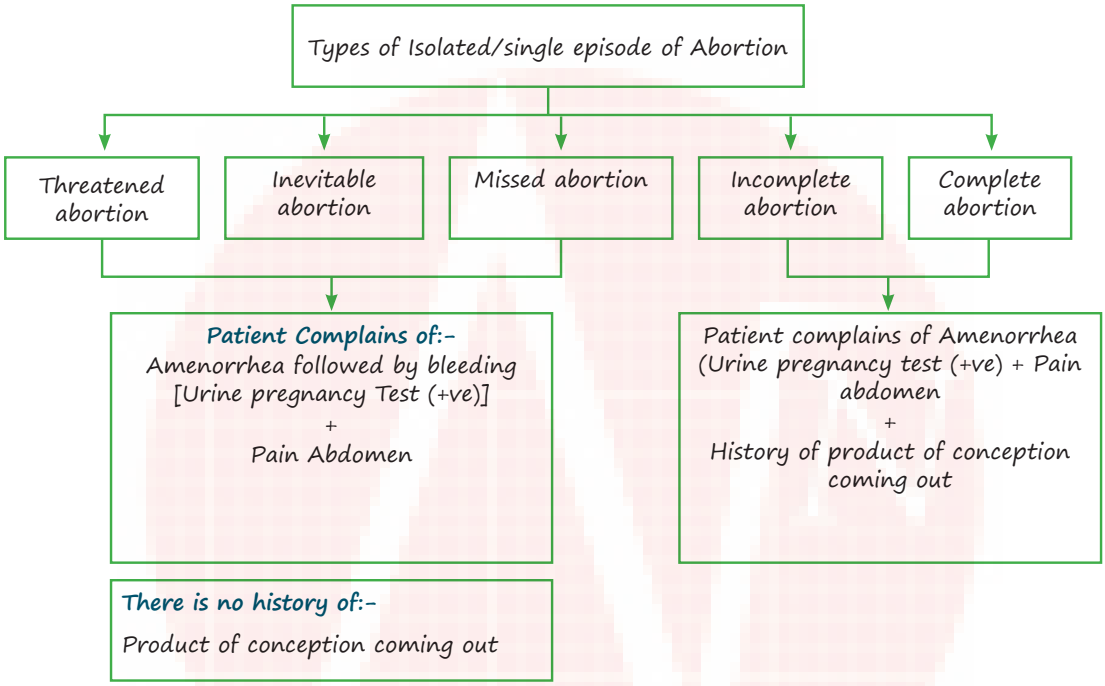
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ABORTION (PART-2)





→ In case of Incomplete + Complete abortion: Patient always complains of:-**Product of conception coming out**

Types	Definition	Symptom	Per abdomen	Internal os	USG
Threatened abortion	It is a type of abortion from where the process can be REVERSED	Pain + amenorrhea + Bleeding No history of product of conception coming out	Height of uterus is equal to period of pregnancy.	Closed	Live Fetus

Treatment of threatened abortion:-

Main Aim:-

To continue the pregnancy

+

Give rest to patient

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Management:-

1. Advise bed rest to patient × 48 hours after bleeding stop.
2. Give diazepam:- Tab 5 mg twice daily.
3. Preserve her pads
4. Once 48 hrs have passed
   - → She should avoid heavy work
   - → Avoid intercourse
   - → Avoid lifting heavy weight

   All this is to be done × **2 weeks**

→ Repeat ultrasound after 3 weeks

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Type	Definition	Symptom	Per Abdomen	Internal os	USG
Inevitable abortion	When abortion reaches a stage from where it cannot be reversed Product of conception do not come out	Pain + amenorrhea No history of product of conception out.	Height of uterus is equal to Period of Pregnancy	OPEN	Dead fetus

Management of Inevitable abortion:-

Aim:

The pregnancy cannot be continued
↓
Speed up the process of abortion

How/ Method:
1st Trimester
↓
Suction Evacuation
↓
Followed by curettage
(Blunt curettage)

2nd Trimester
Admit the patient
Start oxytocin drip
Dose= 10IU on 500 ml of NS at 40 - 60 drops/min

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Figure: Curette

Note:

→ Whenever you do curette:-

→ In Pregnant females:- Blunt curette as uterus is very soft except in case of Molar pregnancy.

→ In Non Pregnant females:

Sharp curettage

↓

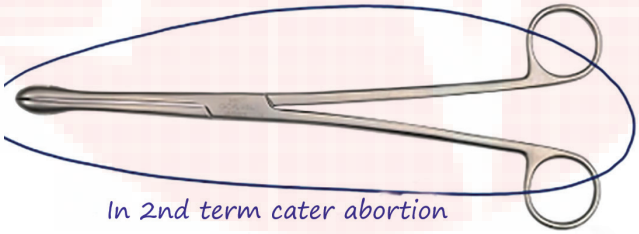
In 2nd trimester

↓

If enter period of conception does not expel by itself then complete the process by

↓

Ovum forceps (Don't do curettage)



In 2nd term cater abortion

⇓

If entire POC does not expel by itself then complete the process by

⇓

Ovum forceps (Do not do curettage)

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Type of abortion	Definition	Symptom	Per abdomen	Internal os	Usg
Missed abortion	When patient is unaware that fetus is dead	Pain + amenorrhea + Bleeding (Brown discharge) No history of period of conception coming out.	Height of uterus is less than period of pregnancy.	Closed	Dead macerated fetus.

Management of Missed Abortion:-

Aim:-

To remove the product of conception

1st Trimester

1. Suction Evacuation
   ↓
   curettage
2. Tab. Misoprostol 800 mcg vaginally in posterior fornix
   ↓ can repeat
   After 24 hours

2nd Trimester
(Dilation & Evacuation)
↓
Ovum forceps
Tab. Misoprost 200 mcg
↓
Every 4 hours
(Maximum 5 doses)

Type	Definition	Symptom	Per Abdomen	Internal os	USG
Incomplete Abortion	Process of abortion has started ↓ Product of conception have started coming out ↓ But the process is incomplete	Pain + amenorrhea + Bleeding H/O product of conception coming out ↓ Lot of bleeding ↓ Shock	Height of uterus is less than period of pregnancy	Open & can see period of conception coming out from it	Incomplete fetus

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Management of Incomplete Abortion

↓

Some like missed abortion

Type	Definition	Symptom	Per Abdomen	Internal os	USG
Complete Abortion	Product of abortion starts ↓ Product of conception coming out ↓ Entire products of conception comes out on its own ↓ Followed by stopping of bleeding	Pain + Amenorrhea + Bleeding + Product of conception come out ↓ Then bleeding stops	Height of uterus smaller than period of pregnancy	Closed	Empty uterus

Management of Complete Abortion:-

1. Do a 'Trans-vaginal sonography "TVS"

   ↓

   If uterus is empty

   ↓

   -Do nothing

   -Reassurance given to patient

2. In all types of abortion:- To all Rh negative females give:-

   ↓

   Give anti D injection

   Dose

   - <12 weeks abortion 50 mcg → Route is intramuscular
   - ≥ 12 weeks abortion 300 mcg

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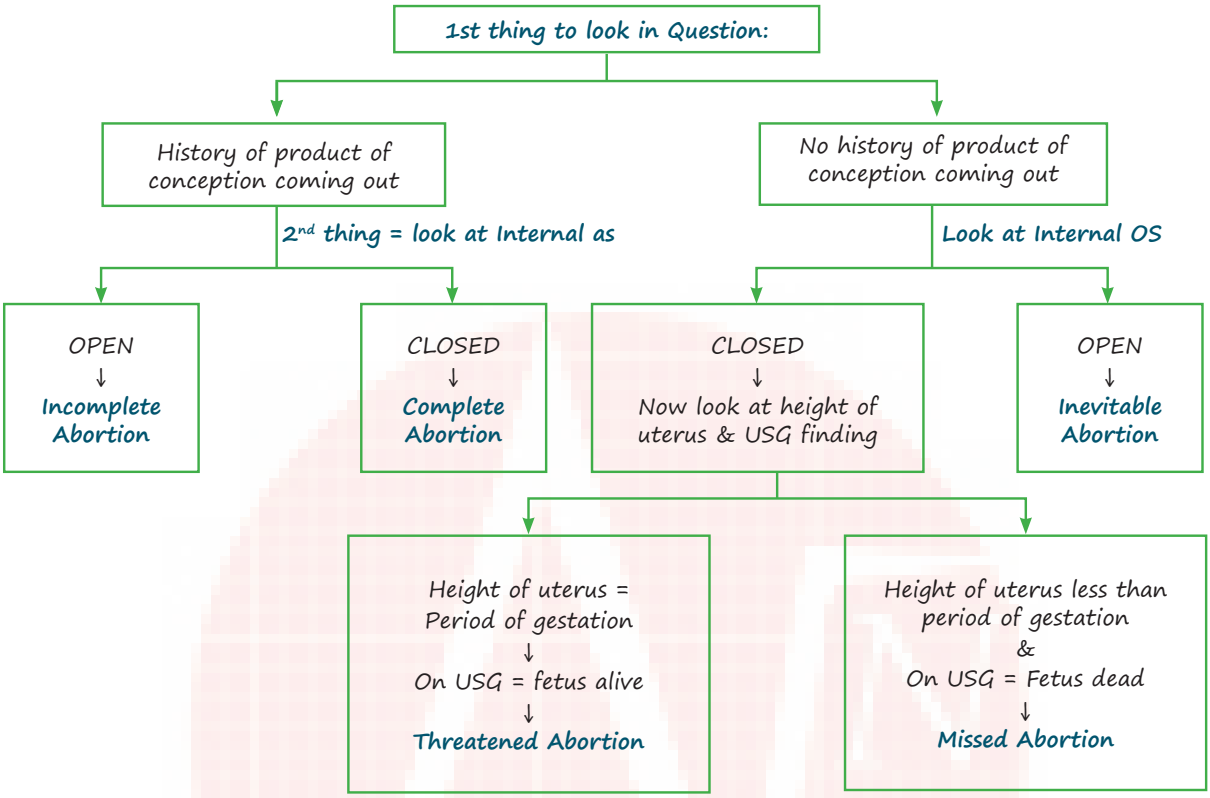
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In clinical Question:- How to identify the type of abortions:-



Any type of abortion with following symptoms:-

1. Fever ≥ 100.4° for more than 24 hours
2. Pain in lower abdomen + Tenderness in lower abdomen.
3. Purulent discharge/foul smelling discharge

It is called as **SEPTIC ABORTION**

Mostly septic abortion is seen with:

→ Induced abortion (85%) → which are done illegally.

→ But it may be seen with spontaneous (15% cases) abortion:-

↓

Most common variety of spontaneous abortion associated with septic abortion: **Missed abortion**

→ Most common organism responsible for septic abortion:- Mixed organism

Grades of septic abortion:-

→ Grade 1 = Uterus Infection

→ Grade 2 = Pelvic Infection (fallopian Tube, Ovaries)

→ Grade 3 = Infection = Spread outside pelvis (Peritonitis, Shock, Jaundice)

Septic Shock

Note: Grade 3 septic shock is seen only with Illegally Induced Abortion.

Q1. Most common type of abortion associated with shock:-

Q2. Most common type best Answer:- Septic Abortion

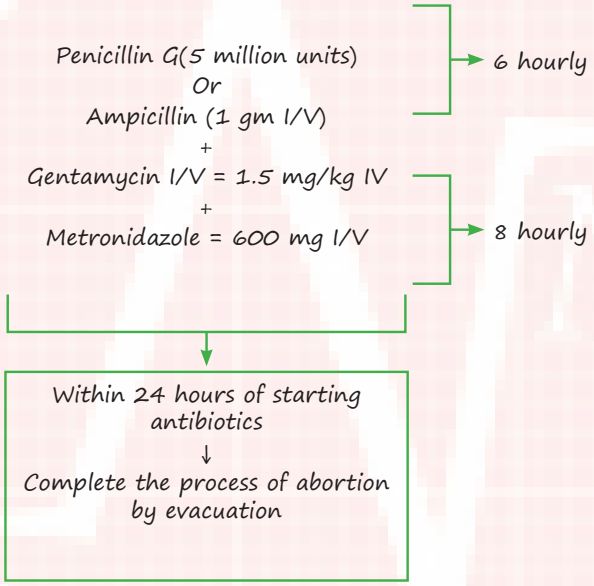
Q3. Most common type 2nd best Answer:- Incomplete Abortion

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Management of Septic abortion:-

1. Hospitalization
2. Hydration Maintain IV fluids
3. Vaginal/cervical swab taken & sent for culture
4. Antibiotics (I/V)



5. Give Anti Gas Gangrene (6000 units i/m)
   +
   Anti Tetanus Serum (3000 units i/m)
6. If Patient is Rh -ve = give Anti D

   Dose

   → <12 weeks = 50 mcg

   → ≥ 12 weeks = 300 mcg

   (Route = i/m)

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ECTOPIC PREGNANCY (PART-1)

What is Ectopic pregnancy?

→ If Implantation occurs anywhere outside the uterine cavity.

→ It is a disorder of **Implantation.**

Morula → Becomes Blastocyst

↓

6th day after fertilization blastocyst attaches to Uterine endometrium = called as **Implantation.**

Normal site = Implantation: Posterior wall of upper part of uterus.

→ Normally, Implantation occurs in: Posterior wall of upper part of uterus.

→ Most common site of Ectopic pregnancy = fallopian tube (90%)

Here Ectopic Pregnancy is also called as - Tubal pregnancy

Fallopian Tube: Anatomy:-

→ Medical to lateral parts of Fallopian tube are:-

Interstitium > Isthmus > Ampulla > Infundibulum

M/C site of ectopic pregnancy

Fallopian tube (90%)

Here ectopic pregnancy is also called as:
Tubal pregnancy

Fallopian tube: Anatomy

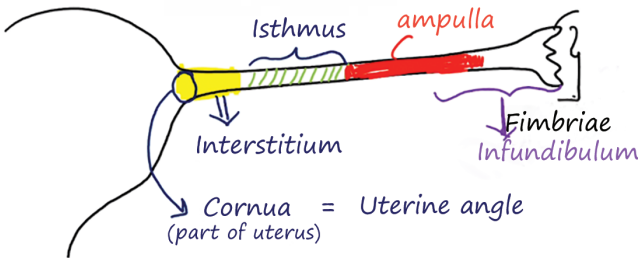


Figure: Fallopian Tube

Q1. M/C site for fertilization = Ampulla

Q2. Most common site in fallopian tube for Ectopic pregnancy = Ampulla

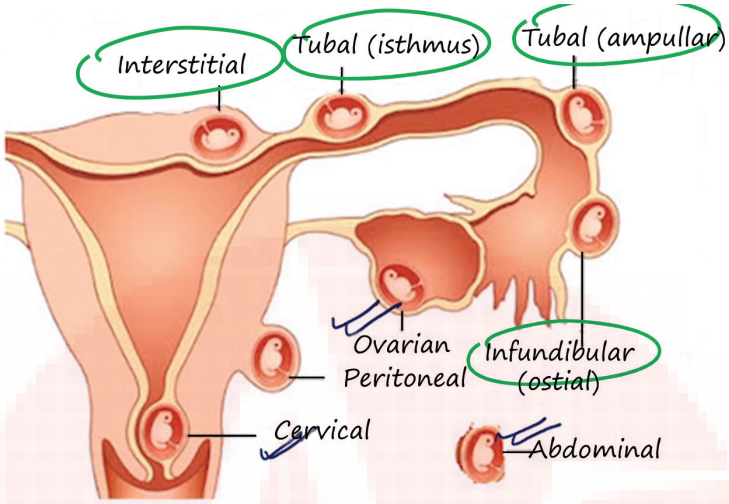
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Q3. Widest & longest part of Fallopian Tube = Ampulla

Q4. Which is the narrowest part of Fallopian Tube :- Interstitium

Q5. Which is the second narrowest part:-Isthmus



M/c site= FT.

Figure: Ectopic Pregnancy

→ Most common site in Fallopian tube for Ectopic pregnancy = Ampulla

Why:- Because fertilization occurs in Ampulla.

Arrange the Parts of fallopian tube in decreasing order of incidence of Ectopic Pregnancy:-

Mnemonic:-	Ampulla	> Is	>in	>Interstitium
	↓	↓	↓	↓
M/C:	Ampulla	> Isthmus	> Infundibulum	> Interstitium

→ Least common site in fallopian tube for Ectopic pregnancy = Interstitium

Overall:-

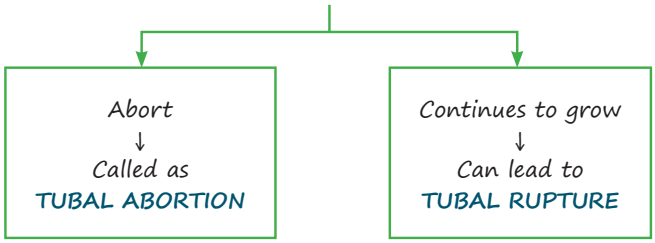
→ M/c site of Ectopic pregnancy = Fallopian Tube (Ampulla)

→ 2nd most common site of Ectopic pregnancy = (Ovary)

→ Least common site of Ectopic Pregnancy = Cervical

Student's Space

Outcome of Ectopic Pregnancy:- Has to end in 1st Trimester or early second trimester.



→ In which part of Fallopian Tube, which outcome is more common:-

(Mnemonic) Ampulla > Is > In > Interstitium

Ampulla	> Isthmus	> Infundibulum	> Interstitium
↓	↓	↓	↓
Abortion	> Rupture	> Abortion	> Rupture
↓			
Tubal abortion			

Q. Most common site for Tubal Abortion = Ampulla

Q. Most Common site for Tubal Rupture = Isthmus

Q. In which part of Fallopian tube Ectopic Pregnancy ends earliest = Isthmus (6 - 8 weeks)

Q. In which part of fallopian tube, Ectopic Pregnancy survives for longest time = Interstitium.

Why: Because this part is closest to uterus.

So uterus

→ Endometrium

→ Myometrium

→ Support the Ectopic pregnancy here (12 - 16 weeks)

Q. Most dangerous site of Ectopic pregnancy:- Interstitium

Q. Overall:- Where does ectopic pregnancy last longest/ survives for longest time

↓

Abdominal Ectopic

Q. What is "HETROTOPIC PREGNANCY"

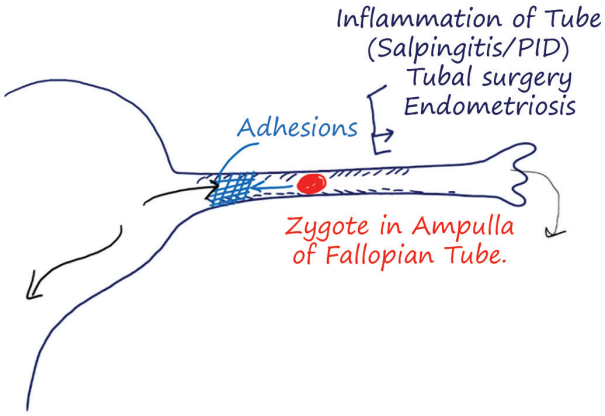
↓

It is twin pregnancy in which 1 pregnancy is inside uterus & other is ectopic.

Q. Why Ectopic pregnancy occurs?

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Tube lined by ciliated columnar epithelium

+

Tube Peristalsis

↓

Move zygote toward uterine cavity

Risk Factors for ectopic pregnancy

Related to genital Tract

1. Adhesions inside tube:-
   - → Salpingitis (Inflammation of Tube)
   - → PID (Pelvic Inflammatory Disease)
   - → Endometriosis (Endometrial tissue blocks the tissue)
   - → Tubal Surgery
2. Immobile cilia k/a KARTAGENER Syndrome
3. IVF (In vitro Fertilization)

Not Related

1. Smoking
2. Low socioeconomic status
3. Multiple partners
4. Young age of Intercourse.

Q. Most common risk factor causing Ectopic Pregnancy/m/c cause of Ectopic pregnancy:- **Salpingitis or PID**

Q. Highest risk of ectopic pregnancy is with:-

Best Answer:- Tubal surgery

2nd Best Answer:- Previous H/O Ectopic Pregnancy.

Q. Is the risk of Ectopic pregnancy Increased after using contraceptives?

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↓

No (contraceptives Prevent all types of pregnancy including ectopic pregnancy)

But When failure of contraceptive agent occurs

↓

It leads to Ectopic pregnancy

Pathology:-

In patients of Ectopic Pregnancy

↓

Similarity with normal pregnancy

1. hCG present in Ectopic pregnancy also = Urine Pregnancy Test (+ve)
2. Progesterone is present in Ectopic pregnancy.

Both are present

BUT:- In Ectopic pregnancy

They are lesser in quantity than normal pregnancy

hCG

Normal pregnancy

1. hCG is present
↓
2. **After every 48 hours:** levels of hCG double till 10 weeks of pregnancy.
3. When levels of hCG are **≥1500 IU of hCG** on TVS (transvagina ultrasound)
↓

Always gestational sac is seen inside uterus

Ectopic pregnancy

1. hCG is present but it is less than normal pregnancy.
↓
2. **After every 48 hours:**
↓

Levels of hCG increase but doesnot double

3. When levels of hCG are > 1500 IU
↓

In ectopic pregnancy

↓

On TVS

↓

No gestational sac will be seen inside uterus

↓

Uterus will be empty

↓

This helps in making best diagnosis of ectopic pregnancy.

Best = hCG + TVS

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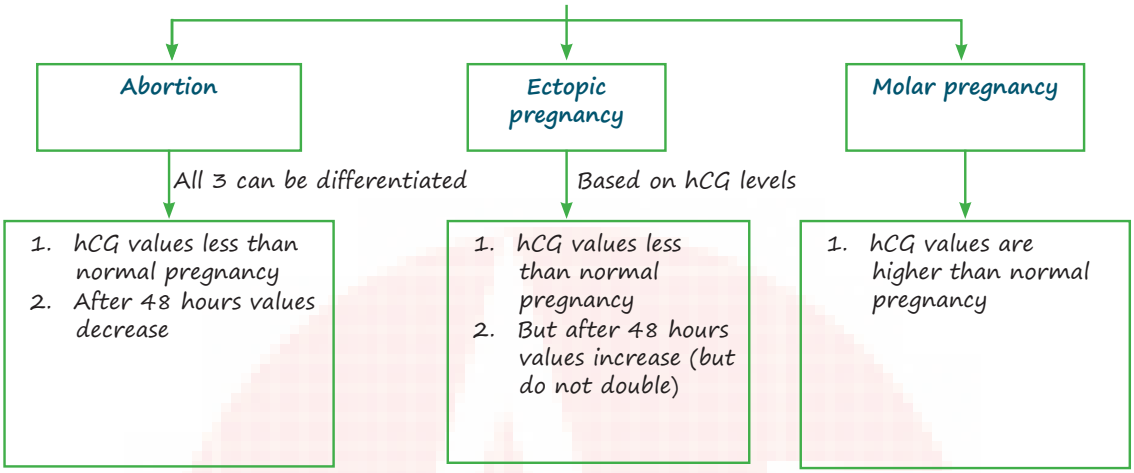
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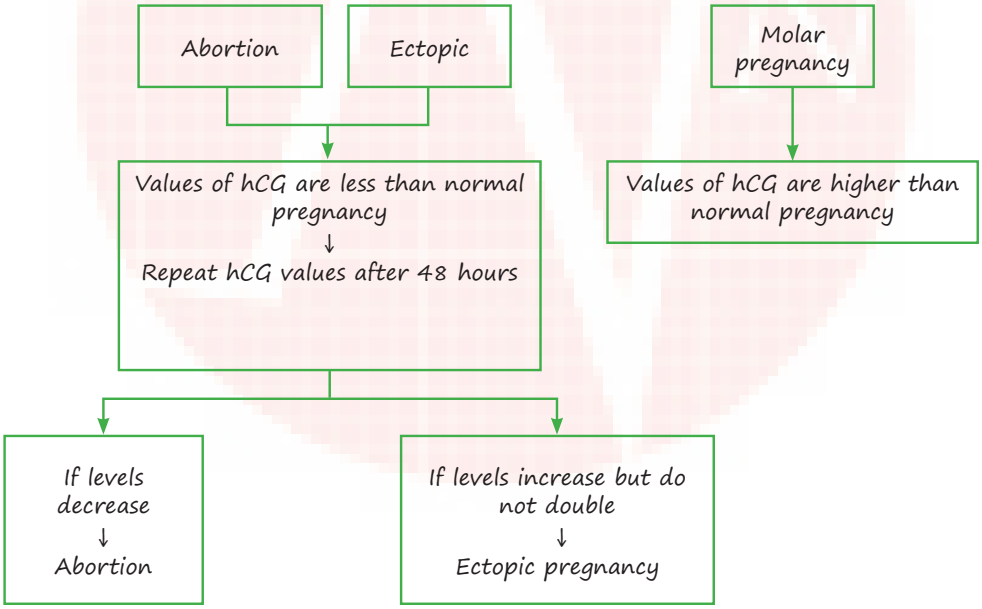
Remember:

Whenever a pregnant female (UPT + ve) comes with condition of

Bleeding in 1st trimester: There can be 3 causes:-



Concept:-



Progesterone:-

→ In Ectopic pregnancy

- → (<5 ng/mL) In ectopic pregnancy
- → Levels of progesterone are less than normal pregnancy
- → Normal pregnancy progesterone ≥ 25 ng/ml

→ But still despite of progesterone being less in ectopic pregnancy

2 Reactions

Decidual Reaction
↓
Converting of Endometrium to decidua

Arias-Stella reaction
↓
Characterized by:-
→ Enlarged glands in Endometrium (glandular cystic Hyperplasia)
→ Abundant cytoplasm
→ Hobnail Nucleus

Note:-

→ Decidual Reaction:- Seen in normal pregnancy + Ectopic pregnancy
→ Arias-Stella reaction:- Seen in:-
  → Normal pregnancy
  → Ectopic pregnancy
  → Molar pregnancy
→ **In case of ectopic pregnancy:-** Endometrium gets converted to decidua
→ The levels of progesterone are low & ectopic pregnancy has to end.

When Ectopic pregnancy Ends
↓
This entire decidua is shed
↓
So patient complains of bleeding.
Some female may have decidua shed in the form of "DECIDUAL CAST".
↓
Decidua will not have any villi as blastocyst not implanted in uterus.

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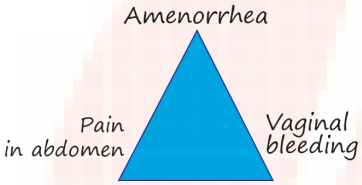
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ECTOPIC PREGNANCY (PART-2)

Ruptured Ectopic Pregnancy:-

- Patient will complain of = 1. Amenorrhea (for 6–8 weeks)
  + followed by
  2. Vaginal bleeding
  3. Pain in Abdomen:- Most common symptom of ecotopic pregnancy

- Triad of Ectopic Pregnancy



→ Due to excessive bleeding → **Hypovolemic shock**

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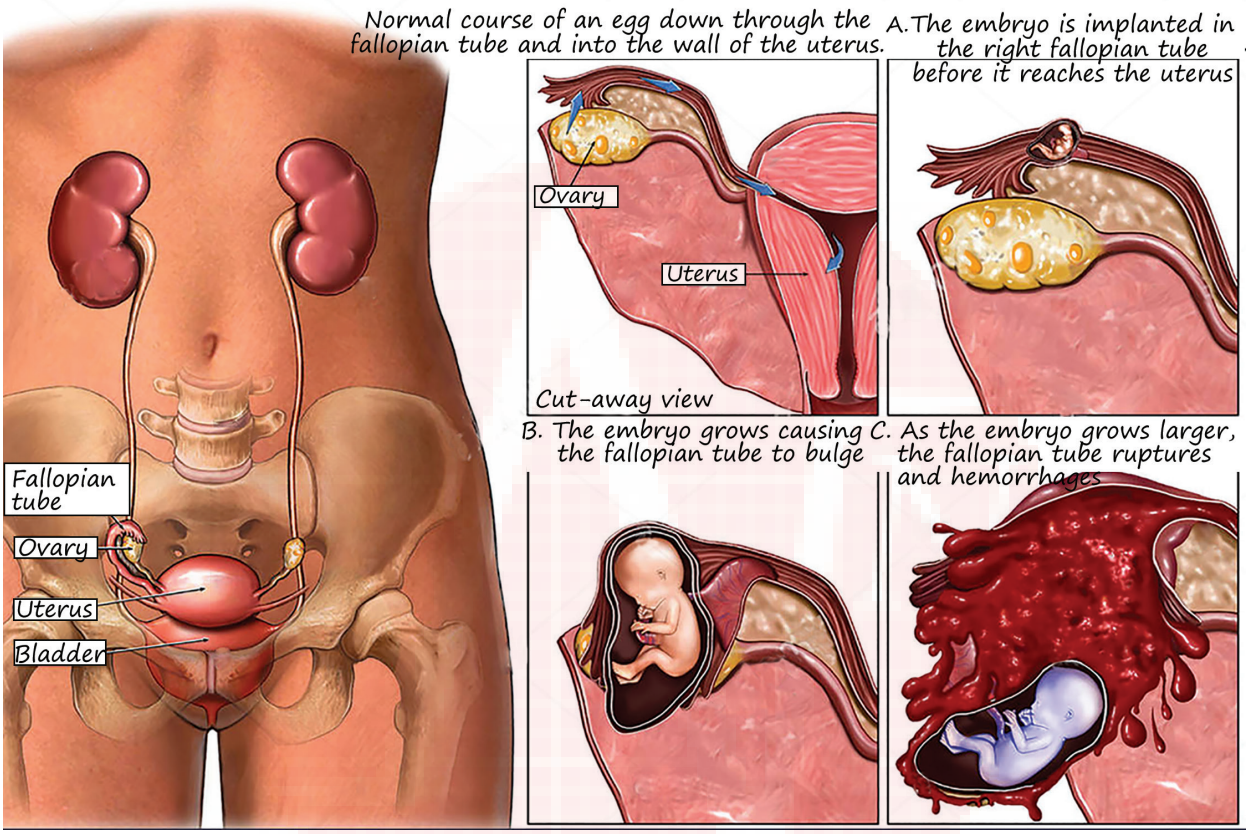
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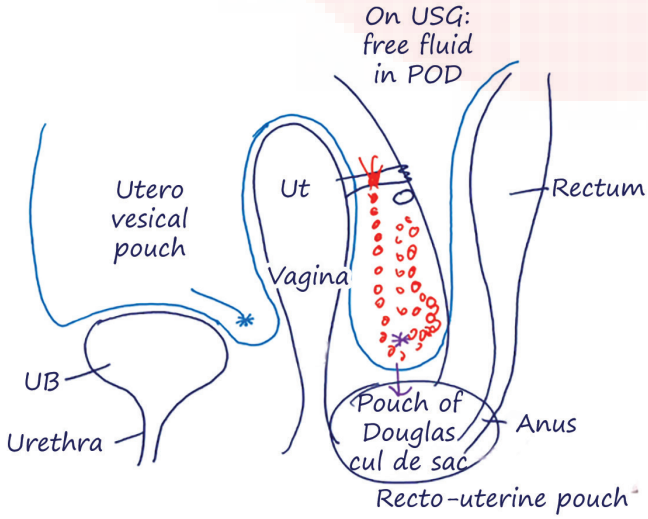
Whenever in Question:-

Patient with 6-8 (6-10 weeks) of Amenorrhea followed by vaginal Bleeding + Pain in Abdomen + Urine Pregnancy Test (+ve) + Patient is in shock

↓

Ruptured Ectopic pregnancy





Please Note

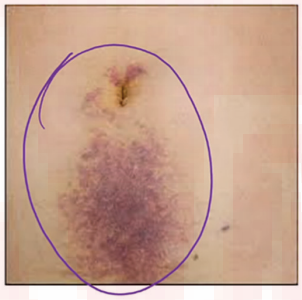
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Due to rupture of ectopic pregnancy
↓
Bleeding occurs
↓
Blood collects in peritoneum
↓
Hemoperitoneum

Irritate Diaphragm
↓
Referred pain in shoulder tip

Bluish black area around the umbilicus
↓
Cullen Sign



Cullen sign
↓
Indicates:
Hemoperitoneum
(Blood in peritoneum)

Indicates: Hemoperitoneum

Blood in peritoneum can be due to:-

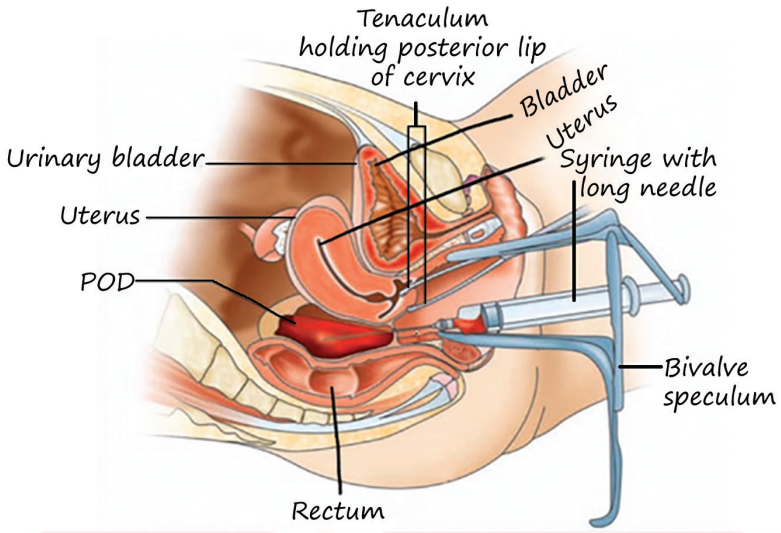
1. Ruptured cyst
2. Hemorrhagic pancreatitis

Whenever a patient of ruptured ectopic pregnancy who is in shock
↓
Do not ↓ **Wait for USG to confirm the diagnosis.**
↓
It is a clinical diagnosis
↓
Can do - CULDOCENTESIS

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Culdocentesis: Take a syringe through posterior fornix of vagina

↓

Enter into pouch of Douglas

↓

If this syringe contains Non clotting blood

↓

Ruptured ectopic pregnancy

If you get blood which clots: It means syringe was in some artery/vein.

A. Management of ruptured ectopic pregnancy:-

↓

Patient is in shock

Priority management

Resuscitation

→ 2 I/V line
→ I/V fluid
→ Blood arrange
→ Catheterize
→ CBC, ABO, Rh, CT, BT report

+

Definitive Management

Open the abdomen of patient.

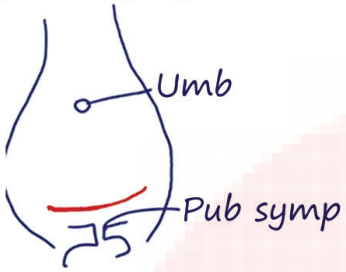
↓

Called as LAPAROTOMY

Also know:

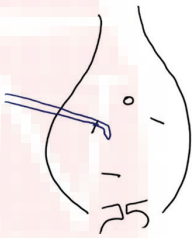
Always are 2 ways in which abdomen can be opened.

Open surgery
Laparotomy



Laparoscopy





In ruptured Ectopic pregnancy

↓

Open the abdomen by LAPAROTOMY (in all emergency surgery vital unstable)

↓

How you will do surgery

↓

Remove the entire tube which was ruptured

↓

Called as **SALPINGECTOMY**

Always:

→ In ruptured ectopic pregnancy (Acute condition/severe ectopic)
→ Definitive Management is → LAPAROTOMY
→ Surgery done is: SALPINGECTOMY (Whether patient is nulliparous/ Multiparous)

There is no role of:

1. Medical Management
2. Expectant Management
3. Laparoscopy (It is never done if patient is in shock/vitals are unstable)
4. Any other surgery except salpingectomy

B. **If Patient comes with unruptured ectopic pregnancy:-**

Patient complains of:

1. Amenorrhea (6-10 weeks)

+

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2. Vaginal bleeding
   +
3. Pain in abdomen

→ Most specific symptom/most common symptom of ectopic pregnancy = Pain in Abdomen.

→ On per vaginal Examination
   → Cervical movement tenderness
   → May get = Adnexal mass (Tubal)

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For Diagnosis:-

→ **1st Investigation: TVS**

→ **Best Investigation**
   → TVS + β hCG (1st best answer)
   → TVS (2nd best Answer)

→ Gold standard
   → Laparoscopy
   → Laparoscopy + TVS

Management of unruptured Ectopic: There are 2 options:

1. Medical Management: Best option
2. Surgical Management

Ruptured Ectopic Pregnancy= Best Management
↓
Surgery

Unruptured Ectopic Pregnancy= Best Management
↓
Medical Management

Medical Management:-

→ Drug of choice:- METHOTREXATE (folic acid antagonist)

→ Dose = 50 mg/m²

→ Done only if following conditions are fulfilled:
1. Patient should be hemodynamically stable
2. It should be case of unruptured ectopic pregnancy
3. Size of ectopic pregnancy = 4 cm
4. β hCG value



Methotrexate (i/m) single dose therapy is best management of Unruptured ectopic pregnancy.

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Note:

If all conditions of methotrexate are fulfilled & hCG value is <1000 IU & values are decreasing itself

↓

OBSERVATION
(Expectant management)
Not preferred → Risk of rupture of ectopic

2nd option in unruptured ectopic pregnancy:-

↓

Surgery

↓

Open the abdomen (vitals stable as it is unruptured ectopic)
by LAPAROSCOPY

Family of patient complete

↓

Remove tube

↓

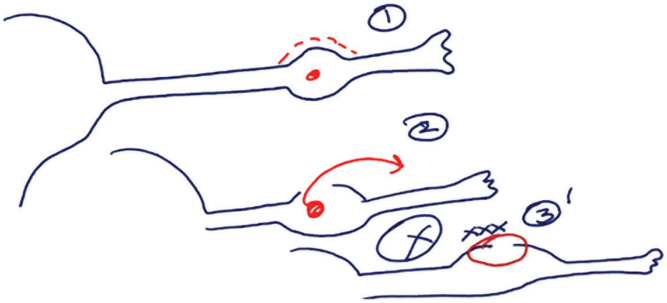
SALPINGECTOMY

Family not complete

↓

1. Open the tube above the ectopic pregnancy
2. Remove ectopic pregnancy
3. Leave incision site open (Don't put stitches)

LINEAR SALPINGOSTOMY



1, 2, 3, Process

Q. Do you remove ovaries in case of ectopic pregnancy? (No)
Salpingoophorectomy is not done, we do salphigectomy in ectopic pregnancy

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MOLAR PREGNANCY



Gestational Trophoblastic diseases

2 Categories

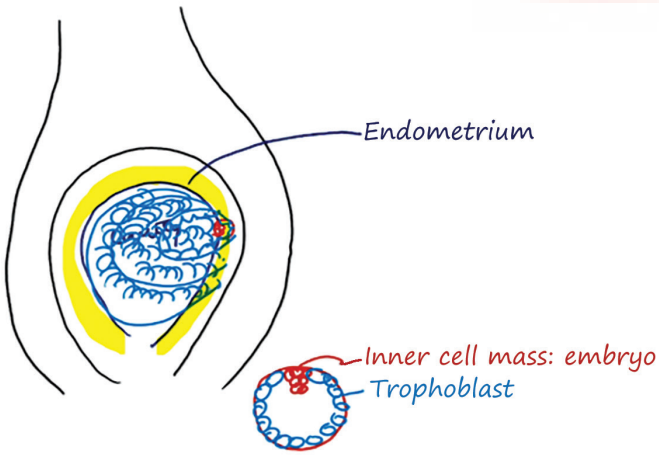
BENIGN
MOLAR PREGNANCY
→ Partial mole
→ Complete mole/hydatidiform mole/vesicular mole

MALIGNANT
GESTATIONAL TROPHOBLASTIC NEOPLASIA
→ M/C = Invasive mole
→ 2nd M/C = Choriocarcinoma

Molar Pregnancy has increased chances of changing into invasive mole & choriocarcinoma.

→ Molar pregnancy is Benign disease of TROPHOBLAST which can become malignant
→ Molar pregnancy when it becomes malignant, which malignancy occurs most common?
  → Best answer:-Invasive Mole
  → 2nd Best Answer:- Choriocarcinoma

Problem in Molar pregnancy:



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Improper excessive proliferation of trophoblast

It gives some space to the inner cell mass to grow ↓ Then some fetal part will be present ↓ This is called **PARTIAL MOLE**	If it does not give any space to inner cell mass to grow ↓ No fetal part grows ↓ Entire uterus is full of TROPHOBLAST ↓ **COMPLETE MOLE**

Whether it is partial mole or complete mole

↓

Pregnancy has to end in 1st trimester

↓

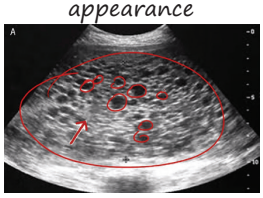
Patient complains of 1st trimester bleeding urine pregnancy test +ve followed by

→ 1st term bleeding
→ 6-8 weeks of pregnancy

What happens in MOLAR Pregnancy?

Excessive, improper, Proliferation of TROPHOBLAST

1. Height of uterus more than period of gestation
2. No fetal part palpable
3. No Fetal Heart Sound Heard
4. **On USG:-** Snow storm like appearance



5. Syncytiotrophoblast also proliferates

↓

hCG↑

Levels of hCG in Molar Pregnancy are higher than Normal Pregnancy.

Hints in question which tell about Molar Pregnancy:-

→ Patient will complain of 1st trimester Bleeding with **Passage of grape-like vesicles**

⊕

Height of uterus > Period of gestation

⊕

β hCG values are higher than normal pregnancy

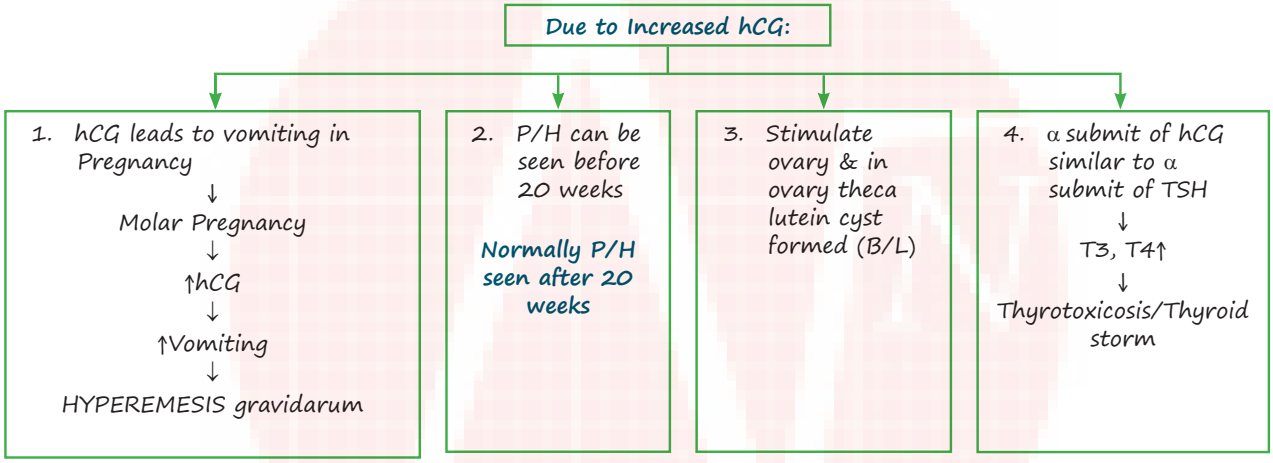
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On **USG** = snow storm like appearance

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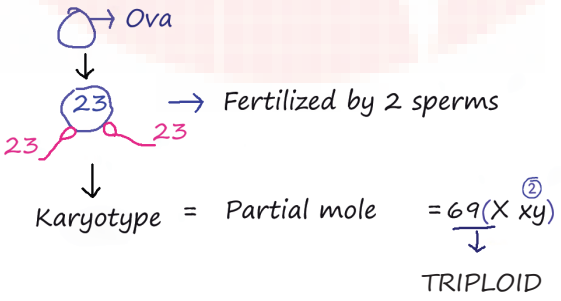
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Due to Increased hCG



Also know:

How partial Mole occurs:-



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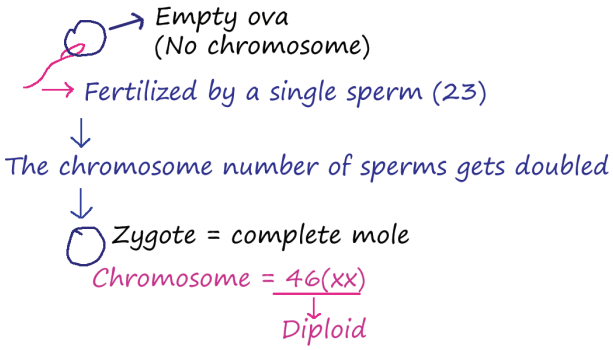
3. DISPERMIC (fertilized by 2 sperms)
4. Extra genetic material in Partial Mole comes from: father (PATERNAL)

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How complete Mole occurs:-

In complete mole



→ MONOSPERMIC

→ **Problem:-** Entire genetic material belongs to father.

Partial mole	**Complete mole**
→ Karyotype = TRIPLOID 69(XXY) → DISPERMIC → Extra genetic material is from father	→ DIPLOID 46 (XX) → MONOSPERMIC → Entire genetic material from father (mother = no genetic matter as ova is empty)
Whether it is partial mole or complete mole, none of them can survive)	
→ Some fetal Part is present → hCG levels are more than normal pregnancy but value is $<10^5$ IU/L <1 lakh IU/L	→ No fetal part present → hCG levels $\geq 10^5$ IU/L ≥1 lakh IU/L
→ **On USG:** Image similar to missed abortion Less in partial mole	→ **On USG:-** Snow storm appearance Image → All complications of molar pregnancy 1. Hyperemesis gravidarum 2. Pregnancy Induced Hypertension 3. B/L Theca-lutein cyst 4. Thyrotoxicosis More in complete mole
→ IOC for Molar pregnancy:- → **Management:-** Whether Partial Mole/complete mole ↓ **Suction Evacuation**	→ USG = In complete mole ↓ **Snow storm appearance**

Management of Molar Pregnancy = Suction Evacuation (Best Answer)

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Q. Female >40 years with family complete has molar pregnancy. Management would be:-Hysterectomy because Molar pregnancy has chances to become malignant

Chances of Malignancy:-

	Gestational trophoblastic neoplasia	Choriocarcinoma
1. Partial mole	4%	<1%
2. Complete mole	15-20%	4%

After Evacuation/After hysterectomy:-

(1) Always send the tissue for histopathological examination.

IOC in molar Pregnancy: USG
Gold standard Investigation: Histopathological Examination

(2) Always do follow-up

↓
For follow-up measure β hCG levels Weekly
↓
Till you get '3' Normal values
↓
Then after that measure β hCG monthly
↓
Till 6 months

If hCG levels Increase or do not return to normal in 6 months
↓
Means = Malignancy has occurred

During these 6 months: pregnancy is contraindicated.

Contraceptive of choice:-

Oral contraceptive pills (Estrogen + progesterone containing pills)

Remember:- Molar pregnancy is a benign disease of trophoblast with Malignant potential.

A patient of Molar Pregnancy after Evacuation/Hysterectomy
↓
Can also change into malignancy

→ Most common malignancy after H. Mole: Invasive mole
→ 2nd most common maligancy after H. Mole: Choriocarcinoma

Nursing Intervention:-

(1) Prepare the client for uterine evacuation.
(2) Do not start oxytocin before evacuation. OS chances of Thromboembolism increase

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(3) Start oxytocin after evacuation is complete

(4) (a) After evacuation = sharp curettage is done.

(b) After evacuation : Monitor for

→ PPH

→ Infection

→ Thromboembolism

(5) Send the tissue for histopathological examination

(6) Monitor her β hCG levels

(7) Instruct patient about: Not to conceive for 6 months after evacuation

Q1. Normally after evacuation of Partial Mole.

When do β hCG levels come back to normal

↓

After 7 weeks

Q2. After complete mole evacuation β hCG levels come back to normal → after 9 weeks

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Choriocarcinoma:-

→ Most commonly develops after:- H. mole/molar pregnancy.

→ Malignant in nature

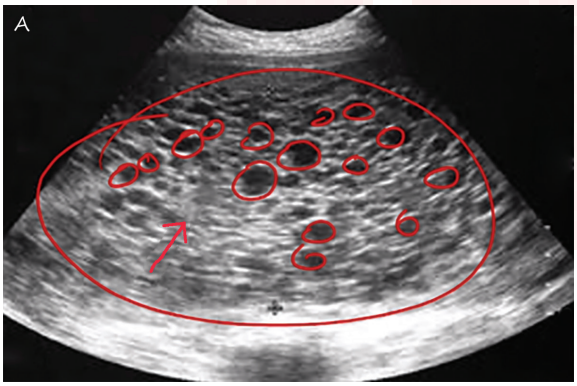
→ Tumor Marker = β hCG

→ Most common site of metastasis- Lungs followed by vagina

→ It is a chemosensitive tumor

→ TOC → Chemotherapy (not hysterectomy)

→ After choriocarcinoma pregnancy is contraindicated for 1 year



Snow storm appearance on USG
MOLAR Pregnancy



Chest X-ray = SNOW storm appearance
↓
choriocarcinoma which has metastasized to lungs

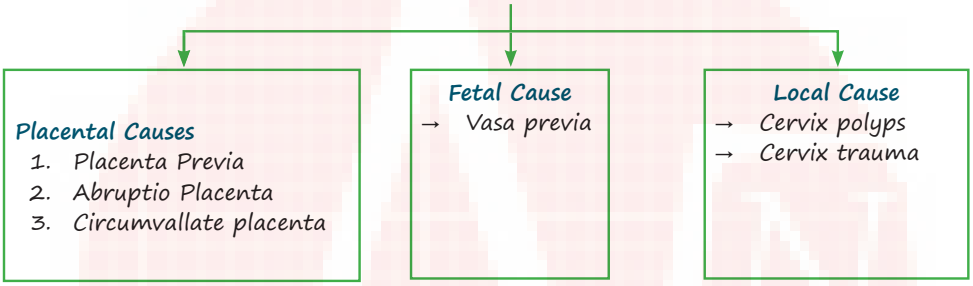
Case:- A G_2 P_1 female with 10 weeks of pregnancy complains of excessive nausea & vomiting. Her β hCG levels are ≥10_5 IU/L. On USG = No fetal parts are seen & snow storm appearance present. She complains of bleeding her vagina. Diagnosis:- Complete mole.

ANTEPARTUM HEMORRHAGE (APH) (PART-1)



Definition: Any bleeding which occurs in the genital tract or from the genital tract at/or beyond 28 weeks of pregnancy & up till delivery.

Causes:

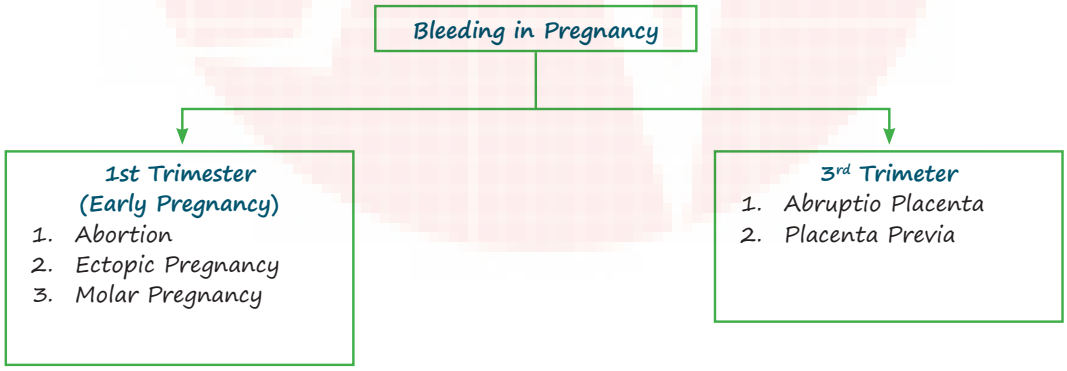


Note:- Battledore placenta does not lead to APH

→ Most common cause of PPH:- Abruptio Placenta

→ Other names of Abruptio Placenta:- Accidental hemorrhage or Uterine apoplexy

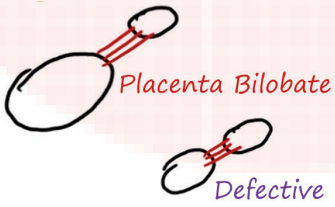
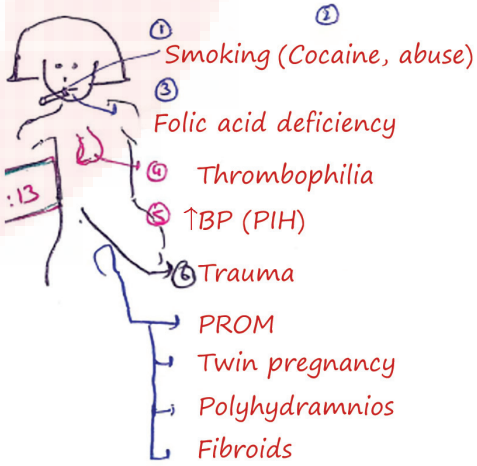
Remember:-



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	Placenta previa	Abruptio Placenta (More Common)
Definition: 	Placenta is located in the lower uterine segment.	Premature separation of placenta before delivery is abruptio
Location of placenta:	Upper uterine segment	In abruptio placenta is normally located in Upper Uterine Segment
Note:	For localization of placenta USG is done in 3rd Trimester	
Incidence in Pregnancy	1 in 300 Pregnancy	1 in 200 Pregnancy
Risk factor	**Common Risk Factors** 1. Increased maternal age 2. Increased maternal parity (APH is more common in multiparous female 3. Smoking 4. Twin Pregnancy	
Most Important:-	→ Previous history of placenta previa → Placenta size = Big → Twin Pregnancy → Diabetes → Succenturiate lobe  → Endometrium defective → Smoke → Cesarean section → Curettage → Endometritis	Previous H/O Abruptio 

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Remember:-

→ 2 Most Important Risk Factors for Placenta Previa:-

(1) Previous H/O placenta previa

(2) Previous H/O Cesarean Section

→ 3 Most Important Risk factors for abruptio Placenta:

(1) Previous H/O abruptio Placenta

(2) Trauma (Abdominal)

(3) Pregnancy-induced hypertension (PIH)

} Uterine Decompression

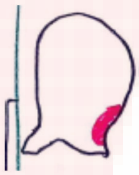
Not a Risk factor for Abruptio → alcohol

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ANTEPARTUM HEMORRHAGE (APH) (PART-2)

	Placenta previa	Abruptio
Classification → Type 1 → Anterior → Posterior	**Type 1:-** Placenta is in lower uterine segment but it does not reach up till margins of Internal OS.  Internal OS:- Lateral Placenta previa	**Page Classification** **Grade 0:** Patient has no complaint. It is a retrospective diagnosis by looking at placenta **Grade 1:** Pain abdomen + bleeding fetal heart sound 'Normal' **Grade 2:** Pain Abdomen + Bleeding Fetal Heart sound 'Absent' **Grade 3:** Pain abdomen + Bleeding Fetal Heart sound 'Absent' Mother shock (vitals unstable) ± DIC
→ Type 2 → Anterior → Posterior	**Type II:-** Placenta reaches up till margins of internal OS : Marginal placenta previa 	
	Type III:- Placenta covers the Internal OS incompletely. Incomplete Placenta previa 	

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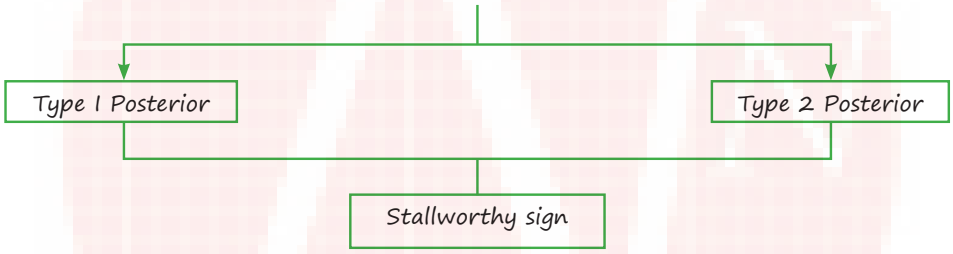
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	Type IV:- Placenta covers internal OS completely. Complete placenta previa or central placenta 	**VARIETIES:-** (3 Types)  **Revealed variety** Placenta separates in such manner bleeding visible  **Concealed variety** Placenta separates in such manner in which bleeding is not visible Mixed

Important Points to Note:-

(1) Dangerous Variety of Placenta previa:- Type 2 Posterior

(2) STALL WORTHY sign:-Posterior varieties of Placenta previa

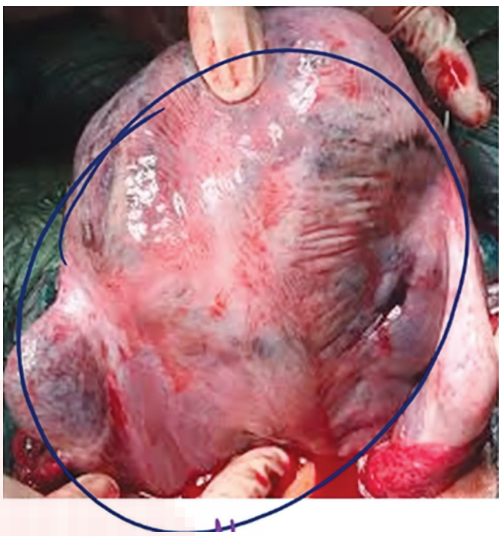


Degree of Placenta Previa:

Minor degrees placenta previa	Major degrees placenta previa
→ Type 1: i. Anterior ii. Posterior → Type I1: Anterior Can try vaginal delivery	→ Type 2 Posterior (Dangerous Variety) → Type 3 → Type 4 Have to do Cesarean section

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Three Important Points on Abruptio:-



In concealed variety of abruptio

↓

Blood collects behind the placenta

↓

Goes into the myometrium of uterus

↓

Giving the uterus blue color (Uterus appears to have bruises)

↓

Called as **Couvelaire uterus**

Three Important Points on Couvelaire Uterus:-

(1) Seen in concealed variety of Abruptio
(2) Risk factor for postpartum hemorrhage
(3) It is not an indication for Hysterectomy.

	Placenta pravia	Abruptio placenta
Complaint of the patient	Bleeding in third trimester	Bleeding in third trimester
	(1) Bright red color (2) No Pain in abdomen PAINLESS BLEEDING (3) No Reason for bleeding CAUSELESS BLEEDING (4) Recurrent bleeding (5) Initially bleeding is less in amount ↓ Warning hemorrhage ↓ Followed later on by excessive bleeding	→ Dark Red colour → Pain in abdomen is present → History of Trauma or H/O PIH → Bleeding is not recurrent in same pregnancy → No warning haemorrhage

	Placenta pravia	Abruptio placenta (concealed [mixed])
On general examination	General condition of patient corresponds to the amount of blood lost. **If bleeding is less** ↓ Patient's vitals will be stable **If bleeding is more** ↓ Patient's vitals will be unstable	General condition of patient & amount of blood loss do not correspond to each other In abruptio ↓ When placenta separates ↓ Release Thromboplastin ↓ Thromboplastin contracts uterus ↓ Causing pain in abdomen in Abruptio

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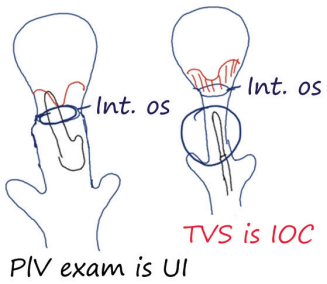
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On per abdominal Examination	(1) Uterus is soft, Non-tender, Relaxed FHS easily heard — Fetal parts are easily palpable (2) Height of uterus=Period of pregnancy (3) Fetal Heart Sound= Present Regular	(1) On Examination Uterus is hard, tensed & tender FHS not easily heard — Fetal parts: Not easily Palpable (2) Height of uterus is more than period of pregnancy (3) Fetal Heart sound not heard (may cause death or distress of fetus)
Per vaginal or Per Speculum Examination	**Contraindicated**	**Contraindicated**
Complications: Common	→ PPH → Fetal death less common → Malpresentation (Transverse lie or breech)	→ PPH → Fetal death more common → DIC

Note:- Whenever a patient of APH comes:

1. Always taken as a case of Placenta previa unless proved otherwise

- Never do per Vaginal Examination
- Always hospitalize them ↓ because in Placenta Previa bleeding may reoccur

	Placenta previa	Abruptio placentae
Diagnosis Investigation of Choice (IOC)	USG:- Initial USG:- Transabdominal USG IOC :- TVS  	Clinical Diagnosis

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Case 1:- Patient of APH, comes to Emergency:-

Next step:-

(1) Patient vitals check (BP, PR)
(2) Fetal Heart Sound auscultate
(3) Ask about blood loss
(4) Resuscitate
   → IV line
   → Blood cross match
   → Fluid

Case 2:- Patient of APH, vitals stable, comes to Emergency:-

Next Step:-

USG = Initial USG = TAS

↓

If placenta previa

↓

Trans Vaginal Ultrasound

Case 3:- Patient of APH, with unstable vitals comes to Emergency:-

Next Step:-

Resuscitate patient

↓

Immediate delivery

↓

Cesarean section

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ANTEPARTUM HEMORRHAGE (APH) (PART-3)



Management of Placenta Previa

Whenever a patient of APH comes:-

Immediate care/Basic care/ 1st line management

- **Check the vitals**
- **Assess Fetal Heart Sound**
  (+) Simultaneously
  → 2 IV cannulas (large bore)
  → Start IV fluids
  → ABO, Rh typing = arrange for blood
  → O_2 by mask
- **Assess blood loss**

Definitive Management of Placenta Previa

- Terminate the pregnancy immediately
  ↓
  Active Management
  ↓
  In any condition where mother's life is at risk
- Continue the pregnancy
  ↓
  Expectant Management
  ↓
  PURPOSE:- To let the fetus attain lung maturity (37 weeks)
  CONDITION:- Never putting the mother's life at risk

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Active Management	Expectant Management
1. If patient vitals are unstable (patient-shock) 2. If there is active bleeding or continuous bleeding 3. If gestational age is ≥ weeks 4. If there is fetal distress 5. On USG if there is malformation which is incompatible with life like neural tube defect	1. Only of patient's vitals are stable + 2. If there is no active bleeding + 3. If gestational age < 37 hours + 4. If no fetal distress + 5. On USG → No congenital malformation → Minor defect **All 5 conditions are fulfilled then only we do expectant**

Steps of Expectant Management :- **It is Macafee-Johnson's regime**

(1) Hospitalization
(2) Bed Rest
(3) Inj. Corticosteroid is given so that lungs of fetus mature.
(4) If patient is Rh negative → give Inj Anti D
(5) Arrange for blood.

Daily check:-

→ Vitals
→ Fetal Heart Sound
→ Ask about bleeding

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Expectant Management
↓
Continue up till

37 weeks
↓
Deliver patient

But if any day:
→ Bleeding start
→ Fetal Distress present
↓
Do not wait till 37 weeks
↓
Immediately Terminate

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Mode of Delivery

Minor degrees
- → Type I
  - i. Anterior
  - ii. Posterior
- → Type II-Antierior

↓

Try vaginal delivery

Major degrees
- → (Type III, IV)
- → Dangerous Variety of Placenta Previa (Type II posterior)
- → If patient is having excessive bleeding irrespective of type of placenta previa

↓

Cesarean section

For mode of delivery in Placenta Previa

↓

Necessary to know Type of Placenta Previa

1. **USG**

↓

If not available

2. **Double set-up Examination**

In OT, after doing all arrangements for cesarean section

↓

Do a pervaginal Examination

↓

Called as Double set-up Examination

Management of Abruptio

↓

When placenta separates

↓

Thromboplastin release

Uterus contract

↓

Stage of delivery

Can lead to DIC

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In abruptio Patients = Immediate delivery should be done to prevent DIC
→ Never Prolong delivery
→ Never Do Expectant Management
→ Never give Drugs to ↓ uterine contractions (Tocolytic)

Management:- Initial management = Resuscitation
+
Immediate Termination of Pregnancy
↓
Mode of delivery => vaginal delivery (preferred)

Indications for cesarean in Abruptio:-

(1) Fetal distress present
(2) Patient's vitals unstable
(3) Gestational age <32 weeks

Major complications of Abruptio → DIC

Case:- Patient of Abruptio, with fetal distress with DIC (coagulation profile Abnormal Fibninogen↓, D-Dimer increases). Next step:-

1st connect DIC → (Fresh Frozen Plasma/ Cryoprecipitate given)
↓ Blood Transfusion
Followed by vaginal delivery

Case:- Patient with Previous cesarean section & in this pregnancy she has Placenta previa, what complication be anticipated?

↓
Increase chances of Placenta accreta
↓
Always delivery by cesarean section followed by Hysterectomy.

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DIABETES IN PREGNANCY

General Discussion

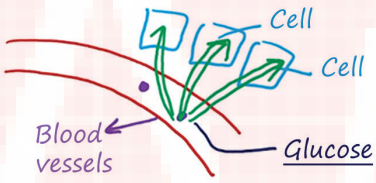
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How & why Diabetes occurs?

1. Main hormone which regulates blood sugar levels:- Insulin
2. Insulin is secreted by: Pancreas (β cells)
3. Fetus starts producing insulin by:- 12 weeks of pregnancy (11-12 weeks)
4. **Role of Insulin:-** Insulin Helps to move glucose from blood to the cells, blood glucose level decreases. Helps in regulating blood sugar levels.

(4) Role of Insulin



5. So if Insulin is present:
   - → In normal Quantities:- Blood sugar levels normal
   - → In Excess:- Blood sugar level decreases (↓)
   - → In less/or if there is resistance to Insulin:-

Blood Sugar Level Increase
↓
Hyperglycemia
↓
Diabetes

In Pregnancy:

There is **Insulin Resistance in all pregnant females**
↓
So glucose does not enter the cells
↓
Hyperglycemia
↓
↑Insulin secretion

Q.1. Insulin Resistance is due to:- Hormone Human Placental lactogenic

Q.2. Maximum Insulin Resistance is seen:- Between 24-28 weeks starting from 24 weeks.

→ Pregnancy is a **Diabetogenic state**

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→ Fetus depends on :

→ Mother for glucose

→ Main source of energy for fetus = glucose

→ **It there is:**

Maternal Hyperglycemia (↑glucose)
↓ Transport from mother to fetus via placenta.
Fetal hyperglycemia
↓
Fetal pancreas will produce more insulin

→ Hormone Responsible for growth of fetus :- Insulin

→ **So when:**

Blood glucose ↑ in mother via placenta
↓
Fetal blood glucose levels Increased
↓
Fetal pancreas will produce
More insulin (↑ Insulin) needed for growth of fetus
↓
↑Growth of fetus (weight of fetus ≥ 4 kg)
(MACROSOMIA)

→ **In Pregnancy:-**

→ Glucose is transported from mother to fetus via placenta.

→ Maternal Insulin does not cross the placenta.

DOC for diabetes in pregnancy
↓
Insulin (Cannot cross the placenta)

→ **ORAL HYPOGLYLEMIC DRUGS**
↓
Can cross the placenta
↓
Can cause fetal hypoglycemia

∴ Not used in pregnancy

Only 2 oral hypoglycemic drugs can be used in pregnancy:-

1. METFORMIN
2. GLYBURID

Still DOC for Diabetes in Pregnancy = Insulin

Investigation done in Diabetes (In general)

1. Fasting Blood sugar (FBS) (8-10 hours overnight fast)
   ↓Breakfast 2 hours after
2. Post parandial blood sugar level (2 hours pp value)
3. Random blood sugar levels **(irrespective of meals)**
4. Glucose tolerance test
5. Glycosylated Hb: HbAIC (Past 3 weeks glucose state)
6. Urine glucose:- If glucose is present in urine ⇒ glycosuria

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Glycosuria (Sugar/glucose is present in urine)

↓

Abnormal finding in Non pregnant female, children, Males.

↓

Indicates Diabetes

But: In pregnancy = Glycosuria is Normal finding & it does not indicate diabetes.

So always in pregnant female to detect diabetes-

Do: Blood test (Never do urine glucose test)

Diabetes in Pregnancy

2 Situations

1. A Diabetic females conceives
   ↓
   Overt DIABETES

A female without diabetes conceives but in pregnancy due to Insulin Resistance she becomes diabetic.
↓
GESTATIONAL DIABETES MELLITUS (GDM)

In overt diabetic patients:- (Before pregnancy)

FBS : ≥126 mg%

Random blood sugar : ≥200 mg%

HbAIC : ≥6.5%

In Gestational diabetic patient (before pregnancy)

FBS, RBS, HbAIC } Normal

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Concepts:

	Overt diabetes	Gestational diabetes
History	History of Diabetes before pregnancy present	Absent
Blood sugar levels		
Before pregnancy	↑	Normal
Day one of pregnancy	↑	Normal
	In overt diabetes patients blood sugar levels raised throughout pregnancy.	In gestational diabetes patient blood sugar levels are raised when there is insulin resistance. ↓ ≥ 24 weeks In gestational diabetes patient's blood sugar levels are raised from **24 weeks onwards.**
1st Trimester	↑	Normal
2nd Trimester	↑	Normal or ↑
3rd Trimester	↑	↑
After Delivery	↑	Normal

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	Overt diabetes	Gestational diabetes
	As blood sugar levels are raised in 1st trimester ↓ This Increased glucose leads to formation of ↓ Free Radicals ↓ → Leads to congenital malformation in fetus → 1st trimester abortion	Blood sugar levels are normal in 1st trimester ↓ No free radical ↓ → No congenital malformation in fetus → No 1st trimester abortion

Nursing Implication

In all pregnant females: (Universal Test)

↓

At First Antenatal Visit

↓

Do 75 gm 2 hours GIT

↓

These are our National guidelines

→ How to do: 75 gm 2 hour glucose tolerance test.

Whenever a pregnant female comes for first antenatal visit.

↓

Irrespective of previous meals

↓

Give her 75 gm glucose in 300 ml of water

↓

After **2 hours** check the blood glucose levels.

Overnight fasting is not needed

If after 2 hours:- **Blood sugar levels**

< 140	140-200	≥ 200
↓ Normal ↓ **Repeat the test between 24-28 weeks of pregnancy**	↓ Gestational Diabetes	↓ Overt Diabetes

Overt Diabetes

→ Means patient has diabetes before pregnancy

→ History of **Diabetes before pregnancy is present.**

→ Glucose Tolerance test (75 gm, 2 hrs GIT): 2 hours post prandial value (≥200)

→ Congenital malformation: Seen in fetus of diabetic mother.

→ Chances of congenital malformation: Depends on mother's blood glucose of 1st Trimester

Case 1:

A diabetic female conceives & comes for antenatal advice. She wants to know the chances of congenital malformation in her fetus. What test will you advise?

↓

Chances depend on her blood glucose levels.

↓

Check "HbAIC"

↓

If HbAIC → <6.5% chances are less
>6.5% chances are more

More is the glucose ~ more is HbAIC ~ More are chances of congenital Malformation.

Questions:

1. What is the best test to predict the chances of congenital malformation in diabetic female is :-HbAIC
2. Best test to detect congenital Malformation:-
   - → Level 2 USG/Targeted Scan/Anomaly scan/TIFFA (Targeted Imaging for fetal Anomaly)
   - → Between 18-20 weeks.
3. Most common system involved in congenital Malformation in diabetic mother fetus:- CVS > CNS
4. Most common congenital malformation in diabetic mother fetus:-

   Ventricular septal defect (VSD) > Neural Tube Defect (NTD)
5. Most specific congenital Malformation:-
6. Sacral Agenesis (Caudal Regression Syndrome)
7. Ways to prevent congenital Malformation in babies of diabetic Mother.
   1. Strict control over glucose
      (Keep the glucose levels normal)
   2. Folic acid supplementation:- 400 mcg/day
      Start 1 month before pregnancy (Till 1st trimester)
8. Treatment of overt Diabetes:- (In Pregnancy)
   - → No Role of diet Modification
   - → No Role of oral Hypoglycemic drugs
   - → Give only INSULIN (TOC/DOC)
9. If an overt diabetes patient is already on Insulin & conceives

   ↓

   Dose of Insulin in pregnancy

   ↓

   Increase in second & Third Trimester

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10. In 1st Trimester → dose of insulin during pregnancy is NOT increased

In first trimester: If we Increase dose in mother:- Chances of Hypoglycemia are increased.

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Gestational Diabetes Mellitus (GDM)

→ Patient's blood glucose levels are normal before pregnancy, in 1st trimester of pregnancy.

→ Sugar levels Increase:- from 24 weeks onwards.

→ **75 gm glucose Tolerance Test:-**

↓

2 hour PP Value = **Between 140 - 200 mg%**

→ **Congenital Malformation:-** No risk of congenital malformation in babies of GDM.

Management of GDM:-

1st step:-

Diet Modification

+

Life style Modification

AIM

1. FBS = <95 mg%
2. 2 hour PP Value = <120 mg%
3. HbAIC = <6%

→ Diet modification is done for 2 weeks. In 2 weeks if above aim is achieved = Then continue the patient on diet (No need of Insulin)

→ If the Aim is not achieved in 2 weeks:-

↓

Put the patient on Insulin

Remember

Overt diabetes	Gestational diabetes
→ No role of diet → No role of exercise → Only Treatment is Insulin → No role of oral hypoglycemic drugs	→ Role of Diet is present → Role of Exercise is present. → Insulin is given only if diet fails. → If patient says she cannot take Insulin. ↓ **Give oral metformin**

→ Drug of choice for diabetes in Pregnancy
→ DOC for overt diabetes in Pregnancy
→ DOC for Gestational Diabetes Mellitus in Pregnancy
} INSULIN

Nursing Implication in GDM Patient

1. Explain diet Modification:-
   - → Diet
     - → Carbohydrates = 40 - 50%
     - → Protein = 20 %
     - → Fat = 30 - 40%
     - → Saturated fats = <10%
   - → Diet = 3 major meals
     +
     3 minor meals
   - → Calories: -Diabetic pregnant
   - → Diabetic = 25 - 30 Kcal/kg/day
     - → OBESE:- 1200 - 1800 kcal/day
     - → NON OBESE:- 2000 - 2500 kcal/day
2. Explain Role of Exercise:- Exercise is essential.
3. Explain self monitoring of glucose:- By glucometer
   ↓
   4-5 times a day
4. HbAIC measurement at end of 1st trimester & 3 months afterwards
5. Inquire about Infections:- In diabetic patients → ↑ chances of infections (UIT/Vaginitis)
   ↓
   → Can lead to preterm labor.
6. Explain Fetal movements:- **(Daily Fetal Movement count)**
   - → In Diabetic patients = ↑ chances of Intrauterine death of fetus.
     1. Lie in left lateral position
     2. After breakfast, After lunch & After dinner count fetal movements
     3. Count fetal movement for 1 hour & maintain chart.
7. In all pregnant females including overt + GDM at 18-20 weeks level 2 USG done.
8. Diabetes is a high risk in pregnancy
   ↓
   From 28 - 32 weeks
   ↓
   Antepartum fetal monitoring
   - → NST
   - → Biophysical score } Weekly
9. When to deliver diabetic patients:-
   39 - 40 weeks
   ↓
   Induce labor

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10. **Mode of delivery:-** Best = **VAGINAL DELIVERY**
11. Indication for cesarean section:- If in diabetic female weight of fetus is ≥4.5 kg

    Macrosomia ≥4 kg weight
12. After delivery:-
    - → Careful as Increased chances of Postpartum Hemorrhage
    - → In gestational diabetes, patient's Blood glucose levels become normal → Do a GTT in term after 6 weeks of delivery.

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Complications of Diabetes

Maternal

1. Maternal hyperglycemia = Increased chances of Infection (UTI, Vaginitis)

↓

2. Preterm Labor
3. Maternal Hyperglycemia → Fetal Hyperglycemia

↓

Polycoria

↓

↑Amniotic fluid = **Polyhydramnios**

↓

- → Preterm labor
- → PROM

4. Increased chances of PIH (Pregnancy Induced Hypertension)
5. After delivery = Due to overdistended uterus

↓

↑Chances of PPH

6. In 50% females:- In future they can have overt diabetes with GDM

Fetal Complications

→ Fetus Hyperglycemia → Fetal Pancreas Produces more Insulin

↓

→ **MACROSOMIA** — More growth of fetus

MACROSOMIA

(Weight of fetus ≥ 4 kg)

- → In Macrosomic babies excessive weight is deposited around the shoulders so it can result in shoulder dystocia.

→ Shoulder dystocia:- Difficulty in delivery of shoulders. So Macrosomia can lead to shoulder dystocia.

→ Increased chances of still birth & intrauterine death.

In **gestational diabetes** + **overt diabetes** = Increased chances of intrauterine death of fetus (death of fetus after 20 weeks of pregnancy)

↑ chances of still birth (death during delivery of fetus)

Only in overt diabetes there is increased chances of 1st trimester Abortion

Neonatal Complication

1. **Due to Preterm labor:-** Baby will be premature

↓

Lungs will not be mature

↓

Respiratory distress syndrome

2. **In Neonate** = HYPOGLYCEMIA

Maternal glucose ↑

↓

Fetal glucose ↑

↓

Fetal Pancreas Produce ↑ **Insulin**

At time of birth :- Connection between mother & fetus gone

↓

Source of ↑ glucose gone

↓

What remains in baby's body is increased Insulin

↓

Hypoglycemia

→ ↓K^+ levels :- Hypokalemia
→ ↓Ca^{++} levels :- Hypocalcemia
→ ↓Mg levels :- Hypomagnesemia
→ Hyper viscosity syndrome
  → Polycythemia (↑Hb)
  → Hyperbilirubinemia
→ In diabetic mother babies we do not get
  → Anemia
  → Mental Retardation
  → Hyperglycemia

Diabetic Mother : **HYPERGLYCEMIA**
Fetus : **HYPERGLYCEMIA**
Neonate : **HYPERGLYCEMIA**

Gestational diabetes = Classification is called as WHITE Classification:-

GDM controlled on Diet = A_1 category
GDM controlled on Insulin = A_2 category

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Overt diabetes Vs gestational diabetes

Overt diabetes	Gestational diabetes
→ 1st trimester = Blood sugar increased	→ Blood sugar normal in 1st Trimester
→ Congenital Malformation in babies present	→ Congenital Malformation in babies Absent
→ Can lead to 1st trimester abortion	→ Does not lead to 1st trimester abortion
→ Only treatment is Insulin	→ 1st treatment is diet × 2 weeks ↓ If not controlled Then Insulin
→ 2 hours 75 gm GTT Value ≥ 200 mg%	→ 2 hours 75 gm GTT Value between 140 - 200 mg%



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HYPERTENSION IN PREGNANCY (PART-1)



Common Terms:

1. Hypertension defined in Pregnancy: BP ≥140/90 mm Hg on 2 occasions, 4 hours apart.
   In Pregnancy = Diastolic BP = Where there is muffling sounds (KORTOKOFF sound IV)

There can be 2 categories

- Hypertensive female has conceived → Chronic hypertension In Pregnancy
- Female did not have ↑BP before pregnancy but during pregnancy due to some placental Problem (at 20 weeks of pregnancy) she develops high BP → **PIH (Pregnancy Induced Hypertension)**

Chronic Hypertension in Pregnancy	Pregnancy Induced Hypertension
1. Patient will give history of increased BP before pregnancy.	1. BP is normal before pregnancy
2. BP is raised throughout pregnancy (Even before 20 weeks of Pregnancy)	2. BP is raised after 20 weeks of pregnancy.
3. BP does not come back to normal within 12 weeks of delivery.	3. BP comes back to normal within 12 weeks of delivery.

PIH (Pregnancy Induced Hypertension)

PIH is Further divided into 2 types

1. Gestational Hypertension

1. Proteinuria absent
   Or
2. End organ damage is absent

2. Preeclampsia

1. Proteinuria present
   Or
2. End organ damage is present

Common

→ Patient BP will be normal before pregnancy
→ BP will increase after 20 weeks of pregnancy
→ BP will come back to normal within 12 weeks of delivery.

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PROTEINURIA

Definition:

Excretion of Protein in Urine

- In 24 hours urine Sample → ≥300 mg (≥0.3 gm)
- **In mg/dL** → Random urine sample ≥30 mg/dL protein → Proteinuria
- By dipstick method → OPD





Dipstick
Green color indicates protein
≥ + 1 Proteinuria present
If Nil/Tracer → No proteinuria is Present

Note:

1. Hypertension in Pregnancy + Proteinuria } PRE ECLAMPSIA
2. Proteinuria is not physiological during pregnancy.
3. Glycosuria is physiological during pregnancy.

Signs of End Organ Damage:-

1. Liver enzymes raised to ≥2 times than normal value.
2. Serum creatinine ≥1.1
3. Platelet count <1 lakh
4. Visual symptoms/cerebral edema
5. Pulmonary edema.

Please Note

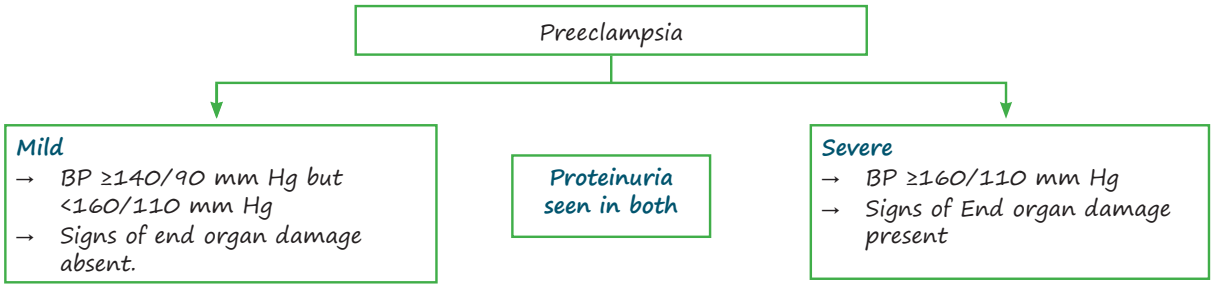
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Note:- Any 1 of these signs if present + Hypertension in pregnant female

Preeclampsia



ECLAMPSIA

Definition:- Severe Preeclampsia
+
Generalized Tonic Clonic Seizure

→ So eclampsia is a complication of severs preeclampsia (It is not a complication of mild Preeclampsia)

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Nursing Implication:

In all patients of severe Preeclampsia you should ask about symptoms which indicate patient throw convulsion at any time:- Signs of Impending Eclampsia.

Signs of impending eclampsia in a severe preeclampsia patient:-

1. Decreased urine output (normal = ≥30 ml/hr)
2. Headache which is not caused by regular medication.
3. Epigastric pain
4. Visual symptoms e.g. blurring of vision or diplopia

Why convulsion occur in Eclampsia:-

When Pressure (BP) is increased volume of blood going to all organ decrease.
↓
Volume of blood going to mother's brain decreases
↓
There will be cerebral hypoxia
↓
There are convulsions
(For treatment = Vasodilation of brain vessels)

Term:- Chronic hypertension with superimposed Preeclampsia:-

Means: A female with chronically Increased BP conceived & suddenly at 20 weeks of pregnancy.

1. Her BP becomes uncontrollable
   or
2. She starts having Proteinuria
   or
3. She starts having signs of End organ damage

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Why PIH occurs?

1. Due to some problem in placenta at 20 weeks of pregnancy (≥ 20 week)

↓

2. ↓Blood supply in placenta (size of placenta in PIH is small)

↓

3. Placental Ischemia

↓

4. Inflammatory Mediators Released

↓

Leakage in blood capillary of mother

Liquid component of blood (Plasma) comes out & collects	Solid component stays Inside (RBC, WBC, Platelet)
1. Under skin = Edema 2. In peritoneal cavity = Ascites 3. In Pleural cavity = Pleural Effusion	Blood thick ↓ **Haemoconcentration** Increased chances of thrombosis ↓ **End organ Damage**

Note:- Earlier to diagnose Preeclampsia criteria used were

→ Edema + ↑BP

→ Rapid weight gain + ↑BP (≥0.5 kg/week)

But these are No longer used, Now we Say:-

→ ↑BP + Proteinuria

Or

→ ↑BP + Signs of End organ damage

} Preeclampsia

Edema seen in Preeclampsia is pitting edema

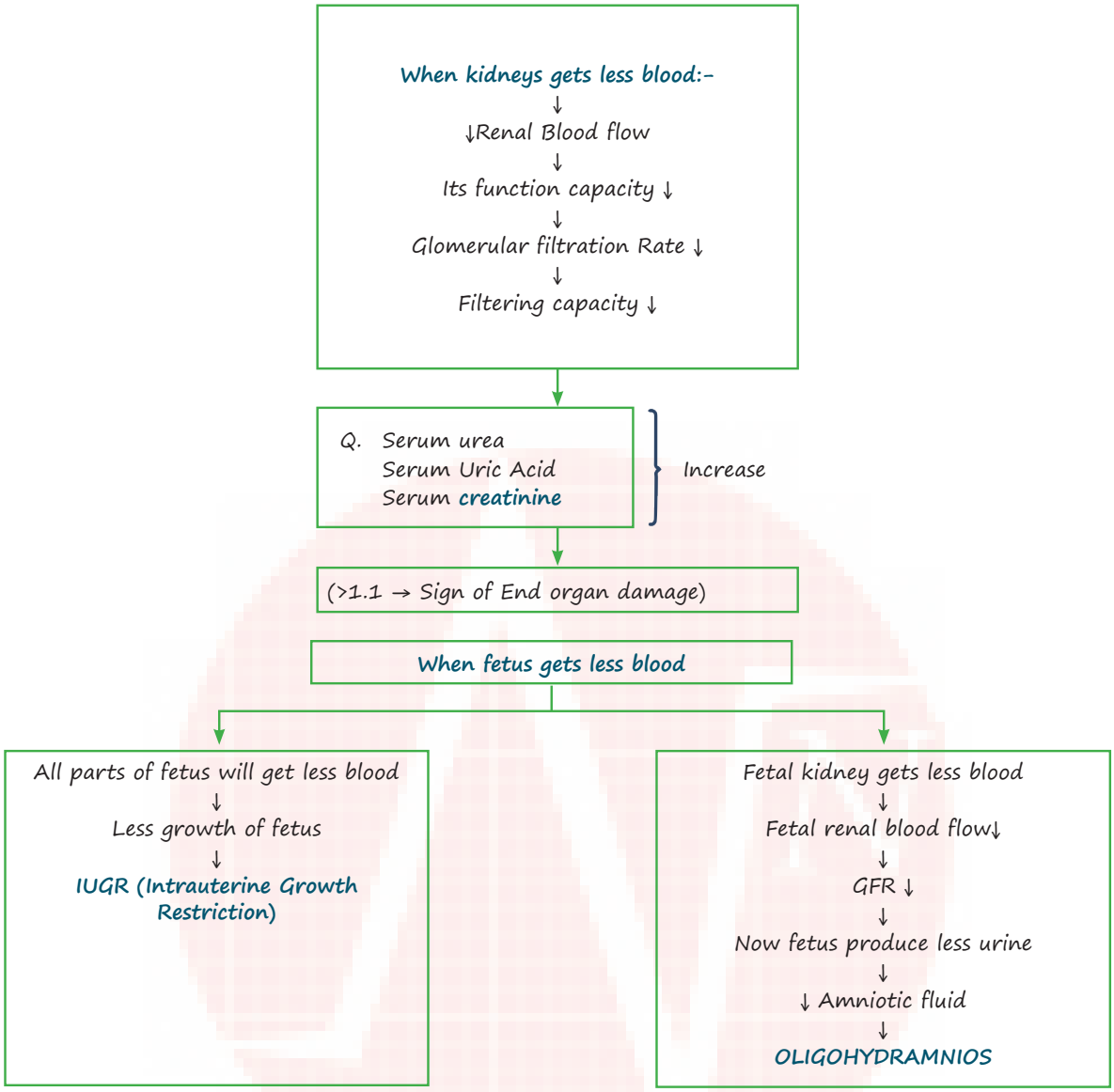


Edema is seen in PIH/Pre eclampsia
but it is not a criteria to diagnose preeclampsia

So in PIH there is Multi organ dysfunction:- (In other words)

→ All maternal organs get less blood & are affected. Fetus also gets less blood.

→ Most common maternal organ affected = **KIDNEY**



Complications of Preeclampsia

All these complications are seen with severe preeclampsia (Not with mild)

1. Eclampsia
2. HELLP Syndrome

   H → Hemolysis (RBC destruction = Fetal Anemia)

   +

   E, L → Elevated Liver Enzymes ↑

   +

   L, P → Low Platelet Count↓

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3. Abruption placenta (Premature separation which is normally located)
4. DIC (Severe **Pre-eclampria, Eclampsia or HELLP** syndrome)

Can lead to DIC

5. IUGR (more common in severe Preeclampsia
6. IUD (Intra uterine death) of fetus → more common in severe Preeclampsia
7. Thrombocytopenia (Decreased Platelet count)

Nursing Implication

1. At every visit in all pregnant females:-
   - → Check her BP
   - → Check proteinuria
   - → Check weight of patient
2. In patients with increased BP. Ask about:- signs of Impending Eclampsia
3. Ask about
   - → Urine output
   - → Headache
   - → Epigastric pain
   - → Visual symptoms
4. **Explain:** The importance of daily fetal movement count & charting.

Risk factors for PIH in general/Preeclampsia

1. Primigravida
2. Big Placenta (Diabetes or Twins)
3. 2 kinds of syndromes:-
   - → Metabolic X syndrome
   - → Anti-phospholipid antibody syndrome (APLA Syndrome)
4. 3 Types of Pregnancy:-
   - → Twin pregnancy
   - → Molar pregnancy
   - → Rh negative pregnancy

1. Previous H/O Preeclampsia
2. Family History of (H/O) ↑ BP
3. Kidney disease
4. Diabetes

Protective factor:- Smoking protects against PIH

Remember

1. In antepartum Hemorrhage (Placenta Previa & Abruptio)

   Risk factor
   - → More common in Multigravida female
   - → Smoking is a risk factor.
2. PIH:-
   - → More common in primigravida female
   - → Smoking is protective

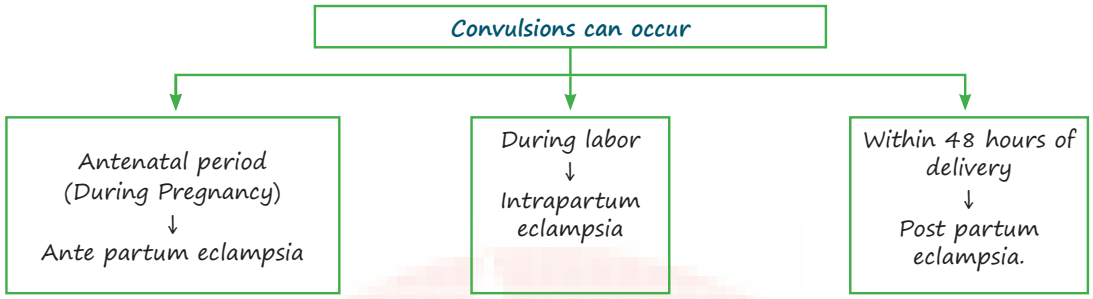
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ECLAMPSIA

→ Means: When a severe Preeclampsia throws convulsions.

→ Complication of : Severe Preeclampsia

→ Convulsions occur because of:- Cerebral anoxia.



→ Most Common type of Eclampsia → Antepartum Eclampsia.

→ Eclampsia with worst prognosis → Antepartum Eclampsia

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HYPERTENSION IN PREGNANCY (PART-2)



Treatment of PIH:

1. PIH is due to some problem in placenta. Before pregnancy, patient's BP was normal. Hence, if placenta is removed her BP will come back to Normal.
   ∴ Definitive management of PIH always is :- **Delivery** = Termination of Pregnancy.

Please Remember:

→ Termination of pregnancy
   → Does not mean:- Abortion/kill fetus
   → Means:- Labor process induced (in other words "delivery of patient")

Condition	Termination of pregnancy is done at
Mild Pre-eclampsia (≥140/90 but < 160/110)	≥ 37 weeks (delivery)
Severe Pre-eclampsia (≥ 160/110 mm Hg)	≥ 34 weeks
Eclampsia	Immediate delivery irrespective of gestational age
HELLP syndrome	Immediate delivery irrespective of gestational age
PIH with Abruptio	Immediate delivery
PIH with fetal distress	Immediate delivery

Role of Antihypertensive:-

1. Given when
   → BP ≥ 160/110 mm Hg (severe Pre-eclampsia)
   → Mild Pre-Eclampsia
      → BP continuously ↑
      → Or BP ≥ 150/100 mm Hg on 2 occasions.
2. Means: Mild pre-eclampsia = BP continuously ↑ (or)
   (ORAL Anti-hypertensive) ≥ 150/100 mm Hg on 2 occasions
   → Severe Pre-Eclampsia
   → Eclampsia

} Always have to give antihypertensive (I/V)



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Anti-hypertensives:-

Can be given in pregnancy	Contraindicated
1. Labetalol (α + β blocks)	1. Ace inhibitors = Enalapril, captopril
2. α - Methyldopa	2. Losartan
3. Hydralazine	3. Diuretics
4. Nifedipine	4. Diazoxide
5. Nitroglycerine	5. β-blockers only
6. Sodium Nitroprusside	

DOC for:-

→ PIH in Pregnancy - LABETALOL
→ Pre-eclompsia in Pregnancy - LABETALOL
→ Chronic hypertension in Pregnancy:
  → Best Answer: LABETALOL
  → 2nd Best Answer: α - METHYLDOPA
→ Hypertensive crisis in pregnancy (suddenly BP ≥ 160/110 mm Hg)
  → Best Answer:- Labetalol I/V
  → 2nd Best Answer:- hydralazine I/V

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HYPERTENSIVE CRISIS

Means: Suddenly BP ≥160/110 mm of Hg
Use: I/V Antihypertensive (not oral)
DOC:

I/V Labetalol
↓
20 mg
↓ 10 min
40 mg
↓ 10 min
80
↓ 10 min
80 mg

Maximum: 220 mg I/V

Other drugs which can be used:-
→ I/V Hydralazine
→ Sustained release nifedipine
→ I/V nitroglycerine

Note:- Methyldopa is a slow acting drug
↓
Cannot be used in Hypertensive crisis

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Q. Safest Anti-Hypertensive in Pregnancy ⇒ Methyldopa

Q. If all Anti-Hypertensives fail, then last Resort = Sodium Nitroprusside.

Q. What is DOC for refractory hypertension in pregnancy: Sodium Nitroprusside

Management of Mild Pre-eclampsia: (BP ≥ 140/90 but < 160/110)

1. No role of:-
   a. Bed Rest
   b. Dietary salt restriction
2. Managed on:- OPD Basis
3. Advise them :-
   a. To monitor fetal movements
   b. Take frequent rest = in left lateral position
4. Anti-hypertensive:- If BP is continuously rising **(or)** BP ≥150/100 on atleast 2 occasions.

   ↓

   Oral

   DOC:- LABETALOL
5. **Definitive management:-** Termination of Pregnancy means delivery = 37 weeks

   ↓

   Mode of delivery = VAGINAL delivery

Management of Severe Pre-eclampsia:-

1. Generally managed:-
   a. As inpatient (Hospitalized)
   b. Advice best rest
2. Check
   a. BP = at least 6 hourly
   b. Weight
   c. Input output chart
   d. Proteinuria
   e. Coagulation profile
   f. LFT/KFT
   g. Platelet count
3. **Fetal monitoring:-** NST or Biophysical score (Twice weekly)
4. **Fundus Examination:-** Visual symptom
5. Ask about:- Signs of Impending Eclampsia daily:-
   1. ↓Urine output
   2. Headache

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3. Visual symptoms = blurring of vision/DIPLOPIA/BLINDNESS
4. Epigastric Pain

6. Fetal heart sound should be auscultated

Treatment:-

1. Anti-hypertensive: In severe pre-eclampsia (≥ 160/110 mm Hg) have to give IV Antihypertensive.
   + (I/V Labetalol)
2. Drug to prevent seizure:- $MgSO_4$
   ↓
   DOC to prevent & to treat convulsion in Hypertensive Pregnancy.

Definitive Management:-

Termination of pregnancy (Delivery)
↓
≥ 34 weeks (mode of delivery = Vaginal)

ECLAMPSIA

(Severe Pre-Eclampsia + Convulsion)

1. Stay near the patient & call for help.
2. 1st step: Airway management & turn patient in left lateral position
3. Give O_2 by mask.
4. Start $MgSO_4$:- Role DOC for treatment & prevention of convulsion.
   +
5. Give Antihypertensive :- I/V Labetalol
6. Check fetal heart rate
7. Prepare patient for delivery

Definitive Management

Termination of pregnancy/Delivery
↓
Immediate Delivery
Irrespective of gestational age
Mode of delivery = Vaginal delivery

Note:-

Always in PIH/Pre-eclampsia/Eclampsia/Gestational Hypertension
↓
Best mode of delivery
↓
Vaginal delivery

$MGSO_4$

DOC:- For preventing and treating convulsions in a hypertensive pregnant female.

Remember: No antiepileptic drug.

Mode of Action:-

Centrally acting drug

- It acts on brain
- ↓
- Vasodilation of cerebral brain vessels
- ↓
- ↑ Blood flow in brain
- ↓
- Stopping of convulsion

How to give $MgSO_4$?

We follow:-

PRITCHARD Regime

Loading Dose
↓
IV = 4 gm of 20% (slow I/V) $MgSO_4$
+
I/m = 10 gm of 50% (5 gm in each buttock)
Total = 14 gm

Maintenance dose
↓
5 gm of 50% $MgSO_4$ I/m (on alternate buttock)

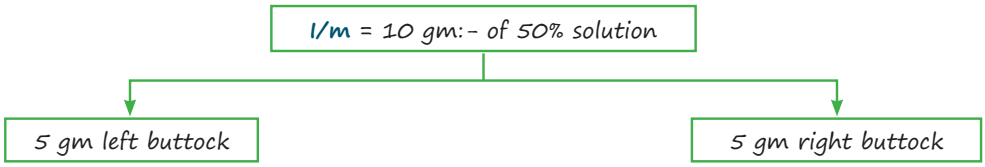
How to give loading dose?



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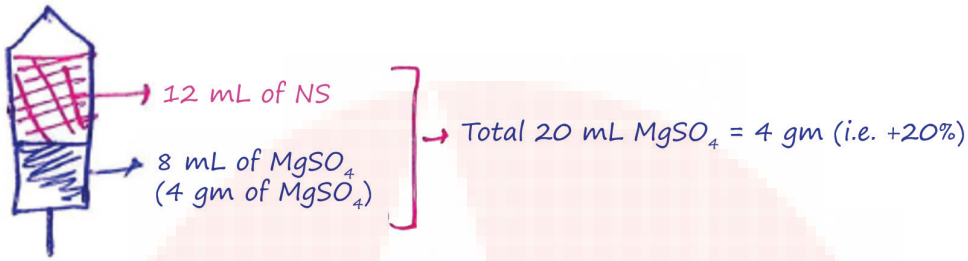
→ Vial of $MgSO_4$



I/V dose:

→ 4gm in 20% solution

→ Take a 20 ml empty syringe



→ **How to give Maintenance dose?**

I/m = 5 gm in alternate buttock (50%)

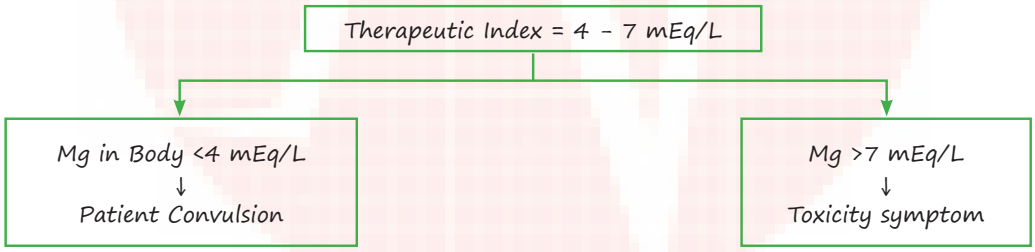
(10 ml vial)

↓

Every 4 hourly

Remember:-

$MgSO_4$ is drug, which has a very low Therapeutic Index



→ So before giving maintenance dose check:- (For symptoms of toxicity)

1. Urine output ≥30 ml/hr
2. Respiratory rate of patient ≥12/min
3. Deep tendon reflexes/knee jerk should be present

→ Give maintenance dose only if above 3 parameters are normal.

→ If any of the above parameter is abnormal:- Then do not give the maintenance dose of that time.

→ Go after 4 hours & check the parameters again:-

If normal then only give the maintenance dose

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→ Maintenance dose should be given till

↓

24 hours after delivery

Or

24 hours after last convulsion

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Signs & Symptoms of $MgSO_4$ Toxicity

1. Earliest Sign: Loss of Knee Jerk/Loss of Deep Tendon reflexes

   ↓

   Mg concentration ≥10 mEq/L
2. Excessive sweating (diaphoresis)
3. Decreased Respiratory Rate (respiratory depression) = Mg Concentration ≥15 mEq/L
4. Respiratory arrest
5. Cardiac arrest = Mg concentration ≥30 mEq/L

   Antidote for $MgSO_4$ Toxicity:- 10% calcium gluconate of 10 ml

Contraindication for $MgSO_4$:-

→ Renal failure

Note: Decreased Urine output is not sign of $MgSO_4$ toxicity.

→ We measure urine output every time before giving $MgSO_4$ because: MgSO4 is excreted by kidney. So if urine output is less, Mg will accumulate in body.

→ $MgSO_4$ = Should be given

- → Eclampsia patient
- → Severe Preeclampsia
- → HELLP syndrome Impending Eclampsia
- → Impending Eclampsia

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MULTIFETAL PREGNANCY/TWIN PREGNANCY (PART-1)



Multifetal Pregnancy:- If in pregnancy female carries >1 fetus

↓

Multifetal Pregnancy

Twins:- 2 Fetuses

Triplets:- 3 Fetuses

Quadruplets:- 4 Fetuses

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Hellen's Rule:

→ Incidence of Twin pregnancy = 1 in 80 pregnancies

→ Incidence of Triplets = 1 in $(80)^2$ pregnancies

→ Risk factors for twin/Multifetal Pregnancy

Risk factors for twin/Multifetal Pregnancy

(1) Maternal Family History of Twinning

(2) Increased maternal age (maximum = 30-35 years)

(3) Increased Parity (female >5^{th} gravida)

(4) Use of Drugs (ovulation inducing drugs:- like clomiphene citrate or (chances 5.8%) procedures like in vitro fertilization

Fetal Reduction:-

→ Purpose:- To reduce Multifetal Pregnancy=> Single pregnancy or Twin pregnancy

→ Drug Used:- Potassium chloride intracardiac injection

→ Time :- 11- 13 weeks

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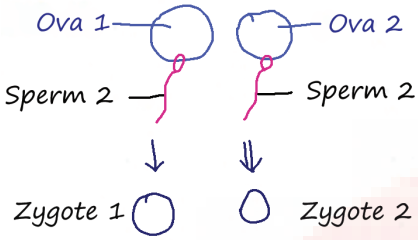
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Twins:

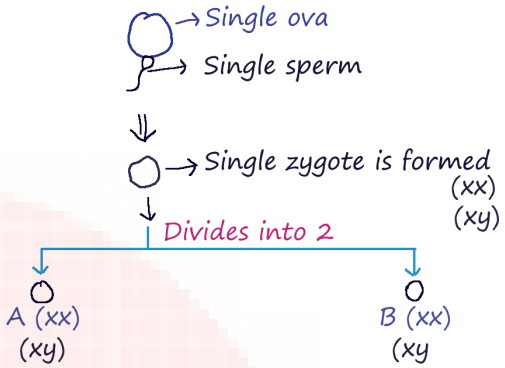
Dizygotic

Also Called As Fraternal Twins



- → Dizygotic twins are more common.
- → Dizygotic → sex= same or different
- → Dizygotic → Looks are not same:- non identical twins or fraternal twins
- → Dizygotic twins Incidence: vary from in country to country
- → Highest Incidence of Twins/Dizygotic → NIGERIA (1 in 20 pregnancy)
- → Lowest Incidence of Twins in Dizygotic = JAPAN (1 in 200 pregnancy)
- → Lowest Incidence of Twins in India = (1 in 80 pregnancy)

Monozygotic



MONOZYGOTIC TWINS:

Twins:



- → Same
  - i. SEX
  - ii. Genotype
  - iii. Looks/Phenotype
  - iv. Blood group
  - v. HLA Typing
- → Different Finger Prints



Figure: Finger Print

Important Points on Monozygotic twins

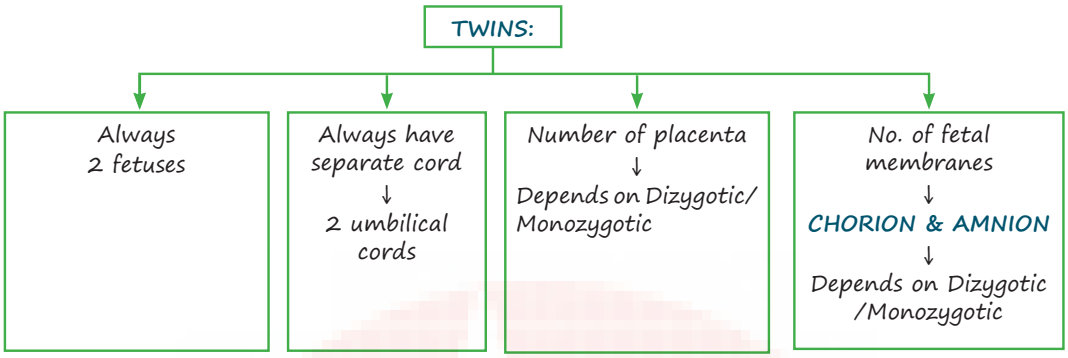
(1) less common than Dizygotic twins

Monozygotic = (30%)

Dizygotic = (70%)

(2) Monozygotic Incidence remains constant throughout the world:- 1 in 250 pregnancies

Q1. Most common type of twin pregnancy = Dizygotic twins



There are two terms

(1) ZYGOSITY
- → Dizygotic
- → Monozygotic

] Type of conception

(2) CHORIONICITY = Type of placentation
- → Number of placenta
- → Number of membranes
- → MONOCHORIONIC
- → DICHORIONIC

] on the basis of number of placenta

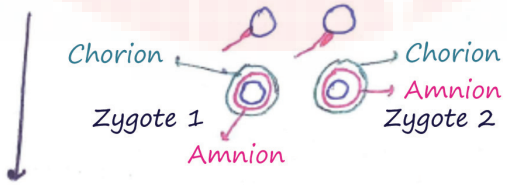
Prognosis:- In Twins prognosis always depends on chorionicity and not on Zygocity
Always:- Monochorionic twins will have bad prognosis as compared to Dichorionic

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Remember:

In case of DIZYGOTIC twins:-



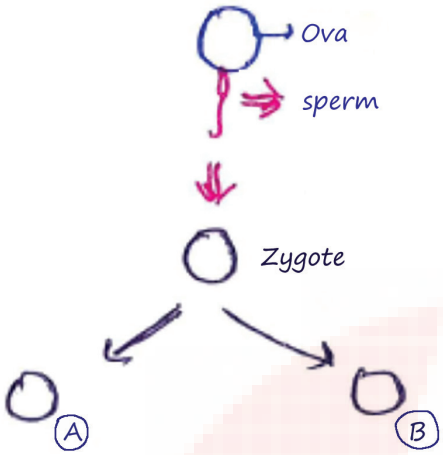
They are Dichorionic & Diamniotic (DCDA) 2 Placentas

MC variety of Twins = Dizygotic twins
↓ Always
Dichorionic and Diamniotic

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In case of MONOZYGOTIC twins:



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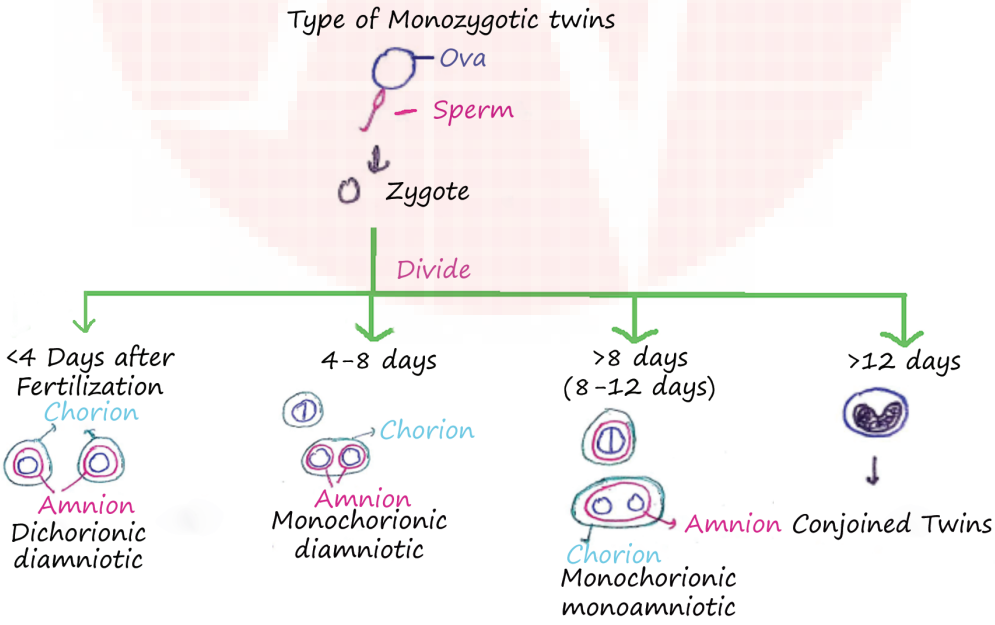
No. of chorion & Amnion & Placenta depends on the time of division

↓

Note:- Chorion:- formed roughly by Day 8 after fertilization

Amnion:- formed roughly by Day 10 after fertilization

Type of Monozygotic twins:



Days of division	Type of twin pregnancy	
<4 days	Dichorionic Diamniotic (DCOA)	Good Prognosis
4-8 days	Monochorionic Diamniotic (MCDA)	Bad Prognosis
≥8 days (8-12)	Monochorionic Monoamniotic (MCMA)	
≥12 days	Conjoined Twins/Siamese Twins	

→ Most common variety of Monozygotic = Monochorionic Diamniotic

→ Most common variety of Twins = Dizygotic Twins → Dichorionic Diamniotic

Rule:

Dichorionic twins have better prognosis than Monochorionic twins

↓

So it is important to know the Chorionicity in twins.

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MULTIFETAL PREGNANCY/TWIN PREGNANCY (PART-2)



Best Prognosis in Twins: Dichorionic Diamniotic Twins

Worst Prognosis in Twins: Conjoined Twins.

Prognosis wise arrange twins: (Best to worst)

Dichorionic Diamniotic > Monochoronic Diamniotic > Monochorionic

Monoamniotic > Conjoined Twins

Cesarean section has to be done:

1. Monochorionic monoamniotic
2. Conjoined twins

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CONJOINED TWINS:

→ Also called: Siamese twin (some body part of the twins is fused with each other)

→ Depending upon the part of twins fused:

- T → Thoracophagus = Thorax fused twins
- O → Omphalophagus = Abdomen fused
- P → Pyophagus = Buttocks fused
- I → Ischiophagus = Pelvic bone fused
- C → Craniophagus = Heads are fused

Note:

→ Rachiphagus: Head to buttocks all parts fused.

→ Most common type of compound Twin: Thoracophagus

→ Least common type of conjoined Twin:

1. Best answer = Rachiphagus
2. 2nd Best answer - Craniophagus

→ Conjoined Twins

1. Delivered by Cesarean section
2. Twins with worst prognosis

→ Prognosis depends on: Chorionicity

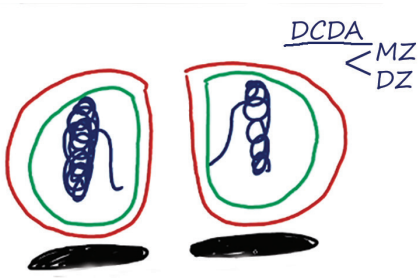
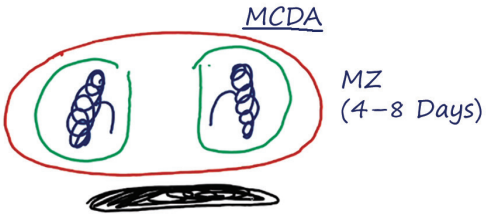
→ Dichorionic twins have better prognosis than monochorionic twins.

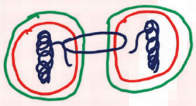
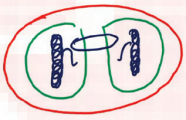
→ Best Investigation to know Chorionicity = **USG** (TVS)

→ Time: 11-13 weeks

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Dichorionic twin	Monochorionic twin
	
→ Sex = Same/Difference	→ Sex = same
→ Number of Placenta: 2	→ Number of Placenta – 1
→ Number of layers of membrane between Twins – 4	→ No. of layers of membrane between Twins 2
→ Thickness of membrane >2 mm Thick	→ Thickness of membrane <2 mm in Thickness
→ **Sign:** Twin peak sign Or Lambda sign (Positive)	→ Twin peak sign or Lambda sign (Negative)

Type of twin	Diagnosis	Simple diagram	Comment
1. DCDA Dichorionic Diamniotic	 → 4 layers of membrane between the fetuses → Thick membranes		→ Best type of Twin pregnancy → On USG ↓ Twin peak sign is +ve → Can be delivered vaginally depending on the lie of twins
2. MCDA	 → 2 layers of membranes between twins → Thin membranes (<2 mm thick)		→ Monochorionic twins ↓ Bad prognosis ↓ Complication e.g: Twin to Twin Transfusion syndrome → Can be delivered vaginally depending on the lie of the fetuses
3. Monochorionic monoamniotic	 Number of layers of membranes between the fetus = "0"		Complication specific ↓ CORD ENTANGLEMENT ↓ Do a cesarean section always between 32–34 weeks
4. Conjoined twins			→ Twin to Twin Transfusion syndrome can be seen but it is less common

Complications which are seen in Monochorionic Twins Only (MCDA/MCMA)

→ Twin to Twin Transfusion syndrome

→ Acardius fetus

↓

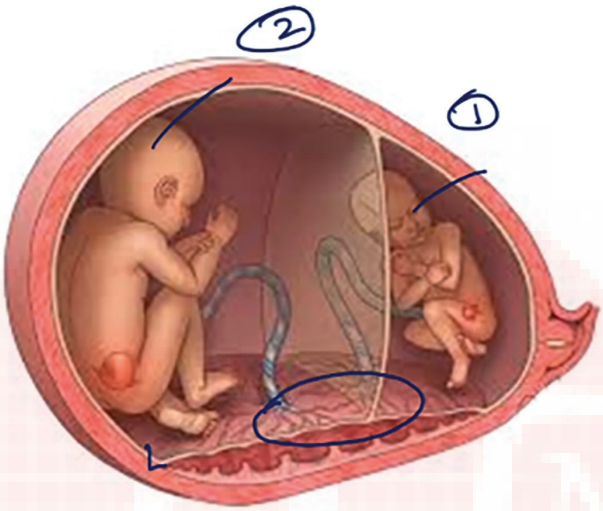
→ These complications are not seen in Dichorionic twins

That is why dichorionic twins have better pregnancy

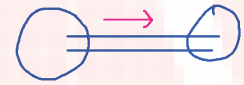
TTTS: (Twin-Twin Transfusion syndrome)

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→ There is a passage/connection between the blood vessels of twins such that blood flows in one direction.



The Twin which gives blood is Donor twin (Twin A)

↓

→ Anemia in Donor Twin

↓

→ Pale look

→ Less growth

→ Renal blood flow↓

↓

GFR↓

↓

Urine output

↓

(OLIGOHYDRAMNIOS) Amniotic fluid

Donor twin

↓

↑Chances of renal failure

The twin which receives the blood is Recipient twin (Twin B)

↓

→ Polycythemia in Recipient Twin (Increased chances of Thrombosis)

↓

→ Pink colour

→ More growth

→ Increased Renal blood flow

↓

→ Increased Urine output

↓

POLYHYDRAMNIOS

Recipient Twin

↓

↑Blood

↓

Congestive heart failure

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Diagnostic criteria: Twin Transfusion syndrome

One fetus: OLIGOHYDRAMNIOS

One fetus: POLYHYDRAMNIOS

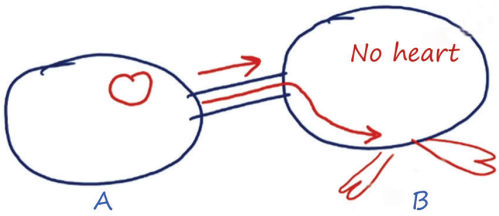
→ Most common in Monochorionic Diamniotic twins & more common in Monochorionic Monoamniotic twin.

ACARDIUS TWIN: One twin has heart

Other twin doesn't have heart.

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In twin B → to a due to gravity: Blood reaches lower extremities

↓

Lower part of Body is developed

↓

But because there is no heart

↓

So blood cannot reach upper part of Body

↓

So upper part of body is not formed

↓

Called as ACARDIUS ACEPHALUS

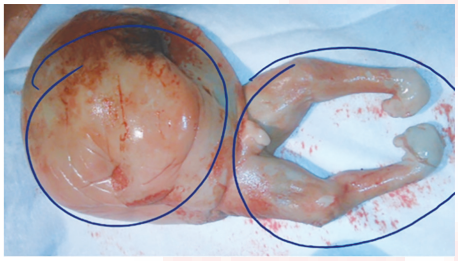


Figure: Acardius acephalus

Sometimes in Acardiac twin

↓

No part of body can be identified

↓

Called as ACARDIUS AMORPHUS



Fetal complication common to both Monochorionic and Dichorionic twins:

1. Most common fetal complication of Twins: Prematurity
2. Congenital malformation
3. Abortions: if Both fetus die.
4. Death of fetus
   - → 1st Trimester death: VANISHING TWIN
   - → 2nd Trimester death: FETUS COMPRESSES

Vanishing twin:

Initial USG shows Twin Pregnancy

↓

One fetus dies before 14 weeks & simply disappears on USG

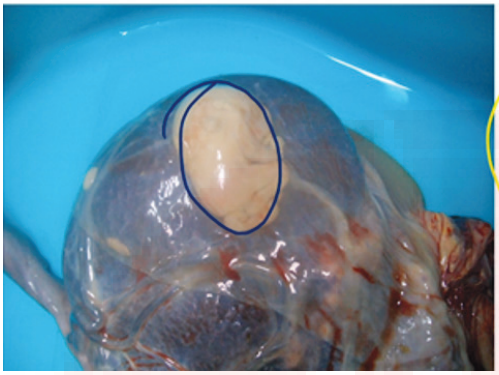
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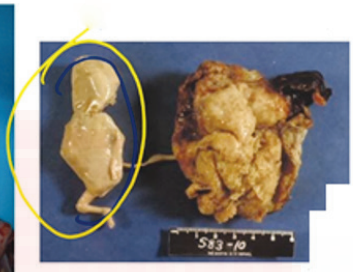
Loteron USG = only 1 fetus visible, other vanishes

Fetus compresses/papyraceus: One twin dies after 1st trimester other twin which is alive grows & compresses the dead twin against the walls of uterus.

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5. IUGR
   - → One Twin
   - → Both Twin

→ Discordant Growth = One twin grows less / Other twin grows more | growth difference ≥20% / weight difference ≥20%



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Maternal complications of Twin Pregnancy:

→ Increased weight gain
→ Height of uterus is more than period of gestation
→ ↑ Anemia
→ All complications of pregnancy & which start with letter 'p'.
  → Placenta previa
  → Abruptio placentae
  → PIH
  → Polyhydramnios
  → PPH
  → Preterm labor
  → PROM

[Except = Post-term Pregnancy]

→ So twin pregnancy is high risk pregnancy which needs extra care
→ Mother needs extra calories, extra rest, extra iron, vitamins & more frequent antenatal visits.
→ Most common cause of perinatal mortality in twins - Prematurity
→ Most common cause of maternal mortality in twins = PPH
→ Most common complication of Twin pregnancy → Preterm Labor

↓

In all twin pregnancies: - Give inj. Dexamethasone (Corticosteroids) to mother between 32-34 weeks:

↓

So that Lungs of fetus mature

Purpose: So that lungs of fetus mature

↓

Prevent Respiratory Distress syndrome

↓

Decrease chances of death of fetus/newborn.

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MULTIFETAL PREGNANCY/TWIN PREGNANCY (PART-3)



Mode of delivery of twin:

Vaginal delivery

↓

Cando in:

1. Dichorionic diamniotic
2. Monochorionic diamniotic (uncomplicated)

↓

→ Vaginal delivery depends on presentation of 1st twin

↓

→ **Vaginal delivery is possible:-**
Only if 1st twin is cephalic (VERTEX)

→ If 1st twin is Breech or Transverse lie Do Cesarean section.

Cesarean at section

→ Congenital twins

→ Monochorionic monoamniotic twins

→ Any complication like:
- → TTTS
- → IUGR

→ If 1st twin is Breech or Transverse lie

If first twin is cephalic (VERTEX): There can be 3 conditions/situations

1st situation



1st twin } cephalic
2nd twin }

2nd situation



1st cephalic
2nd Breach

3rd situation



1st cephalic
2nd Transverse lie

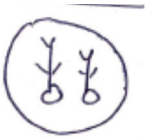
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1st Condition



1st Twin = vaginal delivery

↓

Remember:

1. After delivery of 1st twin do not give injection Methyl ergometrine to mother.
2. CORD CLAMP: 1st twin; Use clamps & cut in between them.

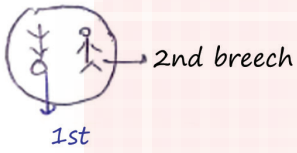
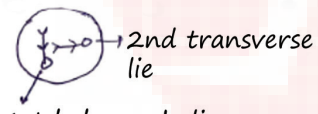


Now check Fetal Heart Sound, lie of Second Baby

→ Usual time of delivery of 2nd baby = 15 minutes maximum wait until = 30 minutes

2nd the Baby: Vaginal delivery

→ Now you can give inj. Methyl ergometrine to the mother.

2nd Condition	
	**1st Twin:** Vaginal delivery **2nd Twin:** Vaginal Breech delivery
3rd Condition	
	**1st twin** = vaginal delivery ↓ Now shift the patient to OT ↓ Give General Anesthesia to mother ↓ Take your hand inside uterus, hold feet of baby & bring it down ↓ This is called as (internal podalic version)

Internal Podalic Version

1. Done under General Anesthesia
2. Only Indication: If a Twin is Transverse lie
3. Take hands inside uterus
4. Chances of uterine Rupture
5. C/I in previous cesarean section patients.

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Recap:

Prognosis:

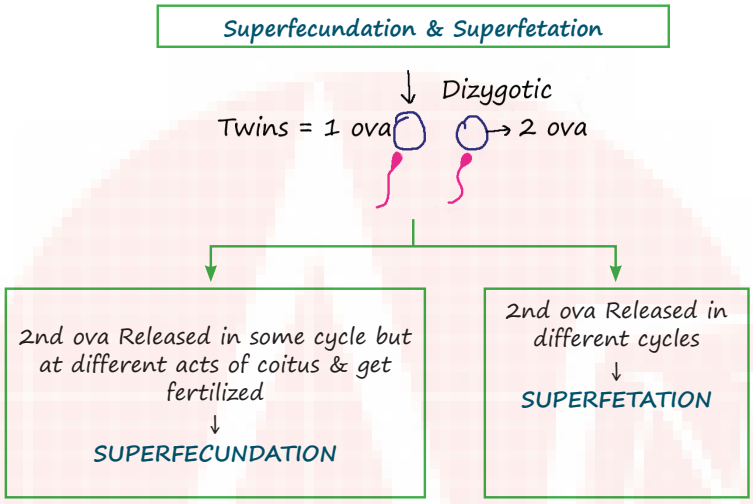
1. Monochorionic Versus Dichorionic Twins. Good Prognosis in dichorionic twins
2. Monochorionic Versus Dizygotic Twins = Good Prognosis, always dichorionic
3. Delivery = 1st twin Vs 2nd twin

   ↓

   Good prognosis in 1st twin

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POST TERM PREGNANCY/POST MATURITY



→ Normal duration of Pregnancy = 9 months +7 day

Or

40 weeks

Or

280 days

→ Patient = EDD = How to calculate?

Naegele's Formula: 1st day of LMP + 9 months + 7 days = EAD

Example: LMP = 10th August 2020

↓

Add 9 month +7 day = 17 may 202

→ Only 4% females deliver on their exact EDD. 50% female deliver I week before or after their EDD

If not delivered by EDD

↓

Wait

↓

Maximum wait = Until 42 weeks

→ Any pregnancy which continues ≥42 weeks is called Post term Pregnancy. (Post Maturity)

REASON (2 Important)

WRONG DATES	ANENCEPHALY
1st stop in assessing a patient of post term pregnancy ↓ REVIEW menstrual History	

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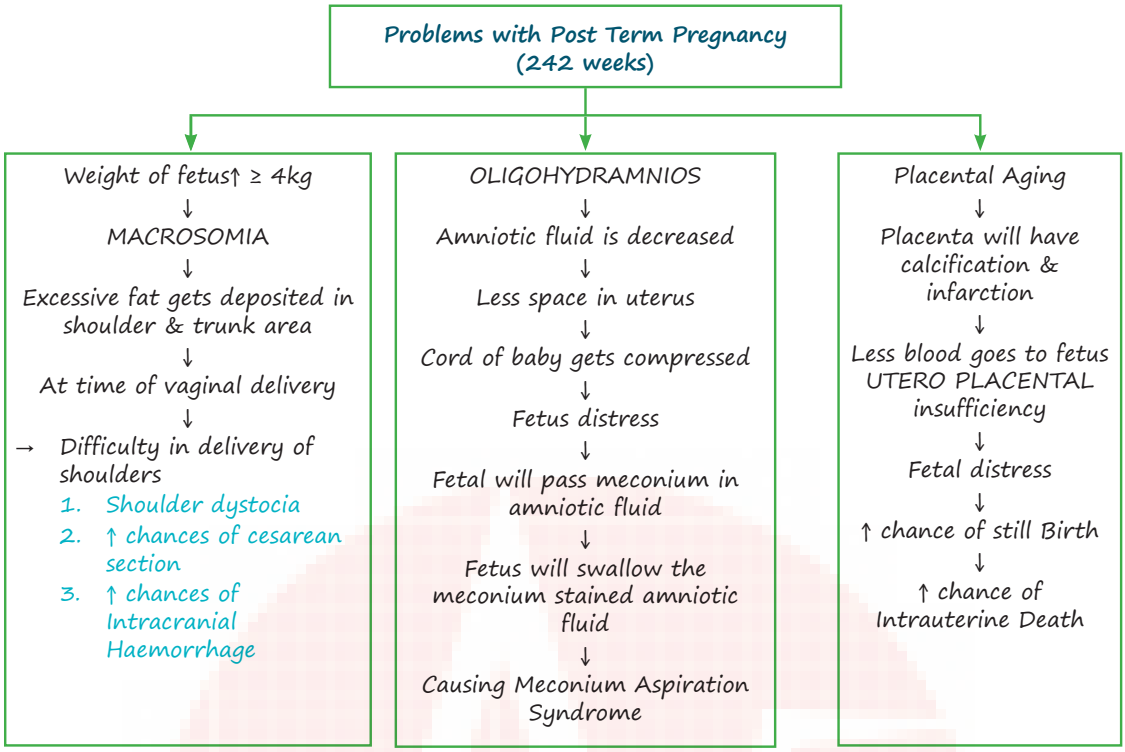
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Post Term pregnancy:

Examination:

1. Weight = stationary/ decrease (Amniotic, fluid ↓)
2. Per Abdomen = Uterus is full of fetus
3. GIRTH (Patient's Abdominal Circumference) → Decrease (Amniotic fluid ↓).
   (Patients: Abdominal Circumference - in Post term Pregnancy)
   (Fetus: Abdominal Circumference ↑ due to macrosomia)

How to confirm Post term Pregnancy?

1. Menstrual History
2. USG
   → Which is the best USG to confirm Post term pregnancy/To confirm gestational age? 1st use of pregnancy

Management

Start Labour Pain
↓
Induce labor

PELVIS - 1A AND 1B - ANATOMY OF PELVIC GIRDLE



- Pelvis is composed of 4 Bones:
  - Sacrum
  - Coccyx
  - 2 innominate Bones
- Each innominate bone (hip Bone) is formed by the fusion of 3 Bones:
  - Ilium
  - Ischium
  - Pubis

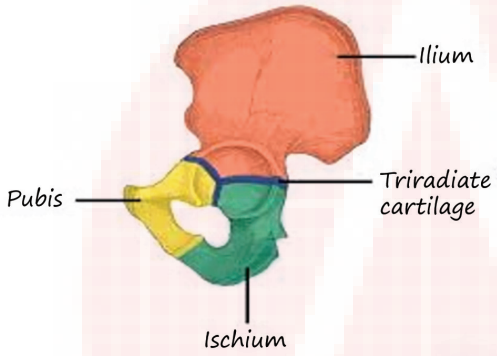


Figure: Innominate Bone

ILIUM: Forms the superior part of hip bone

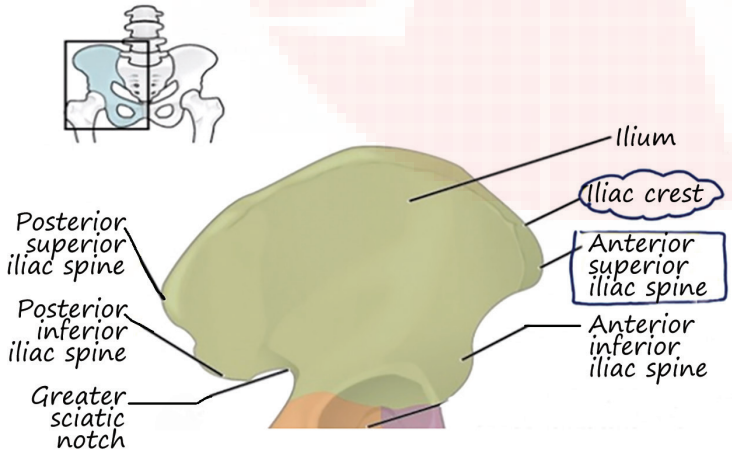


Figure: Iliac bone

- Posterior part of Iliac bone is Rough, called as Iliac tuberosity
- Anterior Part has depressed part called Iliac fossa.

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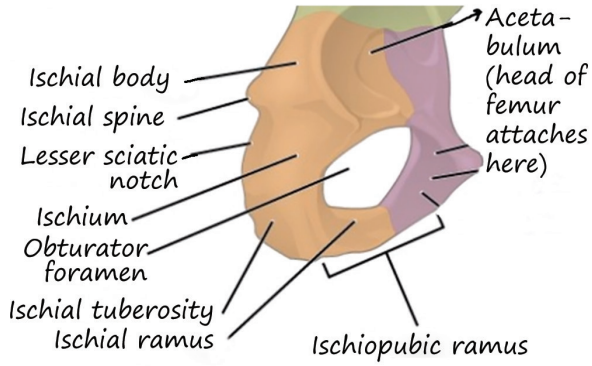
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→ Ilium Bone is attached to sacrum at sacroiliac joint.



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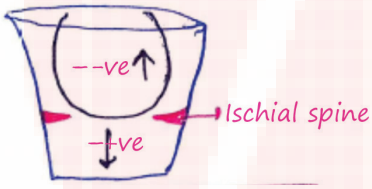
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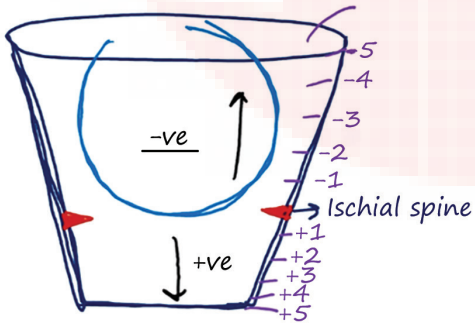
Parts of Ischium

1. Ischial Body
2. Ischial Tuberosity
3. Ischial ramus
   → Posteriorly an important pointed structure is present called **ISCHIAL spine** (very important Landmark)

Importance of Ischial Spine

1. Station of Fetal head is described with respect to Ischial spine.





→ If lowest part of head of fetus is felt at level of Ischial spine we call it 'O'station
→ If head is above the level of Ischial spine denoted by '-' sign.
→ If head is below the level of Ischial spine denoted by '+' sign.
→ The number represents distance in cms from the ischial spine.

For example: '-3' = Head is 3cms, above ischial spine

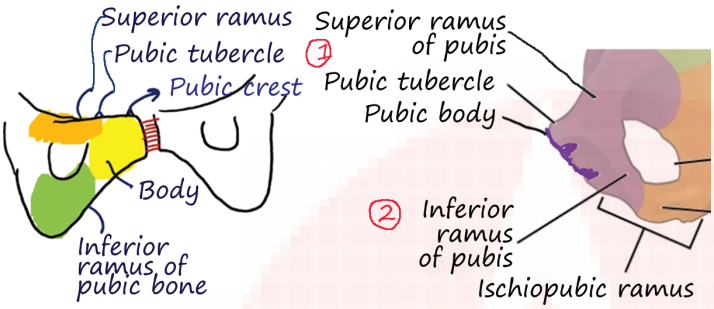
'+2'= Head is 2 cms, below ischial spine

→ At level of Ischial spine (Important muscle) = Levator ani muscle is attached

→ It is the site for giving Pudendal Nerve Block.

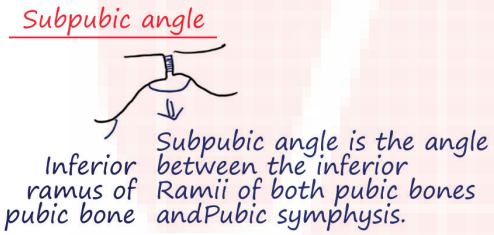
→ During Labor Internal Rotation occurs at the level of ischial spine

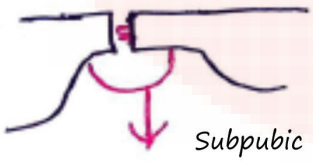
Pubic Bone



→ Where both sides of pubic bones meet is called Pubic Symphysis

Subpubic Angle:





Subpubic angle is the angle between the inferior Ramii of both pubic bones & Pubic symphysis.

Note: In Female pelvis (gynaecoid pelvis) subpubic angle is >90° (obtuse)

In Male pelvis (android pelvis) subpubic angle is <90° (acute).

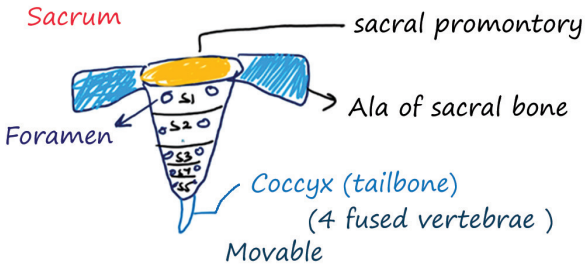
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Sacrum



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→ If one ala of sacral bone is absent = pelvis is called **Naegele pelvis.**

→ If both ala of sacral bone are absent = Pelvis is called **ROBERT pelvis.**

→ Naegele pelvis & ROBERT pelvis are varieties of **contracted pelvis**

↓

If a female having any of these pelvis conceives

↓

Always have to do Cesarean Section

Normal delivery is not possible.

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PELVIS - 2 (MATERNAL PELVIS)



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The maternal pelvis is divided anatomically into false pelvis and true pelvis by pelvis brim.

Pelvic Brim Anatomy

→ From Anterior to posterior it is formed by:-

Pubic symphysis

↓

Pubic crest

↓

Pubic Tubercle

↓ upper border of the superior pubic ramii

Iliopectineal eminence

↓

Iliopectineal line

↓

Sacroiliac joint

↓

Ala of sacral Bone

↓

Sacral promontory

FALSE PELVIS → only supports gravid uterus.

↑ Above

PELVIC BRIM

↓Below

TRUE pelvis → Takes part in labor

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→ **True Pelvis can be divided into:**

- → **Pelvic inlet:** Which lies at the level of pelvic brim.
- → **Pelvic cavity or midpelvis:** Which lies at the level of ischial spine
- → **Pelvic outlet:** Which lies at level of ischial tuberosity

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Pelvis Inlet

Diameters

1. Antero-Posterior Diameter:
   3 in number

AP diameter	Definition	Measurement
TRUE conjugate	Upper border of pubic Symphysis to sacral Promontory	11 cms
Obstetrical conjugate	Mid of the Pubic symphysis to sacral Promontory	10-10.5 cms
Diagonal conjugate	Lower border of Pubic symphysis to sacral Promontory	12 cms

Clinical Assessment of Pelvis: Inlet

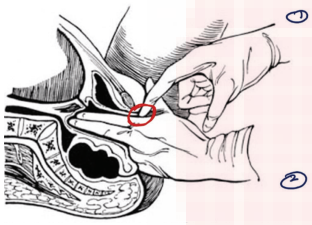


Figure: Measure diagonal conjugate

(1) If diagonal conjugate is normal or 12 cm (IDEAL)
↓
Fingers cannot touch sacral promontory
↓
(2) If sacral promontory can be touched
↓

→ Diagonal conjugate - 1.5 to 2 cm **obstetrical conjugate**
→ Diagonal conjugate - 1 cm = Transverse conjugate

→ **Critical obstetric conjugate** = 10 cm (ie if obstetric conjugate is less than 10 cm vaginal delivery is not possible)

Remember

AP diameter of Inlet: 3 in number

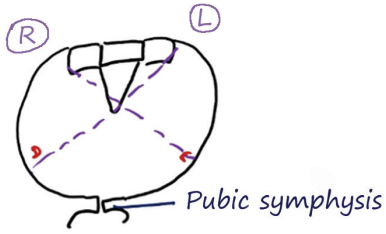
Transverse diameter of Inlet: Distance between 2 Farthest points on iliopectineal line.

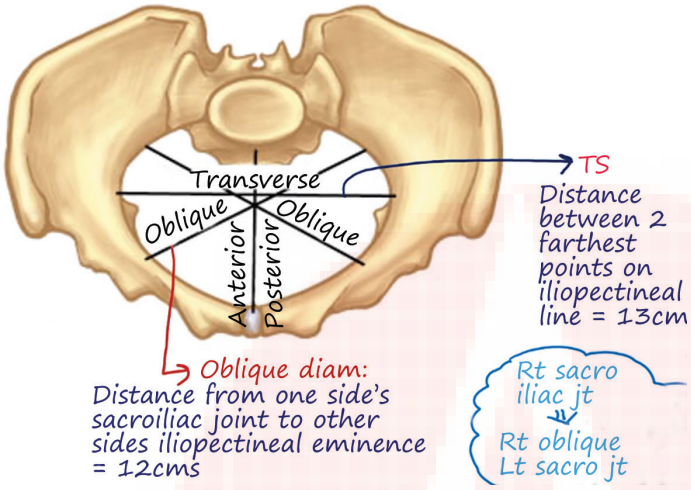
↓

13 cms

Oblique diameter of Inlet: Left oblique = from Left sacroiliac joint to be right side iliopectineal eminence & vice versa

12 cms





Important points Related to diameters of pelvis:

→ Smallest AP diameter of pelvis → obstetric conjugate

→ Largest AP diameter of inlet → Diagonal conjugate

→ Out of 3 AP diameter of Pelvic inlet, only diagonal conjugate can be measured clinically

→ Critical obstetric conjugate → 10 cm (i.e. if obstetric conjugate is less than 10 cms vaginal delivery is not possible)

→ If diagonal conjugate is 'x' cms in a female then obstetric conjugate will be (x-2 cms)

→ Shortest major diameter of pelvis → Interspinous diameter, that is why it is most important diameter during delivery.

In MID PELVIS / Cavity: Lies at the level of Ischial spine

V ↔ V→ Ischial shine.

Transverse diameter of midpelvis is the distance between the two ischial spines. It is also called "Interischial diameter" or "BISPINOUS diameter"

↓

Value = 10 cms

→ Smallest & Most important diameter of entire pelvis.

→ Since the cavity lies at the level of Ischial spine ∴ Plane of cavity is also smallest and called a plane of least Pelvic dimension

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Note: In male Pelvis (Android pelvis)

↓

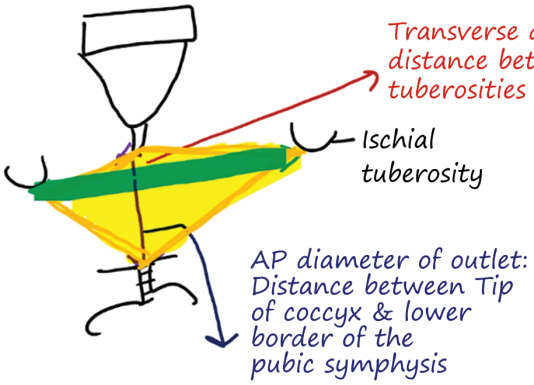
Ischial spines are prominent & Pointed

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Outlet of Pelvic cavity

1. Lies at level of "Ischial Tuberosity"



Transverse diameter of outlet = distance between two Ischial Tuberosity = 11 cms (Bituberous diameter)

AP diameter of outlet: Distance between Tip of coccyx & lower border of the pubic symphysis

Value = 11.5 to 13 cms (13 cm at the time of labor)

→ The inlet of Pelvis makes an angle of 55° with the horizontal

↓

This is Angle of Inclination

	Inlet	Cavity/mid pelvis	Outlet
AP diameter	True conjugate 11 cm obstetrical conjugate 10-10.5cm Diagonal conjugate = 12cms	12 cms	11.5-13 cms 13 cm at the time of labor
Oblique	12 cms		
Transverse diameter	13 cms	10 cms Interischial diameter (most important diameter)	11 cms Bituberous diameter

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PELVIS- 3- CONTRACTED PELVIS

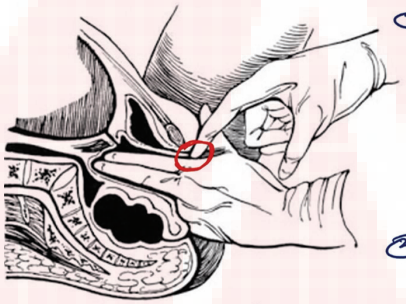
→ If any of major diameters of pelvis is decreased by 0.5 cms the pelvis is called contracted pelvis.

→ In case of contracted pelvis, values of different diameters are, specific answer:

- → Obstetric conjugate < 10 cms
- → Interischial diameter < 8 cms
- → Intertuberous diameter < 8 cms

→ After assessment of pelvic Inlet clinically

Clinical assessment of pelvis:- Inlet



Measure 'DC'

DC- 2cms = OC = DC- 1cms = TC

1. If DC is normal or 12cms (ideal) ↓ Fingers cannot touch sacral promontary
2. If sacral promontary can be touched ↓

If <IQ conj. pelvis is said to be contracted pelvis>

If obstetrical conjugate < 12 cms. Pelvic is said to be contracted pelvis.

Time for Pelvic Assessment

→ Primigravida = 37 weeks

→ Multigravida = At the onset of Labor.

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Clinical assessment of pelvic cavity

↓

Try to touch both ischial spines
Simultaneously, with 2 fingers of same hand

If you cannot touch both ischial spines at same time

↓

Cavity is normal

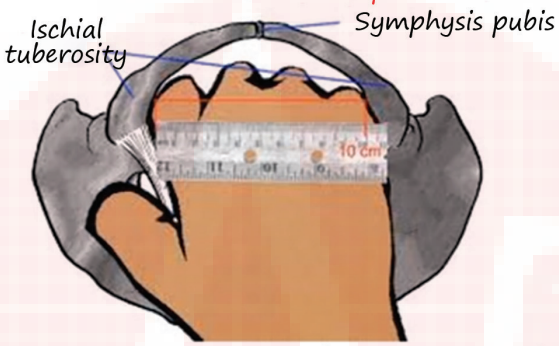
If you can touch both ischial spines at same time

↓

Cavity is narrow (Contracted pelvis)

Clinical assessment of pelvic outlet

Clinical assessment of pelvic outlet



Clinical measurement of bituberous diameter.

Ideally, 4 knuckles should pass between the two ischial tuberosity

Clinical measurement of bituberous diameter.
Ideally, 4 knuckles should pass between the two tuberosity

→ If 4 knuckles do not pass between the two Ischial tuberosity

↓

It is called contracted outlet

↓

Contracted pelvis

→ **Whenever we have contracted pelvis**

↓

Management: Elective cesarean section

↓

At 39 weeks of pregnancy

→ In case of contracted pelvis

↓

If vaginal delivery is tried

↓

Result in obstructed labor

Obstructed Labor: It is a condition in which uterus contracts & tries to push the baby out but due to obstruction in the passage the delivery of baby doesn't happen:-

Causes:-

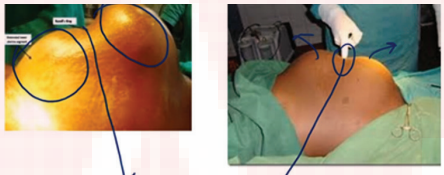
1. Contracted pelvis
2. Tumor in pelvis
3. Hydrocephalus
4. Macrosomia (≥ 4 kg)

On Examination:

→ **Mother is:**

1. Exhausted
2. Dehydrated
3. Tachypnea

On per abdominal Examination:



1. There is a groove or depression seen/felt between upper part of uterus & lower part of uterus

↓

Called as "BANDL ring"

(most important sign of obstructed labor)

Fetal heart sound

→ Fetal distress

→ FHS absent (Fetal death)

Per vaginal Examination:

1. Vagina = dry, hot (as amniotic fluid is drained)
2. Bleeding from vagina
3. Swelling on fetal head → Caput succedaneum
4. There will be alteration in shape of baby head

↓

Skull bones overlap each other

↓

Moulding

5. Hematuria

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Management:

Never give oxytocin

↓

↑Uterine contraction

↓

Uterine rupture

Always immediate cesarean section whether baby is alive or dead.

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Complications:

→ Maternal complication

1. Uterine Rupture
2. It leads to vesicovaginal fistula → Patient complains of continuous dribbling of urine from vagina

→ Fetal complication (Fetal death)

Note:-

→ Types of contracted pelvis.

→ Naegles pelvis = one ala of sacral bone is absent.

→ Robert pelvis = both ala of sacral bone are absent.

→ In case of contracted pelvis:

Whenever a female conceives always caesarean has to be done

↓

Case of recurrent cesarean section

Q1. Most common Indication for recurrent cesarean section is contracted pelvis

Cephalo pelvic disproportion:

In cepholo pelvic disproportion

↓

Pelvis is normal but fetus is big

So management → Cesarean section in this pregnancy

But Next time: If fetus is normal size

↓

Then vaginal delivery can happen.

So in cephalo pelvic disproportion: It is not necessary that everytime a female conceives, you have to do cesarean. You can try vaginal delivery.

Normal varieties of Pelvis:-

→ On the basis of shape of the inlet, the pelvis can be of 4 types:-

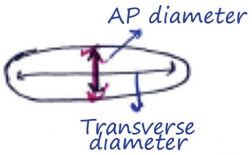
Caldwell & Mohoy classification

→ Gynecoid 50% (female pelvis) (most common)

→ Anthropoid 25%

→ Android 20% (male pelvis)

→ Platypelloid 5% (Least common)

	Gynecoid pelvis	Android pelvis	Anthropoid	Platy pelloid
Diagram (Inlet shape)	 Transverse diameter			
Shape of Inlet	Transverse oval	Heart shaped	Long oval	Flat bowl like
Inlet: (Transverse diameter & AP diameter)	Transverse diameter > AP diameter	Transverse diameter > AP diameter	AP diameter > Transverse diameter (only pelvis)	Transverse diameter >>> AP diameter
Side wall	Parallel broad	Converge	Parallel Narrow	Divergent
Ischial spine		Prominent		
Subpubic angle	Female > 90°	Male < 90°		

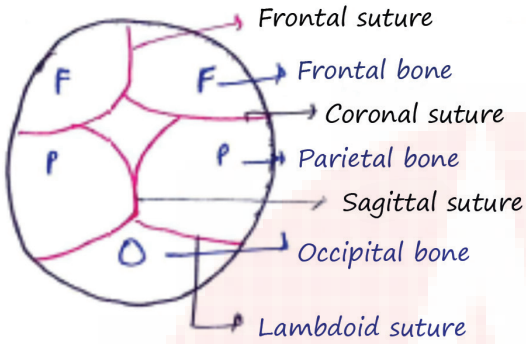
→ Most Common variety of pelvis: Gynaecoid Pelvis
→ Most favourable for delivery: Gynaecoid pelvis
→ Least favourable for delivery: Android pelvis
→ Least common variety of pelvis:- Platypelloid pelvis
→ Pelvis with AP diameter > Transverse diameter: Anthropoid pelvis
→ Pelvis with prominent ischial spine: Android pelvis

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FETAL SKULL

Diagram of fetal skull



Please Note

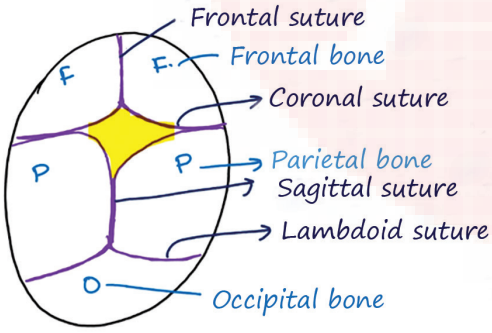
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Fontanelles

→ Gaps between suture lines
→ At the time of birth: 6 fontanelles in fetal skull

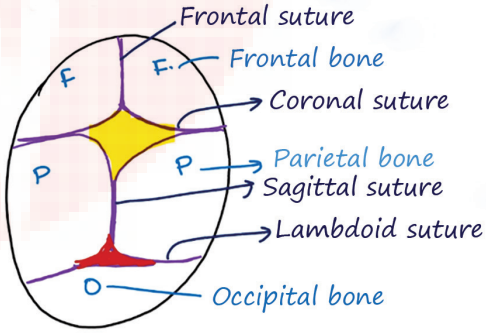
2 most important fontanelles

Anterior Fontanelle



→ Also called as BREGMA
→ Diamond shaped
→ Dimensions = 3 cms
→ Formed by:
  a. Frontal suture
  b. Coronal suture (Left & Right)
  c. Sagittal suture
→ Closes by 1½ years of age (18 months)

Posterior Fontanelle



→ Also called as LAMBDA
→ Triangular in shape
→ Dimensions = 1.2 cms
→ Formed by:
  1. Sagittal suture
  2. Left & right Lambdoid suture
→ Closes at time of birth or immediately after birth.

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2 terms:-

→ **Sinciput:** Part of fetal skull which lies anterior to anterior fontanella.

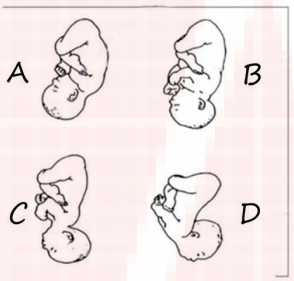
→ **Occiput:** Part of fetal skull which lies posterior to posterior fontanelle.

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Parts of fetal skull

Part	Definition	Seen in
1. VERTEX	Part of skull which lies between anterior fontanelle & Posterior fontanelle.	→ When head of baby is fully flexed → When head deflexed
2. BROW (eyebrow)	Part of skull which lies between anterior fontalle & root of nose + supraorbital ridges.	→ When head of baby is partially extended.
3. Face	Part of skull which lies between root of nose, supraorbital ridges & chin (mentum)	→ When head of baby is fully extended



A. Fully flexed = VERTEX

B. Deflexed = VERTEX

C. Partially extended = BROW

D. Full extended = FACE

a. Fully flexed = VERTEX
b. Deflexed = VERTEX
c. Partially extended = BROW
d. Full extended = FACE

Presenting Part: In Cephalic Presentation

VERTEX
↓
When head is fully flexed
Sub occipito Bregmatic diameter (9.5 cms)
Or
Deflexed
Sub occipito frontal
Or
Occipito frontal diameter

BROW
↓
When head is partially extended.
↓
Mento vertical diameter
↓
Longest diameter
↓
14 cms
↓
Always do cesarean section

FACE
↓
When head of baby is fully extended.
↓
Submento vertical diameter
Or
Submento bregmatic diameter

Diameters of Fetal skull

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→ Always AP diameter of fetal skull are longer than transverse diameter of fetal skull.

→ Longest AP diameter: MENTO VERTICAL diameter (seen in brow) = 14 cms

→ Second longest AP diameter = Sub mento vertical d diameter = Occipitofrontal diameter = 11.5 cm each

Transverse Diameter:

→ Are always smaller than AP diameter

Mis (Smallest)	=	BIMASTOID diameter
Tina	=	Bitemporal diameter
So	=	Super subparietal diameter
Pretty (LARGEST)	=	Biparietal diameter = (9.5 cms)

Moulding: It is the alteration of the shape of forecoming coming head while passing through the resistant birth passage during labor.

Grading: There are 3 gradings of moulding:

→ Grade 1: Bones touch but not overlap +

→ Grade 2 : Overlap but easily separated ++

→ Grade 3 : Fixed overlapping+++

→ Some degree of moulding is normal during labor.

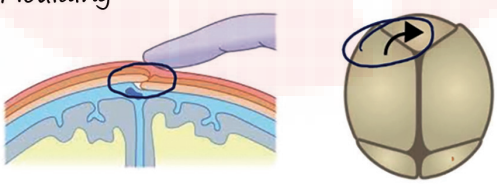
But if there is ++ or +++ moulding

↓

→ means there is cephalopelvic disproportion

Moulding

Moulding



A

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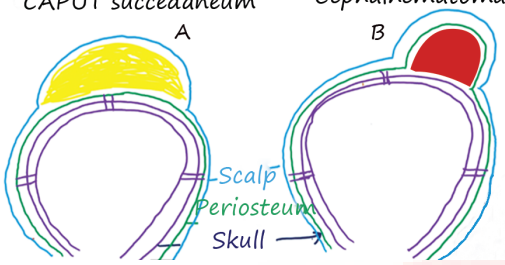
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Swellings on Fetal Head

CAPUT succedaneum

Swellings on Fetal Head

CAPUT succedaneum ↓ | Cephalhematoma ↓



1. Collection of fluid above PERIOSTEUM.
2. Generalized swelling
3. Can cross suture lines
4. Formed because: Head of baby stays in one position for very long time during labor.
5. It is edema (fluid) → Pit on giving pressure
6. Caput succedaneum seen at the time of birth

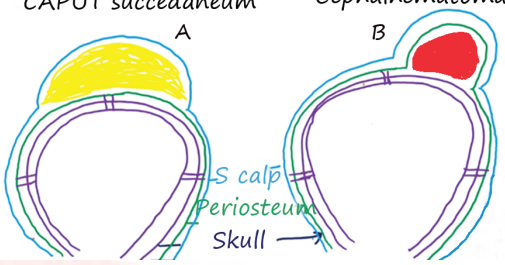
↓

Disappears automatically within few hours of birth

Cephalhematoma

Swellings on Fetal Head

CAPUT succedaneum ↓ | Cephalhematoma ↓



1. Collection of blood below PERIOSTEUM.
2. Localized swelling
3. Cannot cross suture lines (Below Periosteum)
4. Formed due to traumatic instrumental delivery.
5. It is due to blood

↓

Does not pit on giving pressure

6. Can be associated with feature of underlying bone.
7. Can be associated with jaundice
8. Cephalhematoma not seen at birth

↓

Appears within few hours of birth

↓

Disappears automatically in few days

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TERMINOLOGIES RELATED TO LABOR (PART-1)

LIE: Relationship between longitudinal axis of the fetus and the longitudinal axis of mother.



Longitudinal Lie



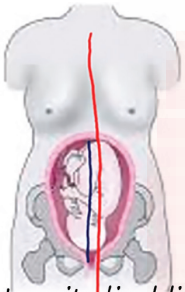
Transverse LIE



Oblique LIE

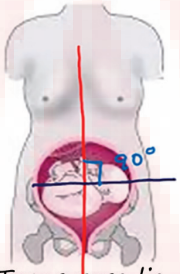
↓

→ Always do cesarean section
→ Whether baby is alive or dead



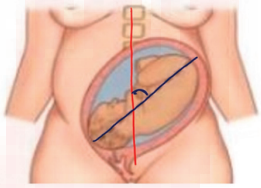
Longitudinal lie
vertex presentation

Longitudinal lie



Transverse lie
shoulder presentation

Transverse lie



OBLIQUE LIE

→ Always cesarean section

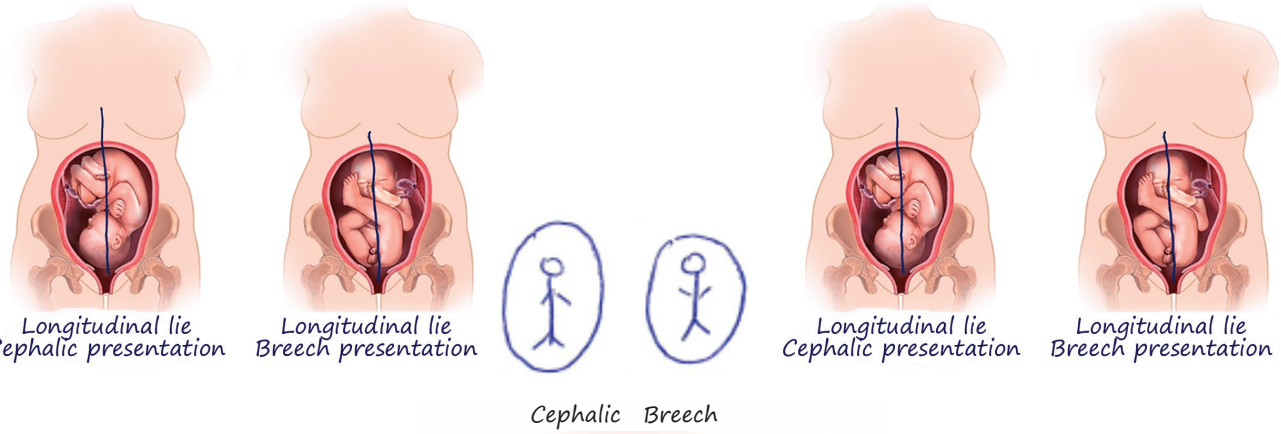
Presentation: Part of the fetus which occupies the lower part of the uterus.

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In Longitudinal lie: It could be:-



→ Most common presentation is cephalic presentation

→ Apart from cephalic presentation, Rest all presentations are Malpresentations

→ Most common malpresentation is Breech.

In Transverse lie :-

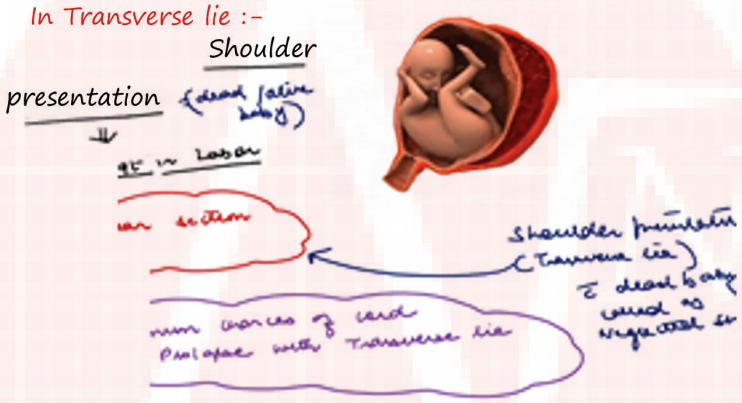


Figure: Transverse lie with shoulder presentation

In Transverse lie:

Presentation: Shoulder Presentation

↓

Management of Labor

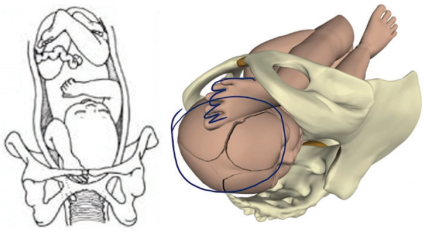
Cesarean section

→ Shoulder presentation (Transverse lie) with dead baby is called as neglected shoulder presentation (Management is cesarean section)

Q1. Maximum chances of cord prolapse are with transverse lie

Q1. Hand prolapse is seen in - Transverse lie

Compound presentation: When 2 parts of baby occupy the lower part of uterus it is called compound presentation.



when 2 parts of baby occupy the lower part of uterus

Compound presentation

Please Note

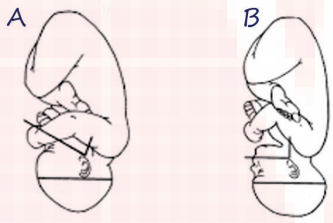
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Presenting part: Part of presentation which lies directly over the internal os.

- First part felt on per vaginal examination.
- Presenting part depends on whether the head of baby:
  - Flexed
    - Fully
      - Vertex
    - Partial
  - Partial extension: BROW
    - Engaging diameter = mento vertical (14 cm)
    - Always Cesarean section
  - Completely extended : FACE

Attitude of fetus

- The relationship of different parts of fetus to each other.
- Most common attitude: FLEXION
- Presenting part depends on attitude of fetus.



Head = flexed
A = Complete flexion
B = Deflexed head
Presenting part in both A & B - Vertex

Presenting part in both A & B - Vertex

- **Flexed**
  - (a) Complete flexion
  - (b) Deflexed Head

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Head slightly extended

Presenting part in head slightly extended is

Brow



Head fullyextended

Presenting part in head fully extended is Face

Face

→ Presenting Part



Head slightly extended

Presenting part in head slightly extended is

Brow



Head fullyextended

Presenting part in head fully extended is Face

Face

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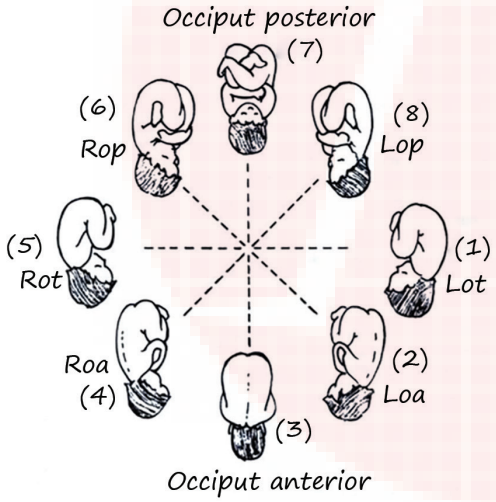
TERMINOLOGIES RELATED TO LABOR (PART-2)



Denominator: Bony point of reference on the presenting part → used to describe the position of fetus & comes in relationship to maternal pelvis.

Presenting part	Denominator
Vertex	Occiput
Breech	Sacrum
Brow	Frontal eminence/Bone
Face	Mentum (Chin)

Position



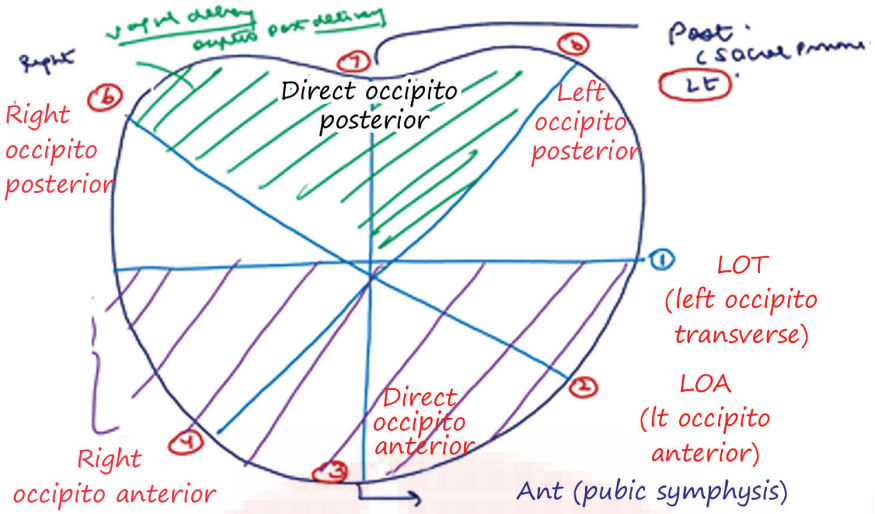
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→ When delivery occurs: When fetus is in any position **1 to 5**

↓

Called normal delivery

↓

Means: Lie = Longitudinal

→ Presentation = Cephalic

→ Presenting part = Vertex

→ Position = 1 to 5↓

→ When vaginal delivery occurs, when fetus in position from 6 to 8

↓

Occipito posterior delivery

Mean:-

→ Lie = longitudinal

→ Presentation = Cephalic

→ Presenting part = Vertex

→ Position = 6, 7, 8

→ Most common fetal position during labor

→ Left occipito transverse

→ **2nd best** → Left occipito anterior

→ Most common fetal position

→ Left occipito transverse

→ **2nd best** → Left occipito anterior

→ Most common occipito-anterior position → Left occipito Anterior.

→ Most common occipito posterior position = Right occipito posterior.

Student's Space

How to Recognise Position in Image?

↓

1st step: Check if:-

How to Recognise Position in Image



1st step: Occiput → facing towards OA position pubic symphysis

or facing towards sacral promontory OP position.

Occiput → facing towards pubic symphysis. If Occiput is facing towards pubic symphysis, it is Occipito anterior position

If Occipit is facing towards sacral promontory, it is Occipito anterior position. (or facing towards sacral promontory occipitoposterior position.

2nd step: If the occiput is towards your right hand side then it will be on the left side of mother

↓

Mother = left

Or

If occiput is towards your left side = then it will be on the right side of the mother = right



Remember:-

1. Posterior fontanelle is 'Δ' in shape
2. Posterior fontanelle lies closer to occipital bone.
3. **Wherever 'Δ' is facing:** occiput is towards that maternal 'side'
4. If 'Δ' is facing anteriorly, it is occipito anterior
5. If the 'Δ' is facing posteriorly, it is occipito posterior.
6. If 'Δ' is toward your left hand side = Mother right hand side
   If 'Δ' is toward your right hand side = Mother left hand side

Leopold Maneuver

→ Done per abdominally

→ Patient's bladder should be empty

→ **Position:** Patient should be lying in dorsal position with knees flexed.

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→ Examiner should always stand on right hand side of patient.

→ **For 1st three maneuver (1, 2, 3):** Examiner should face towards the face of patient.

→ For 4th maneuver: Examiner faces towards feet of patient.

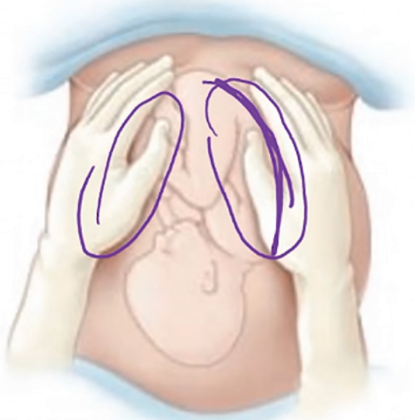
1. First Maneuver (Called "FUNDAL GRIP")



Tells:-

1. **Lie:** If it feels something in first grip then it is longitudinal lie and if it is empty then it is transverse lie. If 1st grip is empty: **Transverse lie**
2. **Presentation:** If soft, broad & irregular part felt → **Buttocks**

Means: Cephalic Presentation



Second maneuver
⇓
Lateral grip

2. Second Maneuver (Called Lateral Grip)

Tells us: Position of fetus

→ Back of fetus: Board like feeling, smooth, regular & curved

→ Limbs: Small multiple knob like structure

→ If back is on left side → LOA, LOT, LOP

→ If back is on right side → ROA, ROT, ROP

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Third maneuver

⇊

Pawlik grip
done with one hand

3. Third maneuver: (PAWLIK grip) done with one hand

Tells us about:



→ Presentation: cephalic: Hard, round, globular structure (Image 43:28)



→ If the baby's head can be moved from side to side it is ballotable. Move the head from side to side (Ballot able)

↓

If it can be moved, it has not entered pelvis

→ If the baby's head cannot be moved from side to side it is not ballotable

→ Not ballot able → Means head has entered the pelvis (Fixed)

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- Done by facing = feet of patient
- If hands are converging below the head of baby

↓

Head has not entered the pelvis

Fourth maneuver ⟶

↓

Deep pelvic grip

Fourth maneuver: Deep pelvic grip (46:38)

Confirms finding of 3rd maneuver

→ Done by facing = feet of patient

→ Now keep the hands parallel to inguinal ligament.

→ If hands are converging below the head of baby

↓

Head has not entered the pelvis.

→ If hands diverge → Head has entered the pelvis.

Leopold 4th maneuver:

1. Confirms finding of Pawlik grip

↓

→ Presentation

→ Head has gone into pelvis or not

Hands converging	Hand Diverging
Head not gone in pelvis.	↓ Head has entered pelvis

2. Also tells about the attitude of the fetus.

Student's Space

NORMAL LABOR (PART-1A)



During pregnancy

→ Uterus is growing in size
  → Hypertrophy
  → Hyperplasia
→ **Uterus quiscent (Resting stage):-**

↓

Due to hormone progesterone (Smooth muscle Relaxant)

↓

Pregnancy is progesterone predominant condition

↓

Whereas labor is estrogen predominant condition

Physiology of labor: At term fetal hypothalamic pituitary axis matures

Fetus: Hypothalamus
↓
Corticotropin Relaxing hormone (CRH)

Fetus: PITUITARY
↓
ACTH hormone
↓
Fetus: ADRENAL

Main Product — **DHEAS**

↓

Utilized by placenta to produce

↓

ESTROGEN

Anencephaly
↓
Fetal adrenal glands not formed
↓
DHEA - S↓
↓
Estrogen↓
↓
Post Term pregnancy

Stimulates uterus to contract
↓
Labor pains begin

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Q1. To initiate labor which hormone is required = Fetal CRH

Q2. Main estrogen in pregnancy = (E_2) Estradiol

Q3. Most specific estrogen produced by placenta = E_3 (Estriol)

Placenta also produces
↓
Placental corticotropin releasing Hormone (CRH)
↓ act

Uterus
→ Decidua = PGF - 2α, C → **↑uterine contraction**
→ **↑ Receptors:**
  → Oxytocin receptors
  → Estrogen receptors
  → Stretch receptors
↓Receptors: Progesterone receptors

Fetal Membranes
↓
Release PGE2
↓
Mainly soften Cervix
↓
Called as **Ripening of cervix**
↓
↑ Water content of cervix
It happens in **Pre Labor stage**

PRELABOR:-

Student's Space

Events in Prelabor:-

1. Ripening of cervix → ↑water content of cervix
   &
   Cervix becomes soft
2. **Lightening/ Welcome sign** →When head of fetus goes down into pelvis
   ↓
   Mother is relieved of respiratory discomfort
3. Patient will feel false labor pain.
4. Mother has sudden burst of energy (called as NESTLING) = 24 - 48 hours before labor.
5. Due to change in progesterone & estrogen level
   ↓
   Fluid shifts
   ↓
   Weight loss of 1 to 3 pounds

For normal labor:

↓

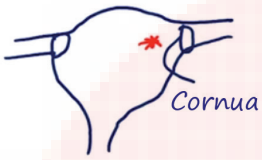
4 P's are needed

1. **PELVIS/passage** (Normal)
2. **Passenger** (Proper Fetus)
3. **Push** (Uterine contraction)
4. **Psyche** ↓ Mindset of Mother

If 3 P's are asked = Then 1st (3)

Uterine contraction:

Begin: CORNUA of uterus (angle of uterus)



Spread: Spread downwards at speed of 2 cm/sec

Maximum: At FUNDUS

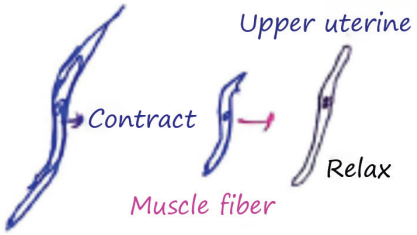
Characteristic

- Coordinated Manner ↓ Regular & Rhythmic
- Lead to = descent of fetal head
- Lead to dilatation of cervix
- Polarity

Polarity: Upper part of uterus : Contract & Relax
(Upper uterine segment)

→ Lower part of uterus (Lower uterine segment): Simply dilate

Retraction of Uterine Muscles:-



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Upper uterine segment = Contract + **Relax**

↓

At the time of relaxation

↓

Length of uterine muscles do not come back to original length
It permanently decreases slightly.

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Parameter of uterine contraction:

→ When uterus relaxes during labor in between contraction

↓

Pressure is 8-10 mmHg called as Basal Tone

→ Peak pressure at the time of contraction
  → **1st stage of labor** 40 - 50 mmHg
  → **2nd stage of labor** 100 - 120 mmHg

→ So Remember → There is uterus contraction followed by relaxation

Relaxation is important Because:

→ At time of contraction blood to fetus decreases

→ At time of relaxation blood flow is restored

→ **Adequate uterine contraction**
  → In a period of 10 minutes = 3 contractions each contractions last.
  → For 45 seconds with Intrauterine pressure = 65 - 75 mm of Hg

→ **Tachysystole:**
  → Excessive uterine contraction
  → Contraction ≥5 in 10 minutes

→ Tachysystole causing fetal distress called as **HYPER STIMULATION**

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NORMAL LABOR (PART-1B)

How to know: Fetal head is descending
↓
With the help of
Station of fetal head
↓
Relationship between the lower most part of fetal skull & Ischial spine

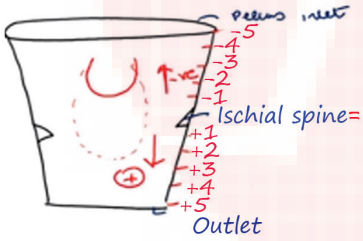
If head of fetus is above level of ischial spines

If head is below level of ischial spine



Fetal head

Ischial spine = level of head
= O station



Ischial spine= @ level= O station

→ If head of fetus is at level of Ischial spine = Zero station

→ Number represents the distance of head from ischial spine in cms.

Q1. Station = (—) 3 = 3 cms (above the ischial spine)
⊕ 2 = (2 cms below the level of ischial spine)

→ **Engagement means: Station of fetal head is "o" or below it**

→ These days we apply forceps or vacuum if head of fetus is at '+2' station or below it.

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Pain during labor

Later stages of Labor	Later stages of labor
↓	↓
Pain is due to dilation of cervix	Pain is due to uterine contraction
↓	↓
Cervix nerve supply = (S2 – S4)	Uterus= Nerve supply (T10-L1)

→ **For Painless labor**

- → Epidural Analgesics is preferred (No motor blockage only sensory blockage)
- → Segment = T10
- → DOC = Bupivacaine
- → We should encourage for painless labor

→ **For Cesarean section**

Give anaesthesia
↓
Sensory + Motor block
↓
Uterus stops contracting

Analgesia = No motor block
↓
Uterus keep contracting

→ Preferred anesthesia for C-section: Spinal anesthesia

→ Level = T4 segment (Why because we have to block pain sensation from peritoneum, Abdominal wall also)

For Instrumental delivery: Forceps/Vacuum

↓

Pain at the time of insertion of instrument due to stretching of perineum

↓

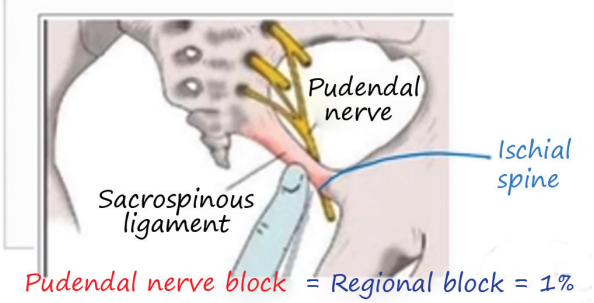
Perineum nerve supply: Pudendal Nerve

↓

So for instrumental delivery **Do pudendal nerve block**

↓

Site: Ischial spine



Pudendal nerve block = Regional block = 1%

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→ Pudendal nerve block: Regional block = 1%

→ Site for pudendal nerve block: Ischial spine

→ Ligament pierced in pudendal nerve block: Sacrospinous ligament

Onset of labor:

Begins: With true labor pain

	True labor pain	False labor pain
Felt in	Felt in lower abdomen & radiate back & thigh.	Felt in lower abdomen only.
Contractions		
Rhythm	Regular & rhythmic (off and on)	Continuous pain or irregular
Intensity	Increase in intensity, duration & frequency with time.	-
Dilation of cervix	Seen	Not seen
Show	Patient complains of blood mixed mucus discharge	-
Bag of membranes	Per vaginal exam feel the membranes with amniotic fluid ↓ Bag of membrane is felt	-
Relief with sedation/Enema	Not Relived with sedation/Enema	Relieved

Most important/Best sign of true labour pain:- Dilation of cervix present

Most Important/best sign of true labor pain: Dilation of cervix present

Note:

If question says: Pregnant female at 35 week complains of pain in lower abdomen progressive dilation of cervix is present & blood mixed mucus discharge is present

↓

True Labor

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NORMAL LABOR (PART-1C)



→ Lie : Longitudinal
→ Presentation : Cephalic
→ Presenting part : Vertex
→ Position : LOT > LOA > DOA > ROA > ROT
→ Denominator : Occiput

The movements which occur while fetus is traversing the maternal pelvis is called as CARDINAL movements.

↓

8 movements

1st movement

Engagement

Definition: When the greatest transverse diameter of presenting part, has passed through the pelvic inlet or crosses the pelvic brim.

In all cephalic presentation: Greatest Transverse diameter of fetal head

↓

BIPARIETAL diameter (9.5 cms)

Time of engagement

Primigravida = 38 weeks = before onset of labor
Multigravida = at onset of labor

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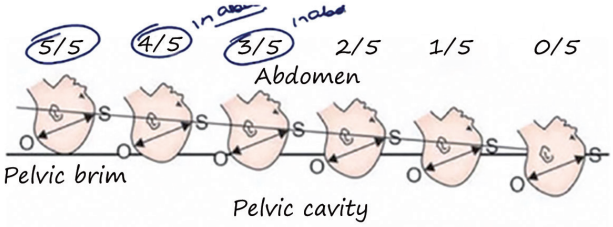
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Clinically:

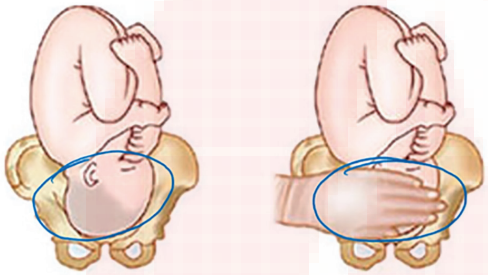
To know engagement has occurred

Abdominal method

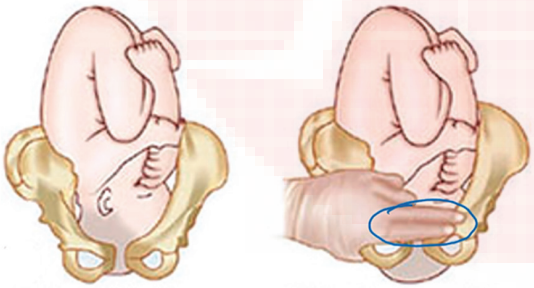


Completely above the pelvic brim	Sinciput high, occipital easily felt	Sinciput easily felt, occipital felt	Sinciput felt, occiput just felt	Sinciput felt, occiput not felt	None of head palpable

Crichton method



1. Head is mobile above the symphysis pubis=5/5
2. Head accommodates full width of five fingers above the symphysis pubis



3. Head is 2/5 above the symphysis pubis
4. Head accommodates two fingers above the symphysis pubis

On per abdominal examination

Head of fetus is said to be engaged

↓

When 2/5th or less of fetal head is palpable per abdominally

Vaginal Method

On Per vaginal examination

Head is said to be engaged

↓

When station of fetal head is at "O" station.

Student's Space

Engaging diameter

Transverse diameter
↓
Biparietally diameter
↓
(9.5 cms)

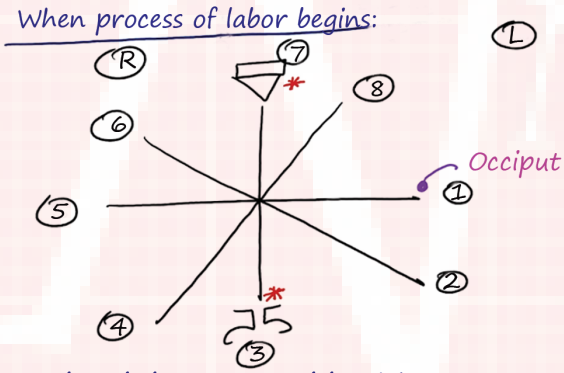
- → Well flexed head: Sub occipito bragmatic diameter.
- → Deflexed head: Occipito frontal or suboccipitofrontal
- → Slightly extended head: Mentovertical diameter (Brow) (14 cms)
- → Fully extended head: Face submento vertical or Submentobregmatic diameter

Important Questions

Q1. Most common cause of non-engagement of head (Free floating) in primigravida at term.

1. Deflexed head/occipitoposterior position (m/c)
2. Cephalopelvic disproportion (2nd mc)
3. Placenta previa

When process of labor begins:



Occiput is in = LOT position (1)
Shoulders are 90° to it = Anterior (3)
Posterior (7)

Occiput is in = LOT (Left occipito Transverse) position (1)
Shoulders are 90° to it = Anterior (3)
Posterior (7)

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Cardinal Movement of Labor

1. **Engagement**

↓

Due to uterine contraction, head of fetus moves down

↓

2. **Descent of fetal head** → **2. Reasons:**
   1. Uterine contraction
   2. Mother pushing down fetus

↓

3. Head of fetus touches levator ani muscles

↓

Due to muscle recoil

↓

Flexion of head occurs

↓

Occiput touches the levator ani first in well flexed head. So because muscle fibers are arranged in such a manner that slope is towards midline of fetal head.

↓

So whatever part of fetal head touches levator ani first → It is rotated towards midline (called as HART Rule)

↓

4. **Internal Rotation of fetal head occurs**

Q2. Internal rotation occurs at level of: Ischial spine

Occiput rotates BY: 2/8 OF CIRCLE DURING INTERNAL ROTATION

→ After Internal Rotation: occiput of fetal head lies directly behind pubic symphysis

→ Now if shoulders do not rotate at all

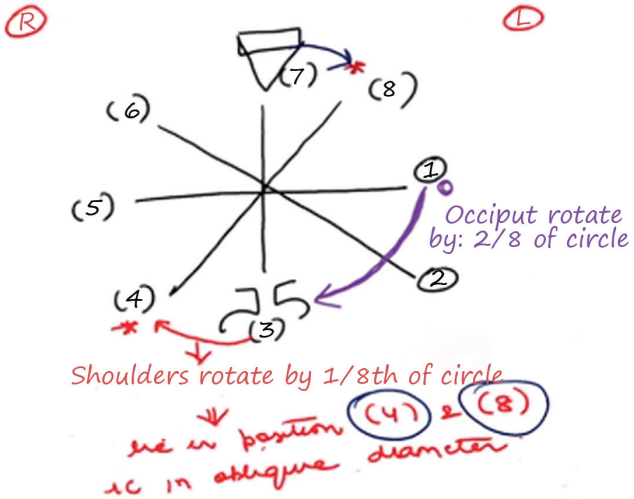
↓

There will be lot of strain on neck of fetus

↓

So shoulders rotate by 1/8th of circle anteriorly

So, still a strain of 1/8 is left on neck but it can be tolerated



NORMAL LABOR (PART-1D)



Now when uterus contracts

↓

Head further descends

↓

Is permanently visible at mothers vaginal movement

↓

This stage is crowning

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Remember

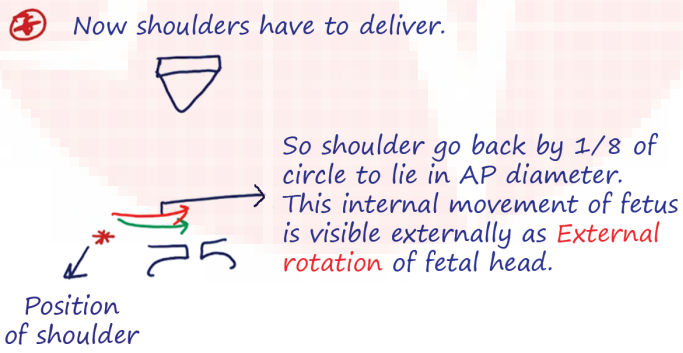
1. Crowning is not a separate cardinal movement
2. Episiotomy is given after rowing occurs
5. Now delivery of fetal head occurs by

   Extension:-

   ↓

   1/8 Torsion of neck was present

   ↓
6. Now untwisting of neck occurs called as Restitution
7. Now shoulders have to deliver.



Now shoulder lie in AP diameter occiput moved back by 1/8 of circle during restitution & 1/8 by shoulder.

→ So shoulder go back by 1/8 of circle to lie in AP diameter.

→ This internal movement of fetus is visible externally as **External rotation** of fetal head.

Now shoulder lie in AP diameter occiput moved back by 1/8 of circle during restitution & 1/8 by shoulder.

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8. Expulsion of baby: By lateral flexion.

8 Cardinal movements:

1. Engagement
2. Descent
3. Flexion
4. Internal rotation (Earlier: 9 movements: as crowning was included)
5. Extension
6. Restitution
7. External rotation
8. Expulsion of body

Note:

After External Rotation:

→ Face of baby: lie towards mother's right thigh

→ Occiput of baby: lies at same position from which delivery started.

Student's Space

Management of Labor

To prevent perineal tear

1. Apply warm perineal compresses
   ↓
   Relaxes lavatory ani
   ↓
   Prevents perineal tear
2. Perineal massage
3. Maintain head in flexion & controlled delivery of head.
4. Give perineal support with one hand.

   (3), (4) recommended by WHO, to prevent perineal tear.

   Not Recommended

   Not done

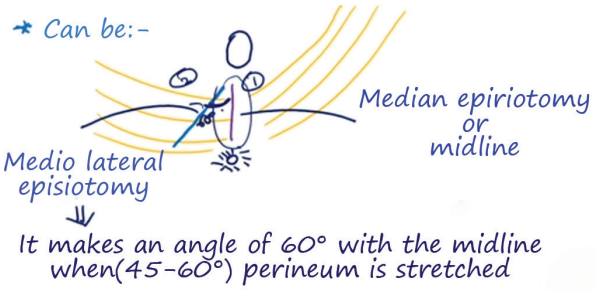
   1. Routine episiotomy
   2. Routine fundal pressure

EPISIOTOMY

→ Planned surgical incision given on PERINEUM.

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→ Can be:-



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Medio Lateral episiotomy

↓

It makes an angle of 60° with the midline when perineum is stretched.

Median episiotomy	Mediolateral episiotomy
↓ Less muscle fibers are cut	↓ More muscle fibers are out.
Advantage: Less bleeding ↓ Easy repair ↓ Healing fast ↓ Dyspareunia is less	**Advantage:** Can never involve anal sphincter no matter how much it is extended. **Preferred**
Disadvantage It can involve anal sphincter if it extends	Disadvantage: More muscle fibers are cut. ↓ More bleeding ↓ Repair difficult ↓ Healing slow ↓ More pain/Dysparenumia

Always: Medio-lateral episiotomy is preferred

WHO:

→ Does not recommend to give episiotomy in all female undergoing delivery.

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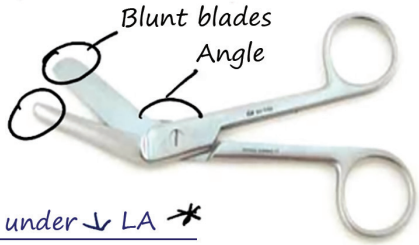
→ WHO says give episiotomy only if it is indicated.

Indications of Episiotomy:-

1. Shoulder dystocia
2. After coming head of breech
3. Instrumental delivery
4. Macrosomia
5. Rigid perineum (eg Primigravida)

Episiotomy scissors

Episiotomy scissors



Given under ↓ LA *

Given under local anesthesia

Structures cut during episiotomy

Mnemonic

Please : Pudendal nerve & vessels
Bring : Bulbospongiosus muscle
Live : Levator Ani muscle
→ Pubococcygeus
→ Iliococcygeus
Vaccine : Posterior vaginal wall
For: Fourchette
Tetanus : Transverse perineum muscle
→ Superficial
→ Deep

Structure which are never cut during episiotomy

1. Ischiocavernous
2. Ischiococcygeus
3. Anal sphincter

Suture: Use chromic catgut "O"

↓

Absorbable suture

Sequence: Vaginal mucosa

↓

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Perineal muscles

↓

Skin

Management of labor

→ General → all aseptic precautions should be taken.

→ Continuous emotional support, encouragement to be given.

→ Continuous supervision needed

→ Fetal heart sound auscultated.

	1st stage	2nd stage
Low risk female	30 mins	15 mins
High risk female	15 mins	5 mins

→ Continuous CTG monitoring

→ Partograph plotting for monitoring progress of labor.

→ Perineal preparation

→ Rest: Early 'Normal' labor:

→ Not be confined to bed

→ Active phase = Bed

→ Not to lie in supine position

→ **Bowel:** Should not be loaded. Give enema

↓

Loaded bowel inhibits uterine contractions.

Enema is contraindicated

→ Kidney failure

→ Intestinal inflammation or blockage

Bladder care: Encourage mother to pass urine frequently

Diet: Delayed gastric emptying at time of labor so solid food not allowed. Liquid food given.

Pain relief: Can give epidural anesthesia.

Points to be kept in mind during delivery of Head:

1. After delivery of head = blood & mucus in mouth & pharynx should be suctioned.
2. Clean eyelids with sterile cotton swab from inner canthus to outer canthus.
3. Steps to prevent perineal laceration/tear should be taken.

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Episiotomy Care

1. Maintenance of perineal hygiene (Instruct patient to clear episiotomy wound after every urination & defecation)
2. Give perineal care: Twice daily to patient

   ↓

   Clean episiotomy with antiseptic solution

   (Cotton swab = wound = from up to down)
3. Abscess the wound using: Reeda score

   R- Redness

   E- Edema

   E- Ecchymosis

   D- Discharge

   A- Appoximation

   Score
4. Instruction to Mother

   → Not sit crossed leg

   → Ambulate

   → Abstinence for 6weeks after delivery

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LABOR PART-2



	1st stage	2nd stage	3rd stage	4th stage
Definition	Begins with true labor pain ends with full dilation of cervix (10 cms)	Begins with full dilation of cervix ↓ Ends with delivery of baby	Begins with delivery of baby ↓ Ends with delivery of placenta	1 hour observation period after delivery of placenta.
Phases Recent guidelines	Latent phase ↓ Uptil 5 cms dilatation of cervix Active phase ↓ 6-10 cms dilatation of cervix			
Normal Duration Nulli Multi parous	Latent phase 12 hours 8 hours	1 hour (nulliparous) 30 minutes (Multiparous)	Passively = 15 - 25 mins Active Management = 5- 10 mins	1 hours
Prolonged Nulli parous Multi parous	Latent phase ≥ 12 hours ≥ 8 hours	≥ 2 hours ≥ 1 hour	More than 30 minutes ↓ Retained placenta	Q. Physiological chills Experienced by Mother

1st stage of Labor:

Begins: With onset of true labor pains

↓

Bring about: dilatation of cervix

Ends: with full dilatation of cervix = 10 cms dilated.

Divided into:

Latent Phase		Active phase
Uptil 5 cm dilatation of cervix	←Recent guideline→	6-10 cms dilatation of cervix
Uptil 3 cm dilatation of cervix	←WHO/Partogram→	4-10 cms dilatation of cervix

Latent phase:

Important events:

1. Dilatation of cervix
2. Effacement of cervix (Shortening of cervix)

Average duration:

1. Nulliparous/Primigravida = 12 hours
2. Multiparous/Multigravida = 8 hours

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Prolonged Latent Phase

1. Nulliparous = ≥ 20 hours
2. Multiparous = ≥ 14 hours

D/D of prolonged latent phase = False labor pain

Management

1. Therapeutic rest to patient.
2. In 1st stage of labor:

Events

1. Dilatation of cervix
2. Shortening of cervix
   ↓
   Effacement
   → Length of cervix in pregnancy = 4cms
   → Lower uterine segment = When cervix shorter, it becomes a part of lower uterine segment

Lower uterine segment:

→ Formed by Isthmus
→ Isthmus is:
  → Lower most part of uterus (0.5 cms)
  → Boundary
    → Above = Anatomical internal os
    → Below = Histological internal os
  → Length in non-pregnant female = 0.5 cms
→ Lower uterine segment length in pregnancy: 5 cms
→ Lower uterine segment length at time of Labor (10 cms): LUS (5 cm) + Cervix (4 - 5 cms)

Active phase

→ As per recent guideline = Cervix 6 - 10 cms dilated
→ As per WHO/Partogram = 4 - 10 cms dilated

Main events:

1. Dilatation of cervix
   Rate of dilation in active phase Nulliparous 1.2 cm/hr
   1.5 cms/hr Multiparous
   → Minum dilation (Nulliparous or multiparous) WHO
   ↓
   1 cm/hr
2. Descent of fetal head
   1 cm/hr
   2 cm/hr

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Protracted active phase

Means: Active phase is progressing slowly

↓

Cervix dilate at rate < 1 cm/hr

Management:

1. Rule out cephalo pelvic disproportion
2. Augmentation of labor (accelerate labor = Artificial rupture of membrane + oxytocin

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Active phase arrest

→ **Means:** ≥ 4 hours have passed but there is no dilatation of cervix. No dilation of cervix.

→ **Management:** Cesarean section.

Second stage of labor

→ **Begins:** Full dilatation of Cervix (10 cm)

→ **Ends:** Delivery of fetus

→ **Main events:** Cardinal movement of fetus

→ **Duration:**

Divided into:

Average		Prolonged
1 hour	← Nulliparous/Primigravida →	2 hour
30 minutes	← Multiparous →	1 hour

Management of prolonged second stage

↓

Principle: We want to deliver baby fast:

↓

2 Methods:

1. Cesarean section
2. Instrumental delivery
   - → Forceps
   - → Vacuum

Remember: Forceps & vacuum can be applied only when station of fetal head is at "+ 2 station" or below it.

Management of prolonged second stage
↓Check station of fetal head

- +2 or below it → Forceps/vacuum delivery
- Station above + 2 → Cesarean section

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But if:

→ Fetal distress = Cannot apply vacuum/Forceps.
Do cesarean section

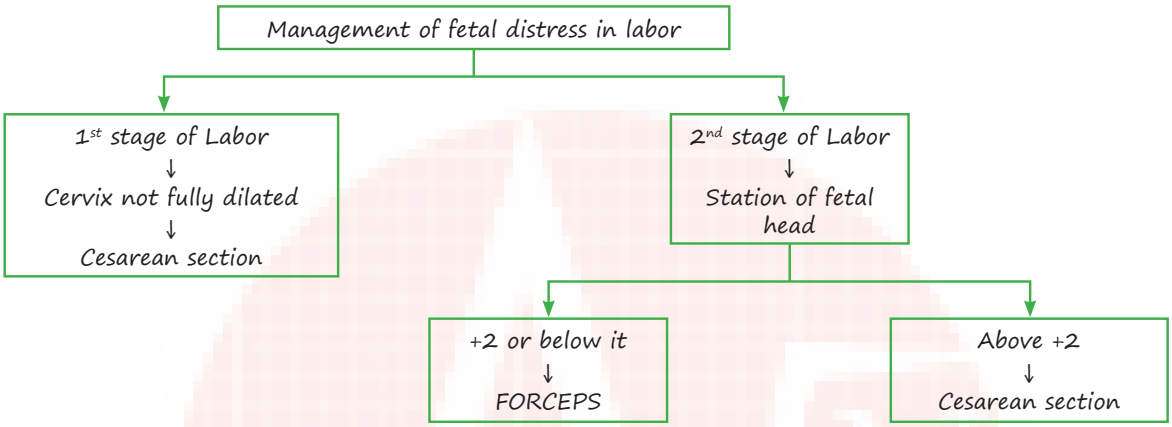
→ Bandl's ring appears = Per abdomen depression between upper uterine segment & lower uterine segment on patient's abdomen.

↓

Indicates obstructed labor

↓

Do cesarean section



→ Never used vacuum in fetal distress

Obstructed Labor

Means: Uterus is contracting

⊕

Cervix is fully dilated

⊕

Membranes are ruptured but delivery of fetus does not happen due to some obstruction in labor

Symptoms:

General: Mother = Dehydrated
Exhausted
Tachypneic

Examination:

Per abdomen:

1. Ring/depression felt & seen between upper uterine
   Segment & lower uttering segment.
   ↓
   Called as Bandl's Ring
2. Fetal Heart sound → absent/distress

Per vaginal

1. Bleeding per vagina
2. Hot vagina
3. Hematuria
4. Caput on fetal head + Moulding of fetal head
5. Foul smelling discharge.

Management of obstructed Labor:

→ Never
  → Wait & watch
  → Give oxytocin
    → ↑ Chances of rupture
  → Instrumental delivery
→ **Always Do:** Cesarean section

Complication of obstructed labor

1. Fetal distress/fetal death
2. Uterine rupture

Long term complication = Vesico vaginal fistula

Q1. Most common cause of vesico vaginal fistula in developing country → Obstructed labor.

Third stage of labor:

→ Begins with: Delivery of baby
→ Ends with: Delivery of placenta
→ Average duration
  → Passive management = 15 - 25 min
  → Active management = 5 - 10 mins
→ Main Event: Delivery of placenta
→ **Prolonged third stage/Retained placenta:** ≥ 30 mins have passed after the delivery of baby but placenta hasn't delivered.
→ **4th stage of labor:** 1 hour observation period after delivery of placenta

Physiological chills are experienced by patient in this stage.

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MANAGEMENT OF THIRD STAGE OF LABOR



Third stage of Labor

Begins: After delivery of baby

End: Until the delivery of placenta

Main Event: **Delivery of placenta**

↓

Human placenta is deciduae

↓

Has to shed after delivery

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Important points

1. The line of separation of placenta is along - Zona spongiosa
2. Most common method of placenta separation: is from centre of placenta called as SCHULTZ method.
3. Main factor responsible for separation of placenta: Uterine contraction
4. What is LIVING LIGATURE: Middle layer of myometrium.

Placenta has to separate after delivery

Obstetrician after the delivery of baby
↓
Relaxes
↓
Doing nothing to deliver the placenta
↓
Passive management of third stage of labor

Obstetrician takes a few steps to deliver the placenta
↓
Active management of third stage of labor

Passive management	Active management
Time taken 15 - 30 mins for placental delivery ↓ ↑Blood loss ↓ ↑ Chances of PPH ↓ ↑ Maternal mortality	Time = 5 - 10 mins for placental delivery ↓ Blood loss ↓ ↓ Chances of PPH↓ ↓ Maternal mortality↓ **Active management of third stage of labor preferred.**

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→ Third stage of labor is said to be prolonged ≥ 30 mins

→ Best method to prevent PPH = Active management of third stage of Labor (AMTSL)

→ Duration of third stage of labor depends on:

  → Passive management - 15 - 20 mins

  → Active management - 5 - 10 mins

→ When is third stage of labor said to be prolonged = If it is ≥ 30 min (Retained placenta)

Best Method to prevent PPH

↓

AMTSL (Active management of third stage of labor)

↓

Steps done in AMTSL:

1. 1st step (Most Important) → (Inj. Uterotonic) after delivery of baby

   ↓

   Drug which increases tone of uterus
2. Delayed cord clamping
3. Delivery of placenta by controlled cord traction
4. Intermittent assessment of uterine tone.

1st step of AMTSL

1. Inj. Uterotonic:

Drug which increases tone of uterus

↓

WHO

Recommend as 1st line drug

↓

Oxytocin

WHO recommend as alternative drug:

1. Methyl ergometrine
2. Syntometrine
3. PG's
   → PGE1 = MISOPROST
   → PGF 2d = Carboprost
4. Carboprost

Oxytocin: Important Points

1. It is the drug recommended by WHO. To prevent PPH (or) To treat PPH.

Natural oxytocin

Made in:

Periventricular nucleus of hypothalamus

↓

→ Stored & released by posterior pituitary

→ NONA - PEPTIDE (9)

Synthetic oxytocin

↓

→ Made in factory

→ OCTAPEPTIDE (8)

→ Oxytocin = give it

Intramuscular		I/V infusion
3 min	- onset of action	1 min
3 hours	- duration of action	1hour

→ Never give oxytocin in IV bolus

↓ Why?

Lead to hypotension

→ Cardiac arrest

Drug	Dose in AMTSL (Prevent PPH)	Important points
Oxytocin (Trade name Pitocin, Syntocinon)	10 IU in electrolyte rich media (RL, NS) (IV infusion	Do not dissolve oxytocin in dextrose 5% solution (Im) ↓ Can lead to water intoxication → Never give it as IV bolus → T1/2 = 3 - 5 minutes → Hormone responsible for milk → Ejection - oxytocin
Methyl ergometrine (Trade name: Methergin inj.	0.2 mg **(im)** ↓ Causes tetanic contraction of uterus (no relaxation in between contraction)	→ Can cause ↑ BP ↓ Never given iv → **Contraindication:** T- After delivery of 1st twin O- Organic heart disease in mother P- Pre-eclampsia/PIH E- Eclampsia R- Rh negative pregnancy
Syntometrine ↓ ↓ Oxytocin + Methergins	Fixed dose combination of oxytocin = 5U + Methylergometrine 0.5 mg	
Prostaglandin PGE1 (Misoprost) Tablets	600 mcg orally (WHO recommended)	→ Side effect= Fever + shivering (Dose dependent) → Can be given to asthmatic patients. → Contraindicated in previous cesarean section
PGF -2d ↓ Carboprost Hemabate dinoprost	250 mcg 1/m	→ Contraindicated in asthmatic patients. → Side effect = diarrhea
PGE_2 : DINOPROSTONE ↓ → Not used in PPH/AMTSL → It is used in induction of labor		
Carbetocin	100 mcg IV	Synthetic oxytocin (Longer t½)

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2nd step in AMTSL

Delayed cord clamping
↓
Do not clamp cord immediately after delivery of baby
↓
Why: Because cord has 80 ml of blood
↓
When cord clamping is delayed
↓
This 80 ml of blood goes to baby
↓
Prevent anemia in baby

Early cord clamping
↓
To clamp cord with 1 min of delivery of baby

Delayed cord clamping
↓
To clamp cord between 1 - 3 mins of delivery of baby.

Conditions in which early cord clamping is preferred:

1. If neonatal resuscitation is needed.
2. If birth asphyxia in baby.
3. If mother is Rh -ve
4. If baby is a known case of heart disease (extra 80 ml of blood can cause heart failure)

If mother is HIV +ve

WHO: Early cord clamping

National guideline (NACO) Delayed cord clamping

3rd step of AMTSL:

→ Delivery of placenta by controlled cord traction (Modified brand Andrew's technique)

→ Please Remember:

Before delivery placenta: Make sure that placenta is separated from uterus
↓
Best sign of Placental separation} → Placenta is lying in vagina

2nd best sign: Lengthening of CORD

It placenta has not separated from uterus
↓
Cord is pulled
↓
Uterus comes out along with placenta
↓
Uterine inversion
↓
Patient immediately goes into shock.

4th step in AMTSL: Intermittent assessment of uterine tone

After the placenta delivers
↓
Abscess the tone of uterus off & on

Earlier 4th step was: uterine Massage

Q1. Which step is most important step of AMTSL?

1st step: Inj. Uterotonic drug to mother

Q2. Which of the following is NOT included in AMTSL:

a. Inj. Uterotonic to mother
b. Early cord clamping
c. Uterine massage
d. Delivery of placenta by controlled cord traction

Early cord clamping is not included in AMTSL delayed cord clamping is included.

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INDUCTION OF LABOR



Means: To initiate the process of labor in a Quiescent uterus.

Augmentation of labor:

To accelerate process of labor in a uterus which is already contracting

For induction of labor:

Necessary to check status of cervix before Induction of labor.

↓

Checked by: BISCHOP SCORE — Score

↓

5 Parameters:

1.	(Delhi) →	Dilatation of cervix	3
2.	(Police) →	Position of cervix	2
3.	(Employed) →	Effacement of cervix	3
4.	(Special) →	Station of fetal head	3
5.	(Commandos) →	Consistency of cervix	2

→ To each of these parameters = Score = Ranging from **0 to 3** or **0 to 2**

↓

(Position consistency)

Maximum score = 13

- If score is ≥9 ↓ Induction of labor successful
- If score is <6 ↓ Induction of labor will not be successful ↓ First ripen cervix ↓ Then Induce the labor

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Modified Bischop score

Effacement: Replaced by **cervical length**

↓

Need USG

Delhi: Dilatation of cervix

Police: Position of cervix

Left: Length of cervix

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Special: Station of fetal head

Commandos: Consistency of cervix

→ Modified bischop score: done with the help of USG

→ Bischop score - done clinically

→ Most commonly done:-Bischop score

→ More accurate - Modified bischop score

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Drugs used for Induction of Labor

1. PGE1 (Misoprost): Recently approved for this purpose.

   Dose: 25 mcg (Per vaginally) → Best
   ↓4 hrly → Not used in patients with previous LSCS.
   6 weeks

2. PGE2 (Dinoprostone) cerviprime gel.

   Dose: 0.5 mcg intracervically
   ↓6 hourly
   4 doses

PG analogue	Name	Action	Use
PGE_1	Misoprost ↓ Tablet available **Side Effect:** Fever + Shivering (dose dependent side effect) **Contraindicated**- Cesarean section patient. **Not contraindicated in Asthmatic**	Cervix + Uterus	→ Induction of labor (Ripens cervix) → PPH (Prevention + Treatment) → Medical abortion
PGE_2	Dinoprostone gel (cerviprime gel)	Cervix **Not onuterus**	→ Induction of labor + Ripening of cervix So not used in prevention + Treatment of PPH
15 methyl PGF 2α	CARBOPROST/DINOPROST/HEMABATE ↓ **Main side Effect** = Diarrhea Contraindicated in asthmatic patients	Uterus Not on cervix	→ Prevention + Treatment of PPH → Not used in Induction of Labor, Ripening of cervix

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CERVIDIL



CERVIDIL
- Dinoprostone
  - 10 mg
  - Pocket
- Kept in posterior vaginal fornix allows slow release of drug
- Remove it after
  - 12 hours (or) earlier if contraction begins



→ Dinoprostone ⇒ 10 mg
→ Kept in posterior vaginal fornix allows slow release of drug
→ Remove it after ⇒ 12 hours **(or)** earlier if contraction begins.

3. **MIFEPRISTONE:** (RU486/Antiprogestogen)
   200 mg per vaginally
4. **Oxytocin:** Used both for inducing & augmentation of labor

Mechanical Method:

Foleys induction:

→ Best used for patients with previous LSCS



Transcervical balloon catheter
- If saline is infused even after filling bulb
  - Extra amniotic saline infusion

Put it in uterus
↓
Filled with normal saline (30-50 ml)
↓
Pull it down into the level of internal os.

→ Transcervical balloon catheter
→ If saline is infused even after filling bulb
↓
Extra-amniotic saline infusion
→ **Stripping of Membranes:** OPD procedure
↓ sweeping & stripping PG's released
Note: Don't rupture the membrane
→ **Hygroscopic dilators:** Like laminaria test
  → Generally not used in term pregnancy
  → Used in abortion to dilate cervix.

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Contraindication for induction of labor:

Rule: Wherever vaginal delivery is contraindicated

↓

There induction of labor is contraindicated

In other words: Those conditions where you have to do cesarean section. There induction of labor is contraindicated.

- → Contracted Pelvis
- → Cephalopelvic disproportion
- → Transverse lie/Brow presentation/Face (mentoposterior position)
- → Major degree of placenta previa
- → Fetal distress
- → Active genital tract herpes in mother
- → Patient with previous history of
  - → 2 LSCS
  - → H/O myomectomy (Removal of fibroid)

Augmentation of labor

- → To accelerate the process of labor
- → Done by:
  1. Artificial rupture of Membranes/Amniotomy
  2. Oxytocin
- → When do you do augmentation of labor?

↓

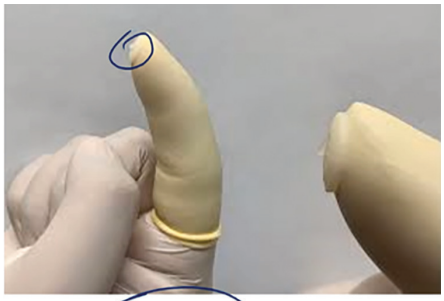
Protracted active phase (Dilatation of cervix <1 cm/hr)

↓

1st step: Artificial rupture of membranes/Amniotomy with Kocher's forceps

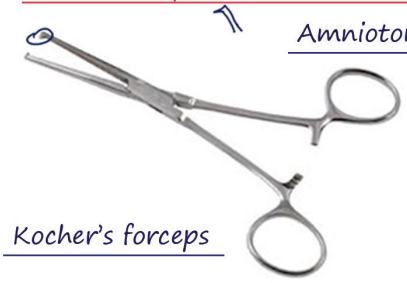
after 30 min↓

Oxytocin started



Use Amino cots

(2) ARM:-
Artificial rupture of membrane:



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Advantages of Artificial Rupture of Membrane

1. Release PGE_2 → ↑uterine contractions
2. See colour of amniotic fluid → detect fetal distress
3. Decreases bleeding in placental abruption

↓

Leads to uterine contraction

↓

↓ Bleeding

Risk

1. Cord prolapse (increased if artificial rupture of membrane is done in free floating head)
2. Infection
3. Trauma

Contraindications of Artificial Rupture of Membrane (ARM)

1. If free floating head (can lead to CORD PROLAPSE)
2. Intrauterine death of fetus
3. HIV positive females
4. Active genital herpes infection

In Polyhydronium

→ **Do controlled ruptures of membranes**

→ Uterus is over distended with amniotic fluid

↓

Whom ARM is done

↓

Entre amniotic fluid will come out suddenly

↓

Uterus will shrink suddenly

↓

Placenta will separate

↓

Abruptio

↓

(So ARM not done)

Nursing Implication in Induction of Labor (IOL)

→ Obtain informed consent

→ Rule out any contraindication review history of patient

→ Maintain PARTOGRAPH to access the progress of labor

→ Use aseptic precautions

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During Cerviprime/Misoprostol Administration

→ Instruct patient to pass urine before falling cerviprime of misoprostol

→ Mother should be instructed to remain in lateral position for 30-60 minutes after augmentation of drug

→ Monitor side effects of PG's

→ Assess cervical dilation after 4-6 hours of induction

→ Do not repeat dose before 2 hours

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During Oxytocin Infusion

→ Check RR, BP, contraction, fetal heart rate

→ Check for signs of water intoxication like confusion, drowsiness, headache

If uterine hyperstimulation/fetal distress occurs

↓

→ Stop oxytocin immediately

→ Keep patient in deft lateral position

→ O_2 inhalation (6-10 L/min) face mask

→ Notify doctor

After Artificial Rupture of Membrane (ARM)

→ Exclude cord prolapse

→ **Note:** Color and quantity of amniotic fluid

→ **Note:** Position, station of fetal head, check temperature 2 hourly to detect developing infection

→ **Note:** Time of ARM on histogram

→ Advice patient: Rest after ARM in left lateral position

→ Give single shot of antibiotic (as ↑chances of infection)

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PARTOGRAM



→ It is a graphical representation of cervical dilatation with respect to time.

→ WHO: gave composite partograph: As a parts of "Safe Motherhood" programme.

→ In this partograph: Both latent phase & active phase were plotted

But now, this partograph is no longer used

Now we use: Modified WHO partograph

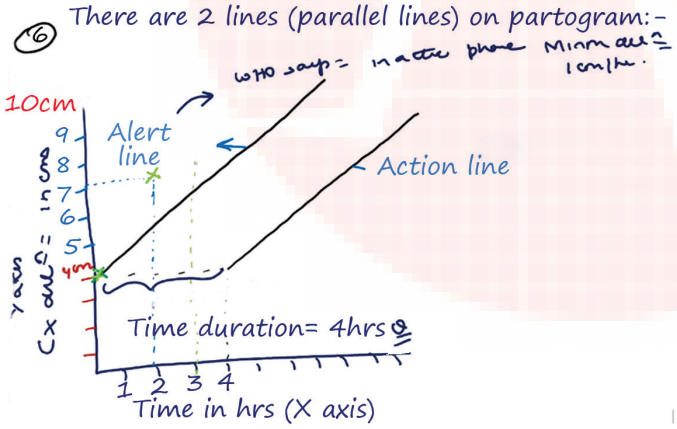
Based on following principles:-

1. No latent phase to be plotted.
2. Plotting begins with "Active phase"

↓

As per WHO/Partogram begins at **4 cm dilation.**

3. Plotting begins from 4 **cms**
4. Time is plotted on: X-axis
5. Cervix dilatation is plotted on : Y-axis
6. There are 2 lines (Parallel lines) on partogram:



→ The progress of patient is plotted on partograph = by "X"

→ Labor is said to be progressing NORMALLY → If it lies to left of Alert line

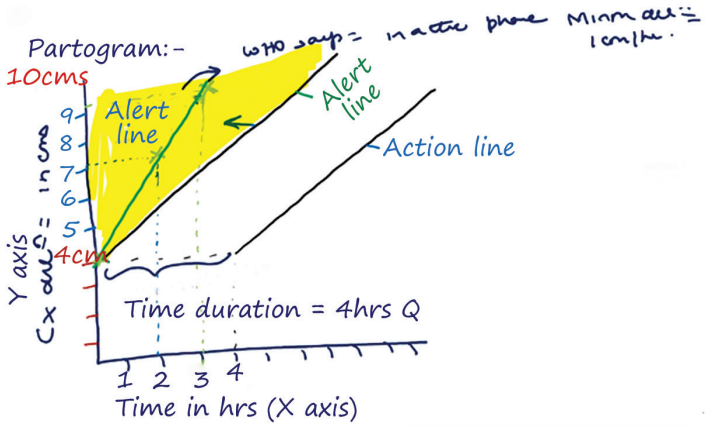
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→ If progress of patient lies towards → Right of alert line

↓

Obstetrician should get alerted

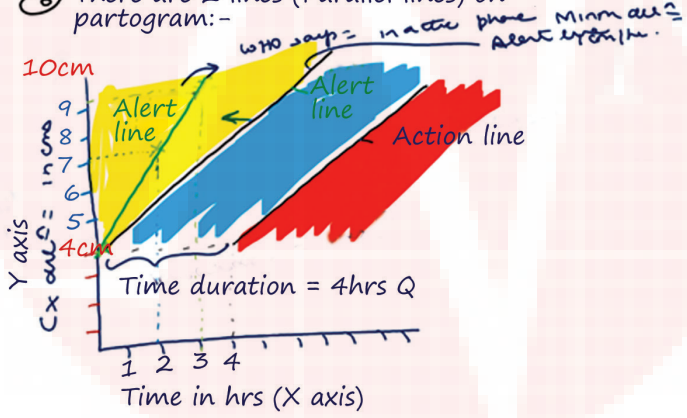
→ This is the time when patient should be referred to higher centre.

→ If progress of patient "touches the action or lies to the right of action line"

↓

Now action has to be taken.

⑥ There are 2 lines (Parallel lines) on partogram:-



Remember:

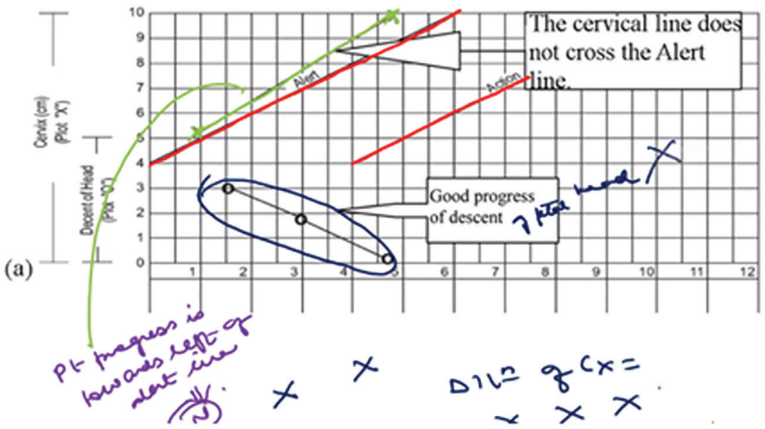
→ Action does not always means cesarean section.

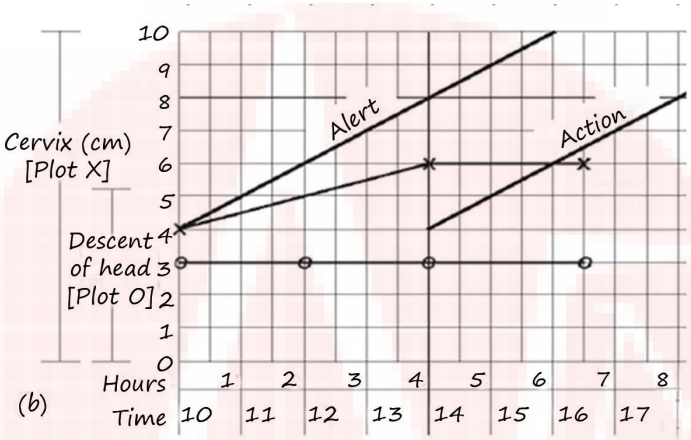
→ Action depends on diagnosis

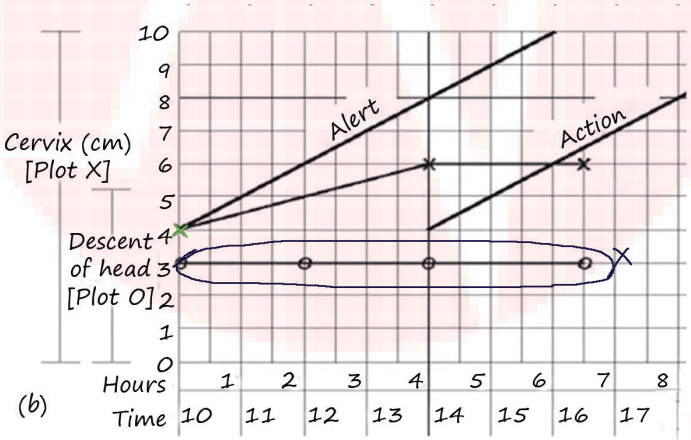
→ Prolonged latent phase = Therapeutic Rest

→ Protracted active phase = Artificial rupture of membrane + Oxytocin

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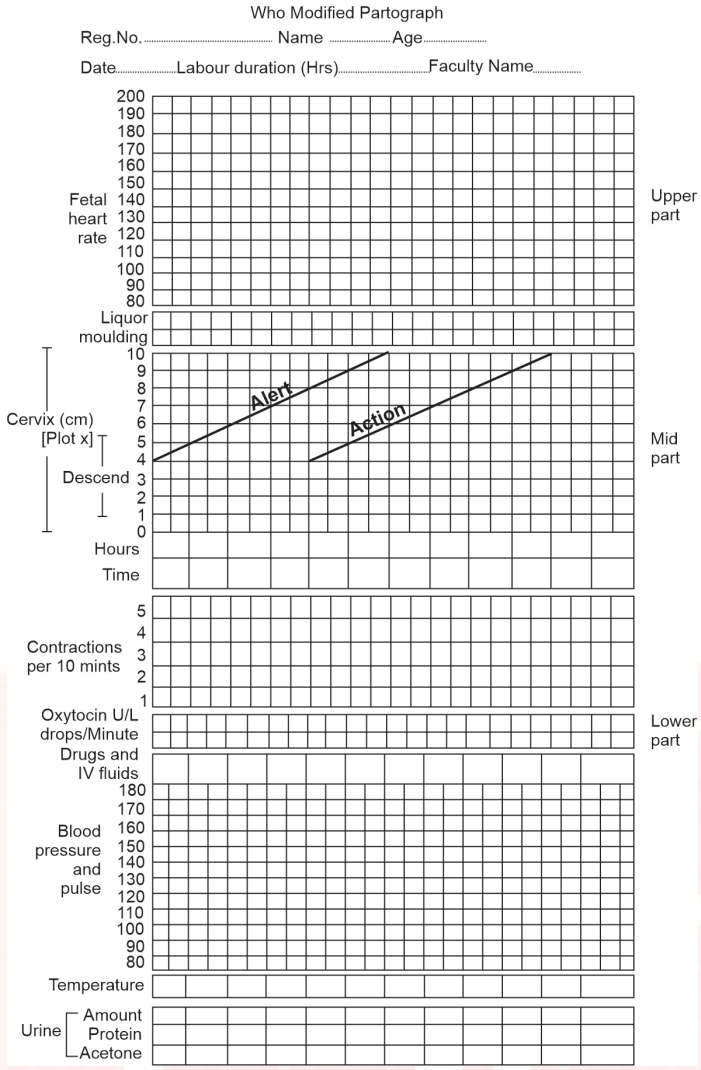




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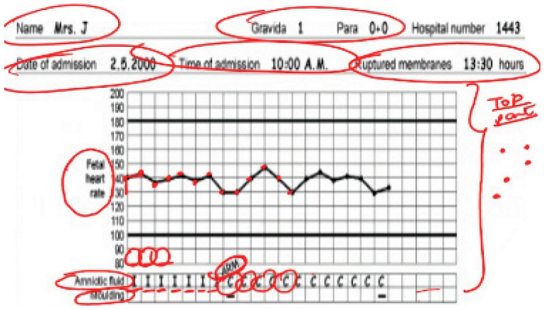


Complete Partograph
↓
3 Parts

TOP part
↓
Fetal condition

Middle part
↓
Cervical dilatation across time

Bottom Part
↓
Maternal condition



Upper part of partograph

1. **Fetal heart rate**
   - → Monitor every 30 minutes
   - → Represent it → with dot
   - → FHR = 110 - 160 bpm
   - → Each square represents 30 minutes.
2. **Status of Amniotic fluid**

   I → Intact (membranes are intact)

   A → Absent liquor

   C → Clear liquor

   B→ Blood stained Amniotic fluid

   M → Meconium stained Amniotic fluid.

   Note: Time when membranes rupture/artificial rupture of membranes.
3. Moulding

   Grade 0 = (-)

   Grade +1 +

   Grade +2 ++

   Grade +3 +++

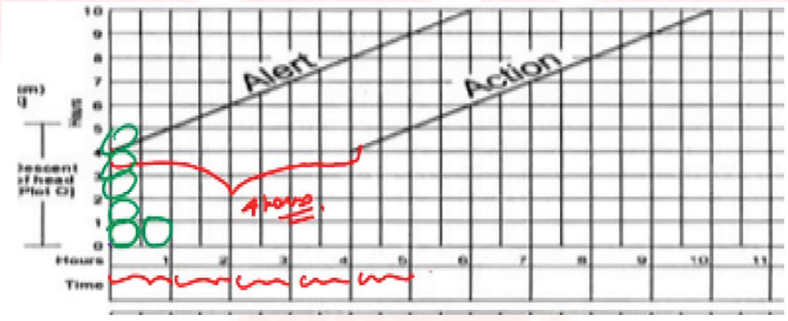
→ **Moulding indicates:** less slow progress of labor:

↓

Moulding + slow progress of labor: Cephalopelvic disproportion

→ Some amount of moulding is normal during labor.

Middle part of partograp



→ **Middle part of partograph in:** (Dilatation of cervix against time is noted)

Note:

Each big square on partograph 1 hour

X axis : 1 hour

Each small square → 30 minutes

Y axis = each square represents = 1 cm

→ Time duration between alert & action line = 4 hours

→ Alert line is plotted on basis of cervical dilatation = 1 cm /hour (in active phase)

→ Per vaginal examination is done after every = 4 hours.

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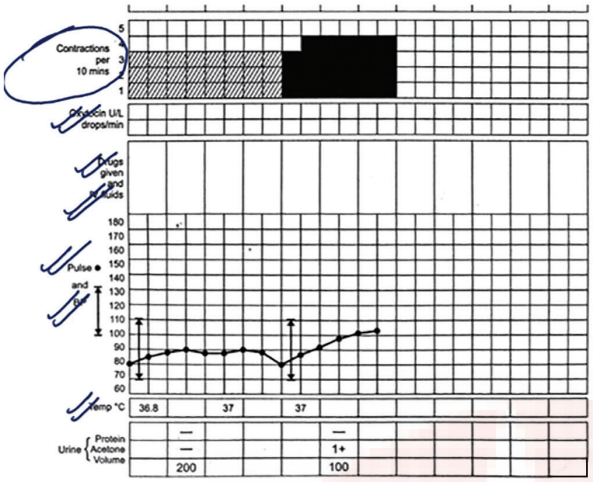
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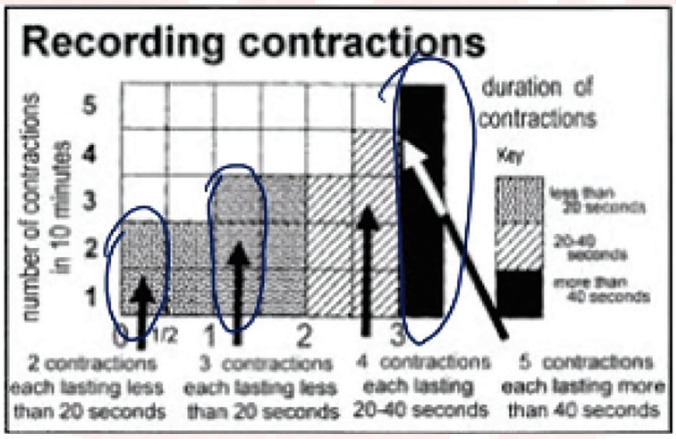
Bottom part of partograph



Bottom Part of partograph:

1. Uterine contractions:

Uterine contractions:-



→ Measured every 30 minutes by placing your hand on uterus.

Note:

No. of contraction in 10 minutes
↓
Each square represents 1 contraction

Duration of contraction
< 20 secs =
20 - 40 secs
>40 secs

Also tells about:

→ Oxytocin
→ IV fluid
→ Pulse rate of mother → check every 30 minutes
→ BP of mother → recorded every 2 hours
→ Urine output
→ Temperature → check every 4 hours

WHO simplified Partogram → Similar to modified WHO partogram (No latent phase plotting)

Uterine contractions:-

- Measured every 30 minutes by placing your hand on uterus

Note

No. of contraction in 10 minutes

Each square represents 1 contraction

Duration of contraction

Mild

< 20 secs :-

20-40 secs :-

>40 secs :-

3 areas:

→ Green area - Normal progress
→ Amber area - Alert/refer
→ Red area - Action

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POSTPARTUM HEMORRHAGE (PPH)



→ Normally blood loss after vaginal delivery = <500 ml

→ After cesarean section = <1000 ml

→ If blood loss is more than above values it is called

Postpartum Hemorrhage

↓

Excessive bleeding

↓

Means:

→ ≥500 mL after vaginal delivery

→ ≥1000 mL after c-section

↓

After delivery & uptil 12 weeks of delivery

Types

Primary PPH

→ When PPH occurs within 24 hours of delivery

→ Most common cause of primary PPH → Atonic uterus

Secondary PPH

→ When PPH occurs after 24 hours of delivery & uptil 12 weeks after delivery.

→ Most common cause of secondary PPH → retained placental tissue

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Causes of PPH: (4T's)

1T: ↓ tone of uterus (Atonic uterus)

2T: Trauma

3T: Retained placental tissue

4T: ↓ Thromboplastin (Bleeding disorder)

→ **Most common cause of PPH:** ↓ tone of uterus called Atonic uterus.

→ **2nd most common cause of PPH:** Trauma (e.g. Perineal Tear)

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Risk factor for PPH

Maternal factors
1. Anemic
2. PIH in this pregnancy
3. Over distended uterus
   - → Twin
   - → Polyhydramnios
   - → Macrosomia
4. Antepartum hemorrhage in this pregnancy
5. H/o PPH in previous pregnancy

Labor Related
1. Prolonged labor
2. Excessive use of oxytocin
3. Precipitate labor
   Entire process of delivery occurs in 3 hours

Placenta Related
1. Big Placenta e.g. succenturiate lobe e.g.
2. Placenta Acreta

Management of PPH

Non specific measures

Resuscitation
1. 2 large I/V cannulas
2. Start RL/NS (Don't start Dextrose 5%)
3. Take out blood sample: Hb, ABO, Rh, CBC
4. Arrange for blood
5. Catheterize the bladder

Specific measures

1st step: Uterine Massage
+
Inj. Tranexa
↓
Inj. Oxytocin & other drugs

Medical Management
For 30 minutes
↓
Fail
↓
2. **Mechanical Method**
Fails
↓
Last = Surgical method

Drugs used to treat PPH:

WHO recommends: **Oxytocin** as **1st line drug**
↓
Bleeding not controlled

2nd line Drugs:
- → Syntometrine
- → Methergine
- → Prostaglandin
  - → Misoprost
  - → Carboprost

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Simultaneously give: **Tranexamic acid**

Drug	Dose = To treat PPH	Important Points
Oxytocin	IM or IV infusion Dose: 40 IU	→ Never give it as IV bolus → Given with NS or RL, not with dextrose 5% → Drug of choice or 1st drug recommended by WHO to prevent & treat PPH
Methylergometrine	0.2 mg IM ↓ Repeat Maximum 5 doses (Interval = 20 - 40 minutes)	→ Never given I/V ↓ Leads to Hypertension
Syntrometrine	Fixed dose combination of **oxytocin** + **methergin** 50 0.5 mg	
PGE_1 = Misoprost ↓ Can be given in asthmatic patient	**800 mcg to treat PPH** **Route: Sublingual** ↓ Recommended by WHO	600 mcg to prevent PPH (AMTSL) Route: oral For treating PPH: can give misoprost per rectally = Dose 1000 mcg (not recommended by WHO)
PGF -2α Carboprost or Dinoprost or Hemabate	250 mcg I/M ↓Repeat inj. Every 15 - 90 minutes Maximum 8 doses **2 mg**	Most Potent Drug/Best drug to treat PPH ↓ Carboprost
Tranexamic acid	1 gm I/V	Not specific drug for PPH Used for controlling any kind of bleeding

Try medical management for 30 minutes

↓

If bleeding is not controlled

↓

Do Mechanical method

↓

Aim: Press the uterus so that bleeding stops

2 ways:

1. Bimanual compression of uterus → One hand is on uterus per abdominally & other hand is inside the uterus.

   ↓

   Now press the uterus between the 2 hands.

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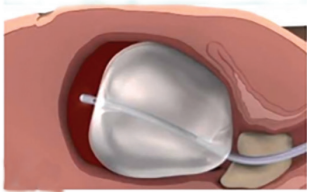
2. Use: Sengstaken-Blakemore esophageal tube/Bakri balloon catheter.

↓

Bakri balloon catheter

Transvaginal placement





↓

Take it inside uterus & inflate its bulb with 300 - 500 ml of warm normal saline

↓

This bulb presses uterus

↓

Bleeding can stop

Q1. Maximum capacity of Bakri balloon catheter = 500 mL.

If still bleeding doesn't stop

↓

Next step:

Surgical management

Depends on

If Patient wants future pregnancy

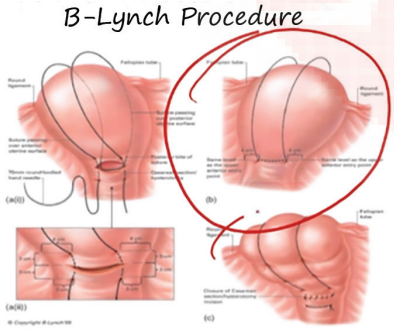
↓

Apply stitches on uterus

↓

B-Lynch sutures

B-Lynch Procedure



Patient family is complete

↓

Remove uterus

↓

Hysterectomy

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→ B-Lynch sutures are applied along entire length of uterus

↓

It still bleeds

↓

Stop blood supply of uterus:

↓

1. Ligate uterine artery
2. Ligate ovarian artery

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3. (Uterine artery is a branch of anterior division of internal iliac Artery) Ligate Anterior division of Internal Iliac artery.

↓

If still bleeds

↓

Last resort: Hysterectomy

Q1. Pregnant female at time of delivery

Patient had perineal tear

↓

She has PPH

↓

Management: Repair the tear

Perineal Tear: Means tearing of perineum during delivery.

Grades of perineal tear:

1st degree: Vaginal skin + Mucosa is torn

2nd degree: Vaginal skin + vaginal mucosa + Vaginal muscles are torn

3rd degree: Vaginal skin + vaginal mucosa + Vaginal muscles either external or internal anal sphincter torn or both are torn.

4th degree: Vaginal skin + Vaginal muscles + either external or internal anal sphincter torn or both are torn.

+

Rectal mucosa is torn.

→ **3rd degree & 4th degree perineal tears**

↓

Called as Complete perineal tear

→ 1st & 2nd degree perineal tear

→ Repaired in labor room

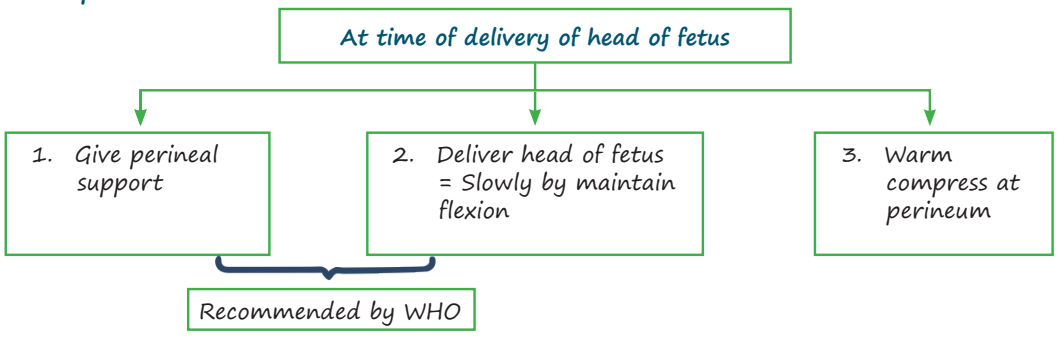
→ Under local anesthesia

→ 3rd & 4th degree perineal tear

→ Repaired in operation theatre

→ Under general anesthesia

Ways to prevent perineal tear:



Remember:

WHO does not recommend routine episiotomy to prevent perineal tear.

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PUERPERIUM—NORMAL & ABNORMAL



→ Period following childbirth uptil 6 weeks after delivery
  → Immediate: within 24 hrs of pregnancy
  → Early: from 24 hrs to 1 week after delivery
  → Late: from 1 week to 6 weeks after delivery

Uterus: Immediately after delivery

→ **Position:** At level of umbilicus (i.e. 13 cm above pubic symphysis)

→ **Size:** 22 weeks of pregnancy

→ **Weight:** 1 kg

Uterus:

After 1 week = 500 gm
2 weeks = 300 gms
3-5 week → 100 gms
At the end of 6th week = 80 gms
Height of uterus = Height of uterus descends by 1.25 cm/day

} Involution of uterus

→ After 10-12 days it lies at level of pubic symphysis, not palpable per abdominally

→ Original position = by 6 weeks

If involution of uterus does not occur at this normal rate and is slower

↓

SUBINVOLUTION

2 most common causes of sub involution

Retained placental
Tissues in uterus
↓Management: Do on UsG
Gentle curettage and remove it

Infection
↓ Management
↓
Antibiotics

Note: When curettage is done in post partum period, it can lead to Asherman syndrome, intrauterine adhesions

Important Point

If a female has prolapse after delivery

↓

Do not do any surgery till uterus comes back to original size and position

↓

Till 6 weeks after delivery

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→ Management of prolapse in puerperium: Ring pessary

→ Management of prolapse in puererium: Weakening of supports of uterus

↓ ↓

After menopause due to birth trauma

→ Best way to prevent prolapse: Perineal exercises (KEGEL'S Exercise)

→ **Nurse/Doctor**

→ Check fundal height of uterus

→ Palpate uterus

↓

→ Feels soft and boggy

↓

Do a uterine massage

If there is any clot it is passed out

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Endometrium (Decidua)

Superficial layer
↓
Shed after delivery
↓
as progesterone ↓
↓
So support is lost
↓
Shedding of decidua - LoCHIA

Deep layer
↓
Begins to Regenerate
Starts: 7 days
Completed: 10 days
Entire endometrium is restored = 16 days
Except at place where Placenta was attached

→ Most common site of infection

→ Regenerate by 6 weeks after delivery

Lochia

→ Postpartum shedding of decidua

Physiological

→ Seen for 15-21 days (Dutta) 24-38 days (Williams)

→ Alkaline PH

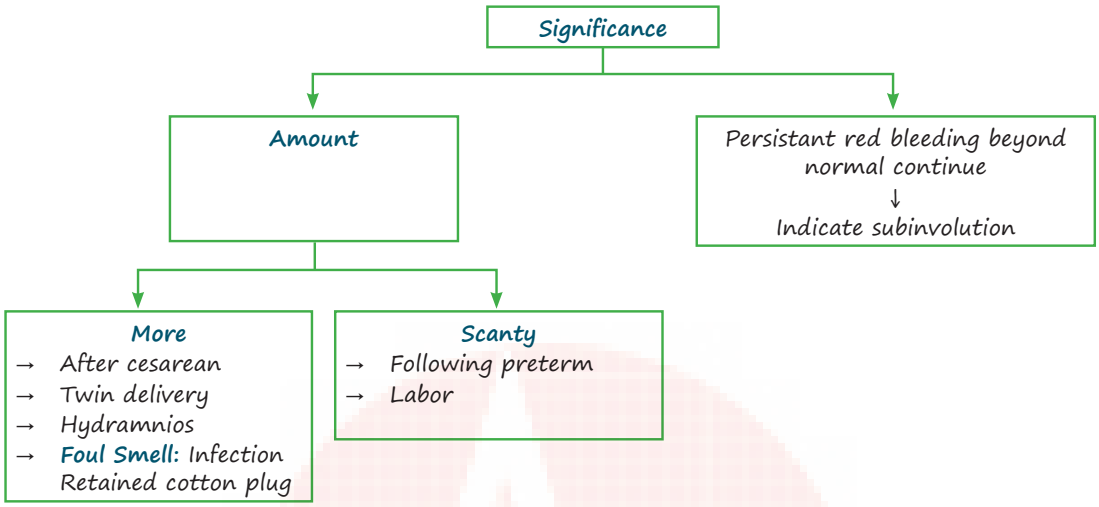
→ Offensive smell→ foul smelling

↓

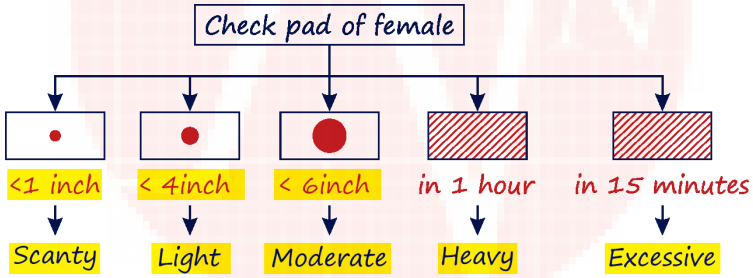
Puerperal sepsis

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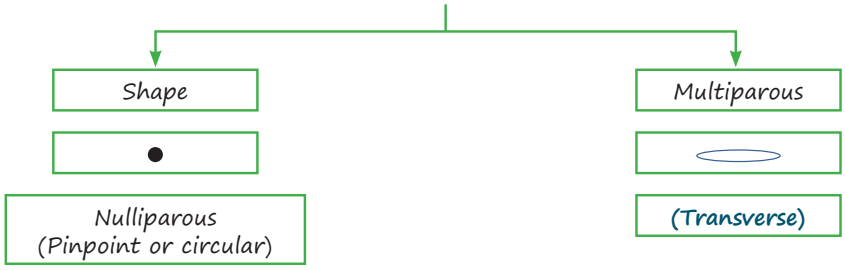
Sequence: Lochia rubra: Red = Seen until 4th day
(Blood + product of conception)
↓
Lochia serosa → Yellow seen uptil 10th day (pus cells)
↓
Lochia Alba → White ≥10 days epithelial cells



How to Assess lochia?



Cervix: → Takes 6 weeks to regain normal shape and size
→ After 1 week of delivery: 1 finger can be admitted through internal os
→ **External os:** Never comes back to pre pregnant state



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Vagina:

→ Rugosities appear = 3 weeks
→ Elasticity of vagina never comes to 'normal' after delivery
→ So chances of vaginal prolapse ↑

	Normal	Important point
TEMPERATURE **Management** ↑hydration by encouraging oral fluid	↑ slightly by 0.5°F for first 24 hours after delivery ↓ due to dehydrating effects of labor ↓ Monitor Temperature 4 hourly till time she is awake	If temperature ↑ after that: → Breast engorgement (by 4th day post partum) → Infection → Puerperal pyrexia/ → Puerperal sepsis
Pulse Rate	↑ slightly after delivery	Infection→ Perpetual pyrexia puerperal sepsis

Puerperal Pyrexia

→ Temperature of >38°C or 100.4°F on 2 occasions, 24 hours apart after delivery
→ Manifest in → first 10 days
→ Most common cause → Puerperal sepsis
↓
→ M/C site: Endometrium (Endometritis)
(at site of placental attachment)
→ M/C cause → group A streptococci
→ M/C mode of spread: Direct spread from cervix and vagina
→ M/C mode of delivery associated with puerperal sepsis → C-section
↓
→ Most common risk fack for endometritis

→ Most common organism **late onset Endometritis:** Chlamydia
→ **Most common cause of mastitis:** Staph aureus

Other risk factor

→ Iron deficiency anemia
→ Prolonged labor
→ PROM
→ Bacterial vaginosis

Management of puerperal sepsis

Clindamycin + Gentamicin

Signs/symptoms of Endometritis:

→ Temperature ↑
→ Uterine tenderness

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→ All inflammatory markers ↑
→ Subinvolution of uterus

Other Changes in Patient in PUERPERIUM

1. Weight loss: 5 kg → at time of delivery
   2 kg → at time of puerperium
2. Excessive sweating (Diaphoresis)
3. Urinary retention
   → Due to pain
   → Laxity of abdominal wall
   Encourage Patient to pass urine every 2-3 hours
4. Constipation:
   → Atony of intestine
   → Reflex inhibition
   Sufficient roughage and fluid
   Females are hungry after labor→ something to eat is given

After pain:

→ Spasmodic colicky pain in lower abdomen in early post partum days due to uterine contraction

MC:

→ Multiparous
→ Multiple pregnancy
→ Polyhydramnios
→ Large sized baby

→ Can be precipitated by retained placental tissue (DR) by suckling of breast by baby

Management

→ Encourage to pass urine frequently as full bladder can cause discomfort
→ Massage of uterus: To expel any clot
→ Analgesic/Antispasmodic

Remember

There is an (↑) in levels of fibrinogen
+
Factor VIII
+
Platelets

} for 1 week after delivery
↓
Female is at increased risk of THROMBOSIS

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Advise: Ambulate early

Post Natal assessment

Aim:

→ General health status check

→ Detect: Gynae/obstetric problem

→ Guidance: Self-care and baby care

→ Family planning method advice

Time:

1. First 0-24 hours of delivery
2. At time of discharge
3. At end of puerperium

What to check: BUBBLEHE

Breast

Uterus

Bowel

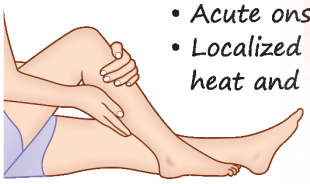
Bladder

Lochia

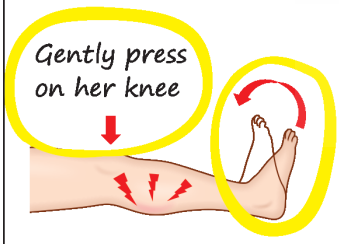
Episiotomy

Homan's sign:

Homan's sign



- Acute onset of unilateral leg pain
- Localized area of edema, erythema heat and tenderness over a superficial vein



Positive: if she has pain or discomfort in her calf

Thrombophlebitis

Emotional status of patient

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Breast

→ For milk ejection/galatotenesis/milk let down reflex

↓

Oxytocin

↓

Causes contraction of myoepithelial cells of alveoli

→ For continuous milk production/galactopoesis

→ Prolactin

→ Suckling of breast by baby

→ Levels of prolactin maximum → pregnancy (3rd trimester)

→ Why in pregnancy= milk production does not occur

↓

Estrogen levels are high in pregnancy

↓Progestrone

Inhibit action of prolactin

After delivery: Levels of estrogen and progesterone ↓

↓

So inhibition ↓

↓

Milk production occurs

Amenorrhea in pregnancy

↓

due to progesterone (↑)

↓

Delivery

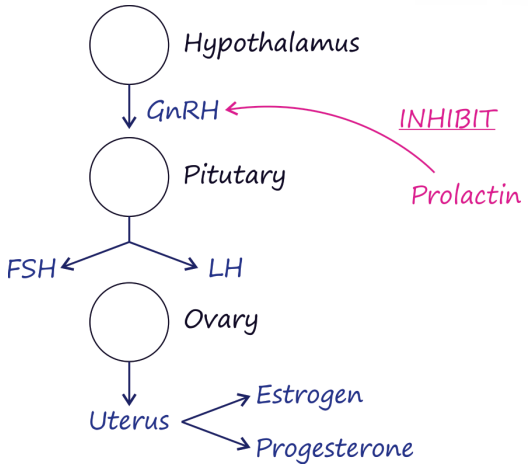
↓

Lochia (15-21 days)

↓

Again if patient is breast feeding there is no menstruation. Called **lactational amenorrhea**

Reason for lactational Ammenorhea



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→ Normal levels of prolactin in female: 5-25 ng/ml

→ Normal levels of prolactin in pregnant female: 10-200 mg/mL

→ DOC for ↑ Prolactin: Cabergoline

2nd choice → Bromocriptine

↓

Side effect → ↑BP

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How suckling leads to continuous milk production?

Suckling
↓
Dopamine ↓
↓
Dopamine is prolactin Inhibiting factor → Prolactin ↑

So, whenever milk production has to be increased
↓
Decrease dopamine

Case 1: Female after delivery → has ↓ milk production
↓
Antidopaminergic/Metoclopramide

Case 2:

Female with Intrauterine death
↓
To stop lactation

- ↓ Prolactin
  - → Cabergoline
  - → Bromocriptine
- Inhibit action of Prolactin
  - → Estrogen
- ↑ Dopamine
  - Pyridoxine

For first 48-72 hours of birth
↓
Yellow coloured secretion comes out
↓
COLOSTRUM

- Rich in immunoglobins and nutrients
  ↓
  Should be given to baby
- It has less in compared to breast milk

$K = (K^+)$ potassium
F Fat
C carbohydrate

→ Breast engorgement occur on day 4 in both breast feeding and non breast feeding female

Care of Breast:
- → Avoid nipple stimulation
- → Wear tight fitting bra in the evening during sleeping
- → Engorgement relieves by 24-36 hours
- → Use Warm compress before breastfeeding
- → Use ice pack between feedings
- → Give analgesics

Mastitis:

Infection of breast parenchyma
- → MC organism: Staph aureus
- → MC source of infection: Nose and mouth of baby
- → Symptoms: seen in 3-4 weeks
- → Unilateral
- → Breastfeeding is not contraindicated

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Patient Complain of:

- → Fever
- → Pain in breast

Management

Penicillin/Dicloxacillin
+
Milk ejection

Return of menstruation

Breastfeeding
↓
3-6 months
Maximum = Till she breast feeds

Non Breastfeeding
↓
7-9 weeks over age
Maximum = by 12 weeks

Ovulation:
↓
Returns by **10 weeks**

Contraception: Golden rule of 3
Use contraception latest by 3 months after delivery

Ovulation:
↓
Ovulation returns by **4 weeks**

Contraception:
Use contraception latest by
3 weeks after delivery

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Contraceptive of choice: **Lactating female**

Contraceptive of choice
↓
IUCD
↓
Time of insertion

- Within 10 minutes of delivery of placenta
  ↓
  Post placental IUCD insertion
  2nd choice
  ↓
  Progesterone only pills
- After 10 minutes but insertion 24-48 hours after delivery
  ↓
  Post partum IUCD insertion
  → After 48 hours of delivery IUCD not inserted until 6 weeks of delivery
- After 6 weeks of delivery
  ↓
  Interval IUCD insertion

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PRE-TERM LABOR & PROM



Definition: When labour starts at <37 weeks is called Preterm tabor.

Problems:

Lungs of fetus are not mature
↓
Can lead to Respiratory Distress Syndrome

Brain of Baby is not fully developed

1. Fetal lungs start maturing by = 34 weeks & maturation is complete by 37 weeks
2. To know whether lungs of fetus are mature or not:

↓

We do

↓

Fetal Lung Maturity tests

Student's Space



Basis of Lung Maturity Test



Fetus Lung cells ⇒ Type II Pneumocytes
↓
Secrete ⇒ Soapy Material (SURFACTANT)
↓
Role ⇒ Decreases surface tension of Lungs

Surfactant: Soapy Material

↓

Which is formed by Fetal lungs

↓

Ultimately secreted in Amniotic fluid

↓

To do lung Maturity Tests: Take out amniotic fluid

↓

By doing amniocentesis

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Fetal lung Maturity Test:

1. Most commonly done:

Measure ratio of LECITHIN & SPHINGOMYELIN In amniotic fluid

- Fetal lungs are mature → Lecithin: Sphingomyelin ≥2
- Fetal lungs are not mature → Lecithin: Sphingomyelin ≤2

2. Best Test

Check the presence of Phosphatidylglycerol in amniotic fluid.

- Fetal lungs are mature → Phosphatidyl glycerol is Present in amniotic fluid
- Fetal lungs are not mature → Phosphatidyl glycerol is absent in amniotic fluid

Best Test to detect lung maturity of fetus in diabetic females → Phosphatidyl glycerol in amniotic fluid

3. Bedside Test

Shake test/Bubble test

Take Amniotic fluid in a Test Tube & shake it

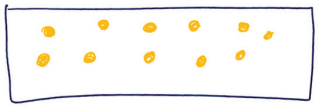
- If fetal lungs are Mature → On shaking the tube bubbles can be seen, (soapy material = surfactant)
- It of fetal lungs are not Mature → On shaking the tube, bubbles will not be seen

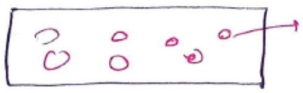
4. **Nile Blue & sulphate Test:**

Based on principle
↓
Fetal skin cells have Phospholipids similar to surfactant
↓
If skin cells have Phospholipids that means surfactant is present in lungs of fetus
↓
Lungs of fetus are mature

Student's Space

Procedure:





Take out amniotic fluid by amniocentesis
↓
Amniotic fetal has fetal skin cells
↓
To amniotic fluid add Nile Blue SO_4 dye
↓
Look under microscope
Orange color skin test
If stem cells appear in orange in colour (≥50%)
↓
It means lungs of fetus are Mature.

Q.1. Nile Blue sulphate does not tell about skin maturity. It tells about – lung maturity.

Q2. After adding dye skin cells appear orange in colour.

Drug which can accelerate Fetal Lung maturity is:

Corticosteroid

- DEXAMETHASONE → 4 injections → 6 mg each 12 hours apart i/m
- BETAMETHASONE → 2 injections → 12 mg each 24 hours apart i/m

Note: Corticosteroid need at least 48 hours to act after giving last injection

Contraindication of corticosteroid = CHORIO AMNIONITIS

→ Corticosteroid of choice in India = Dexamethasone

→ In all patients who deliver or is about to deliver at <37 weeks of pregnancy
↓
give corticosteroid

Student's Space

Preterm labor:

→ Most common cause: Idiopathic

→ Causes:
  → Infection like bacterial vaginosis or UTI
  → Over distension of uterus
    → POLYHYDRAMNIOS
    → TWIN PREGNANCY
    → LMACROSOMIA

→ Most important Risk Factor: Previous History of Preterm Labour

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How to Prevent Preterm labour in a Patient with Previous H/O Preterm Labor:

1. Give Progesterone to Pregnant female

↓

Smooth muscle Relaxant

2. Uterus → Internal OS / Cervix → Circlage surgery
   - Mc Donald circlage
   - Shirodkar circlage

Diagnosis of Preterm Labor

Uterine contractions should be present <37 weeks,
⊕
Any 1 of the following

1. **USG finding**
   - → Normal Length of Cervix in Pregnancy = 4 cms
   - → As the cervix dilates the length of cervix Shortens.

On USG = Length of Cervix = <2.5 cms
OR
Dilation of cervix ≥ 2 cms

2. **FETAL FIBRONECTIN**
Protein in amniotic fluid or vaginal secretions at <37 weeks.
It Indicates:
1. Preterm Labor
2. PROM

Q1. Cut off length of cervix to predict Preterm labor = 2.5 cms

Q1. What is the shape of cervix on USG in Preterm Labor = "U" shaped cervix"

Management of Preterm labour

Means managing problems due to Preterm labor

1. Lungs of fetus are not mature
↓
(Doc = corticosteroid)
But corticosteroid need 48 hours to act
↓
Have to give drugs which decrease uterine contractions for 48 hours
↓
(Have to give TOCOLYTICS)

Brain of Baby is not mature
↓
For NEURO PROTECTION we give $MgSO_4$
↓
In all Preterm Labor <34 weeks

TOCOLYTICS: These are drugs which decrease or stop uterine Contractions.

→ **They are given for short duration:**

→ Given when preterm labor occurs before ≤34 weeks

→ Best Tocolytic: NIFEDIPINE (CaChannel Blockers)

→ Best Tocolytic in diabetic mother: NIFEDIPINE

→ Best Tocolytic in Heart disease patient: **ATOSIBAN**

↓

(Antagonist of oxytocin)

→ Tocolytic with maximum fetal side effect: **Indomethacin**

↓

Lead to

→ Oligohydramnios

→ Premature closure of Ductus Arteriosus

→ Tocolytic with maternal matemal side effect **β agonist**

→ β agonist used as Tocolytic:

1. RITODRINE
2. ISOX-SUPRINE
3. TERBUTALINE

→ Most common side effect of β agonist: TREMORS

→ Other side effects:

→ Hyperglycemia

→ Hypokalemia (↓K^+)

→ Pulmonary edema

→ Tocolytic contraindicated in Diabetic patients: **β agonist**

Note: $MgSO_4$: Can also act as Tocolytic but the level at which its Tocolytic effects seen → Toxicity also occurs → not commonly used as Tocolytic

Tocolytic drugs

1. Nifedipine
2. ATOSIBAN
3. Indomethacin
4. β agonist
   - → Isosuprine
   - → Ritodrine
   - → Terbutaline
5. $MgSO_4$

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Lets Review:

S.No.	DRUG	ROLE	TO BE USED
1.	CORTICOSTEROID(DEXA)	Mature lungs of fetus	Preterm labor 37 weeks
2.	TOCOLYTIC	It decreases or make uterine contraction absent	Preterm labor <34 weeks
3.	$MgSO_4$ (Low dose)	For NEUROPROTECTION	Preterm labor <34 weeks

Durgs which have No Role in Preterm Labor:

1. Antibiotics
2. Progesterone
   - → Can prevent Preterm labor
   - → Cannot treat Preterm tabor
   - → Progesterone is NOT A Tocolytic drug
3. No Role of Induction of labor.

Case 1: A pregnant female at **35 weeks of gestation** is having **uterine contractions**. On USG her **cervical Length is 2 cms.**

What is the next step in management ?

- → Give Corticosteroid (Dexamethasone)
- → No Role of Tocolytic
- → No Role of $MgSO_4$

} at more than 34 weeks.

Remember: When Preterm labor occurs between 24-37 weeks - give only corticosteroid

Case 2: A pregnant female at 32 weeks of gestation is experiencing uterine contractions on USG, her cervical length is 2 cms. What is the next step in management:

1. Corticosteroid
2. Tocolytic
3. $MgSO_4$

No Role of Induction of labor

Remember: When Preterm labor occurs at <34 weeks. Give corticosteroid + Tocolytic & $MgSO_4$

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MALPRESENTATION (PART-I)

→ Occipito-posterior (OP) is a malposition & not malpresentation as here also the presentation is cephalic & presenting part is vertex.

→ At the onset of labor–10% of fetus are in OP position.

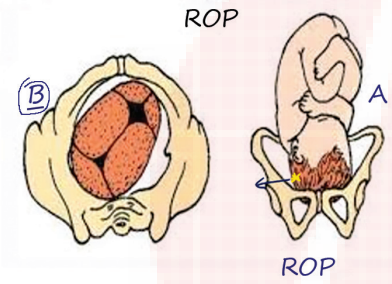
→ During late stage of labor–only 2% as OP positions rotate in 80-90% cases & become occipitoanterior

→ Most common cause of OP position: Android pelvis

→ Second most common cause of OP position is deflexed head of baby

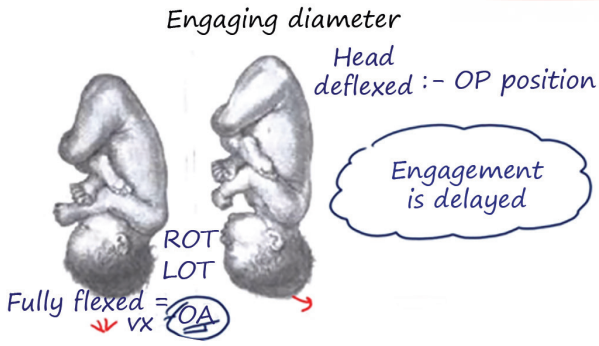
→ It is more common in Primigravida females

→ Most common OP position is: Right occipito-posterior position



→ Most common occipito anterior position is: Left occipito Anterior position

Engaging Diameter



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A

Suboccipitobregmatic = **9.5 cm**

B

Occipitofrontal = 11.5 cm
Or
Sub occipito frontal = 10 cm
↓
Engagement is delayed

Mechanism of labor:

1. Complete forward rotation:
   - → In 90% cases abnormal delivery occurs as head moves through 3/8th of circle.
   - → Hence the **best management of occipitoposterior position** when it is diagnosed during labor is - wait & watch.
   - → This rotation is **complete forward rotation.**
2. Incomplete forward rotation
   - → Baby rotates only 1/8th of circle
   - → From ROP → it becomes ROT & further rotation doesn't occur, this is called incomplete forward rotation.
   - → It occurs in:
     - → Most Common - android pelvis (ischial spines are prominent)
     - → Big baby
     - → Less liquor

↓

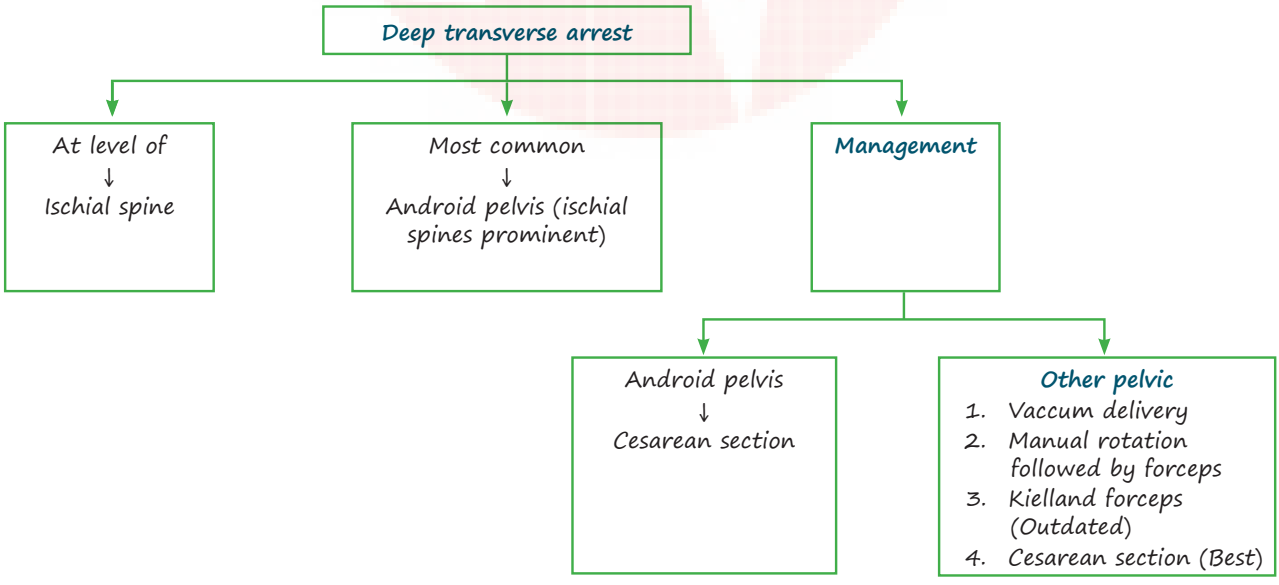
Baby's head stop in this position inspite of good uterine contraction

↓

Called deep transverse arrest

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Note:

→ **Vaccum can rotate the head of fetus forceps cannot**

→ **Only forceps which can rotate head**

↓

Kielland forceps (Outdated)

3. Posterior rotation
   - → Instead of rotating anteriorly occiput rotates posteriorly & lies directly anterior to the sacral promontory.
   - → Thus becoming direct OP position/Persistent OP position.
   - → Most common in Anthropoid pelvis. Occipital rotates posteriorly

↓

It becomes DOP

↓

It stays in this position for a very long time despite good uterine contraction.

↓

Deep sacral Arrest

Management: Cesarean section

Q1. Deep transverse arrest is most common = Android pelvis

Q2. Deep canal arrest is most common = Anthropoid pelvis

Transverse Lie

→ LIE: Transverse
- → Presentation: Shoulder
- → Denominator: Acromion process
- → Most common position: Dorsoanterior position
- → Most common cause: Prematurity/Preterm delivery
- → Most common cause at term: Placenta previa
- → Most of the times fetus with transverse lie spontaneously rotates during pregnancy and become cephalic/breech.

On Examination

→ Height of uterus is less than period of gestation

→ **On Leopold maneouver:** Fundal grip (1st grip) & deep pelvic grip (4th grip) are empty.

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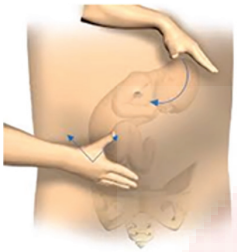
Note: Highest chances of cord prolapse - are with transverse lie.

Management of Transverse lie

Patient comes at term (≥36 weeks) ↓ External cephalic version ↓ If external cephalic version fails twice **Or** If external cephalic version is contraindicated	If patient comes in Labor ↓ Cesarean section whether alive or dead baby

→ No mechanism of labor in transverse lie
→ Transverse lie babies cannot be delivered vaginally

If transverse lie recognized in pregnancy = External cephalic version can be tried.



External cephalic version

As it is done per abdominally
Ix :- Transverse lie
Breech

Student's Space

External Cephalic Version

→ As it is done per abdominally

Indications:

→ Transverse lie
→ Breech

→ Try to make it cephalic.

External cephalic version (ECV)

Do an USG → before doing ECV

OPD Procedure

→ No anesthesia needed → but tocolytics are used so that the uterus is relaxed (Terbutaline is DOC - 25 mg S/C, 30 minutes before procedure)
→ Should be done under continuous fetal monitoring.
→ If Rh negative females - give Anti D injection.
→ If while doing the procedure fetal distress/death can happen.

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Prerequisite for ECV

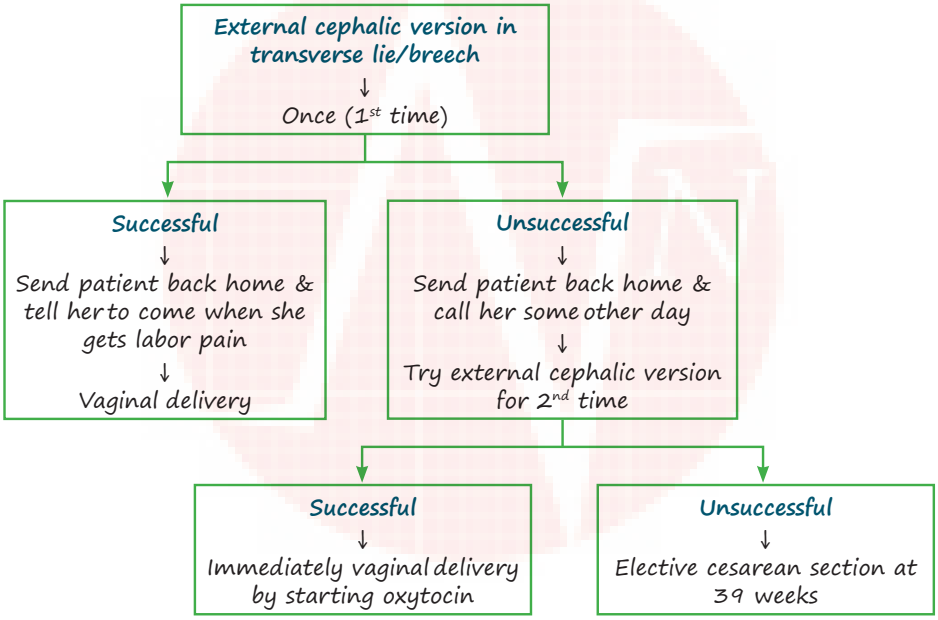
- → Period of gestation ≥36 weeks usually done at 37 weeks (as chances of reversion are less)
- → Liquor should be adequate
- → Membranes should be intact
- → Singleton pregnancy (not done in twins/multifetal pregnancy)
- → Fetal heart rate should be normal on CTG.
- → There should be no contraindication for vaginal delivery/no placenta Previa/contracted pelvis.
- → Not be done if uterus/fetus are grossly anomalous.

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Relative Contraindications of External Cephalic Version

1. PIH
2. Heart disease in mother
3. IUGR
4. Previous LSCS



Hand Prolapse/Neglected Shoulder Presentation



- → All features of obstructed labor seen (Bandl's ring seen)

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Management

→ Cesarean section (whether the baby is dead or alive)

→ No role of destructive procedures decapitation/ Evisceration.

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Face presentation

→ Presenting part is face

→ There is abnormal attitude i.e. in normal attitude there is flexion of fetal head but in face presentation, there is complete extension.

→ Denominator is mentum (chin)

→ The commonest position is left mentoanterior (LMA)

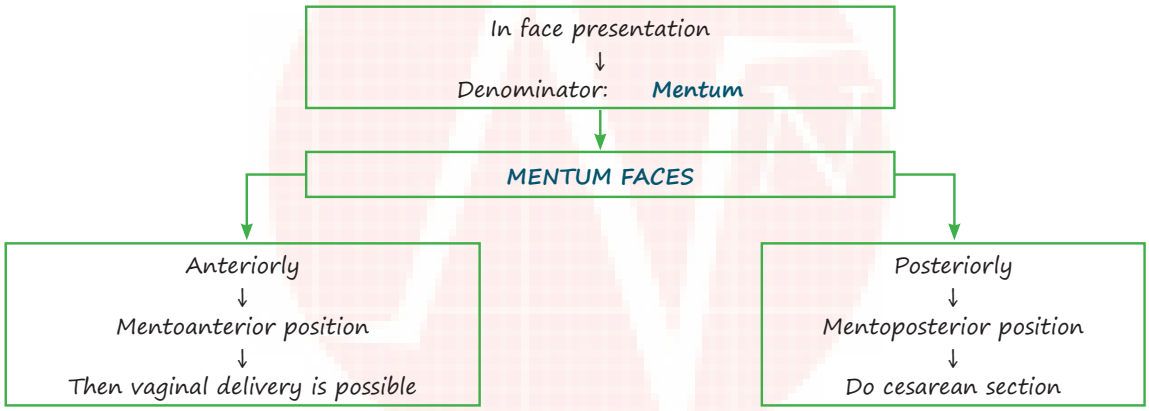
Risk factors:

→ Most common in Multiparous females

→ Most common pelvis in which it is seen – Platypelloid pelvis.

→ Most common cause of face presentation – Anencephaly

→ Most common presenting part in anencephaly – Face.



→ Mento anterior is more common than mentoposterior

→ Most common position – left mento anterior

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Brow Presentation

→ Brow occurs – partial extension

→ Engaging diameter – longest one – Mentovertical diameter 14 cm.

→ Denominator – Frontal bones

→ No mechanism of labor

→ Only cesarean section

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Presentation where cesarean section has to be done:

1. Transverse lie
2. Brow
3. Face = Mentoposterior

Note: Forceps can be applied in all those conditions where vaginal delivery is possible. But it cannot be applied in those condition where cesarean section has to be done.

→ **Forceps can be used:**

1. Occipito anterior position/vertex presentation
2. Face – Mento anterior
3. Delivery of head in breech.
4. Occipito posterior after manual rotation.

→ On the other hand vacuum can be applied only in vertex presentation:

→ Occiptoanterior

→ Occipito posterior

↓

Because vacuum can rotate head of baby

→ Vaccum is not used:

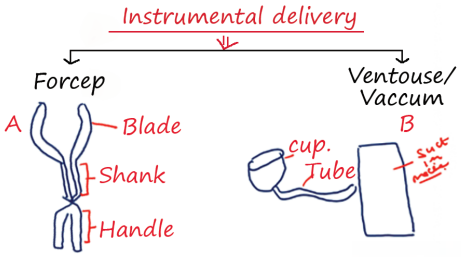
1. Face (Mentoanterio/mentoposterier)
2. Delivery of head in breech

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INSTRUMENTAL DELIVERY

Instrumental delivery

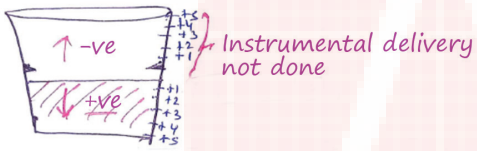


Note:

→ Always take consent.

→ Give episiotomy.

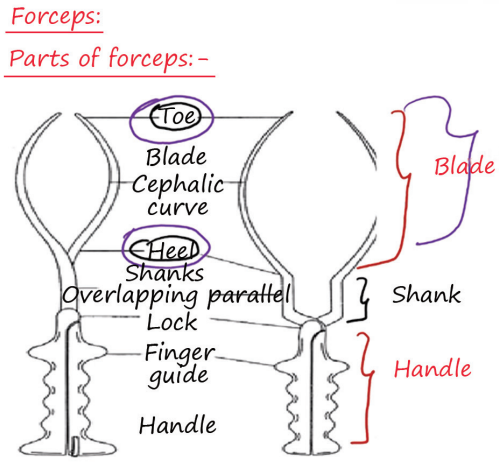
→ Done only if head of fetus is at + 2 station or below it



Instrumental delivery is Done only if head of fetus is at +2 station or below it (+3, +4, +5)

Forcep's

Parts of forceps



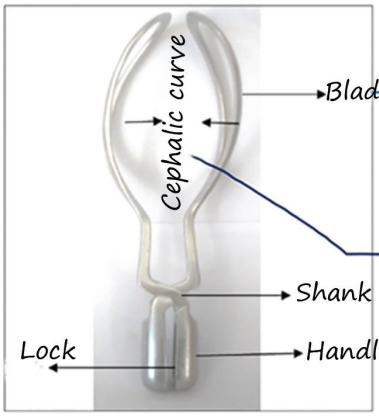
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Fenestrated
- Make it light
- Less trauma
- Less compression on fetal head

There are 2 curves in Forceps
1. Cephalic curve

↓

Inside part of forceps 4 fits

Blade - Fenestrated

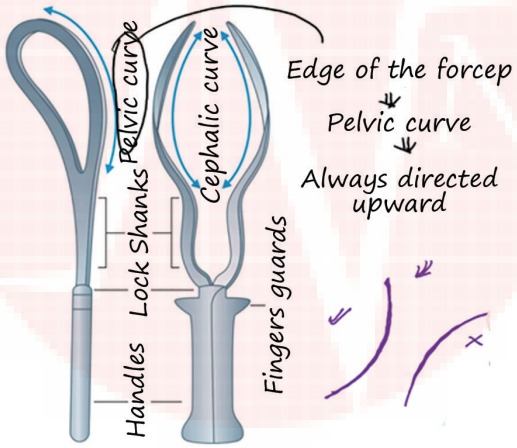
→ Make it light

→ Less trauma

→ Less compression on fetal head

There are 2 curves in Forceps

1. **Cephalic curve:** Inside part of forceps. It fits around the fetal head.
2. **Pelvic curve:** Edge of the forcep



↓

Pelvic curve

↓

Always directed upward

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Lock

English lock
2 sockets
↓
One in each handle (more common)
↓
Always left blade is introduced first

English lock



Always left blade is introduced first

Sliding lock
Single socket on any 1 handle

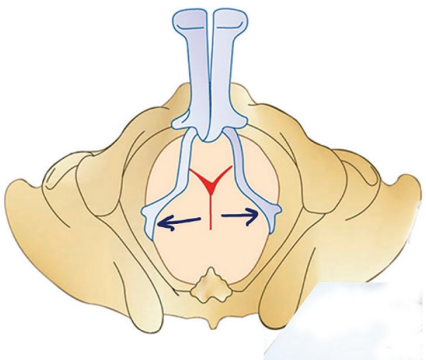


Single socket on any 1 handle

→ To identify the blade
  → Left
  → Right

1st Point: Pelvic curve should be faced upward.
↓
2nd Point:

→ **In left forcep:**
  → Goes into left maternal side
  → Socket is upwards when held correctly
→ **In Right forcep:**
  → Socket is placed below.
→ Left forcep is introduced first & right blade slided over it.
→ How to know: forceps are correctly applied:
  1. Lock will close properly
  2. The 2 blades after application will be equidistant from sagittal suture.



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Vacuum cup:

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→ Made of:
- → Earlier →Metal
- → Now → Silastic material

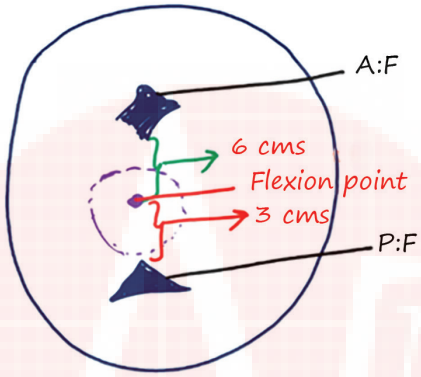
→ Advantage:
- → Soft
- → Less trauma to head

→ Initial pressure in vacuum = 0.2 kg/cm²

↑By 0.1 kg/cm²

Maximum pressure = 0.8 kg/cm² → Takes (5 - 10 minutes)

Vacuum cup is applied such that = Centre of cup should be at 'Flexion point'



Point which is 3 cm anterior to posterior fontanelle & 6 cm posterior to anterior fontanelle

Forcep	Vacuum
Prerequisites **F**- Favourable station (≥+2) **O**- Os should be fully dilated (cervix = 10 cm dilated) R- Membranes should be ruptured. Head should be rotated **C**- Uterus should be contracting consent should be token **E**- Bladder should be empty head of baby should be engaged **P**- Pelvis should be normal No cephalopelvic disproportion	**Same prerequisites except** 1. Vacuum can be applied even when cervix is partially dilated (≥6cm) 2. Vacuum can rotate head of fetus.

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Forcep	Vacuum
→ **Can be used** → Occipito anterior position → After coming head of breech → Occipitoposterior position → Face (Mento anterior position)	→ **Can be used** ✓ × ✓ ×
→ **Advantage** → Preterm delivery use → Fetal distress use	 × ×
→ **Indications of using forceps** → Maternal exhaustion → Fetal distress → Prolonged 2nd stage of labor (Primigravide ≥2 hrs) (Multugravida ≥1 hrs) → In heart disease patients to deliver the head of fetus	**Indications of using Vacuum** ✓ × ✓ ✓
→ **Complication** Most commonly leads to maternal complication (Perineal tear) **Forceps → Facial nerve palsy**	→ **Complication** Most common leads to fetal complication ↓ → Intracranial hemorrhage → 6th nerve palsy → Cephalhematoma
Maximum attempt ↓ 3 attempts ↓ Baby is not delivered ↓ Failed forceps In case of failed forceps ↓ Management → Cesarean section	**Maximum attempt** ↓ 3 attempts ↓ Failed vacuum In case of failed vacuum ↓ Management → Cesarean section.

Absolute Contraindication for Instrumental Delivery (Vacuum/ Forceps)

1. Cephalopelvic disproportion
2. Inadequate pelvis
3. Known bony deformities of fetus, e.g. Osteogenesis Imperfecta
4. Known coagulopathy in fetus- Bleeding disorder.
   "Avoid in HIV +ve females"

Nursing Implications in Forceps/Vacuum

1. Take consent
2. Explain to patient = Procedure + complications

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3. Check that prerequisites are fulfilled
4. Check no contraindication for instrumental delivery
5. Explain to patient - maximum 3 attempts → **fail** → **cesarean section**
6. Once Instrumental delivery is done = **Check mother** → **for any complication**
7. Check fetus for any complication

These days: Never vacuum device



- Inbuilt pump to create vaccum
- Smaller in size
- Disposable
- Can be used for both OA/OP deliveries
- Portable

↓

Omnicup

→ Inbuilt pump to create vacuum
→ Smaller in size
→ Disposable
→ Can be used for both occipito anterior/occipitoposterior deliveries
→ Portable

Types of forcep application

High forceps Outdated: When forceps is applied & head of fetus is above ischial spine

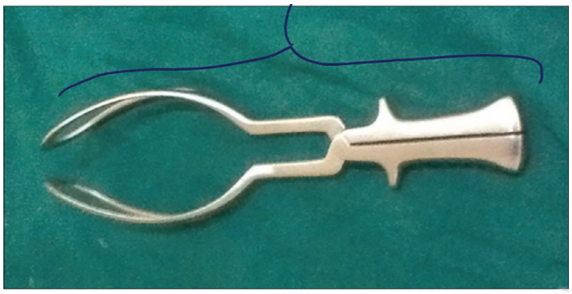
Mid cavity forceps outdated: When forceps is applied & head of fetus is at level of ischial spine ('O' station or '+' station)

Low forceps: When head of baby is at +2 station or below it but has not reached the perineum.

Outlet forceps: When head of baby is at level of perineum i.e., scalp of fetus is visible through mother's introitus.

↓

Wrigley forceps



Wrigley forcep:

- Outlet forcep
- Short & light forcep

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→ Outlet forcep

→ Short & light forcep

→ Only one forcep is used at the level of outlet = WRIGLEY forceps.

Remember: Rotation of fetal head

→ Forceps cannot rotate head of fetus

→ Vacuum can rotate head of fetus

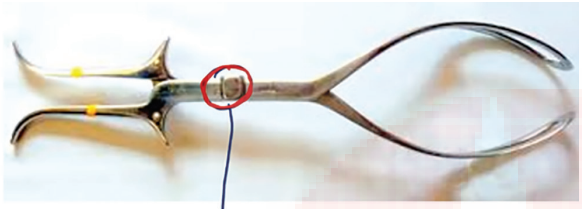
Exception: Only 1 forceps which can rotate head of fetus

↓

Kielland forceps (outdated)

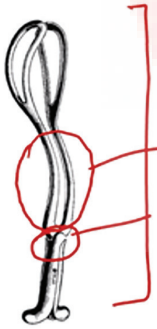
→ Long forceps

→ Sliding lock



Sliding lock
Long forcep

Kielland forceps:- Only forceps which can rotate head of fetus
↓
Rotational forcep



Long forcep

Perineal curve

English lock

Piper forcep

PIPER forcep

↓

To deliver the after coming head of breech.

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Also know:

- → Take consent
- → Give adequate analgesia
  - → Epidural block
  - → Pudendal nerve block
- → Give episiotomy
- → **Traction:** (Force = pull forceps)

  Primigravide = 16-18 kg

  Multigravida = 12-13 kg
- → Forceps is applied along occipital mental diameter of fetal head.
- → When vacuum is applied on scalp of baby - swelling is formed

↓

Chignon

↓

Caput

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ANTEPARTUM FETAL MONITORING (PART-1)



Means monitoring the well being of fetus in antenatal period in "HIGH RISK PREGNANCIES".

Investigations:

1. Daily Fetal movement count
2. Listening to FHS by stethoscope
3. By Doppler USG
4. Nonstress Test
5. Biophysical score
6. USG

Daily Fetal Movement Count: Done by pregnant female.

QUICKENING: Means when a pregnant female feels fetal movements for the first time.

→ Felt by Primigravida: 18 weeks of pregnancy

→ Felt by Multigravida: 16 weeks of pregnancy

From 3rd trimester onwards (≥28 weeks of pregnancy)

↓

We advice all pregnant female to lie in left lateral position for 1 hour, after Breakfast, lunch & Dinner

↓

Count her fetal movements

↓

Maintain a Chart

NORMAL:

When there are 10 fetal movements in 2 hours of rest

(or)

When there are 10 fetal movements in 12 hours of activity

↓

Called CARDIFF COUNT of 10

Whenever a pregnant female complains of decreased fetal movement (Sign of fetal distress should be taken seriously)

↓

Next step: DO NST (nonstress test)

↓

This is only a **screening test**

↓

ABNORMAL/NONREACTIVE

↓

BIOPHYSICAL Profile/Score

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Diagnostic Confirmatory Test

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Nonstress Test

↓

Like 'ECG'

↓

1. Here we monitor the fetal Heart Rate & its characteristics on a graph paper
2. Leads = "TRANSDUCER" (single)

↓

Attached to mothers abdomen

Leopold maneuver: Feel the fetal back

↓

Attach the Transducer

Fetal Heart Rate & Characteristics:

1. **Fetal Heart Rate:**

NORMAL → 110–160 beats/min

ABNORMAL → <110 A BRADYCARDIA } **Abnormal**

>160 TACHYCARDIA } more dangerous = **Bradycardia**

↓

Fetal Hypoxia

Role of Nurse: If there is Bradycardia/Tachycardia

1. Inform the doctor/senior
2. Stop any oxytocin
3. Give O_2 by mask
4. Check mother's vital

(2) **BEAT to BEAT – VARIABILTY:**

Fetal Heart Rate keeps on changing (until the normal limit)

This is called "Beat to Beat Variability":

(or)

VARIABILITY

↓

Means fetus is healthy

→ Beat to Beat Variability Ranges between 5 and 25 beats/min.

→ Absent Beat to Beat Variability:

Student's Space

→ Absent Beat to Beat Variability

↓

FHR becomes fixed/decreassed variability

↓ (Eg: Question says FHR is between 118–120 bpm x 30 minutes)

↓

 → ABNORMAL = Indicate Fetal Hypoxia, Fetal Acidosis

↓

OR Beat to beat variability decreased

 → Sinusoidal Heart Rate Pattern –

↓ ↓

Wave like pattern Abnormal

↓

Means :- Fetal Anemia

→ 1) Vasa Previa
→ 2) Rh Incompatibility
→ 3) Twin Twin transfusion syndrome

IMAGE 37:16
SINUSODAL WAVE Pattern

FHR = Normal findings

↓

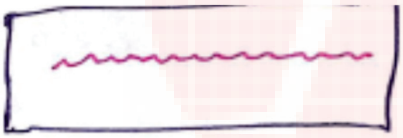
Beat to beat variability

↓

FHR = Abnormal findings

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1. Absent beat to beat variability/decreased beat to beat variability



seen in Fetal Hypoxia, Fetal acidosis

2. Sinusoidal wave pattern:



→ Abnormal
→ Indicates Fetal Anemia
→ Seen in:
   1. Vasa Previa
   2. Rh incompatibility
   3. Twin to Twin Transfusion Syndrome (Donor twin)

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→ **Management** (Sinusoidal Wave Pattern/ Decreased variability)

1. Inform doctor
2. Stop all oxytocin
3. Let the mother lie in left lateral Position & give O_2.

3. **Fetal Heart Rate Acceleration:**

↓

Whenever Fetal movement occurs

↓

Fetal Heart Rate

Increase by 15 beats/min × 15 sec

↓

Called Fetal Heart Rate acceleration

↓

Indicates: HEALTHY FETUS

How To do NONSTRESS TEST:

How to do non stress test:-



Whenever a pregnant female complains of decreased fetal movement.

↓

Do Nonstress Test (NST)

↓

Ask the pregnant female to lie in **SEMI FOWLER position/Recliner Position/Left Lateral Position**

↓

Tie the belt of NST machine to her abdomen such that transducer lies on the fetal back

↓

[Test is done for 20 minutes]

↓

In these 20 minutes whenever she feels fetal movement

↓

She will press a button on left

↓

Whenever she presses the button

↓

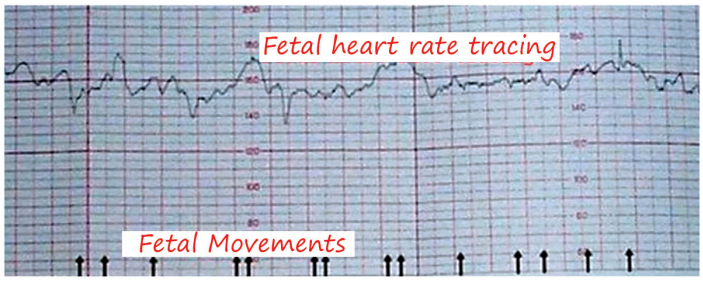
(An arrow will come on the graph Represent fetal movement.)

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Whenever there is fetal movement

↓

In a NORMAL fetus

↓

FHR should increase (FHR acceleration) (by 15 beats/min × 15 sec)

In a period of 20 minutes

We get 2 or more than 2 accelerations within 20 minutes

↓

Called Normal NST/Reactive NST

↓

Next stop: Send the patient back. Tell her everything is NORMAL

If we get in <2 acceleration in 20 minutes.

↓

NEXT STEP

↓

Repeat NST for 20 more/minutes.

↓

Total NST = for 40 minutes In a period of 40 minutes <2 accelerations then

↓

Called: Nonreactive NST/Abnormal NST

↓

NEXT STEP

↓

CONFIRMATORY TEST: **DO BIOPHYSICAL SCORE**

Note:

ABNORMAL FINDINGS ON NST NON Reassuring Finding:

1. Bradycardia/Tachycardia
   (<110) (≥160)
2. Absent/Decreased Beat to Beat variability
3. Sinusoidal Heart wave pattern
4. In 20 minutes <2 acceleration
   ↓
   20 minutes
   ↓
   Total 40 minutes <2 acceleration

Most important: Parameter on NST = Parameter

NST should be done in

↓

1. In all pregnant female who - complains of decreased fetal movement
2. In all high Risk pregnancies

↓

Time to begin: ≥32 weeks: have to do NST

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Interval between NST: Weekly (every week do NST in high Risk Pregnancy)

Note: If it is very high risk pregnancy (severe preeclampsia, Eclampsia)

↓

You can also do NST twice weekly (every 72 hours)

Student's Space

Bio Physical Score/Manning Score

→ **Done by:** USG

→ **Done for:** 30 minutes

→ **Look at:** 5 parameters

→ To each parameter we give a score of either

→ (2) If it is NORMAL

→ 'O'If it is ABNORMAL

5 parameters:

Mnemonic

Toppers = Fetal tone

Always = Amniotic fluid = USG measure (Single largest vertical Pocket)

Make = Fetal Movement (≥3 = Normal)

Brief = Breathing movements (≥1 = NORMAL)

Notes = NST (Reactive = NORMAL)

Total maximum score = $\frac{10}{10}$

Remember:

To measure Amniotic fluid with USG there are 2 ways:

AMNIOTIC FLUID INDEX (AFI)	Single largest Vertical pocket
Normal: 5-24 cm (adequate)	Normal = 2-8 cm (adequate)
Oligohydramnios ≤5 (amniotic fluid ↓)	If <2 cm = oligohydramnios
Polyhydramnios ≥25 (Amniotic fluid ↑)	If ≥8 cm = POLYHYDRAMNIOS

If Biophysical

→ Score is $\frac{10}{10}$ or $\frac{8}{10}$ } NORMAL = Repeat Biophysical score after 1 week

→ Score is $\frac{6}{10}$ = Repeat Biophysical score on same day.

→ Score is $\frac{4}{10}$, $\frac{2}{10}$ = Take immediate action

↓

Deliver the patient

ANTEPARTUM FETAL MONITORING (PART-2)



Diagnostic test for:

1. Decreased fetal movement
2. Fetal Hypoxia
3. Uteroplacental insufficiency

↓

BIOPHYSICAL SCORE

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Modified Biophysical Score:

Here we see only 2 Parameters: (Quick)

↓

1. **Nonstress Test**
2. **Measure Amniotic fluid by USG: Amniotic fluid Index**

Note: Modified BPS is also a screening test & not Diagnostic Test

If there is a pregnant female complains of decreased fetal movement

↓

2 screening test **[NST or NST + AFI]** } **MODIFIED Biophysical score**

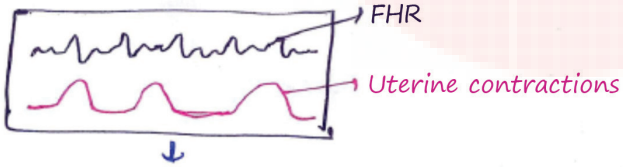
↓

Abnormal

↓

Diagnostic test: BIOPHYSICAL SCORE

→ The same Nonstress test when done during Labor (uterine contractions **graph shows 2 lines:**



↓

Student's Space

This is called CTA (Cardiotocograph)

In CTG: We use: 2 Transducers

1. For Fetal Heart Rate
   ↓
   Place: Near fetal Back

2. In Uterine contractions
   ↓
   Place: Near fundus of uterus
   ↓
   Maximum contractions

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CTG

→ Full form: Cardiotocogram

→ Done during: Labor (in all patients ideally)

→ Procedure is same like Non stress test

→ Parameters of CTG are same like NST ⊕ ladditional Parameter which can be present.

↓

DECELERATION

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Remember:

When uterus contracts
↓
Pressure inside uterus ↑
↓
Volume of blood coming to fetus ↓

If this is a normal fetus	If it is unhealthy fetus
↓	↓
Can tolerate this ↓ in blood	Cannot tolerate this decrease
↓	↓
FHR remains (N)	FHR will ↓ (called DECELERATION)

Fetal Heart Rate Deceleration:

When Fetal Heart Rate decreases
↓
By 15 bpm × 15 secs
↓
with uterine contraction
↓
In indicates: The fetus has some problem.

Note:

1. FHR acceleration is a good thing
2. FHR deceleration is a bad thing

The most important parameter on CTG is:

↓

FHR Deceleration → Present Abnormal

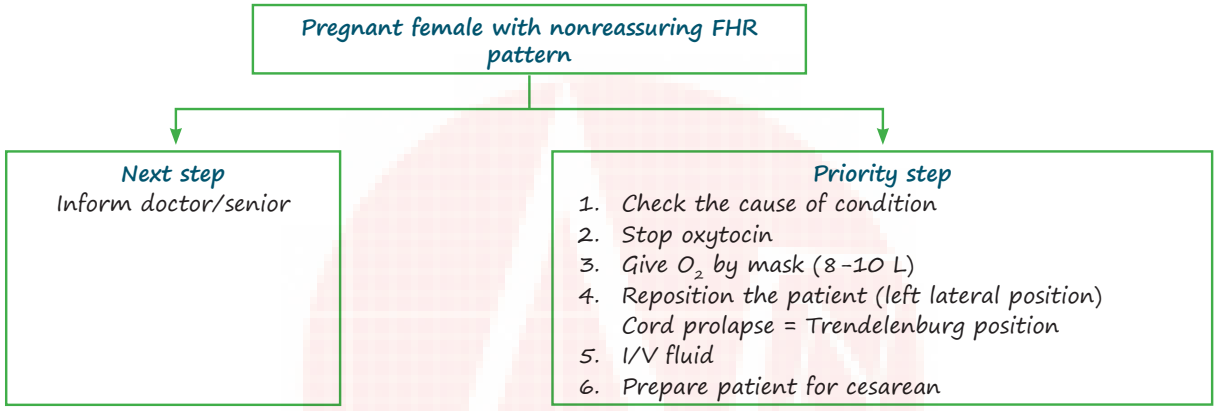
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Abnormal CTG findings:

1. Bradycardia/Tachycardia
2. Absent or decreased best to best variability
3. Sinusoidal heart rate pattern
4. Absent acceleration
5. Late deceleration/variable deceleration

Deceleration: 3 types

Deceleration		Seen in	Importance
1	Early deceleration	Compression	→ Can be seen during labor → Physiological → Nothing to worry
2	Late deceleration	Uteroplacental Insufficiency (↓ blood supply to fetus)	→ Worst kind of deceleration
3	Variable deceleration	CORD compression or CORD prolapse	→ Bad kind of deceleration



Cesarean

1. Sinusoidal heart rate pattern
2. Variable decelerations
3. Late deceleration
4. Bradycardia

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Note:

During labor: To detect fetal distress

1. Either CTG should be done

   OR

2. FHS should be heard by stethoscope

	Low-risk patient	High-risk patient
1st stage labor	After every 30 minutes	After every 15 minutes
2nd stage labor	After every 15 minutes	After every 5 minutes

NST
OR
CTG
} Transducer on mother's abdomen (External fetal monitoring)

During labor: We can also rupture the membranes and put the transducer on fetal scalp

↓

(Internal fetal monitoring)

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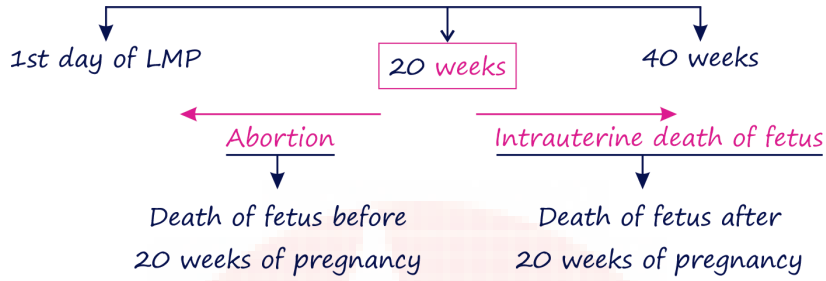
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INTRAUTERINE FETAL DEATH (IUD) AND DIC



Older Concept

Total duration of pregnancy = 40 weeks

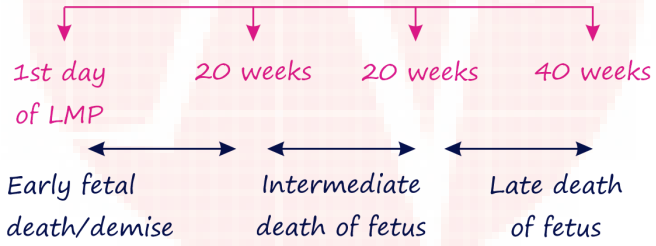


Note: If fetus dies during delivery

↓

STILL BIRTH

New Concept



→ Patient complain of absent fetal movements

→ O/E →

1. Weight of patient
2. Per abdomen:
   - → Fundal Height = less than the period of gestation
   - → Fetal movement = Absent
3. FHS: Absent

→ **On ultrasound:** Cardiac activity: Absent (Diagnostic sign of death of fetus)

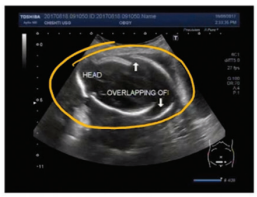
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→ Signs of fetal death on USG

If death of fetus occurs ≥7 days have passed
↓
SPALDING sign can be seen on USG
↓
OVERLAPPING of cranial bones of fetus



*SPALDING sign



→ Signs of fetal Death on X-Ray:

	Name of sign	Description	Seen at
1	Robert sign	Presence of gas in great vessels of fetus (Aorta, IVC)	→ Within 12 hrs of fetal death → 1st sign of fetal death seen on X-ray
2	Spalding sign	Overlapping of skull bones of fetus	≥ 7 days after fetal death
3	Ball sign  *SPALDING sign  Ball sign	Hyper flexion (OR) Hyperextension of fetal spine	≥ 3-4 weeks of fetal death

Also know:

1. Colors of amniotic fluid on fetal death:
   ↓
   Tobacco juice color
2. Complication of intrauterine death: if after IUD= dead fetus stays in uterus for 3-4 weeks
   ↓
   Can leas to DIC

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Management

1. Grief management wait and watch. Body automatically expels the fetus and labor process starts
2. If patient wants delivery: Respect her decision and start induction of labor
3. If time internal between IUD and expulsion is 3-4 weeks. Induction of labor (Otherwise will lead to DIC)
4. Mode of delivery: Vaginal delivery

Case: A pregnant female at 32 weeks of pregnancy. Complains of loss of fetal movement. On USG-There is no cardiac activity, Fetus is in transverse lie, next step in management

→ Vaginal delivery is not possible whether baby is a alive or dead

→ Mode of delivery in transvers lie→ Cesarean section

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DIC (Disseminated intravascular coagulopathy)

Clotting mechanism is activated
↓
Clots formed in CIRCULATION
↓
Formation of clots is very rapid
↓
So, CLOTTING factors are consumed
↓
Also called Consumptive coagulopathy
↓
Bleeding occurs
↓
Bleeding + clotting
↓
Thromboembolism
↓
Increased chances of maternal death
DIC (life threatening for mother)

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Obstetrical Causes of DIC

1. M/C cause: Abruptio Placentae/Accidental haemorrhage
2. Intrauterine death of fetus
3. Septic shock/septic abortion
4. Amniotic fluid embolism
5. Severe preeclampsia/eclampsia/HELLP syndrome

Assessment:

1. Uncontrolled bleeding
2. Presence of:
   → Hematemesis
   → Hemoptysis
   → Occult blood in stool

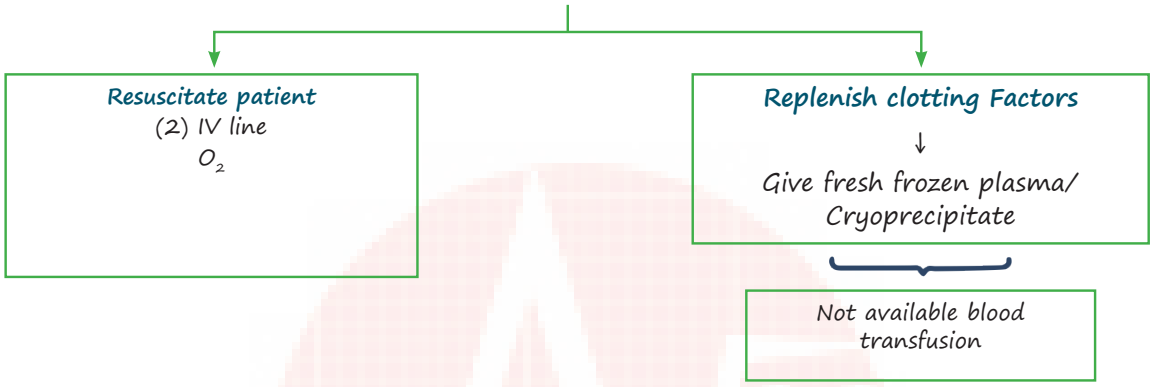
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3. Signs of shock
4. Lab investigation: All clotting factors ↓ sed
   Fibrinogen levels ↓
   Platelet count ↓
   Prothrombin time ↑
   Clotting time↑
   Partial thromboplastin time ↑
   Fibrin degradation product ↑

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Management



→ Once this is done Do delivery

Remember: Whenever any patient has DIC

↓

Always do vaginal delivery

(Never do cesarean section)

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NEURAL TUBE DEFECT



Most important (1) ANENCEPHALY, (2) SPINA BIFIDA

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Anencephaly

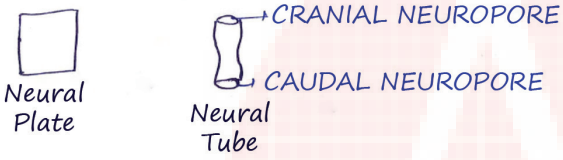
Main Problem: Skull/Cranial vault is absent

Skull features are incompatible with life

↓

Have to die when they are born

How Anencephaly Occurs

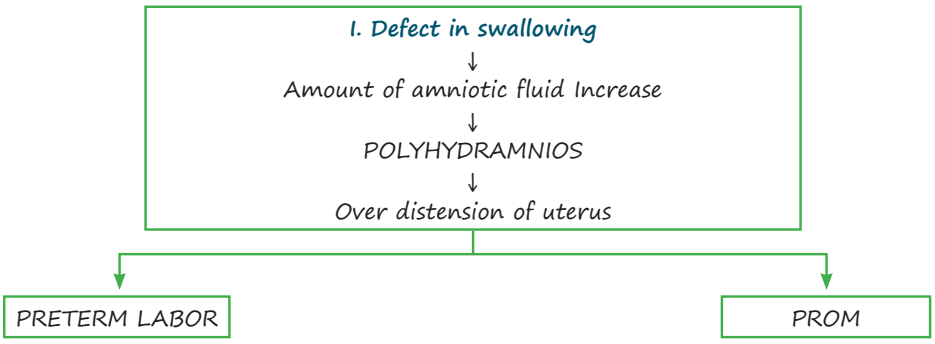


→ When cranial neuropore fails to fuse/close: Results in Anencephaly.

→ When posterior/caudal neuropore fails to close: Results in spina Bifida

Anencephaly:

1. Neural tube defect
2. It results to non closure of Anterior neuropore
3. In anencephaly the skull of baby is absent
4. So brain is exposed & it is incompatible with life.
5. Associated Problems



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II. Adrenal glands of fetus are not properly developed.
↓
Fetal adrenal glands play a very important
Role in initiation of labor.
↓
In Anencephaly = Adrenal glands not developed
↓
[Post term Pregnancy >42 weeks]

In Anencephaly = you can get either PRETERM labor (or) POST-TERM Pregnancy

The part which is normal in Anencephaly
↓
Face

- Most common presentation in Anencephaly at labor ↓ Face presentation
- Which congenital Anomaly most common: leads to face presentation ↓ Anencephaly

Other Important points on NTD (Neural Tube Defect)

1. Most common in: Female fetus
2. It can recur in next pregnancy
↓5% chances
To prevent its recurrence
↓
FOLIC Acid supplementation

Folic acid supplentation in pregnancy

In all pregnant females
↓
Give folic acid
↓
Dose = 400 mg/day (PROPHYLACTIC dose of folic acid)
↓
Prevents NTD
Where to begins: Begin 1 month before conception

In those pregnant females who have history of previous Neural Tube defect baby
↓
(or)
If a pregnant female is on Antiepileptic drug like valproic Acid
↓
Give Folic acid
↓
Dose = 4 mg (THERAPEUTIC DOSE)
↓
Prevent Recurrence of NTD
When to give: 3 months before Conception

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3 months after conception ← When to stop → 3 months after conception

↓

After this from 4th month onwards Iron & Folic acid Tablet (Anemia Mukt Bharat Programme)

Important Question:

1. **Prophylatic dose of folic acid – 400 mcg/day (to all pregnant female)**
2. **Therapeutic dose of Folic acid = 4 mg/day (to all pregnant female with Previous H/O NTD baby)**
3. **Dose of folic acid given to diabetic pregnant females = 400 mcg**
4. **Dose of folic acid given to diabetic pregnant female with previous history of NTD → 4mg/Day**
5. **Dose of folic acid in tablets distributed by government of India under Anemia Mukt Bharat Programme = 500 mcg**

ANEMIA MUKT BHARAT PROGRAMME

↓

Government of India: Distributing Iron & Folic acid Tablets free of cost

Dose of Iron = 60 mg
Dose of folic acid = 500 mcg

1 tablet of Iron ⊕ 1 tablet of folic acid

Should be taken by all pregnant female

Starting from 4th month of pregnancy & ideally it should be continued throughout pregnancy (For MINIMUM → 180 **Days**) & also for **180 days after delivery**

↓

To Replenish the iron stores

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Neural Tube defect:

Screening test: In mother's blood check levels of

↓

→ Alpha Feto Protein

Test: Maternal Serum Alpha Feto Protein (AFP)

Time: 15-20 weeks (16-18 weeks) ↓

If Raised

↓

Diagnosed Test:

↓

Level 2 USG/Targeted scan/TIFFA/Anomaly scan

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→ In NTD - AFP↑
→ In AFP Best biochemical marker for NTD: NO
→ **Why:** It can be raised in many conditions

Best Biochemical marker for NTD = ACETYLCHOLINESTERASE

Q1. When can Anencephaly be diagnosed earliest on USG: At 10 weeks.

Q2. When can Anencephaly be best diagnosed on USG: At 14 weeks.

Q3. Signs of Anencephaly on USG:

1. Mickey mouse sign
2. FROG eye sign

Q4. Signs of spina bifida on USG:

1. Scalloping of Frontal Bone = LEMON sign
2. Banana sign: Cerebellum looks like Banana

Q5. Management of Anencephaly if diagnosed in pregnant female:
→ Termination of pregnancy

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Alpha fetoprotein:

→ Protein synthesized by Fetus
  → In Early weeks of pregnancy: Synthesised by Fetal Yolk sac.
  → In later weeks of pregnancy: Synthesised by Fetal GIT & Liver

Fetus
↓AFP
Comes in Amniotic fluid
↓
Goes into mother's blood
That is why maternal serum AFP levels are used as screening test for NTD

Conditions in which AFP↑:

1. NTD
2. Abdominal wall defect = e.g. Gastrochisis omphalocele
3. PILONIDAL sinus.

etc.

AFP ↓ sed:

1. Mother diabetic
2. Baby = Down syndrome
   → Abortion
   → Molar pregnancy

MACROSOMIA AND SHOULDER DYSTOCIA



Macrosomia

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→ **Definition:** If weight of fetus is:

1. ≥4 kg
2. >90 percentile

→ More common in: male fetuses

→ Seen if: Pregnancy continues beyond 72 weeks (post-term pregnancy = ↑ chances)

→ Seen if mother is: Diabetic

Reason:

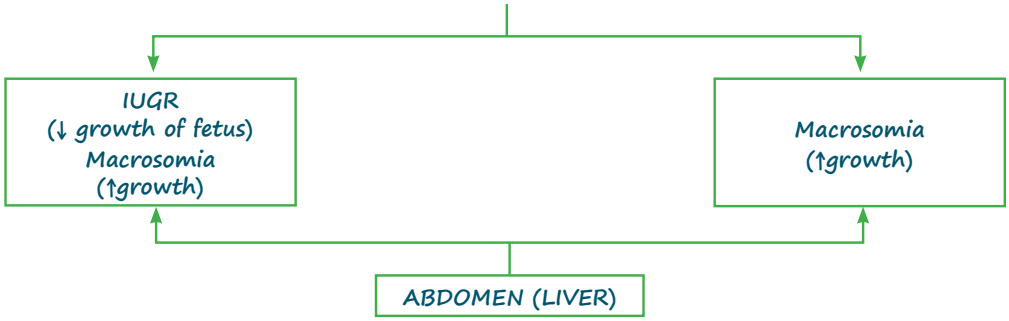
Mother has hyperglycemia
↓
Fetus also hyperglycemia
↓
Fetal pancreas secrete more insulin
↓
↑ growth
↓
Macrosomia

Hormone needed for fetal growth = insulin

In macrosomia:

→ Excess weight of fetus: get deposited in shoulder and trunk area
↓
During vaginal delivery there is difficulty in delivering the shoulders
↓
Called SHOULDER dystocia

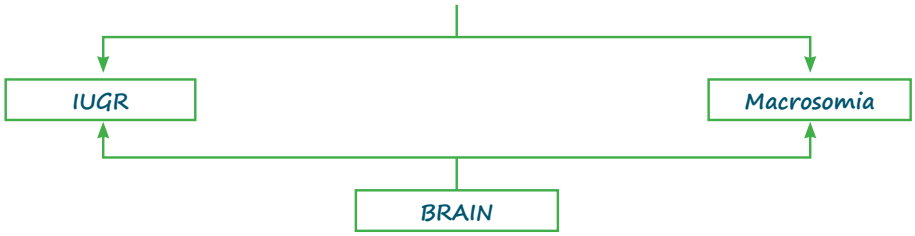
→ 1st organ affected



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→ Last organ affected



→ Ultrasound parameter which has to be checked to know about growth of fetus

∵ Abdominal circumference

→ Best USG parameter to detect macrosomia
→ Best USG parameter to detect IUGR
} **Abdominal circumference**

→ Mode of delivery in macrosomia:

↓

Vaginal delivery

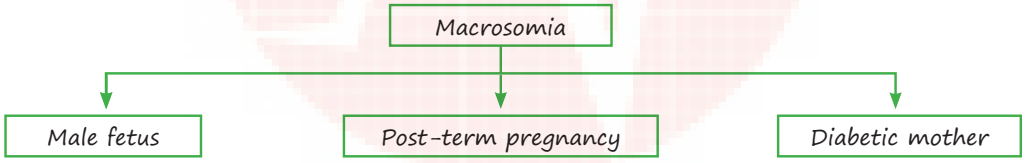
Only: If weight of fetus ≥4.5 Kg in a diabetic mother
Or
≥5 kg in a nondiabetic mother
} Cesarean section

Shoulder Dystocia

Definition: Difficulty in delivery of shoulders
(Delay in ≥1 minute in delivering shoulder after delivery of head)

Sign seen: Turtle Sign
(Head tries to go back inside)

Predisposing factors



Steps to do when shoulder dystocia occurs

H = call for help
E = liver episiotomy
L = leg maneuver = **Mc Robert maneuver** → 2 assistants needed
→ Each assistant flex the legs of mother against her abdomen and abduct them
→ 1st maneuver done in shoulder dystocia (Best maneuver)
P = give suprapubic pressure & again perform Mc Roberts maneuver
→ supreapubic pressure is given in shoulder dystocia
→ Fundal pressure is never given in shoulder dystocia

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E → Enter your hands and rotate shoulder of baby (Wood's Corkscrew maneuver/Rubin Maneuver

R → Removal of arm of baby

R → Roll over the patient on all 4 limbs (all 4 maneuver GASKIN manuever)

If everything fails

↓

Last step

ZAVANELLI maneuver

↓

Push the delivered head back into uterus and then do cesarean section

Steps which are NEVER done is shoulder dystocia:

1. Never gives fundal pressure
2. Never fracture clavicle of baby

↓

CLEIDOTOMY

Destructive procedures are never done nowadays

→ M/c maternal complication of shoulder dystocia: PPH

→ M/c fetal complication of shoulder dystocia = Brachial plexus injury

↓

ERB's paralysis

→ Which nerve gets damaged when you do Mc Robert's Maneuver?

Lateral cutaneous nerve of thigh

→ Which is the first maneuver
Best maneuver
Most effective maneuver
} In shoulder dystocia

↓

MC Roberts maneuver

→ During normal delivery which bone of baby can get fractured most commonly: Clavicle

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FUNDAMENTAL OF GYNECOLOGY (PART-1)



Human Cell = Chromosome Number

↓

46

↓

44 autosomes/22 pairs of chromosome (Same in male & female) **Males** = Chromosome no. = 46 Genotype (genetic makeup) 44 autosomes + XY 44 + XY or 46(XY)	(2) Sex chromosomes **Female** = Chromosome no. = 46 Genotype (Genetic makeup) 44 autosomes + XX 46 (xx)

Key Concept

→ All human cells have 46 chromosomes (Diploid number) Except male & female gamete (sperm & ova) = 23 chromosome

→ ½ of Diploid is called as Haploid

→ Male gamete (sperm) & female gamete (ova) have Haploid no. of chromosomes (Total = 23 chromosomes)

Summary:

All Human Cells (except sperm/ova)	Sperm/ova
→ Total no. of chromosome = 46 → Diploid number or → 23 pair of chromosomes	→ Total no. of chromosome 23 or → Haploid number

→ Whenever there is a deviation from the normal number of chromosomes (46) (Whether it is more than 46 or less than 46) it is called as **ANEUPLOIDY.**

→ **Which nerve gets damaged when you do Mc Robert's maneuver?**

Lateral Cutaneous Nerve of Thigh

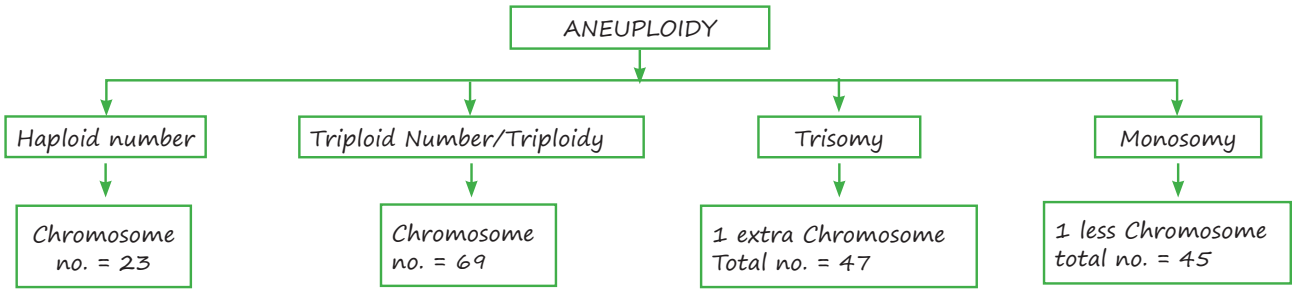
Which is the First maneuver
Best maneuver
Most effective maneuver
} In shoulder dystocia ↓ Mc Roberts maneuver

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→ During normal delivery which bone of baby can get fractured most commonly: Clavicle



→ Chromosome number 23 is seen in sperm & ova, if it is seen in any other cell then it is abnormal KARYOTYPING → Photo of all chromosome together)

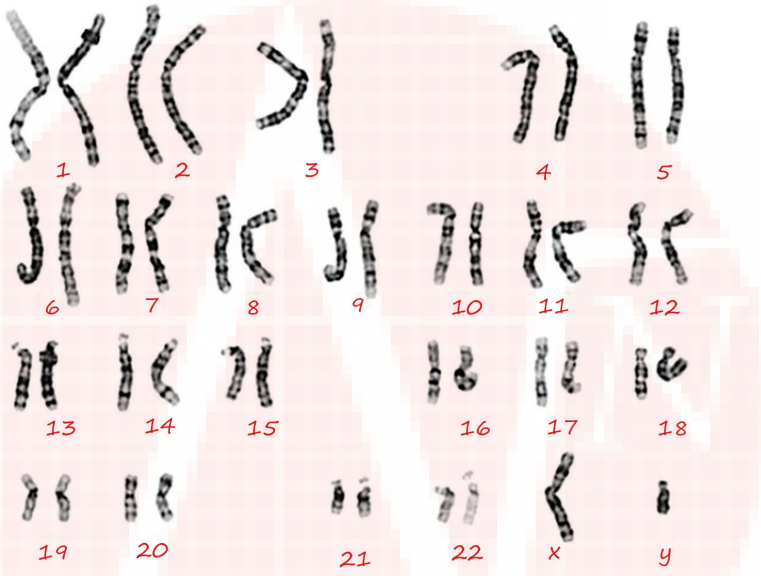


Figure: Normal Male Karyotype

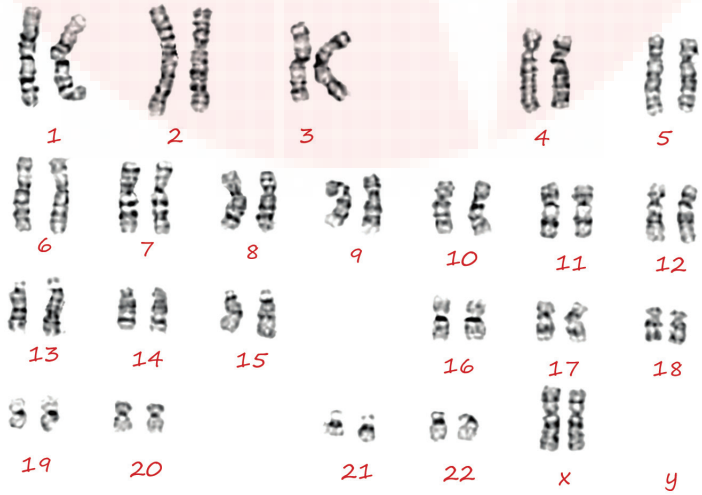


Figure: Normal Female Karyotype

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FUNDAMENTAL OF GYNECOLOGY (PART-2)



→ IOC for detecting Aneuploidy = Karyotyping

→ IOC/Best investigation for diagnosing DOWN Syndrome (Trisomy 21) (Karyotyping)

Sperms = 23 chromosomes
22 + 1 sex chromosomes
Males = 44 + xy
↓
Autosomes
/ 2
Sperm = 22 + x
Sperm = 22 + y

Ova = 23 chromosomes
22 autosomes + 1 sex chromosome
Female = 44 + xx
↓
autosomes
ova = 22 + x

22 + Y — Egg (22 + x) = Zygote → 44 + xy (male)

22 + Y — Egg (22 + x) - Zygote → 44 + xx (female)

Sperm/ova = (Gametes)
↓ ↓
Male gamete | Female gamete

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Important Question

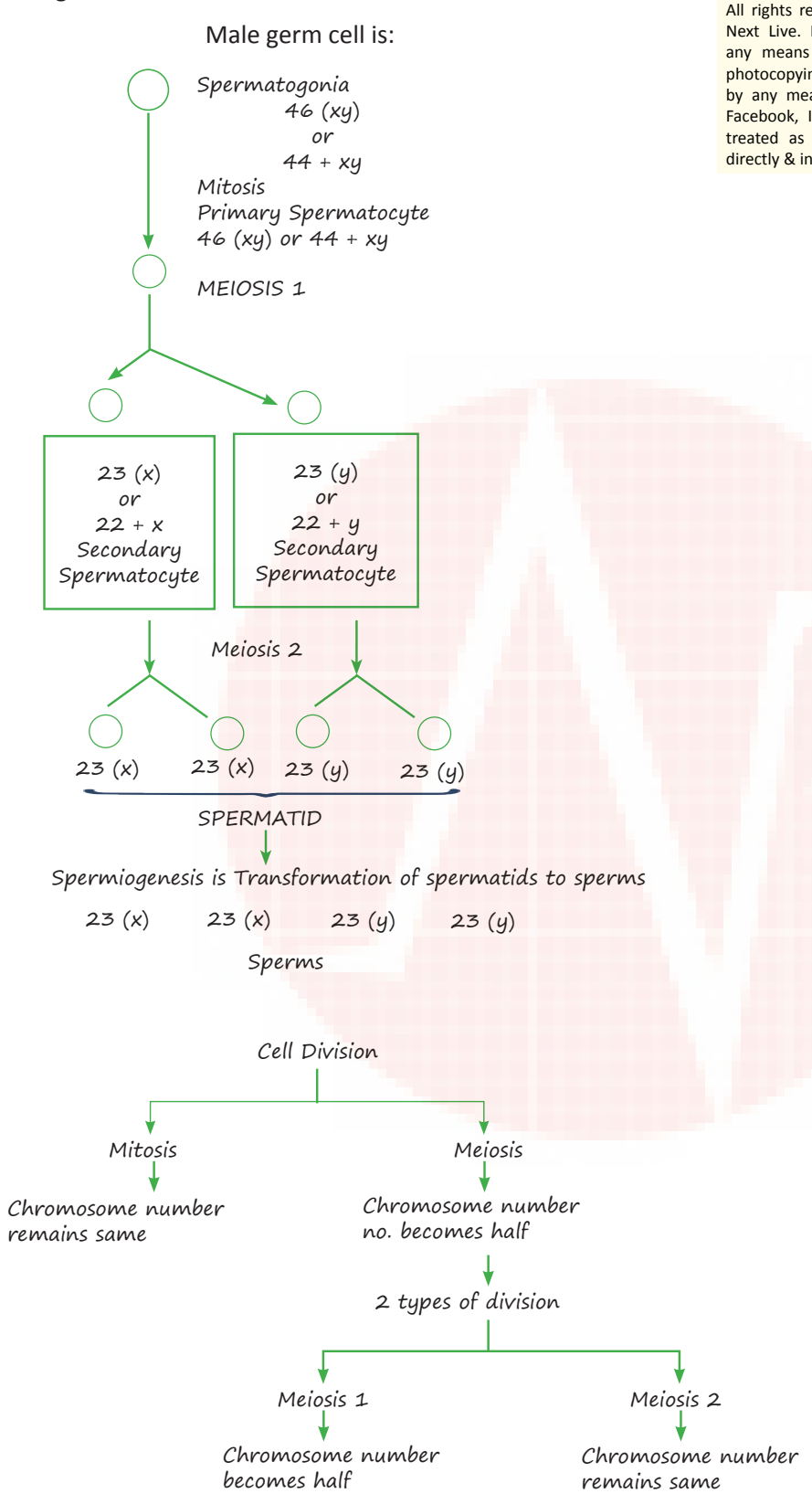
1. Gametes are derived from: GERM cells
2. Germ cells are derived from: Endoderm of yolk sac
3. GERM Cell — Process → Gameta
   ↓
   Called as gametogenesis

→ Male germ cell is called as
Spermatogonia
↓
Process is called spermatogenesis
↓
Sperm

→ Female germ cell is called as
Oogonia
↓
Process is called as Oogonia
↓
OVA

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Spermatogesis: The process in which sperms are formed from male germ cell.



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Key Points:

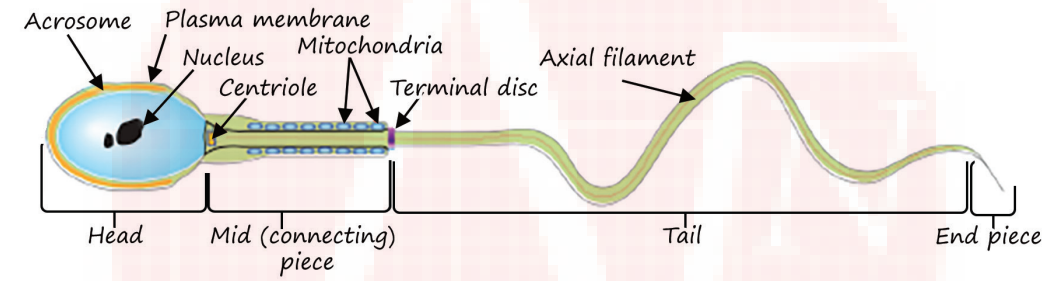
1. One primary spermatocyte → 2 secondary spermatocyte, 4 spermatid, 4 sperms
2. In which division does Chromosome no. become half

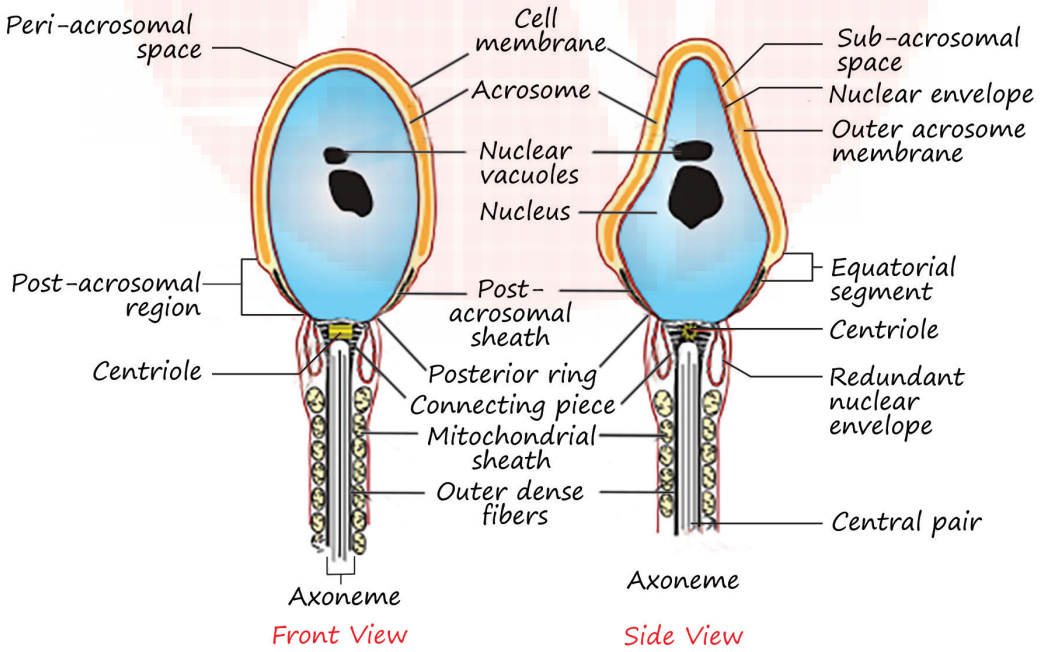
   Spermatogenesis: When primary spermatocyte changes into secondary spermatocyte then chromosome no. becomes half.
3.

Spermatogenesis	Spermiogenesis
The process by which sperms are formed from germ cell (spermatogonia)	The transformation of spermatid to sperm.

4. When does spermatogenesis begin? Begin at puberty & continues throughout life.
5. Time taken for spermatogenesis: 70-74 days
6. Size of sperm = 50-60 microns
7. Fertilizable span of sperms: 48-72 hours

Structure of Sperm:





8. Spermatogenesis occurs in Testis → Seminiferous Tubule

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FUNDAMENTAL OF GYNECOLOGY (PART-3)



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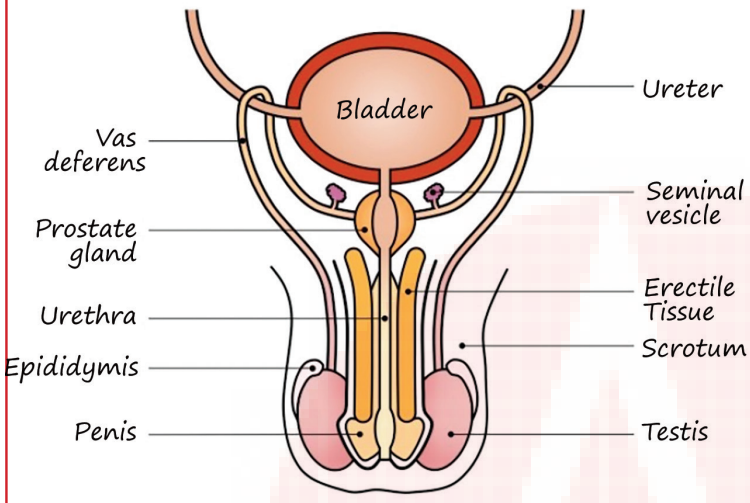
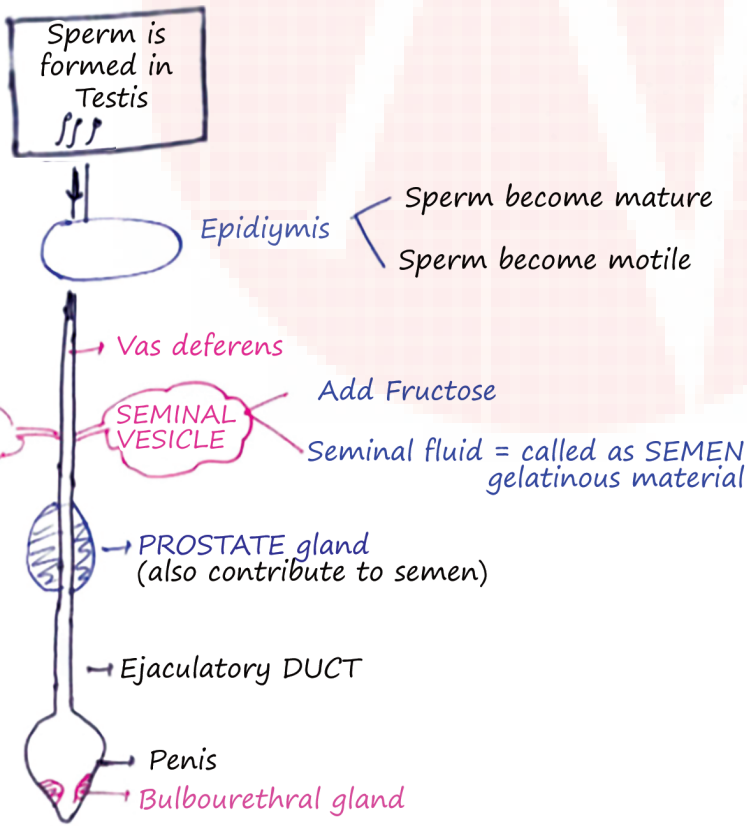


Figure: Testis

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Q. Semen is formed by contribution from:

(a) Seminal vesicle

(b) Prostate gland

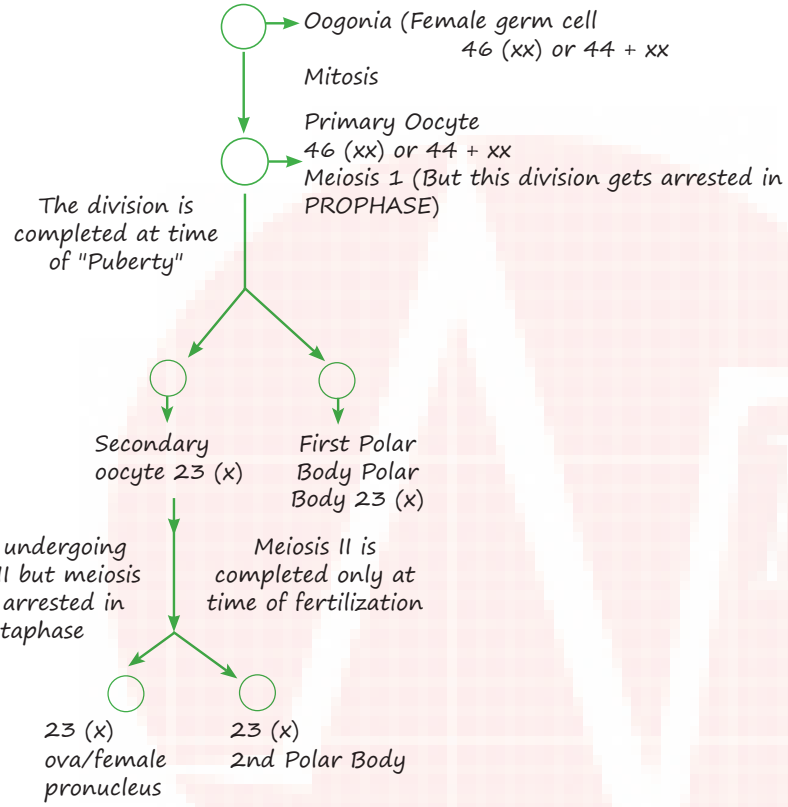
(c) Bulbourethral gland

Q. Major contributor to semen is: Seminal vesicle

Oogonia (Female germ cell)

↓ } Process is called as oogenesis.

ova } **Oogenesis begins in intrauterine life.**

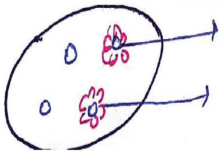


What IS OVULATION?
Ovulation is the release of secondary oocyte from primary oocyte every month

→ In a newborn female ovary

↓

→ We will get primary oocyte but no secondary oocyte



Primary oocyte
Follicular cells of ovary
} PRIMORDIAL FOLLICLE

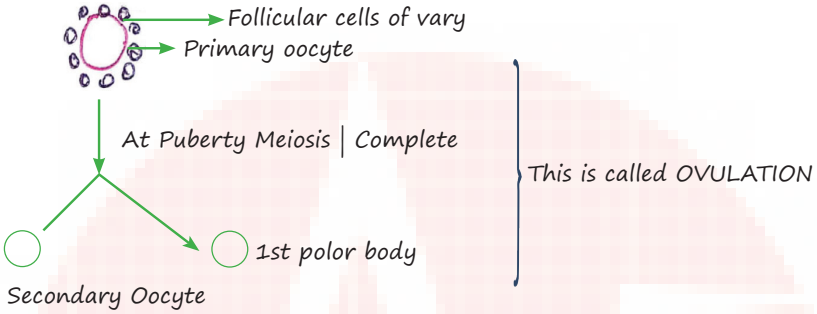
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Time	No. of follicles in Ovary
5th month of Intrauterine life (20 weeks)	6-7 million follicles (maximum = 7 million)
At time of birth	1-2 million follicles
At time of puberty	4-5 lakh follicles
	↓ Only 400-500 follicles mature in entire life time.

Maximum no. of follicles are seen at: 5th month of Intrauterine life or 20th week of Intrauterine life



- → Size of follicle first before ovulation = **18-20 mm**
- → Meiosis 1: gets arrested in which stage: Prophase
- → When is 1st polar body released: at the time of ovulation
- → When is 2nd polar body released: At the time of fertilization.
- → Meiosis II gets arrested in which phase: Metaphase
- → Size of ova = 120 microns
- → **Largest cell = ova**
- → **Longest cell = NEURON**
- → Fertilization span of ova = **12-24 hours**

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FUNDAMENTAL OF GYNECOLOGY (PART-4)



Extra Edge

→ Sex of baby is determined by:

"Y chromosome"

Y Chromosome absent	Y Chromosome Present
↓	↓
Female	Male

Example:

→ Turner syndrome

↓ Genotype = 45 (xo)

Y chromosome is absent

↓

Female

→ Klinefelter syndrome

↓

Genotype = 47 (xxy)

↓

Y chromosome is present

↓

Male

→ Most common method used for sex determination

↓

By looking at external genitalia

When by looking at the genitalia, the sex of baby cannot be determined is called as Ambiguous genetalia

→ Best method for sex determination → Karyotyping

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PUBERTY

Puberty:

→ It is that period in life in which a child grows and attains the ability to reproduce.

→ Link between childhood & reproductive age.

Main Event:

Appearance of secondary sexual characteristics

Females:

→ Breast develop (most important characteristic)
→ Pubic hair
→ Axillary hair



Figure: Pubertal changes in female

Males:

→ Deepening of voice
→ Facial hair
→ Testicular enlargement

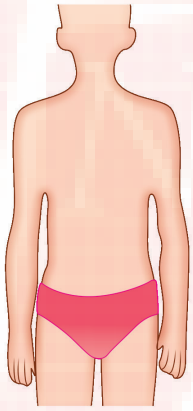


Figure: Pubertal changes in male

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Primary Sexual Charteristics

Genital organs

External genital organs

Internal genital organs

Male		Female
Penis &	Homologous organ	Clitoris
Scrotum	Homologous	Labia Majora
Penile Urethra		Labia minora

Male:
- Vas deferens
- Seminal vesicles
- Prostate gland
- Ejaculatory duct
- Epididymis

Female:
- Uterus
- Cervix
- Vagina
- Fallopian tube

Organs in male & female that have same origin are called homologous organs.

Q1. Why Puberty occurs:

Puberty occurs because:

i. In females: Hypothalamic Pituitary Ovarian Axis is activated.

ii. In males: Hypothalamic Pituitary Testicular Axis is activated.

Females

HYPOTHALAMUS (activate)

↓

GnRH (Pulsatile manner)

↓

Anterior pituitary/ Posterior pituitary

↓

FSH → Ovary follicles → Estrogen

LH

↓

Main hormone in female responsible for Pubertal changes

Males

HYPOTHALAMUS (activate)

↓

GnRH (Pulsatile manner)

↓

Anterior pituitary/ Posterior pituitary

↓

FSH

LH

↓

Testis (Leydig cells)

↓

Testosterone (male hormone) Androgen

↓

Main hormone in male responsible for Pubertal changes

Q2. Main Hormone in female for development of breast (Secondary sexual characteristics) → (Estrogen)

Q3. Main Hormone for development of secondary sexual characteristic in males = (Testosterone).

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Extra Edge

→ Is testosterone present in female: Yes

→ Female ovary also produces testosterone & adrenal gland produces testosterone, but it is present in small quantities.

→ If levels of testosterone increase in female (For eg: Polycystic ovarian syndrome PCOS)

↓

In such female will have more hair growth.

↓

On chest, arms, legs, chin

↓

This is called as Hirsutism

Q4. Most Common cause of HIRSUTISM → PCOS or PCOD (Polycystic ovarian syndrome/disease)

Q5. DOC to treat HIRSUTISM = Oral contraceptive Pills (OCP) × 3 weeks.

Sequence of Puberty in Female

2 Years

First Sign of Puberty in Female: Appearance of breast bud also called as THELARCHE

↓

2nd Sign: Appearance of pubic hair = PUBARCHE
Appearance of Axillary hair = ADRENARCHE

↓

3rd Sign: Height of female increase

↓

Last Sign: Female starts menstruating = MENARCHE

Mnemonic: For sequence of Puberty changes

→ Bombay = Breast Bud

→ Puna = Pubic hair & Axillary hair

→ Highway = Height Increase

→ Made = Menstruation

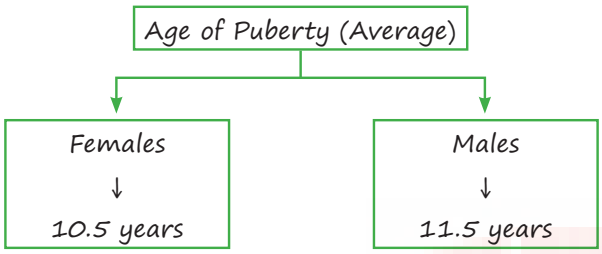
Q6. What is the first sign of puberty in males: Testicular Enlargement.

Pubertal changes in female in internal genital organs:

Organ	Childhood	Puberty
Ovary	 Elongated	 Oval

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Organ	Childhood	Puberty
Uterus	Body size small & cervix is big Uterus: Cervix Ratio Corpus: Cervix Ratio 1:2	Body of uterus increase in size & become bigger than cervix Corpus: Cervix ratio 2:1
Vagina	PH is alkaline	Doderlein Bacteria appear in vagina & make the PH of vagina acidic (4.5 – 5)



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Abnormal Puberty

Abnormality	Meaning	Female	Male	Most common cause
Precocious puberty	Early onset of Puberty	< 8 years (Breast)	<9 years (Testicular enlargement)	Idiopathic
Delayed puberty	Late onset puberty	≥ 13 years (no breast)	≥ 14 Years (no testicular Enlargement)	Constitutional delay



Figure: Precocious puberty

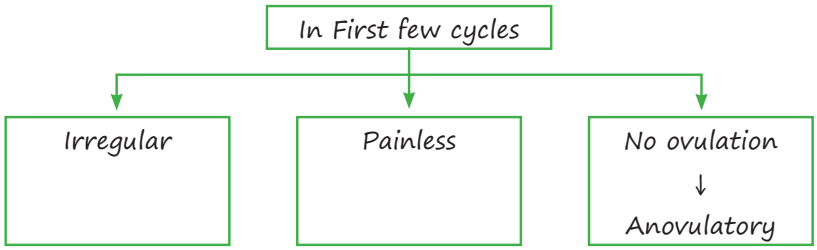
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Menarche: Onset of menstruation in a female.

→ Normal age: 10 – 16 years

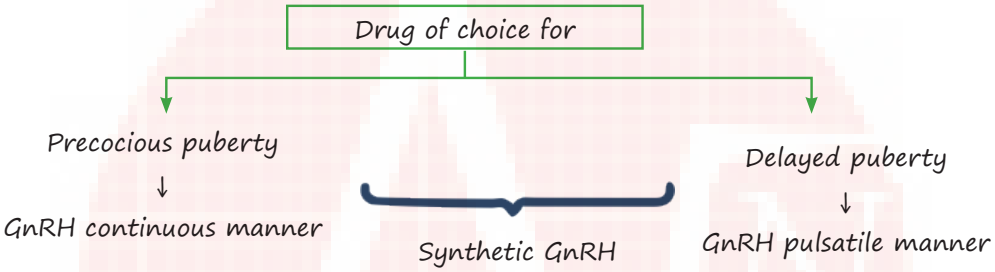
→ Average age: 13 years



Precocius menstruation: Early onset of menstruation at <10 years.

Delayed onset menstruation: Female has reached 16 years of age still there is No menstruation.

Extra Edge

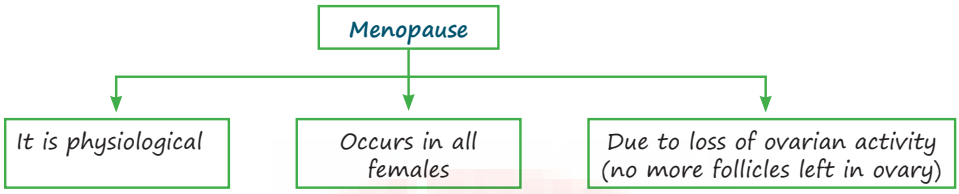


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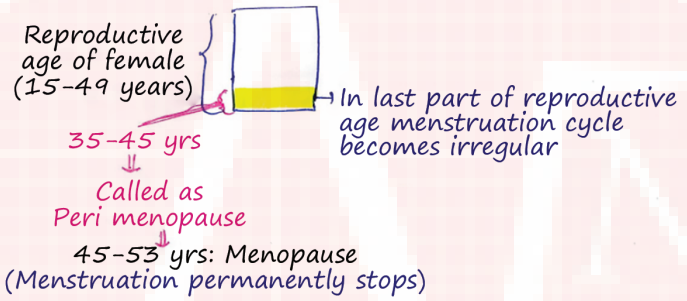
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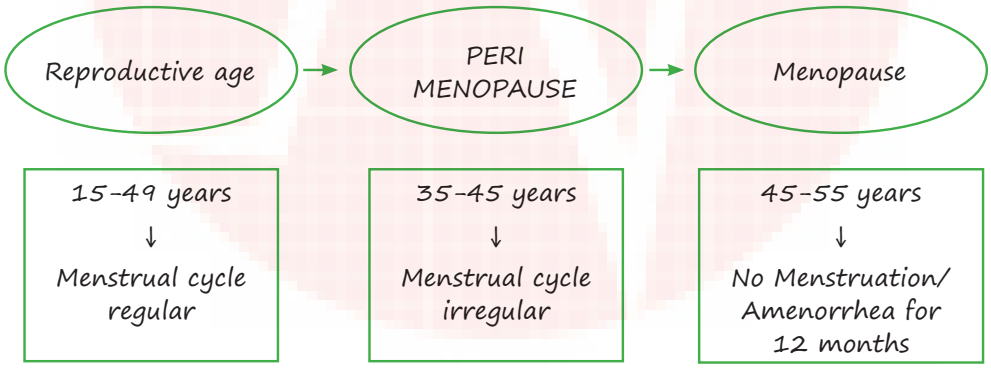
MENOPAUSE (PART-1)

Definition: Permanent cessation of menstruation in a female at the end of reproductive life.



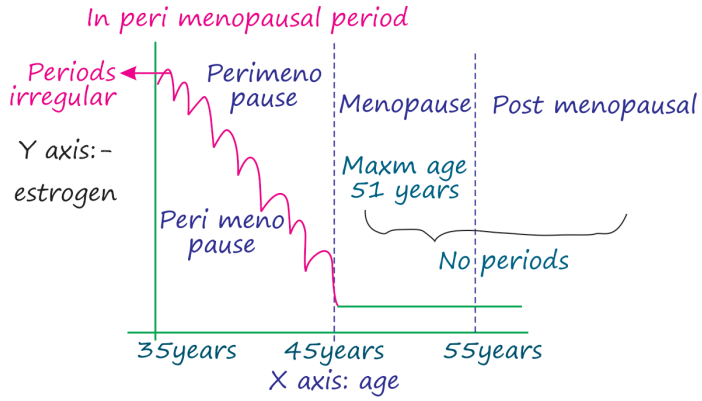
Stages of Menopause





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Age of Menopause

→ Between 45 - 55 years

→ Mean age = 51 years

→ In India = 47 years

1. Age of menopause determined genetically
2. Age of menopause does not depend on
   - → Height
   - → Weight
   - → Age of Menarche
   - → Economic status
3. Early menopause occurs in female. (Premature menopause)
   - → Those who smoke
   - → Malnourished

Abnormal Menopause

- In females <40 years if menopause occurs
  ↓
  Premature menopause
  ↓
  More common in → Smoking females, Malnourished females
- If female is more than 55 years & still there is no menopause
  ↓
  Delayed Menopause

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Terminologies related to menopause

Surgical Menopause

↓

Surgically ovaries are removed (Bilateral salpingooophrectomy)

↓

That leads to menopause

Hysterectomy = Removal of uterus + Cervix

↓

Female will not menstruate, but because her ovary is intact, she will not experience menopause like symptoms

Radiation Induced Menopause

↓

Female cancer

↓

Radiotherapy

Ovaries are very radiosensitive

↓

Ovaries die

↓

Female experiences menopause like symptoms.

Hysterectomy with bilateral salpingo-oophorectomy (BSO)

↓ organs

Means organs removed are

- Uterus
- Cervix

→ Not menstruate

- Fallopian Tubes (Both)
- Ovary (Both)

→ Menopause like symptoms present

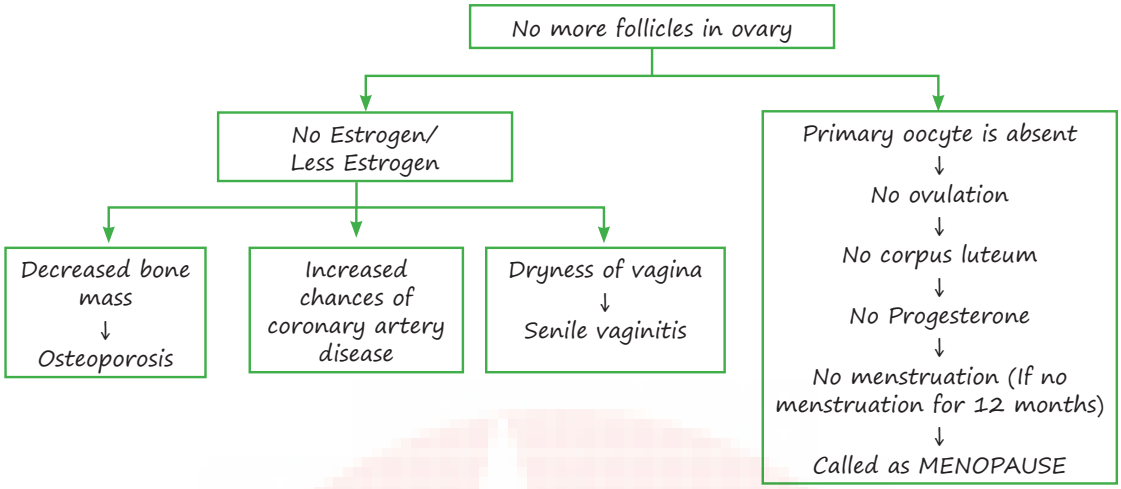
Clinical Care: Patient of fibroid. She has excessive bleeding. Her hysterectomy is planned.

Female < 45 years	Age ≥ 45 years
↓	↓
Only hysterectomy	Hysterectomy + Bilateral salpingo-oophorectomy

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Physiology of Menopause



Hormonal Changes in Menopause

1. Estrogen:
   a. Decreases
   b. Most common estrogen in menopause = E1 (Esterone)
   c. All symptoms of menopause are due to decrease in estrogen
2. Progesterone:
   a. Decreased
   b. Ammenorrhea is due to decreased Progesterone
3. LH ↑: Increase in Menopause.
4. FSH ↑: Increase in Menopause

   FSH ≥ 40 → Diagnostic test for menopause.

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MENOPAUSE (PART-2)

Symptoms of Menopause

1. Most characteristic symptom/Hallmark of menopause

↓ Hot Flashes/Flushes

↓

→ Sweating
→ Palpitation
→ HR↑
→ Anxiety

} 1 - 3 mins

2. Decreased bone mass:

Osteoporosis

- Increased chances of fracture
  ↓
  M/C = Lumbar fracture
  Fracture of wrist
  Fracture of femur neck
- → Complaint of back pain
  → Bending of spine

3. Dryness of vagina = Senile vaginitis

↓

Pain in intercourse

↓

Called as Dyspareunia

4. Increased chances of heart attack

Because estrogen is cardio protective

↓

↑HDL & ↓LDL

In menopause, estrogen decreases, so chances of heart attack increases

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Genital changes in Menopause

All genital organs atrophy, decrease in size

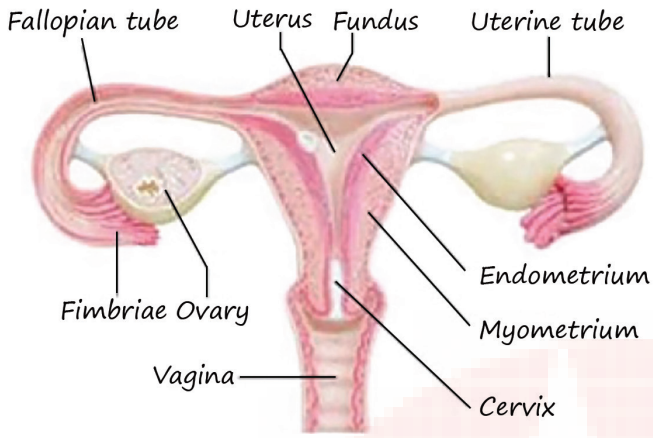
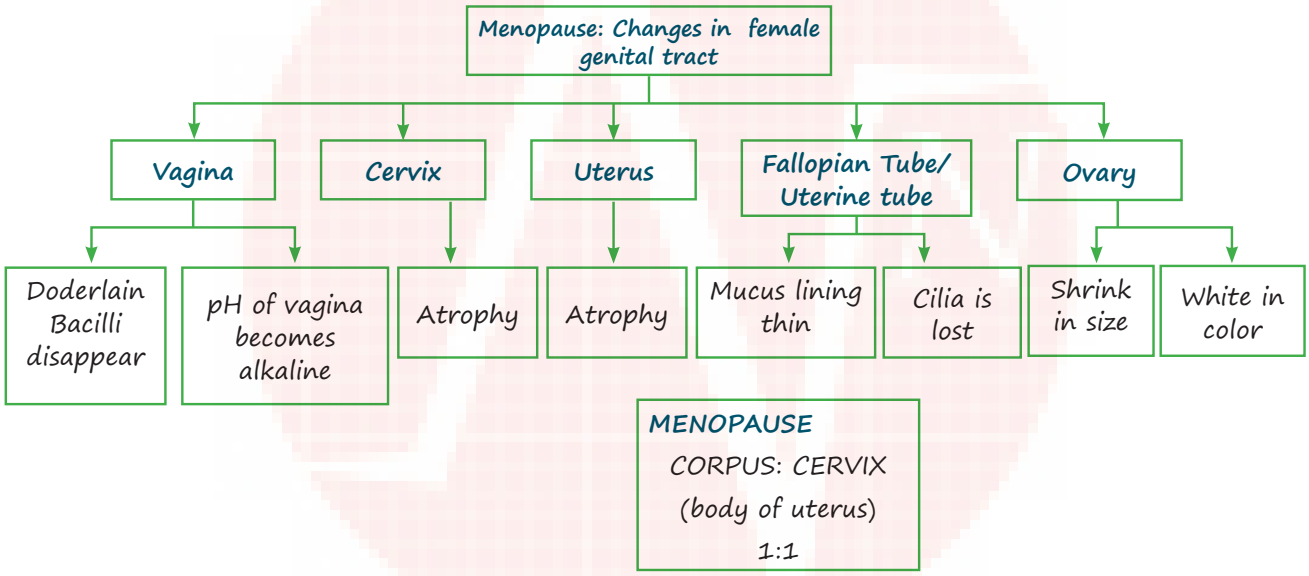
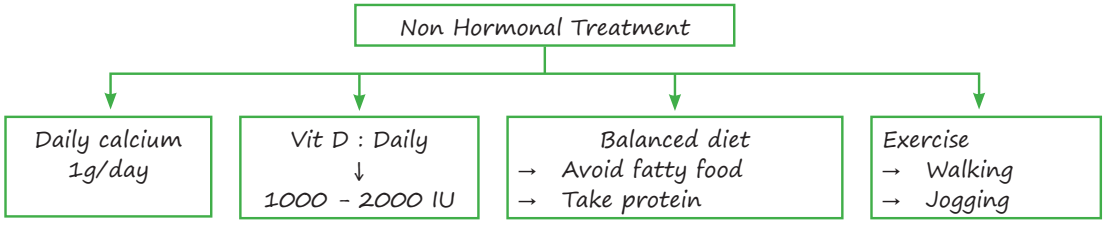


Figure: Genital changes in menopause



Management

1. Counsel the patient.
2.



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3. Hormonal Treatment

↓

HRT (Hormone Replacement Therapy)

Hormone Replacement Therapy

Check: uterus

Uterus Present	Uterus has been removed
↓	↓
Estrogen + Progesterone	Estrogen alone given

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Indications of HRT

1. Any menopausal female if she is experiencing symptoms of menopause like hot flushes/ osteoporosis/senile vaginitis.
2. Premature Menopause (<40 years)
3. Surgical Menopause
4. Radiation induced Menopause

Student's Space

Symptoms of Menopause for which HRT is given

1. Hot flushes (Most important reason)
2. Osteoporosis
3. Senile vaginitis: Treatment: Local estrogen cream

   ↓

   Do not give estrogen + Progesterone

Contraindication of HRT

A : Active liver/Gall bladder disease

B : Abnormal uterine bleeding

C : Cancer (Breast cancer, Uterine Cancer)

D : Deep vein Thrombosis (Present or History)

*HRT is not given to prevent coronary artery disease/ Heart disease

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Symptoms of Menopause	Best Treatment	Alternative treatment
Hot flushes	HRT ↓ Uterus present → Estrogen + Progesterone Uterus removed → Only Estrogen	→ Phyto estrogen → In leguminous plants → Soybean bean → Flax seeds → Whole grains
Osteoporosis ↓ **Detect by:** Bone Mineral density test decreases in menopausal female	BISPHOSPHONATES ↓ Eg. Alendronate Pamidronate ↓ **Instructions:** → After taking the medicine patient should not lie down or sit for 1/2hour → It should be taken with full glass of water Side effect = gastritis	HRT ↓ Uterus present → Estrogen + Progesterone Uterus removed → Only Estrogen 2. Selective estrogen receptor modulator (SERM) Eg: RALOXIFENE ↓ Side effect (Hot Flushes)
Senile vaginitis	Topical estrogen cream	

→ Most common estrogen in menopausal female = E1 (Esterone)

→ Diagnostic test for osteoporosis, (FSH ≥ 40)

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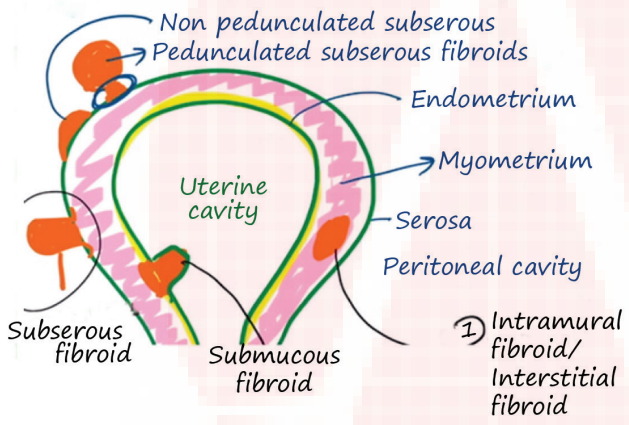


FIBROID

1. It is the most common benign tumor in females.
2. It is the most common Pelvic tumor in female.
3. FIBROID — Composed of smooth muscle + Connective tissue } LEIOMYOMA

Sites

Uterus (Uterine fibroid) Most common



Extra uterine fibroid ↓ } Less common
Present at sites other than the uterus
e.g. cervical fibroid

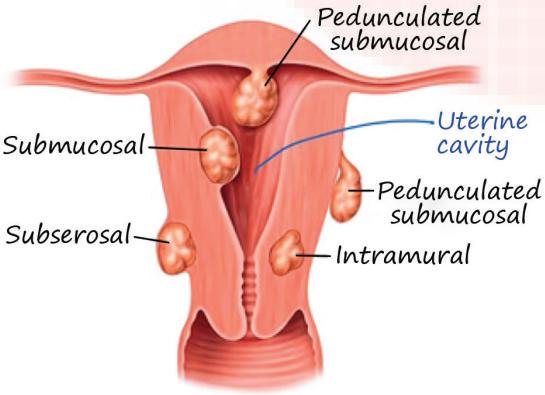
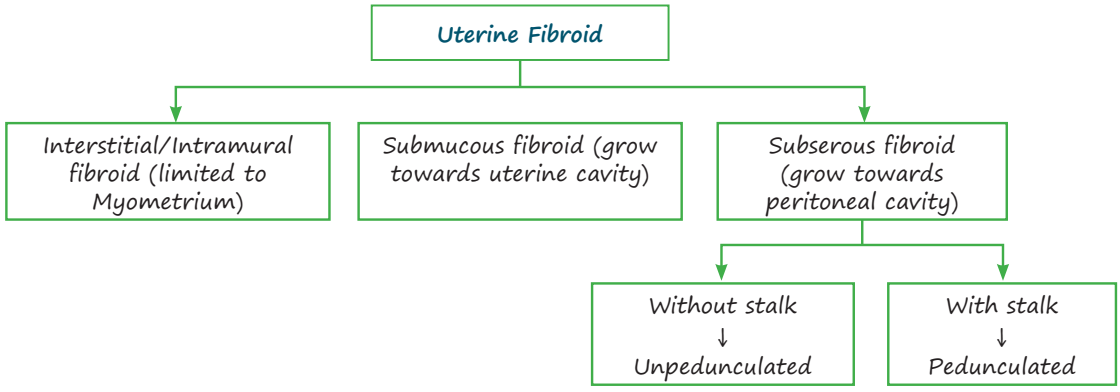


Figure: Types of fibroid

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Important one Liners

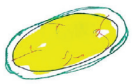
→ Most common site of fibroid: Uterus

→ Most common variety of uterine fibroid: Intramural fibroid

→ To begin with all fibroids are: Intramural fibroid.

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Fibroid Structure



→ Appearance: Pale/yellow

→ Consistency: FIRM

→ Covered by a Pseudocapsule

→ Blood vessels supplying fibroid are found in the periphery of fibroid.

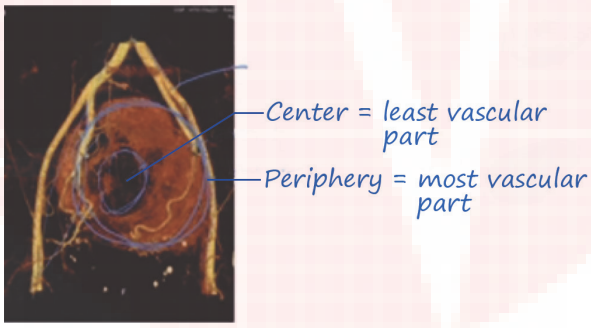


Figure: Structure of fibroid

Q1. Most vascular part of fibroid => PERIPHERY (Pseudocapsule)

Q2. Least vascular part of fibroid => CENTER

Q3. Degeneration in fibroid begin from center.

General Points on Fibroid

→ Age → More common 35 - 45 years.

→ Fibroid is estrogen dependent Tumor (at time of menopause give an arrow in between fibroid shrink)

Conditions ↑ with ↑estrogen
- Fibroid
- Endometriosis
- Endometrial cancer/uterine cancer
- Ovarian cancer

All these 4 conditions are more common in

→ Obese female

→ Nulliparous female (Female who has never given birth to child)

→ Smoking patients against all these 4 conditions

Degenerations in Fibroid



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→ Degeneration begins from → center of fibroid → as it is least vascular

→ Most common degeneration seen in fibroid → Hyaline Degeneration

→ Most common degeneration in Menopausal female in a fibroid → Atropy.

→ Degeneration which is specific for pregnancy: RED Degeneration

Red Degeneration

→ Seen in pregnancy only => most commonly 2nd trimester.

→ Why? Thrombosis in the blood vessels which supply the fibroid

↓

Patient complains of:

→ Pain in abdomen

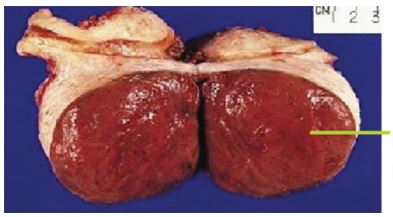
→ Nausea, vomiting

→ Called RED degeneration because fibroid appears in red color/salmon pink

↓

(Due to hemolysed RBC)

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Red degeneration of fibroid

→ We get a fishy odor from the fibroid.

Management of Red Degeneration

→ No Surgery (Myomectomy/Hysterectomy)

→ Managed conservatively
- Bed rest
- Analgesics (Pain)
- Antiemetics (Vomiting)

→ Least common complication of fibroid

↓

Malignancy (rarely < 0.5%)

→ Maximum chances of malignancy are seen in SUBMUCOUS Fibroid.

Symptoms of Fibroid

→ Mostly fibroids are asymptomatic

→ Most common presentation of fibroid: Asymptomatic

→ Most common symptom of fibroid: Menstrual symptoms

↓

Excessive bleeding

↓

Menorrhagia

→ In fibroid, patient can also complain of pain during menstruation => dysmenorrhea

→ Amenorrhea is never seen in fibroid.

→ Pressure symptoms can be seen in fibroid:

Patient can feel heaviness	Fibroid can press on veins ↓ Varicose veins	Fibroid can press on lymphatic ↓ Edema	Fibroid can press on intestine ↓ Constipation	Can press urethra ↓ Urinary Retention

→ Urinary symptoms are more common in which fibroid: **CERVICAL FIBROID**

→ Fibroid with maximum symptoms: **SUBMUCOUS FIBROID**

→ Fibroid which has maximum chances of causing abortion: **SUBMUCOUS FIBROID**

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→ Fibroid which has maximum chances of causing infertility: **SUBMUCOUS FIBROID**

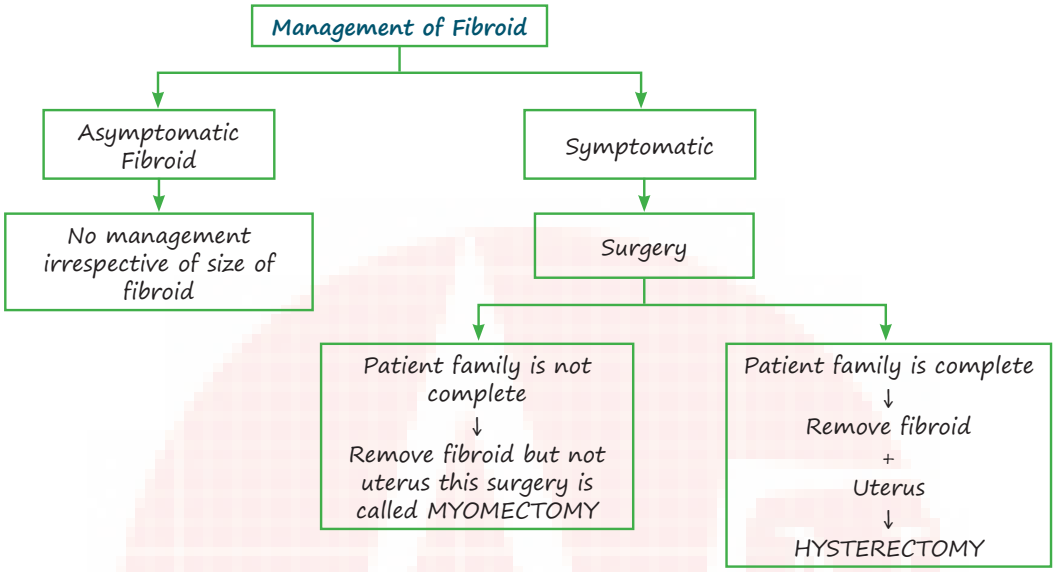
→ Fibroid which has maximum chances of becoming malignant: **SUBMUCOUS FIBROID**

→ Fibroid which has maximum chances of undergoing TORSION

↓

Pedunculated subserous Fibroid

Investigation of choice: Ultrasound



→ If patients refuses for surgery

→ Contraindication to surgery

↓

Medical Management

↓ Drugs

Today = Tranexemic acid → Non Hormonal drug (Fibrinolytic)

Domino = Danazol (Best)

Pizza = Progesterone

Got = GnRH (Continuous)

Late = Letrozole

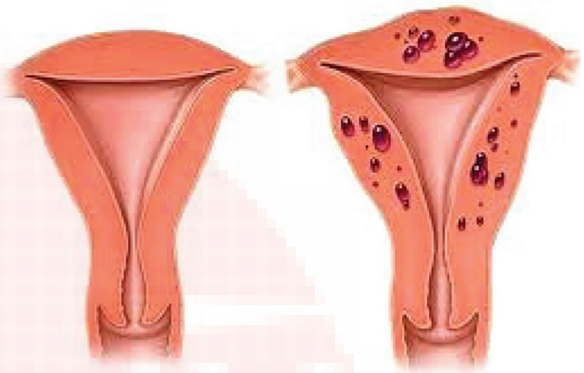
Hormonal drugs

Action = ↓ Estrogen

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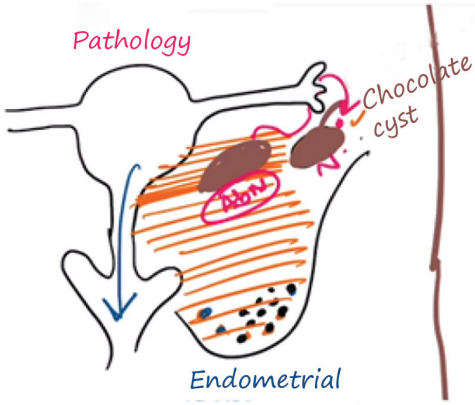
ENDOMETRIOSIS AND ADENOMYOSIS

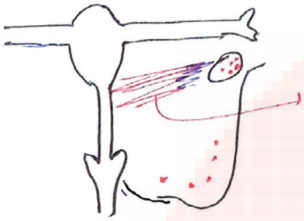
Endometriosis	Adenomyosis
Definition: Occurrence of Endometrial tissue outside uterus. → Most common site of Endometriosis = OVARY (in form of chocolate cyst) → 2nd most common site = Pouch of Douglas (called rectouterine Pouch) → Endometriosis can occur ant where in body → GI tract → Urinary bladder → Lungs → Pleura, nose, kidney, Broad ligament → Endometriosis can occur anywhere in body except spleen.	→ Condition where endometrium is found in Myometrium ↓  Normal uterus Adenomyosis **Figure:** ADENOMYOSIS (Endometriosis Interna)
→ Related to Excessive Estrogen (If estrogen is more) ↓ ↑Chances of Endometriosis	→ Not related to Estrogen
→ More common in obese female → More common in nulliparous female	→ More common in multiparous female
Age = more common 30-35 years	≥ 40 years
Chief complaint: (Most common symptom) Secondary Dysmenorrhea (Pain during menstruation)	**Most common complaint:** → Excessive bleeding called Menorrhagia.
Other complaints → Dyspareunia (Pain during intercourse) → Infertility	→ Secondary dysmenorrhea

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Pathology:





Adhesions
↓
Leads to infertility

Ectopic endometrial tissue
↓
This responds to hormones
↓
During menstruation it will shed.
↓
There is no space for it to come out
↓
Becomes encysted
↓
Adhesions formed

Pathology:



Endometrium is found inside Myometrium
↓
→ Uterus size increases (12-14 weeks pregnancy)
→ Uterus: Uniformly enlarged.

Most common complaint: MENORRHAGIA.

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Cysts in ovary: Brown color

(RBC => Breakdown hemosiderin pigment
↓
Brown
Called as chocolate cyst

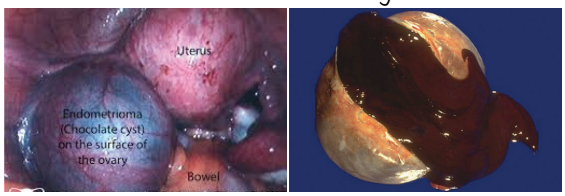


Figure: Chocolate cyst of ovary

Peritoneum: Multiple small blue/Black cysts called as powder burn appearance/gunshot appearance.

Per vaginal Examination
→ Uterus
→ Size = Normal
→ Fixed (it cannot be moved)
→ Adenexa (tubes + ovaries) : Adnexal mass (chocolate mass)

Per vaginal Examination:
→ Uterus: Enlarged (Not more than 12-14 weeks pregnant uterus size
(Symmetrical)
→ Mobile
→ No adnexal mass felt.

IOC: Laparoscopy
↓ What do you see?

Ovary	Peritoneum	Uterosacral ligament
↓	↓	↓
Chocolate cyst	Gunshot appearance	Small cyst called Cobble stone appearance

IOC: MRI
1st Investigation → Transvaginal ultrasound.

Management:
Endometriosis is due to = Excessive estrogen
Drugs to decrease Estrogen:
Dominos: Danazol
Pizza : Progesterone
Got: GnRh (continuous)
Late : Letrozole

Management:
To remove uterus (bulky)
↓
Do hysterectomy (uterus and cervix removal)

If age of patient is less than 45 years	If age of patient ≥ 45 years
↓	↓
Do not remove ovaries	Remove ovaries (Bilateral salphigo-oopheractomy)

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Important Questions

Q1. Endometriosis: Symptoms Triad

Secondary dysmenorrhea (m/c)



Infertility — Dyspareunia

Q2. IOC for Endometriosis: LAPROSCOPY

Q3. Management of Endometriosis – Medical management

Q4. Should chocolate cyst in ovary be removed in a patient of endometriosis?

↓

No

↓

It disappears on its own when Endometriosis is treated.

Q5. Endometriosis is a Hyperestrogenic condition (dependent on Estrogen)

Q6. Smoking decreases level of Estrogen & therefore protects from endometriosis.

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MALE INFERTILITY



Definition: Inability of a couple to conceive even after 1 year of unprotected intercourse.

UNPROTECTED intercourse

- **Primary Infertility**: Female has never conceived
- **Secondary infertility**: If a female was earlier able to conceive but now is unable to conceive then it is secondary infertility

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Reason:

- Male partner → Male Infertility (30-40%)
- Female infertility (40-50%)
- Combined (10%)
- Unknown (10%)

Whenever a couple complains of infertility

↓

1st investigation to do

↓

Semen Analysis

Semen Analysis: (Advice)

→ Abstinence x 3-5 days

→ ↓ come to clinic

→ Container : Masturbate: Specimen

→ Specimen should not be collected in a condom

→ Smoking and alcohol should be avoided in the period of abstinence

Semen Analysis Report

Parameter	Normal	Abnormal	Called as
pH	≥7.2		
Volume	≥1.5 mL	No semen	Aspermia

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Parameter	Normal	Abnormal	Called as
Sperm concentration	≥15 million/mL	Sperm <15 million/mL	Oligospermia
		Sperm <5 million/mL	Severe oligospermia
		No sperms in semen	Azoospermia
Total sperm count	≥39 million/ejaculate		
Motility	≥40%	Less Motility	ASTHENO SPERMIA
Progressive motility	≥32%		
Morphology	≥4% should have normal morphology	More abnormal forms	TERATO SPERMIA/ TERATOZOOSPERMIA
Living/Viable sperms	≥58%	More non living/dead sperms more	NECROSPERMIA

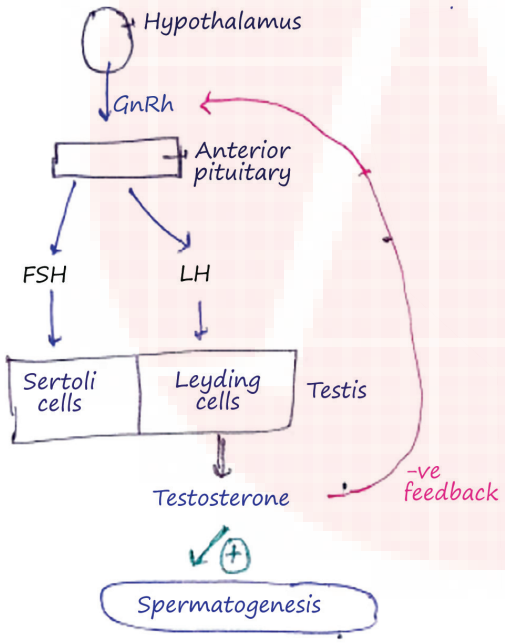
Most Important Criteria is Semen Analysis

Sperm morphology (Most important)
Sperm Motility (2nd most important)
Sperm concentration (3rd most important)

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Cause of Male Infertility



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→ Spermatogenesis
↓
Production of sperms
→ Occurs in: Testis (Seminiferous tubules)
→ Begins in: Puberty
→ Time taken: 70-75 days
→ Most important hormone needed for spermatogenesis: Testosterone

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→ Other hormones needed: LH
FSH

Male infertility could be due to:

Problem in hypothalamus pituitary	Problem in testis	Obstruction of Sperm path
PRETESTICULAR AZOOSPERMIA	Testicular Azoospermia Torsion of testis Testis tumor orchitis	Post-testicular Azoospermia or obstructive Azoospermia Example Vasectomy Absent vas deferens

→ Kallman syndrome (hypothalamic failure)

→ Increase prolactin level

Best Prognosis is Seen in:

In post-testicular azoospermia

↓

LH, FSH } Normal

Hypothalamus, Pituitary, Testotaler, (12 normal) } Normal

Spermatogenesis is normal

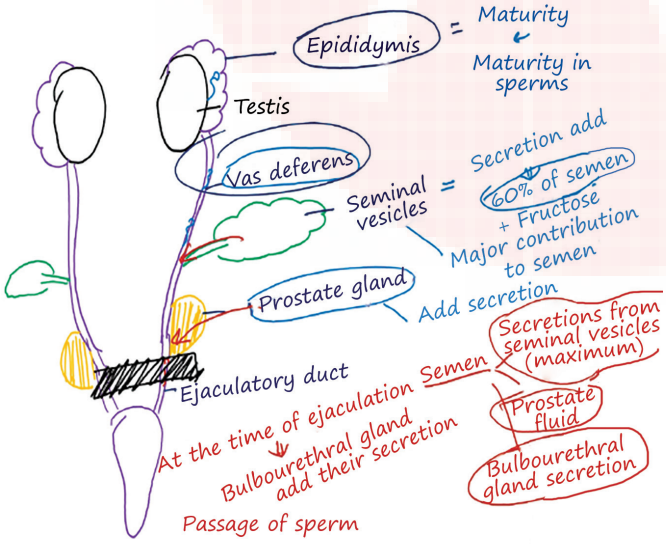
↓

Sperms are being formed normally

↓

But due to some obstruction in passage, they cannot come out

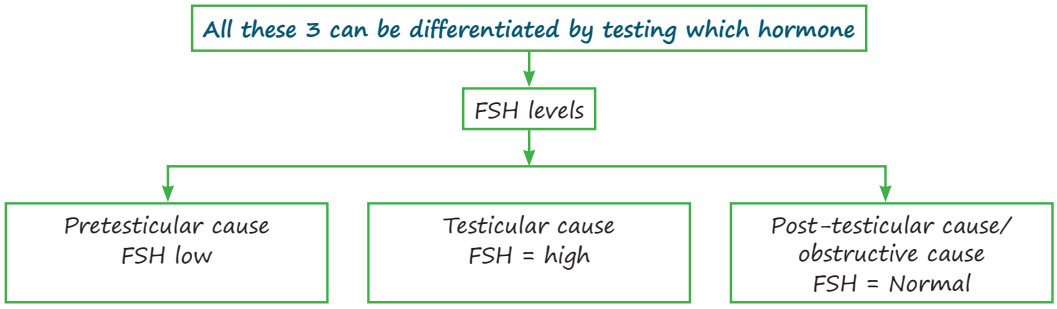
Sperm Pathway



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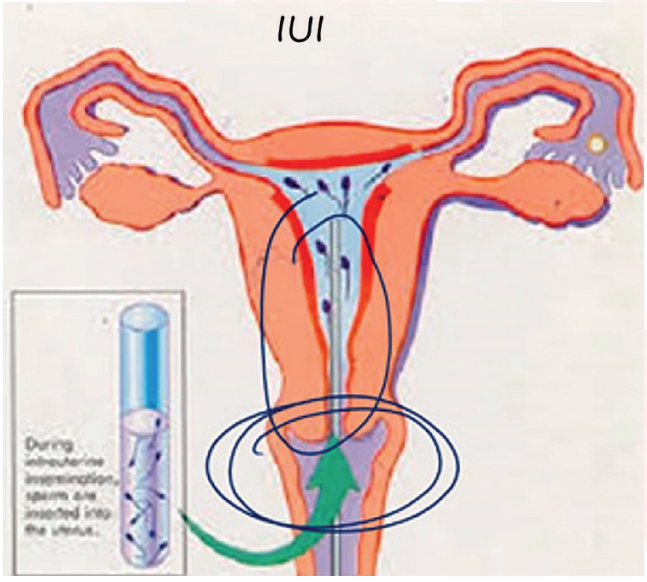
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Treatment of Male Infertility

Problem	Treatment
→ Oligospermia (Sperm count <15 million but >10 million/ mL)	IUI (Intrauterine insemination)
→ Sperm count <10 million/mL but >5 million/ mL	IUF (In vitro fertilization)
→ Severe oligospermia (<5 million/mL)	ICSI (intracytoplasmic sperm injection)



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IUI (Intrauterine Insemination)

Method: At the time of ovulation in female

1. Male partner: Ejaculate in a container

2. **Wash and process** the semen

↓

Washed and processed sperms are taken

↓

With a sterile catheter

3. The sermen is slowly introduced in female's uterine cavity
4. Patient is asked to lay supine for 15 min

IUI
- IUI-4 (intrauterine insemination with husband semen)
- IUI-D (intrauterine insemination with Donor semen)

***Minimum sperm concentration needed for IUI**

↓

10 million/mL

IUI (Intra uterine Insemination)

Indication	Not done
1. Male partner sperm Concentration 10-15 million/mL	→ <10 million/mL sperm concentration
2. In females in which cervix has anti sperm antibodies	→ Severe oligospermia
3. Males have ejaculatory problem	→ Azoospermia
4. Unexplained infertility	→ In females whose tubes are blocked

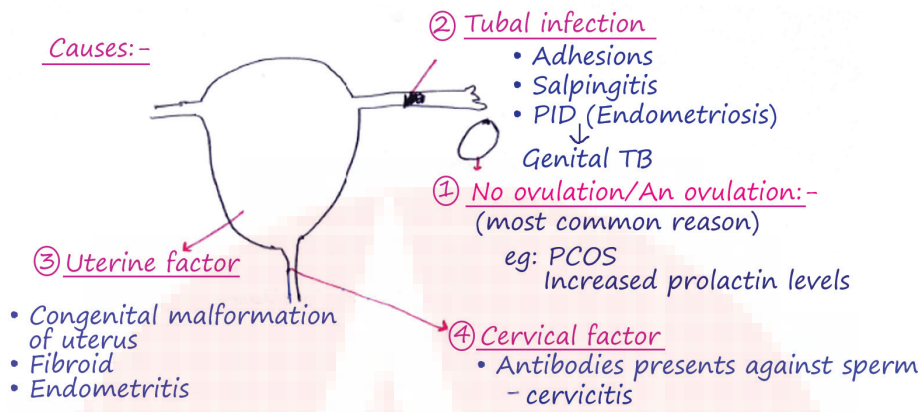
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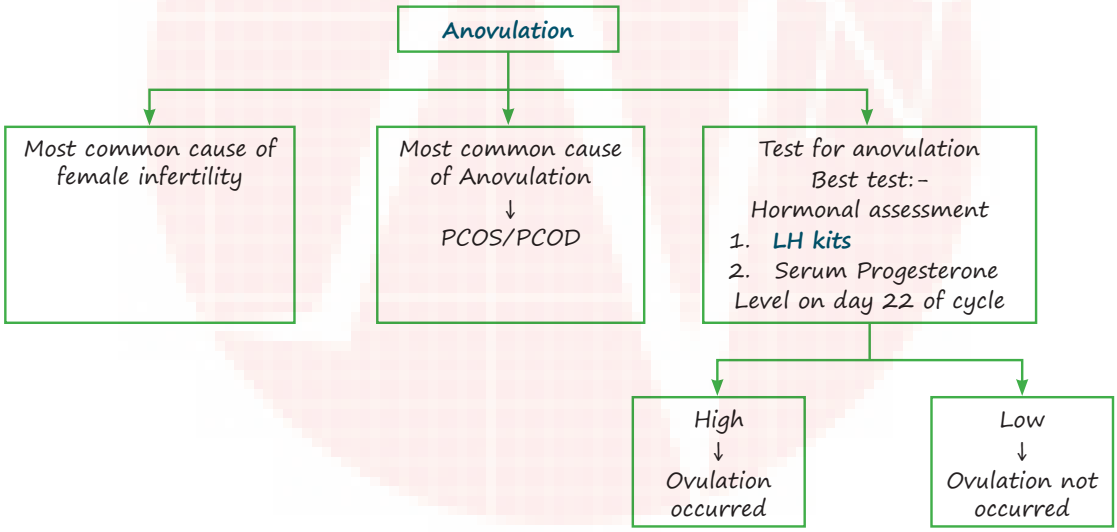
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FEMALE INFERTILITY



1. **Ovarian cause:**



Most Common Done Test

Special transvaginal ultrasound called **Follicular monitoring**

→ Start doing it from day 10 of cycle

→ Do every alternate day

→ Daily: See follicles growing in size by 1-2 mm/day

→ When follicles reach = 18-20 mm size

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↓

Suddenly

1. Size of follicles decreases
2. Fluid in pouch of Douglas
3. Endometrium = 3 layered (TRILAMINAR appearance)

} Signs of ovulation on ultrasound

Management of Anovulation:

↓

Easily treated by

↓

Ovulation Inducing drugs

Eg: Clomiphene citrate

→ Clomiphene citrate

→ Letrozole

→ Synthetic LH and FSH called as hmg (Human menopausal gonadotropin)

→ Pulsatile GuRH

→ Most commonly used drug for anovulation/PCOS treatment: Clomiphene citrate

→ Best drug for anovulation/PCOS treatment: Letrozole

How to Give Clomiphene?

Starting dose : 50 mcg/Day

Maximum dose : 100 mcg/Day

Given from : Day 5- day 9

or

Day 2 - Day 6

Day 10 = Do follicular monitoring

↓

Due to clomiphene

↓

Multiple follicles grow

↓

When follicles reach 18-20 mm in size

↓

Give inj. HCG to patient

↓ HCG structurally + functionally same toLH

Acts like LH surge

↓

Ovulation (90% cases)

Side effect of clomiphene = Multifetal pregnancy/Twins (5-8%)

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→ In clomiphene Induced cycle, which hormone acts like ovulation trigger? hCG

→ Percentage of female ovulate with clomiphene 90%

→ Percentage of female who conceive after giving clomiphene 40 – 50%

→ How many hours after injection HCG patient ovulates?

Inj HCG $\xrightarrow{32\text{-}36\ hrs}$ Ovulate

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Tubal Infertility

↓

Means due to some reason the tubes are blocked/blockage

↓

Treatment is needed only if both tubes are blocked

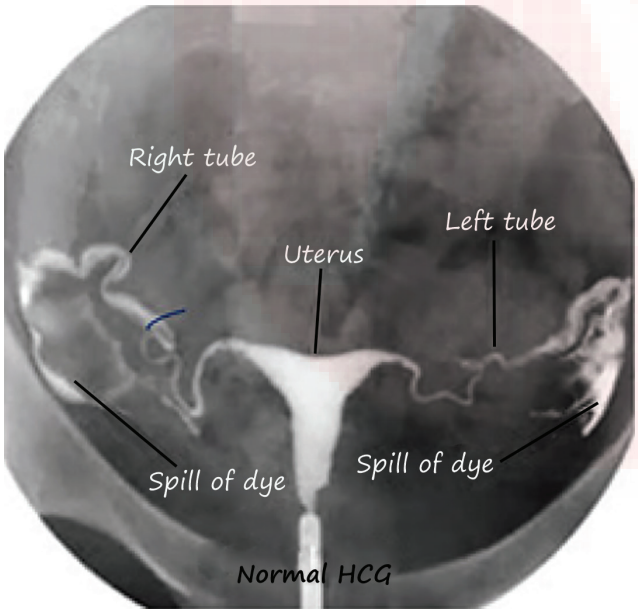
→ Reasons for tube blockage

1. Infection - salpingitis
2. PID
3. Genital TB
4. Endometriosis

IOC for Tubal infertility

Hysterosalpingography (Hsg)

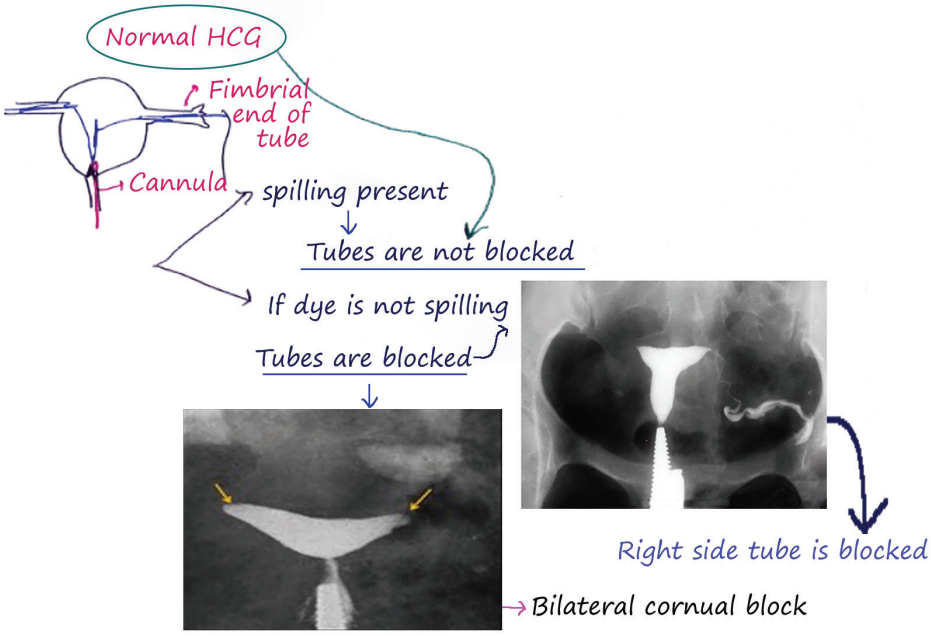
HSG (hysterosalpingography): Radiopaque dye is put in the uterus with help of cannula called as LEECH Wilkinson cannula and then serial X-rays are done to see whether dye comes out of tube or not.



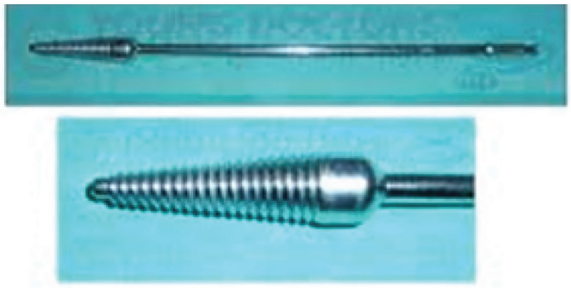
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Leech wilkinson's cannula/hysterosalpingography cannula



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HSG Important Details

1. Done on day 10 of cycle (day 7-day 10)/Pre ovulatory phase Never done after ovulation
2. Cannula = leech Wilkinson cannula
3. No anesthesia needed
4. Painful → Analgesics are given
5. ***Contraindications of HSG:***
    1. Pregnancy
    2. Active genital TB
    3. PID
    4. Allergy to dye

Treatment of infertility due to blocked tubes

↓

No treatment to relieve the block

↓

Only option → IVF (in vitro fertilization)

IUI (Intrauterine insemination) is not useful in this case

Cervical infertility

↓

In some females: In cervix = antibodies are present against sperms

↓

Called as immunological cause of infertility

Management: Bypass the area of cervix by **Intra uterine insemination**

Unexplained Infertility Treatment

Clomiphene + inj HCG —(after 32 -36 hrs)→ Intrauterine insemination (IUI)

(when follicles becomes 18-20 mm)

IVF (In vitro fertilization)

Male partner

↓

Semen specimen

↓

Sperms process

Female partner

↓

Clomiphene days 5 - Day 9

↓

Follicular monitoring from day 10

↓

When follicle reaches 18-20 mm in size

↓

Injection hCG to trigger ovulation

↓

After 32-36 hrs ovulation occurs

↓

Secondary oocyte Pickup under USG guidance

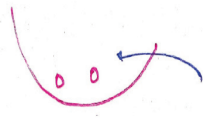
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Per oocyte = Put 50,000 to 1.5 lakh sperms

Secondary oocyte

↓

Further action occurs in petri dish

(Outside female's baby)

↓

Zygote formed

↓

Day 3= 8 cells stage

Day 5 = Blastocyst stage

↓

Transferred back into uterus

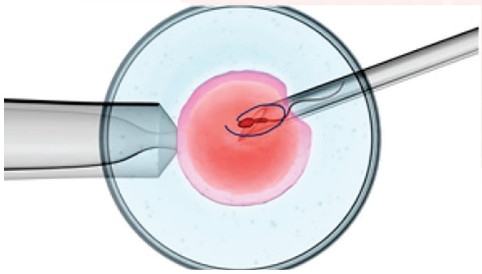
2 cms below fundus (site of implantation)

Success rate = 20-30%

Cumulate success rate: 40-50%

IVF done	Not done
1. Both tubes of female are blocked	1. Males sperm concentration <5 million /mL (severe oligospermia
2. Female uterus absent eg: Mullerian agenesis	2. Absent sperms in semen (Azoospermia)
3. Males with sperm concentration between 5-10 million/ mL	3. Anovulation
4. If IUI has failed x 3 times	

Intra Cytoplasmic Sperm Injection (ICSI)



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Its entire procedure is same but instead of putting sperms in petridish

↓

Take/Sperm and inject in cytoplasm of oocyte

↓called as

ICSI (intracytoplasmic sperm injection)

It is done in case of:

→ Severe oligospermia

→ Per oocyte only 1 sperm needed

→ Repeated IVF failure

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PROLAPSE

Definition (0:42)

Displacement of an organ from its normal anatomical position.

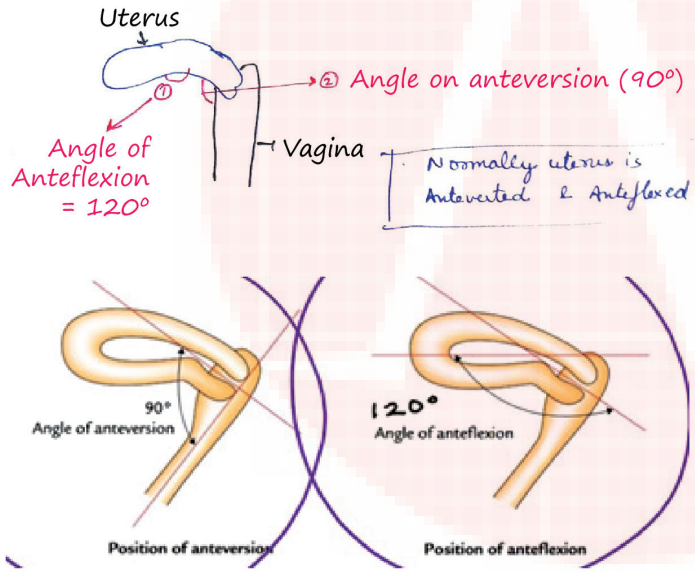
How uterus remains in its normal anatomical Position?

↓

Because of three kinds of supports of uterus.

1. Mechanical support
2. Ligaments that support uterus
3. Muscles supporting uterus

What is the Normal Anatomical Position of Uterus (4:50)?



Supports of Uterus (6:30)

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A. Mechanical Support (6.36)

Because uterus is Anteverted and Anteflexed

↓

This position prevents prolapse

↓

The First step in Prolapse is

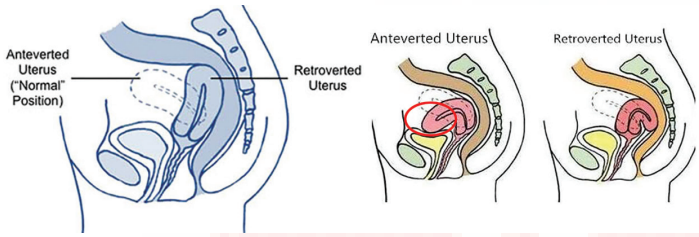
↓

Retroversion of uterus.

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Retroversions of Uterus



Anteverted uterus

↓

Fundus points towards pubic symphysis (Anteriorly)

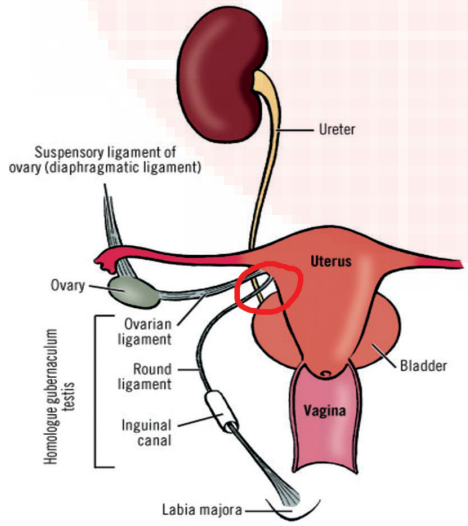
Retroverted uterus

↓

Fundus points towards sacral Promontory (posteriorly)

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Round Ligament (9:18)



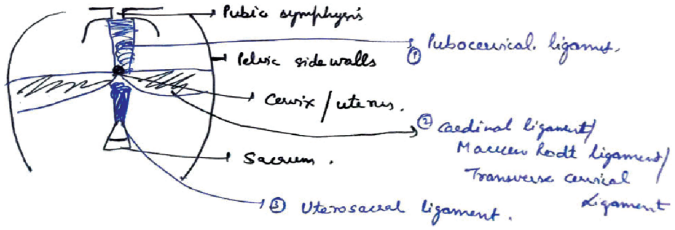
→ Arises from angle of uterus and get inserted in Labia Majora

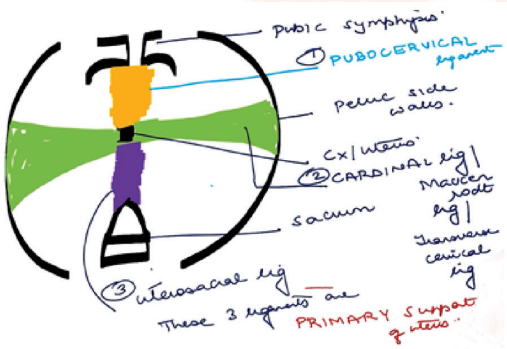
→ Round Ligament = "**Homologous to Gubernaculum of Testis in males**"

→ **Role:** Helps to keep the uterus in Anteverted position

→ Therefore, it indirectly supports the uterus OR is it secondary support of uterus.

B. Ligaments Supporting the Uterus (13:39)





These 3 ligaments are the Primary support of uterus.

Important Questions

→ TRIRADIATE ligament:

1. Pubocervical ligament
2. Cardinal ligament (most important)
3. Uterosacral ligament

→ These 3 ligaments are called as:

Primary support of uterus

→ Most important ligament supporting uterus:

Cardinal ligament > Uterosacral ligament

→ Secondary support

Round ligament

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Ligament which does not support uterus at all:

↓

Broad ligament

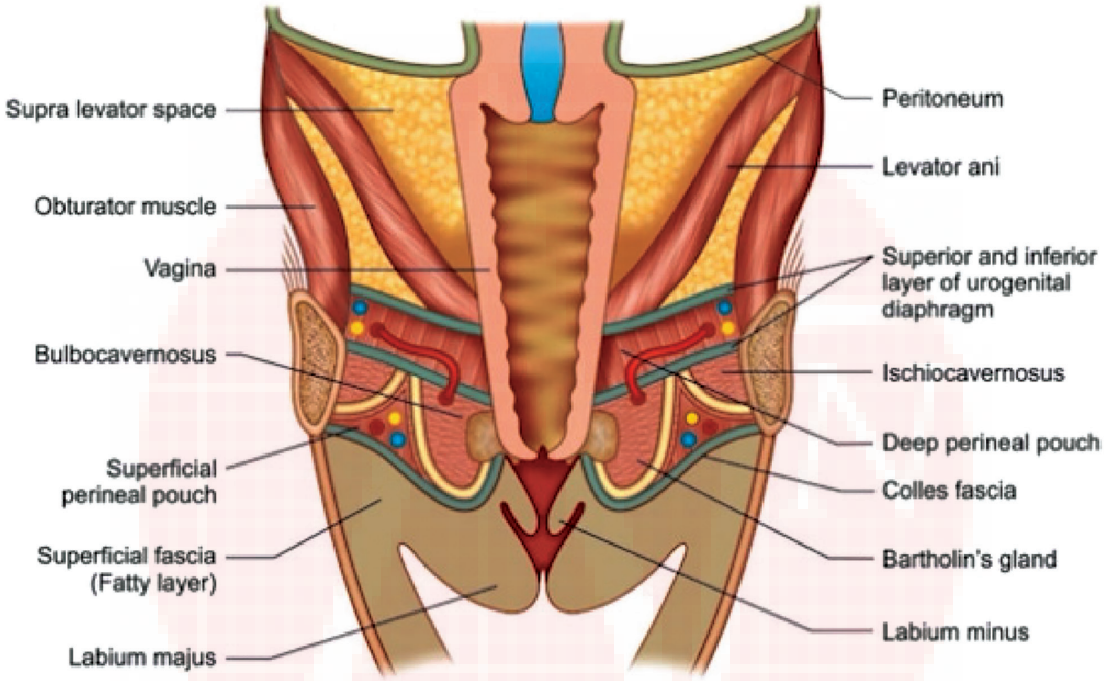
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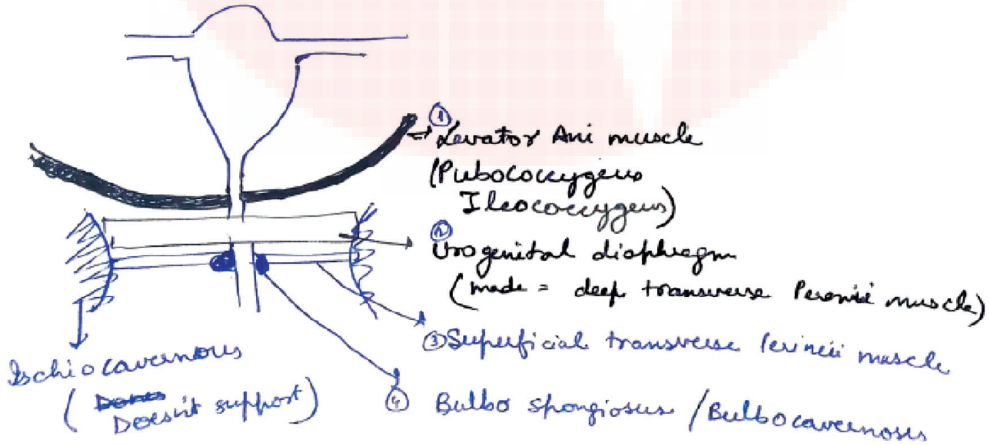
It is thin peritoneal fold
which extends from sides of uterus
to the pelvic side wall.

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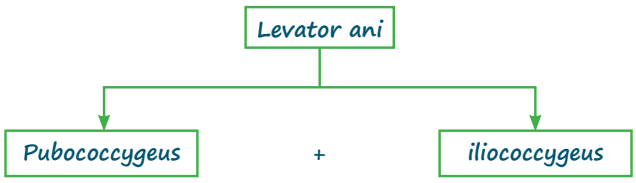
C. Muscles Supporting Uterus (23:39)





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→ Most Important muscle that support uterus:



Ischiococcygeus is not a part of Levator ani muscle.

→ Muscles which support uterus:

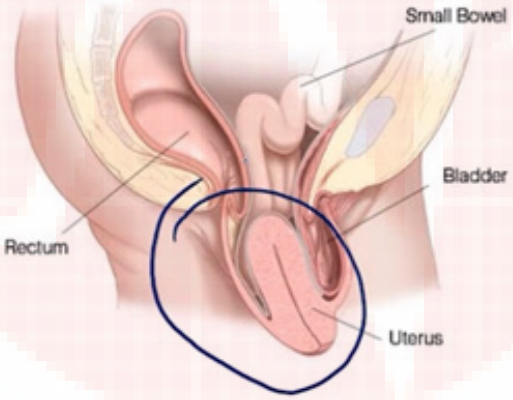
1. Levator ani
2. Deep Transverse Perineal → Present in midline
3. Superficial Transverse Perineal → Attached to Perineal body
4. Bulbospongiosus
5. External urinary sphincter
   External anal sphincter

→ Muscles which do not support uterus:

1. Ischiocavernosus
2. Ischiococcygeus

→ Overall most important support of uterus — Levator ani muscle

Prolapse of Uterus (33:24)



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Uterovaginal Prolapse





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Prolapse occurs

↓

Muscles/Ligaments become weak

↓

Due to Menopause → Prolapse is problem of Elderly & multiparous female.

Repeated childbirth → Especially

- → Obstructed labor
- → Prolonged labor
- → Perineal tear
- → Instrumental delivery

Other Risk Factors

1. Cigarette smoking
2. Chronic increase in intra-abdominal pressure
3. Spinal cord injury
4. Connective tissue disorder.

Rarely

Prolapse occurs in young, nulliparous females

↓

Called as:-

Congenital prolapse

↓

Risk factor

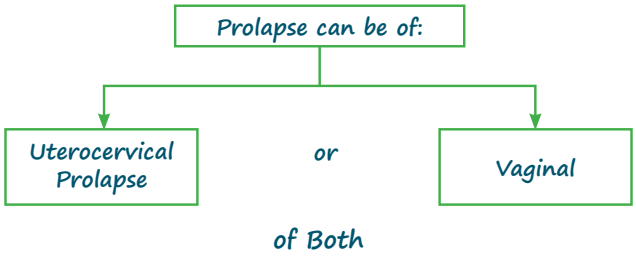
↓

Connective tissue disorder spina bifida

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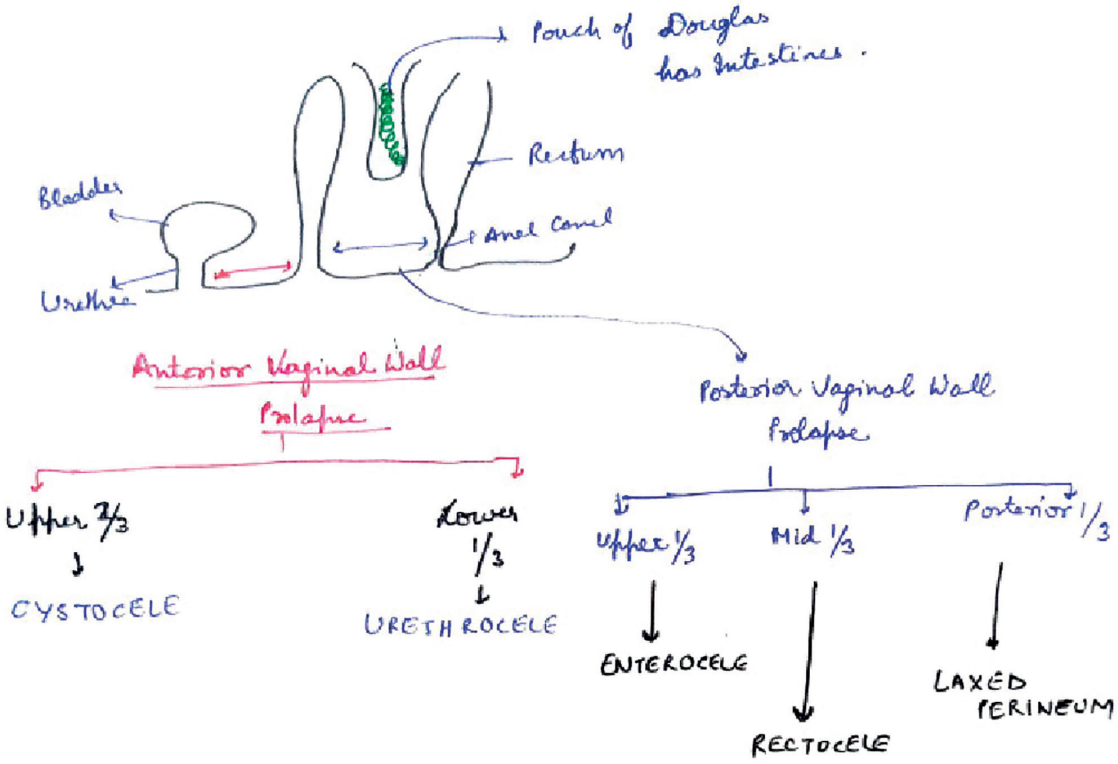
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Vaginal Prolapse (38:08)



Management of Vaginal Prolapse (43:21)

Same for all age of females.

Type of Vaginal Prolapse	Surgery
→ Cystocele/Ureterocele	→ Anterior colporrhaphy
→ Enterocele	→ Moscowitz repair/Halban repair/MCCALL culdoplasty
→ Rectocele/Laxed Perineum	→ Posterior colpoperineorrhaphy

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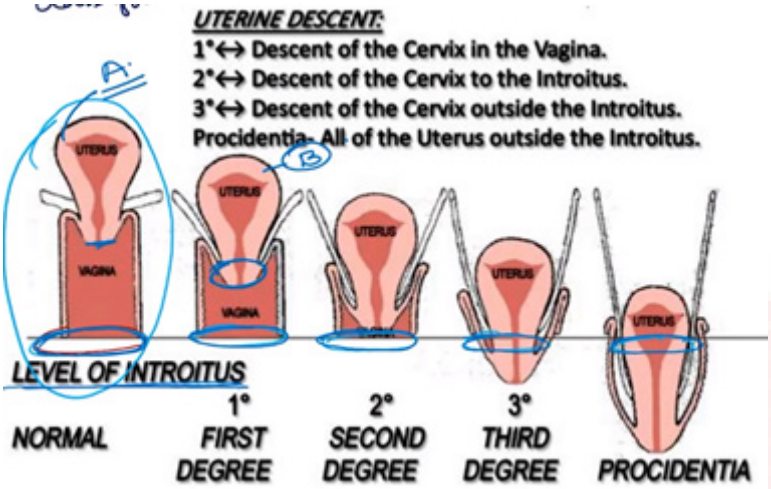
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Uterine Prolapse (47:31)

UTERO + Cervical prolapse

Classification = show classification

Reference Point: Introitus (Vagina open)



Degrees	Meaning
GRADE 0	Normal position of uterus and cervix No Prolapse
GRADE 1	→ Cervix descends into vagina but not uptil level of introitus
GRADE 2	→ Cervix is uptil the level of introitus
GRADE 3	→ Cervix is outside the vagina (introitus)
GRADE 4	→ Entire cervix of uterus are outside vagina (PROCIDENTIA)

Symptoms in Prolapse (52:11)

1. Something coming out of vagina
2. Backache is due to stretching of uterosacral ligaments
3. Decubitus ulcer → (d/t venous concession)

due to
↓
In Prolapsed uterus
↓
Uterus hang outside
↓
Venous return is hampered
↓
VENOUS CONGESTION
↓
Ulcer

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Ulcer is not due to:- Friction between prolapsed uterus and thigh.

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Management of Decubitus Ulcer

Daily packing of uterus with sterile gauze pack

Acryflavin → Antiseptic agent + Glycerine → Hygroscopic agent

Management of Uterine Prolapse (59:46)

Depends on 'age' + need for future pregnancy or not

Condition	Management
→ Young female with prolapse who wants to have pregnancy in future or congenital prolapse	 Artificial support in form of 'SLING' → MERSILENE TAPE "SLING SURGERY" CERVICOPEXY"
→ Female who <40 years does not desire pregnancy but she wants to keep menstruating	FOTHERGILL SURGERY/ MANCHESTER Surgery + Cervix is amputed Uterus is stitched to vagina.
→ ≥40 years = Does not want pregnancy + Does not want to menstruate	Vaginal Hysterectomy (Uterus & Cervix removal) Major Surgery - done under general Anesthesia.
→ ≥60-65 years with diabetes heart failure, hypertension + You cannot give general Anesthesia	Stitch the Anterior & Posterior wall of Vagina → Done under Local Anesthesia ↓ called as LEFORT colpocleisis

Young Female with Prolapse

1. During pregnancy
2. Immediately after delivery
3. Unfit for surgery
4. Refusing for surgery

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Management

Ring pessary → (kept at the level of External os)

↓ (Temporary Treatment, changed after 3 months)

Space occupying device

↓

Which does not allow uterus to enter into vagina



1:18:45

Best method to prevent Prolapse

↓

Perineal exercises
(Perineal muscles get strengthened)

↓

KEGEL's exercises



Advice

→ Pregnant female (after 4 month of pregnancy)

→ After delivery

Please Note

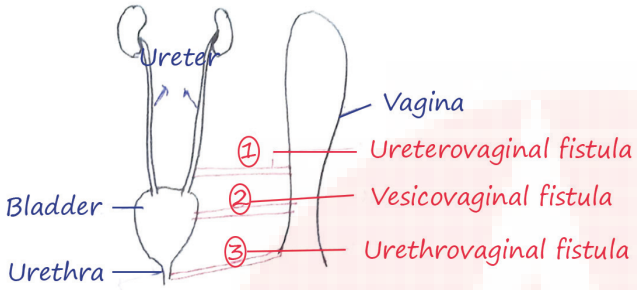
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Student's Space

GENITOURINARY FISTULA

Fistula: It is an abnormally/surgically made passage between two hollow organs or between an organ & surface.

Urinary fistula (3 types)



Types of urinary fistula	Connect
1. Ureterovaginal fistula	Ureter to vagina
2. Vesicovaginal fistula	Bladder to vagina
3. Urethrovaginal fistula	Urethra to vagina

Complain	Type of fistula
1. **Patient complains:** Continuous dribbling of urine from vagina + Normal urination also	Uretero vaginal fistula
2. **Patient complains:** Continuous dribbling of urine from vagina but there is no normal urination because her bladder is never full.	Vesico vaginal fistula.
3. **Patient complains:** Patient says there is no continuous dribbling of urine from vagina but when she sits for urination, urine comes from her vagina & urethra	**Why?** Because urine comes in urethra only at time of urination, otherwise normally urethra is empty → Urethrovaginal fistula

Test: Methylene blue 3 swab test (helps in distinguishing between the fistula)

Procedure: Take 3 cotton swabs

↓

Place them: In vagina

1st swab = High = Correspond to Ureterovaginal fistula

2nd Swab = Mild ≅ Correspond to Vesicovaginal fistula

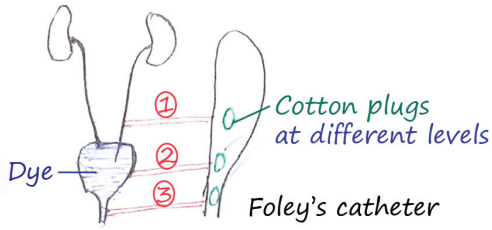
3rd Swab = Down = Correspond to Urethrovaginal fistula

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Now with the help of Foley's catheter

↓

Put Methylene Blue dye in → Urinary Bladder
→ Urethra.

Observation of test	Conclusion
Uppermost cotton swab is wet with urine but is NOT blue in color	Ureterovaginal fistula
Middle cotton swab is wet with urine & is BLUE in color	Vesicovaginal fistula
Lower most cotton swab is wet and is blue in color	Urethrovaginal fistula

Vesicovaginal Fistule

→ Most common fistula.

→ Patient complains: Continuous dribbling of urine from vagina

but

No normal urination

1. Wetness in external genitalia
2. Excoriation

→ Methylene blue 3 swab test:

Middle cotton swab will be wet

+

Blue in colour

Most common cause of VVF (Vesicovaginal fistula)

- Developed countries → Surgery (like hysterectomy)
- Developing countries (like India) → Obstructed labor ↓ after 4-5 days → Fistula

Prevent: Put foley's catheter in bladder for 4-5 days after obstructed labor.

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Other Causes

→ Forceps delivery

→ Radiation

IOC:

To see bladder from inside: CYSTOSCOPY

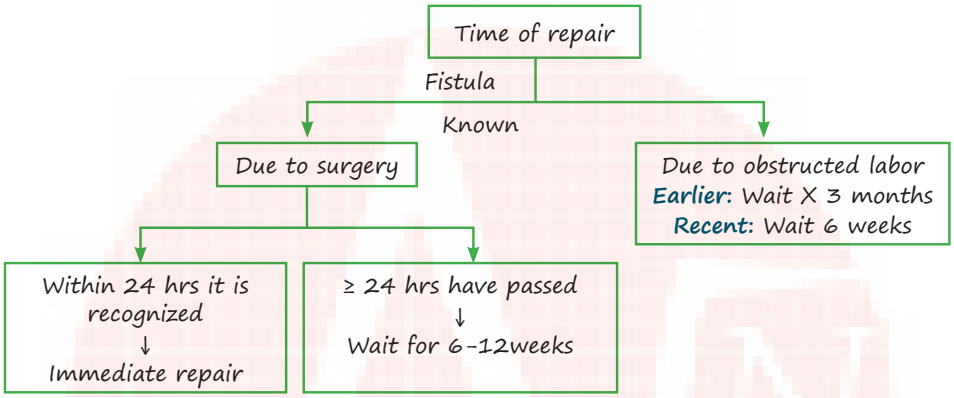
In patient of vesico vaginal fistula:-

Best Method to collect urine

↓

Foley's catheterization

Management: Surgical repair



Post Operative Care

1. Continuous drainage of bladder by Foley's catheter × 10 - 14 days
2. After removing catheter => Advise the patient to pass urine every 2 hours.

Advise on Discharge

1. Avoid Intercourse × 3 months
2. Avoid pregnancy × 1 year
3. Have to pass urine frequently
4. Whenever patient becomes pregnant

↓

Compulsory for her to visit hospital for delivery

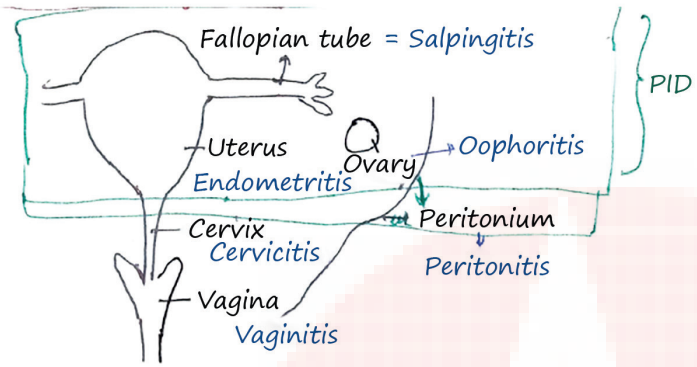
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PELVIC INFLAMMATORY DISEASE (PID)



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Definition of PID: Inflammation of upper female reproductive tract. It includes:

1. Peritonitis
2. Oophoritis
3. Salpingitis
4. Endometritis

} PID

→ Most common cause of PID world wide/India = Chlamydia trachomatis followed by Neisseria gonorrheae.

→ Most common cause of acute PID: Neisseria Gonorrheae/ Gonococcal infection.

→ Most Common cause of PID in menopausal female: E. coli

→ Most common cause of PID in IUCD user: Actinomyces

→ Most common cause of PID in IUCD user: Actinomyces

Other organisms which lead to PID:

→ KLEBSIELLA

→ Group B streptococci

→ Anaerobic organism

Most common route of spread of PID:

↓

Ascending infection along with sperms

↓

It is sexually transmitted disease

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Except

All PID's are transmitted sexually except

↓

Genital TB

M/c route of spread of genital TB: By blood (Hematogenous spread)

M/c PID in a VIRGIN female: Genital TB

.

Risk factor for PID	Protective factor
→ Multiple partners → Early age of intercourse (10-18 years) → Sex with a partner having PID → History of instrumentation → Low socioeconomic status → Past history of PID	Barrier Methods of contraceptive ↓ E.g, Condoms

CDC Criteria for PID

Minimum criteria	Supportive criteria	Definitive Diagnosis
(any 1 should be present) → Uterus tenderness Or → Cervical movement tenderness Or → Adnexal tenderness	(any 1 should be present) → Fever ≥ 101.6°F → ↑ESR → ↑C-Reactive protein → Mucopurulant discharge → Discharge = Abundant WBC present → Definitive test for chlamydia/ Gonorrhea comes to be positive.	→ USG: Normally tubes are not seen on ultrasound but in case of PID, due to infection ↓ Discharge is accumulated in Tubes  ↓Dilated tube avoid & ♀ Dilated Ovoid → Laparoscopy: Pus can be coming out from tube → Endometrial biopsy ↓ Endometritis will be present

→ IOC for PID: Laparoscopy

→ Most common symptom of PID: Pain in Abdomen

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Treatment

General Treatment:

1. Bed Rest
2. To keep hydrated

↓

Patient is unable to take orally

↓

I/V fluids

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Antibiotics

Principle: Most common cause: Chlamydia > Gonorrhea > Anaerobic organism

Regime: Inj. Ceftriaxone (250 mg once 1/m)
+
Tab. Doxycycline (100 mg < BD × 14 days)
+
Tab Metronidazole (500 mg < BD × 14 days)

} Blanket treatment or Syndrome approach

Kit	Number	Colour	Content
PID	Kit No. 6	Yellow colour	→ Ceftriaxone (Tab) 400mg 1 Tab → Doxycycline 100 mg ☾ BO × 14 day → Tab. Metronidazole 500 mg ☾ BD × 14 days

Indications of Hospitalization

P = Pregnant female with PID
A = Abscess formed → Pelvic abscess, Tub. ovarian
S = Surgical cause like appendicitis cannot be ruled out
T → Oral treatment is Ineffective, Patient cannot tolerate oral treatment.

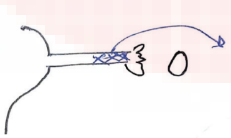
Parenteral injection:
Inj. Cefoxitin 2g i/v 6 hourly
+
Inj. Doxycycline 100 mg i/v 12 hourly

Indications for Surgery in PID

1. Tubo ovarian abscess
2. Pelvic abscess
3. Peritonitis

If abscess does not resolve within 48-72 hours of antibiotic Surgery (brain age) called as: COLPOTOMY

Complication of PID



PID = adhesions for
Tubal blockage

Complication →
1. Ectopic pregnancy
3. Chronic pelvic pain
2. Infertility

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→ Avoid having multiple sex partners.
→ It partner has infection → advice to get treated
→ Advise female → At time of intercourse use a condom.

Vaginitis

→ **Means:** Infection & inflammation of vagina.
→ **Vaginal defense:** At puberty in all females in vagina

↓

DODERLEIN bacilli appear

↓

Convert the glycogen present in vaginal epithelium into Lactic acid

↓

Vagina pH = acidic (H.S)

↓

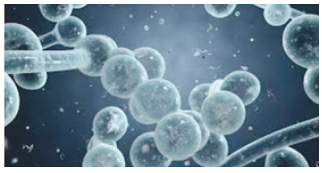
Pathogenic organisms cannot survive

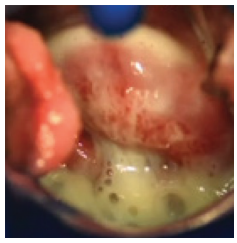
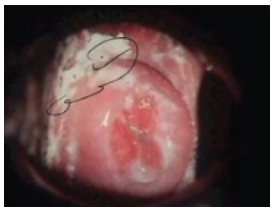
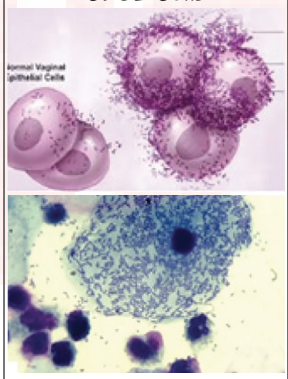
In case of vaginitis

↓

DODERLIEN Bacilli ↓

Vaginitis

Points	TRICHOMONAS vaginitis	Bacterial vaginitis	Candidiasis
→ Most common → MC vaginitis in diabetic females → MC vaginitis in pregnancy → MC vaginitis in a female who uses. → OCP → Antibiotics → Steroids		✓	✓ ✓ ✓
Causative organism	Trichomonas vaginitis  Flagellated Protozoa	→ Alteration in vaginal flora → Doderlein bacilli are replaced by → Gardenella → Mobilincus No inflammation	Fungus ↓ Candida albicans 

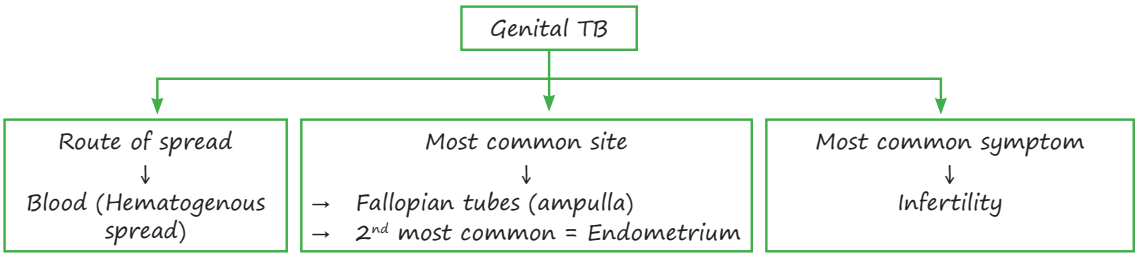
Points	TRICHOMONAS vaginitis	Bacterial vaginitis	Candidiasis
Symptoms	→ Greenish yellow copious discharge  → Foul small → Itching present ↓ (Pruritic present)	→ White/Grey colour discharge  → Foul smell → No inflammation ↓ No itching	→ Discharge = White appearance cottage cheese like  → Intense itching → Pain during urination ↓ DYSURIA
pH of discharge	Between 5-6	≥ 4.5	< 4.5
Add 10% KOH to discharge	×	Get fishy odour ↓ Whiff test positive	×
Signs	Vagina appears Red ↓ Like a strawberry Strawberry vagina  Trichomonas vag		
IOC	Saline On saline Microscopy: Something Moving	Microscopy ↓ On Saline Microscopy CLUE Cells  ↓ Vaginal epithelium cells to which bacteria are attached	On saline microscopy ↓ Fungus seen
Confirmatory Test	Culture	A muscles criteria	Culture
Treatment	Tab Metronidazole	Tab. Metronidazole	Tab. Fluconazole
STD (Sexually transmitted disease) Male Partner treatment	✓ ✓	× ×	+/- +/-

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Important Points

1. PID is STD except genital TB (Tuberculosis).



Recurrent Candidiasis:

→ If in any female candidiasis occurs ≥ 4 episodes in a year.

→ DOC - Fluconazole.

Student's Space

FAMILY PLANNING METHODS/ CONTRACEPTION (PART-1)



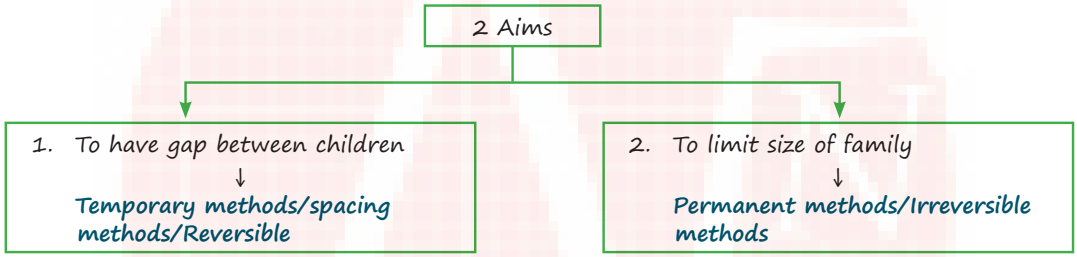
Contraception

→ India was the first country in 1952 to initiate a family planning programme.

What is Planned Family

1. 1st child birth should be after mother is ≥ 20 years of age
2. Minimum of 3 years of gap between 2 children
3. Limited size of family (India 2, 3)

So contraceptive Methods



Some contraceptives have other benefits also like decreasing chances of STD (Sexually transmitted disease), Decrease bleeding.

↓

These benefits are called as Non contraceptive benefits

→ To know the efficacy of contraceptive: Indication used is

PEARL INDEX

↓

Number of accidental pregnancies which occur if 100 women use the same contraceptive for 1 year.

Unit = HWY = Hundred women year

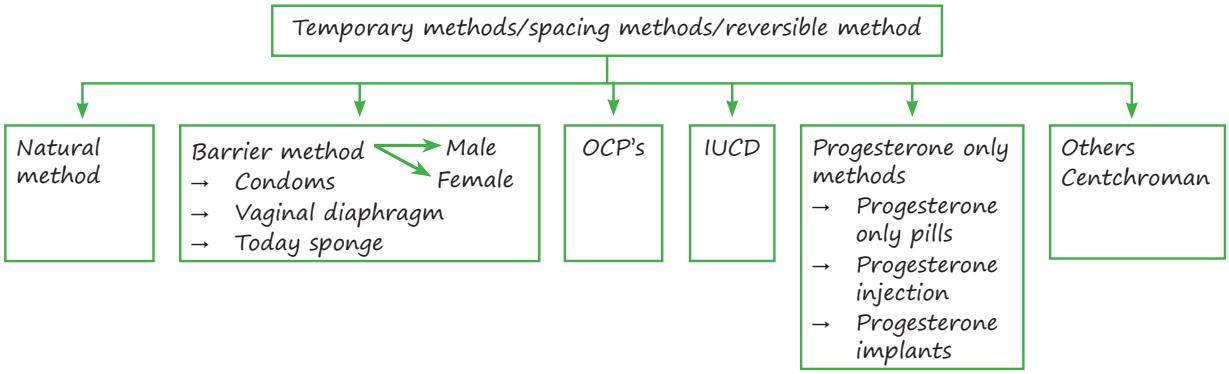
→ Most effective contraceptive/Least failure rate = Implants 0.05
Vasectomy 0.1
Progesterone IUCD (Mirena) 0.2

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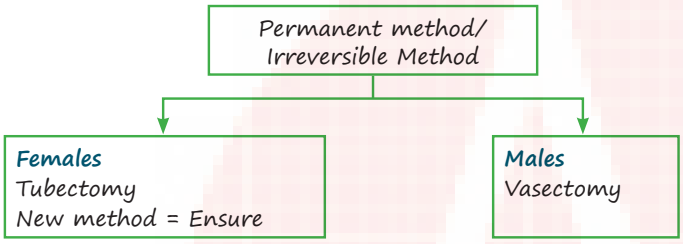
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LARC (Long acting Reversible contraceptive

1. IUCD
2. Progesterone injection
3. Progesterone implant



Student's Space

Natural Method

→ Couple don't use any contraceptive

→ They have knowledge about when it is safe to have intercourse & when to avoid based on hormonal changes

↓

Apply this knowledge

↓

Have timed intercourse

↓

Prevent pregnancy

Disadvantages

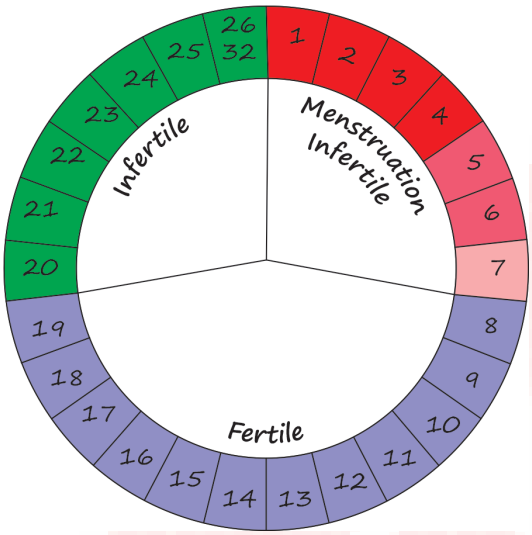
1. Educated couple
2. Motivated couple
3. Can be done if cycles of female are regular
4. High failure rate

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Natural Methods

1. Safe period method/Rhythm method/calendar method
2. COITUS interruptus
3. Cervical mucus method/Billing method
4. Basal body temperature method.

1. Safe Period/calendar Method/Rhythm Method



Basis: Intercourse is safe

1st weak before + 1 week after intercourse

↓

Unsafe Period: Day 8 - Day 19 of cycle

2. **Coitus Interruptus:** Male ejaculates outside the female vagina
3. **Basal body temperature:**

Progesterone → Released at time of ovulation

↑ Basal body temperature by 0.5 to 0.8°F

↓

Measure BBT daily

↓

When it rises

↓

She has ovulated

↓

Avoid intercourse

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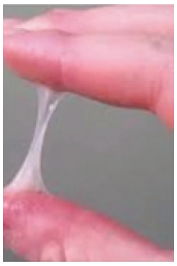
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4. **Cervical mucus Method:**



Estrogen: Cervical mucus: Thin watery, elastic

Progesterone: Cervical mucus: Thick, scanty, Non Elastic

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Barrier Method

1. Male condom
2. Female condom
3. Diaphragm
4. Today sponge

1. Barrier method does not let sperms to come in contact with vagina

   Mechanism of action
2. Prevent fertilization
3. All of them:
   a. Protect against sexually transmitted disease
   b. Protect against pelvic inflammatory disease
   c. Protect against ectopic pregnancy

Only male & female condom protect against HIV and HPV

↓ also protect against

Cancer cervix

4. Failure rate: High
5. Male condom: NIRODH
   Female condom: FC2
   Sponge: Today
   } included in family health programme

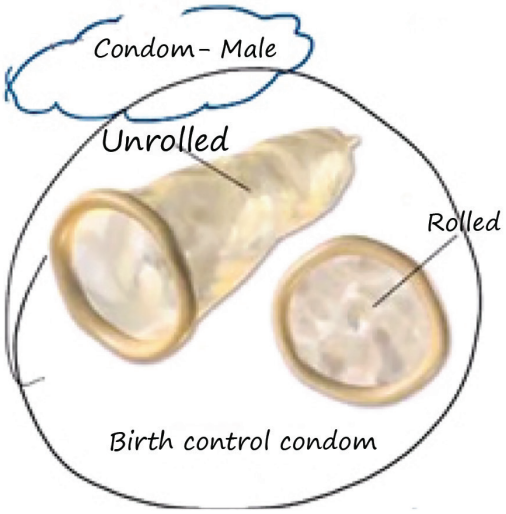
   Diaphragm: Not included in family Planning program
6. All are "one time use" except sponge =

   Sponge can be left in female body for 24 hrs

   ↓

   In these 24 hours: can have intercourse number of times using sponge.

1. Barrier method:



Male Condom = 1. Originally made of latex

↓

Oil based lubricant could not be used.

2. Now made of POLYURETHANE

3. 'NIRODH': included in family planning programme of Government of India.

Biggest advantage: Best method to prevent Transmission of HIV (Now contraceptive benefit)

As a contraceptive it has disadvantages:

1. ↓ Sexual pleasure
2. High failure rate (2-12 HMY)

Most commonly due to incorrect use	Break

3. Can cause contact dermatitis.

2. Female condom = FCI



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FC2 Varieties

FC3 Family planning programe

↓

Made of Nitrile

→ Prelubricated

→ Expensive than male condom

→ Contraindicated in Female who has prolapse

→ Failure rate- 5-20 HWY

→ They decrease chances of HIV & HPV transmission

3. Vaginal diaphragm





1. Not included in National family planning programme
2. Does not decrease HIV Transmission.
3. Has to be left in vagina till 6 hrs after intercourse.
4. If left for more than 24 hours → leads to Toxic shock syndrome.

4. Today sponge:





→ Shape: Mushroom shaped

→ 'Today' → Included in National family planning programme

→ Has 1 gm Non oxynol-9 → SPERMICIDAL agent

↓

Action: Disrupt the cell membrane of sperm

→ Can be left for maximum 24 hrs in female body

↓

Female can have intercourse using

Same sponge any number of times.

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Student's Space

IUCD

→ Intrauterine contraceptive device

→ IUCD: 3 generation available

- 1st generation → Lippes loop (Outdated)
- 2nd generation
  - 1 CuT → CuT 380A
  - 2. MULTILOAD → Also has copper but not 'T' shaped
- 3rd generation → Hormonal
  - MIRENA
  - PROGESTASERT (no longer used)

Identification Mask: Have thread attached

- To know that IUCD is in place
- Removal of device

→ They are inserted once & have long action

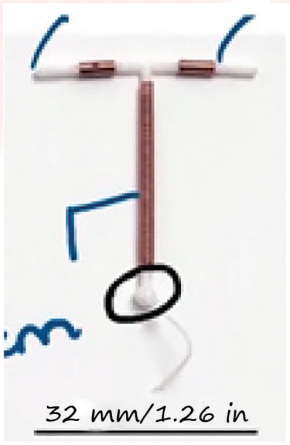
↓

Long acting reversible contraceptive (LARC)

CuT 380A:	10 years
MINENA:	5-7 years
PROGERT assert:	1 years

Student's Space

CuT 380A



→ T shaped

→ Cu wire: surface area = 380 mm2

Therefore CuT380

→ A = Copper present on arms.

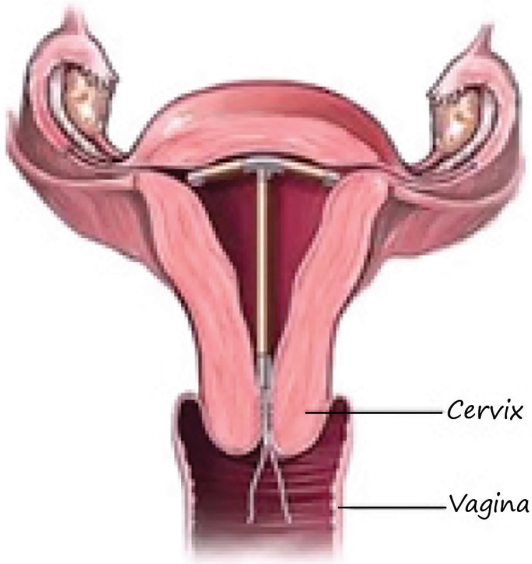
→ Family planning programme = Name of 'PARAGAURD''

Ball: Prevent perforation

Thread

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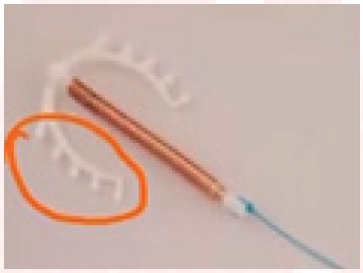
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CuT→ Releases copper

- Mix with cervical discharge ↓ Does not allow sperm to come ↓ Prevent fertilization (Mainly)
- Is harmful for Endometrium ↓ Prevents Implantation

Never Inhibits Ovulation



Copper wire present ↓ Not 'T shaped' ↓

MULTILOAD 2nd generation

- → Has flexible arms
- → Has spurs fins present

} Helps to keep multiload in position and Decrease rate of expulsion.



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→ IUCD: with No copper wire

↓

3rd generation IUCD

↓

MIRENA

↓

Also called as LNG - 20 → Release of LNG 20µg/day

↓

Progesterone = Levonorgestrel

MIRENA: Releases Progesterone

↓

Leads to secretory change in Endometrium & later becomes endometrium atrophy

↓

Prevents implantation

→ No Endometrium = No bleeding → used in case of excessive bleeding also.

Non contraceptive benefit

→ Progesterone => Cervical mucous become thick => Decreases PID chances.

Non Contraceptive Benefit of MIRENA

1. ↓Bleeding → used in female with excessive bleeding
2. Has progesterone = It can be used in

- Hormone replacement therapy
- Treatment of condition where estrogen is more.
  - → Fibroid
  - → Endometriosis

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CuT	MIRENA
→ ↑ chances of PID (most common time: within 1 month of insertion) → M/c PID after IUCD insertion: Actinomyces → Can be used as Emergency contraception → Most common side effect: Bleeding → 2nd most common side effect: Pain Most common reason for removal of IUCD = Pain	→ Has Progesterone => makes cervical mucus thick ↓ ↓ Chances of PID → Not to be used as Emergency Contraceptive → Most common side effect: Irregular Bleeding.
→ Failure Rate → 0.5 - 1%	→ Failure Rate = 0.2%

→ Contraindication for used of IUCD: (CuT + MIRENA)

Infection related	Pregnancy related	Bleeding related
Current PID/History of PID Puerperal sepsis	→ Currently pregnant → Past history of ectopic pregnancy → Past history of molar pregnancy	→ Undiagnosed vaginal blading → Cancer cervix → Cancer Endometrium → Fibroid

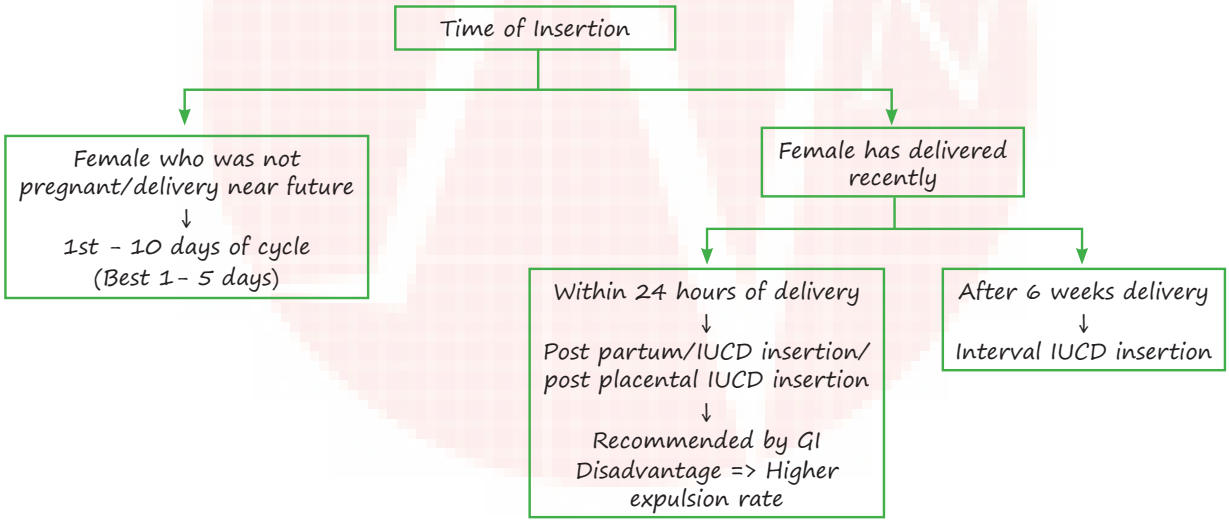
CuT IUCD → Contraindicated in Wilson disease

MIRENA → Contraindicated in Breast cancer

Note:

→ CuT should not be used in female with multiple partner

→ CuT should not be used in severely Anemic female



Student's Space

FAMILY PLANNING METHODS/ CONTRACEPTION (PART-2)

OCP (Oral Combined Pills) = (Estrogen + Progesterone)



Figure: Mala-D

Estrogen + progesterone

↑

1. **Mala D** (21 tab + 7 brown tabled)

   (Iron = ferrous fumarate tablet)

   Social marketing scheme: sold at low cost



Figure: Mala-N

2. **Mala N** (21 tablet of estrogen + progesterone)

↓

No cost

↓

Free distribution by Government of India

Both have Same Composition

E = Ethinyl estradiol = 30 mcg (0.03 mg)

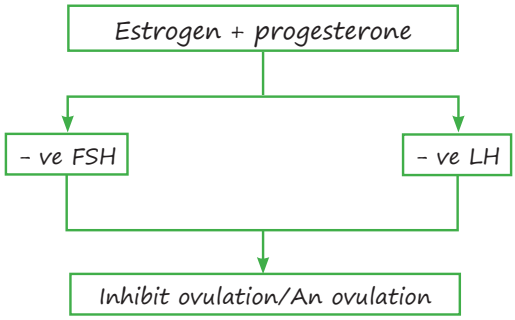
P = levonorgestrel = 0.15 mg

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OCP = ↓ Body's natural estrogen and progesterone

Classification

→ High dose pills = Estrogen ≥ 50 mcg

→ Low dose pills estrogen < 50 mcg (30-35 mcg) Mala D
Mala N

→ Very low dose fills = estrogen < 20 mcq

Natural LH ↓
Natural FSH ↓
Natural Estrogen ↓
Natural Progesterone ↓

← OCP pills affect on natural hormones

OCP decreases body's natural estrogen and progesterone

So when a female uses OCP overall levels of estrogen in her body decrease

That is the reason why: OCP = ↓ Fibroid
↓ Endometriosis
↓ Ovarian cyst
↓ Endometrial cancer
↓ Ovarian cancer
↓ Colon cancer
↓ Benign breast diseases

Due to anovulation = used in treating dysmenorrhea used in treating irregular cycles (Why ??)

How to take OCP: Day 1 of cycle start

↓

Everyday = 1 pill

↓

21 pills

↓

Take till 21 days (3 week)

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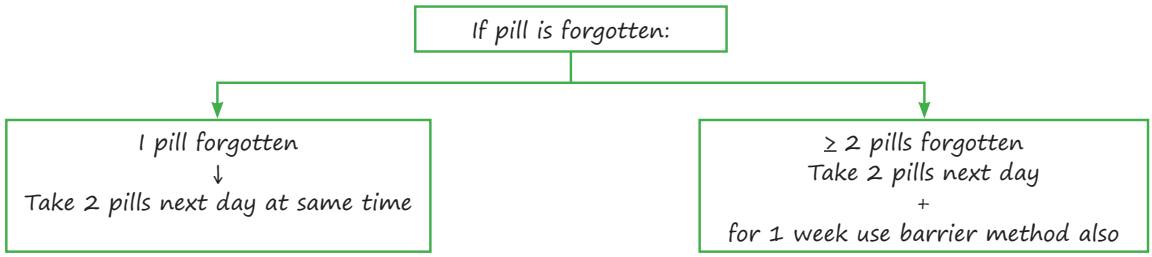
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Then stop: Whenever period comes then start again

Roughly = 3 week on + 1 week off



Disadvantages/Side effect of OCP

Metabolic	Thrombosis	Cancer
Weight gain → Lipid profile abnormal; Depression → Blood pressure ↑ → Cholestasis → Gall stone ↑ → Liver disease ↑	→ OCP ↑ clothing factor ↓ Thrombosis ↓ MI stroke } risk ↑	↓ Cancer cervix ↑ Breast cancer ± Liver cancer ±

Contraindications of OCPs:

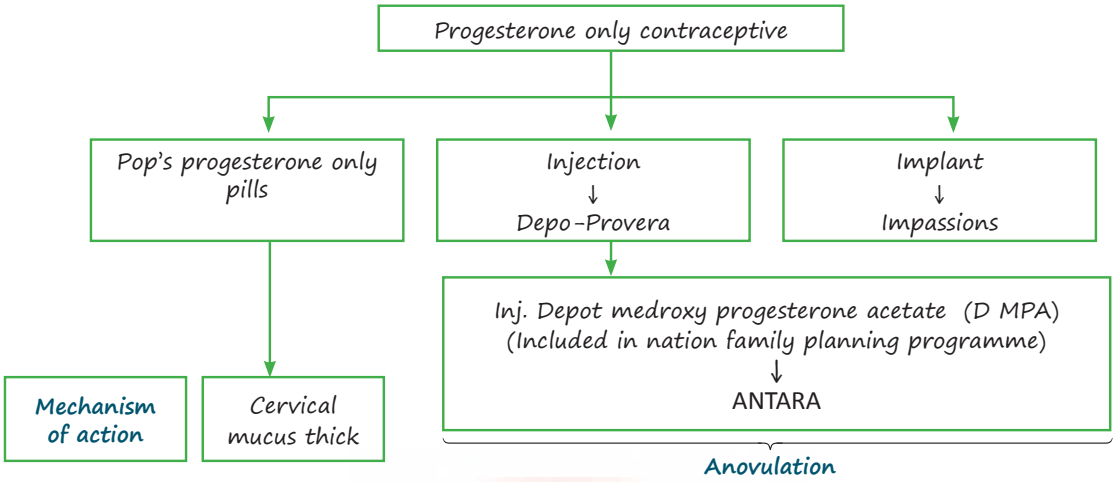
Mnemonic

Banks	:	Breast cancer
Have	:	Hyper triglyceride
Various	:	Undiagnosed vaginal bleeding
Schemes	:	Smoker ≥ age 35 years
To	:	History of thrombosis (MI, stroke)
Provide	:	Pregnancy
Home	:	Hypertension (>160/110 mm Hg)
Loams	:	Liver disease
During	:	Diabetes with vasculopathy
May	:	Migraine with aura

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Most common side effect: Irregular bleeding

All of them: Decrease chances of PID

All of them: Can be used in lactating female

None of them: Used as an emergency contraceptive

Contraindication of all progesterone contraceptives:-		
Virat	=	Undiagnosed vaginal bleeding
Likes	=	Liver disease
To	=	Thrombosis
Play (with)	=	Pregnancy
Ball	=	Breast cancer

Student's Space

Antara

→ Depot med Roxy progesterone acetate injection (DMPA)

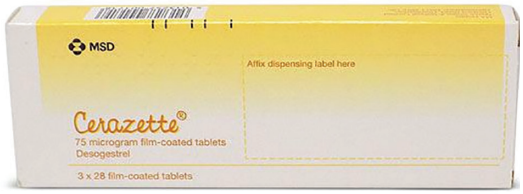


→ Injection 150 mg

→ i/m

→ Every 3 months

2 Advantages:	2 Disadvantages
→ ↓ decrease seizures frequency therefore very good in epileptic patients → Very good in sickle all anemia	1. Delayed return of fertility 2. Bone loss → osteoporosis



India: Progesterone only pill available:

CERAZZETE

↓

→ Desogestrel Progesterone

→ 1 tab/day (for 21 days)

Implanon

→ Single 4 cm rod

→ Insert subcutaneously into medial side of left arm



Figure: Progesterone contraceptives



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Centchroman = Saheli/Chhaya



Figure: Centhroman

→ Has been included in national family planning programme
→ Development by CDRI Lucknow
→ Non steroidal
→ Has ORMILOXIFENE
→ Once weekly tablet

Emergency Contraceptive/Post Coital Pills

→ Normally: Contraceptives are given before intercourse
→ But emergency contraceptives are given after unprotected

Intercourse

→ Best time to give emergency contraceptive within 72 hours (3 day)
→ Can be given until Until 5 days (120 hours)

Methods of emergency contraception
Chief — Cu T (Best), Chhaya
Medical Officer → Mifepristone → OCP = yurpee method
Likes → levonorgestrel (m/c used)
'U' → Ulipristal

Best emergency contraceptive = Cut
Best hormonal emergency contraceptive = ulipristal
Second best hormonal emergency contraceptive = Levonorgestrel
Most commonly used emergency contraceptive = Levonorgestrel
Emergency contraceptive distributed free of cost by Government of India = levonorgestrel E-pills

Not used as emergency contraceptive
1. Progesterone only pill/mini pill
2. Misoprost
3. Mirena

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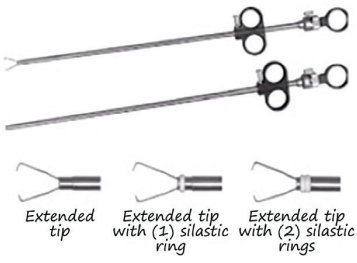
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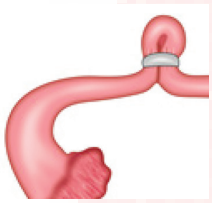
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Permanent Method/Irreversible methods

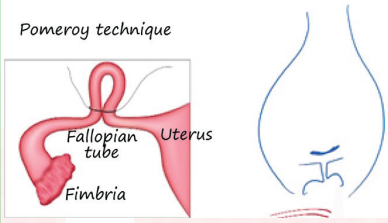
Female
↓
Tubectomy

Laparoscopic using fallope ring (fallope ring in isthmus of fallopian tube)





MINILAPAROTOMY
↓
Pomeroy technique



→ Pomeroy technique



Pomeroy method

Male
↓
Vasectomy (cut the was deferens)
→ Non scalpel vasectomy
→ For 3 months/9 weeks/30 ejaculates
↓
after vasectomy
↓
Use some other method of contraceptive
↓
Do semen analysis
↓
No sperms
↓
No contraceptive needed

Part of tube ligated
↓
Isthmus

→ Which method is most common for tubal ligation = laparoscopic tubal ligation
→ Which method can be used in post partum females: Minilaparotomy (pomeroy method)
→ Best time to do tubal ligation after deliver = (Post partum)
  → After 48 hours of delivery and until 1 week of delivery

Laparoscopic Tubal Ring

1. It is done using fallope ring applicator positive fallope ring
2. Loop is male in isthmus of tube and fallope ring is applied

Laparoscopic
→ Gas used to create pneumoperitoneum = CO_2
→ Maximum volume of CO_2 can be used = 2L
→ Pressure during laparoscopy = 8-12 mm of Hg (maximum = 15 mm of Hg)

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Contraindication of Laparoscopy

1. Heart disease patients
2. COPD

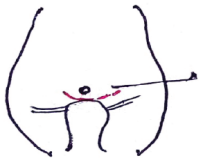
Contraindication of laparoscopic Tubal Ligation:- Not done in post partum delivery

Tubal Ligation by Minilaparotomy



In female who has not delivered in recent post
↓
2- 3 cms incision (above pubic symphysis)
Pub

Female has Recently Delivered Post Portum Tubal Ligation



2 cms below umbilicus = incision is given

Method used in minilaparotomy = Pomeroy technique



→ Make a loop isthmus of tube
→ Tie a catgut at the base
→ Cut the loop

Minilaparotomy can be done in post partum period

ESSURE



→ - coil made of steel, nickel and titanium
→ Inserted in intramural part of tube hysteroscopically
→ It acts like foreign body

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↓

Inflammation

↓

Adhesions

↓

Blockage of tube

→ So after inserting essure

↓

Advise the female to use some other contraceptive for 3 months

↓

Then Do hysterosalpingography and confirm that tube is blocked

↓

Then ask female not to use any contraceptive

Condition	Best contraceptive
1. Young, newly married staying to gather	OCP
2. Young married couple staying in 2 different cities	Barrier method
3. After evacuation of molar pregnancy	OCP
4. In a lactating female	Best: IUCD 2nd best: Progesterone only pills
5. Female with heart disease	Temporary: New concept: IUCD Permanent: Old concept, barrier method → Best: Vasectomy → Husband refuse: Tubal ligation → Method: Minilaparotomy
→ Female has epilepsy → Female has sickle cell anemia	DMPA (depot medroxyprogesterone acetate)

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MALIGNANCY OF FEMALE GENITAL TRACT (PART-1)

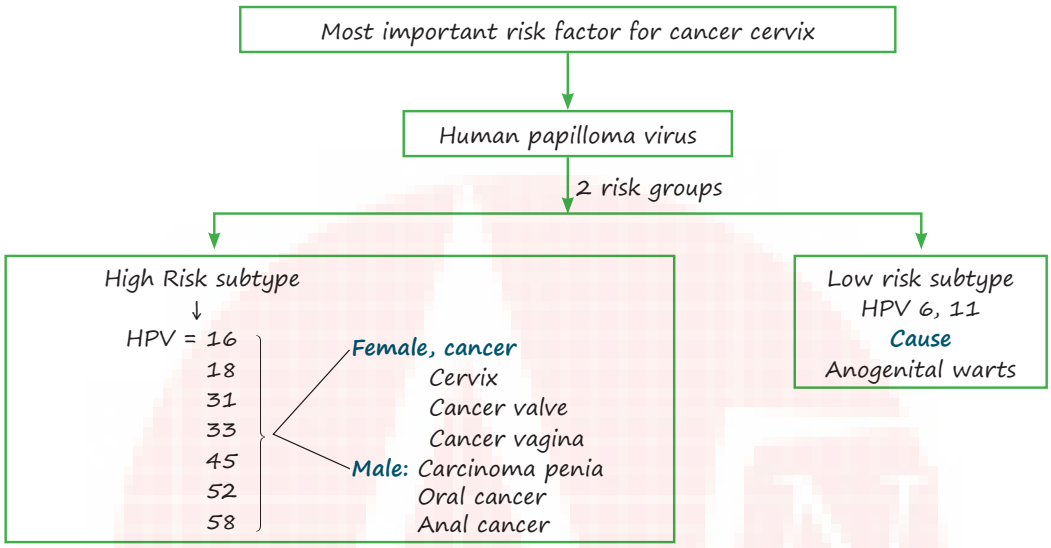


→ Most common cancer in females in world = Breast cancer
→ Most common cancer in females in India = Breast cancer
→ Most common cancer of female genital tract = cancer cervix
→ Most common cancer of female genital tract in developed countries = uterine cancer/ cancer endometrium
→ Most common cancer of female genital tract in world cancer cervix

	Cancer endometrium	Cancer cervix	Cancer Ovary
Most common in india		✓	
Age group	55-70 years mean age = 60 years (post menopausal)	Age = 35-39 years / 60-65 years	60-70 years
Multiparous/ nulliparous	Nulliparous	Multiparous	Nulliparous
Related to increased estrogen	✓	×	✓
Hereditary/genetic factor	✓	×	✓
Related to intercourse/ multiple partners	×	✓	×
Risk factors Tamoxifen ↓ used in treatment of Breast cancer ↓ But if we use it for a longtime ↓ Can lead to endometrial cancer Female = obese positive hypertension Positive diabetic positive ↓ Endometrial cancer ↑ Corpus cancer syndrome	Increased estrogen increased ovulation Family = Family History Hes = Hypertension O - Obesity L - Late menopause & early menarche D - Diabetes A - Atypical endometrial hyperplasia U - Unopposed estrogen N - Nulliparity T - Tamoxifen therapy	1. Early age of intercourse 2. Early age of marriage 3. Multiple sex partners 4. STD's 5. Low Socio economic status 6. Immuno compromised condition (HIV positive) 7. Smoke 8. Most important HPV infection	Increased estrogen Increased ovulation → Nulliparrous → Obese → Early menarche → Late Menopause → Ovulation inducing drugs (clomiphene citrate)
Socio economic and Conditions	More common high socioeconomic status	More common low socioeconomic status	More common high socio economic status

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	Cancer endometrium	Cancer cervix	Cancer Ovary
Built	Obese	Cachexia look	Obese
Protective factor	→ Pregnancy (Multiparity) → Exercise → Smoking (↓ estrogen) → OCP's (↓ ovulation) → Breast feeding	HPV vaccine	→ Pregnancy (Multiparty) → Exercise → Smoking (↓ estrogen) → OCP's (↓ ovulation) → Breast feeding



→ Most common HPV associated with cancer cervix = HPV 16
HPV 18

→ Second most common HPV associated with cancer cervix = HPV 18

→ Most specific HPV for cancer cervix = HPV 18

→ Most common HPV associated with squamous cell cancer of cervix = HPV 16

→ Most common HPV associated with adeno carcinoma of cervix = HPV 18

→ Many young females get HPV infection

↓

In most of them it resolves

→ So if HPV infections is present in a female it does not mean she will have cancer cervix

In very few females: HPV infection persists

↓

If it persists it leads to dysplasia/CIN/cancer cervix

HPV infection is sexually transmitted

Therefore, early age of intercourse, multiple partners, STD's are risk factors for cancer cervix

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HPV vaccines: Recombinant vaccines
CAPSID protein

	Cervirax	Gardasil	Gardasil-39
Active against	HPV 16, 18 Bivalent vaccine	HPV 16, 18 HPV 6, 11 Quadravalent vaccine	HPV 6, 11, 16, 18, 31, 33, 45, 51, 58 Nonavalent
Protective against	Cancer cervix	Cancer cervix + Anogenital warts/ genital warts	Cancer cervix Cancer valve Cancer vagina + Genital warts
Age Ideal	11-12 years		
Can be given	9-26 years		
Male/female	Both Male and Female can be given		
Dose	0.5 ml		
Route	I/M		
M/c side effect	Syncope		
Premalignant condition	Endometrial hyperplasia Without Atypical Cell → Less chances of malignancy → **Treatment:** Progesterone with atypical cell → ↑ chances of malignancy → **Hysterectomy**	CIN (Cervical intraepethelial Neoplasia)	**Ovarian cyst** → Solid → Unilateral → Associated with ascites → Associated with LN enlargement
Screening	×	✓	×
Screening Method	×	1. Pap smear 2. HPV DNA testing (>30 years) 3. Rural areas VIA, VILI	× Tumor marker CA 125 in post menopausal woman > 35 IU ↓ ↑ Chances of ovarian cancers
Most common variety	Adenocarcioma	Squamous cell carcinoma ↓ **Most common site** Transformation zone **Most commonly seen** with HPV 16 infection	Epithelial cell tumor ↓ Arise from germinal epithelium of ovary
Other varieties	Most malignant: Clear cell tumor **2nd best:** → Papillary serous tumor	Adenocarcinoma of cervix → Most common site = Endocervix → Most commonly seen with HPV 18 infection	GERM cell tumor, sex cord tumor, metastatic tumor

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Ovarian cancer: Varieties and names

Epithelial cell tumor (MC)
1. Serous tumor (80–90%) ml
2. Mucinous tumor
3. Clear cell tumor
4. Brenner tumor
5. Endometrial tumor

Germ cell tumor
Thaul:- **Teratome**
- Immature: Demoid cyst
- Mature: Malignant

Yolk sac tumor
C = Choriocarcinoma
D = Dysgerminoma
E = Embryonal tumors

Sex cord tumor
Female hormone producing
1. Granulosa cell tumor
2. Fibroma
3. Thecoma

Male hormone producing
1. Sertoli cell tumor
2. Leydig cell tumor
3. HILUS cell tumor

Metastatic
↓
Krukenberg tumor

→ Most common variety of ovarian tumor = Epithelial cell tumor

→ Most common Benign tumor of ovary/most common benign epithelial cell tumor: Serious cyst adenoma

→ Most common malignant tumor of ovary/most common malignant epithelial cell tumor: Serous cystadeno carcinoma

→ Most common age of Epithelial tumor of ovary 60–70 years/break most common malignant epithelial cell tumor: serous cyst adeno carcinoma

→ Most common ovarian tumor in young girl (Puberty): Germ cell tumor

→ Most common benign germ cell tumor 4 dermoid cyst (Immature teratoma)

→ Most common germ cell tumor: Mature teratoma

→ Most common ovarian tumor seen in pregnancy: Dermoid cyst

→ Most common ovarian tumor to undergo TORSION: Dermoid cyst

→ Most malignant germ cell tumor: Yolk sac tumor

Remember

Ovary
↓
Radiosensitive organs
↓
If radiotherapy is given for an reason in pelvis
↓
Leads to ovarian failure

Ovarian tumor
↓
Radioresistant
↓
Only ovarian tumor which is radiosensitive = Dysgerminoma

Kruken Berg Tumor

Stomach cancer
↓Metastasis by retrograde lymphatic's
Ovary
↓
Called as Krukenberg tumor

Student's Space

Characteristic

→ Bilateral
→ Soft, waxy, consistency
→ Freely mobile (no adhesion)
→ Shape of ovary is retained

Tumor marker for epithelial cell ovarian cancer
↓
Ca125 levels
↓
Significant in post menopausal females
↓
It the value ≥ 35 IU in a post menopausal females
↓
Positive for ovarian cancer

CA 125 levels are not done in young females
↓
Increased in young females in many conditions

	Cancer Endometrium	Cancer cervix	Cancer Ovary
Most common symptom	Post menopausal bleeding	Post coital bleeding	Vague symptom Appetite loss nausea vomiting abdominal pain
Most specific symptom	↓	↓	×
Most common route of spread	Direct spread	Lymphatic spread → m/c LN involve: - Obturator LN → 1st LN involve: Uretine LN	Peritoneal spread
First investigation IOC **OPD procedure** No anesthesia Gold standard	Trans vaginal ultrasound Endometrial sampling Endometrial Aspiration biopsy Dilatation and curettage ↓ Histo pathological examination (HPE) (OT procedure) Anesthesia needed	Screening Pap smear ↓ Positive report ↓ Definitive test ↓ Biopsy ↓ Colposcopy	Trans vaginal ultrasound ↓ Postmenopausal female CA 125 levels

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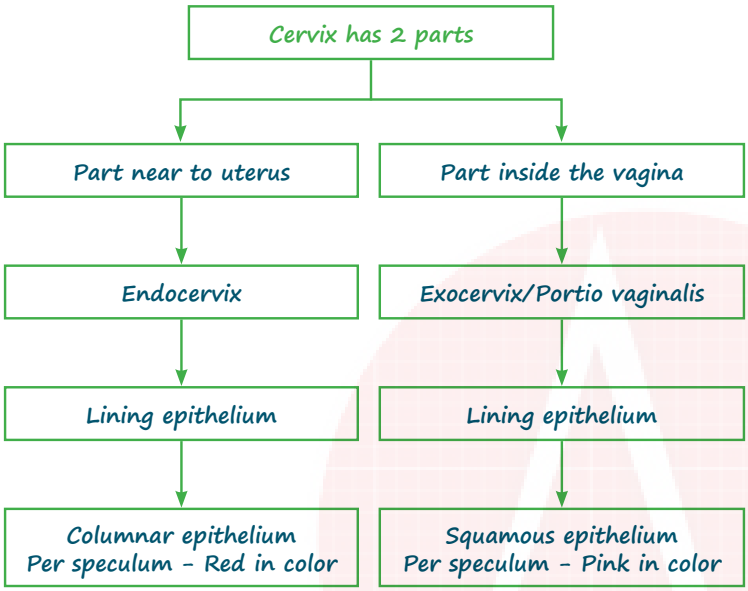
	Cancer Endometrium	Cancer cervix	Cancer Ovary
Staging procedure	Remove uterus ↓ Both tubes and Both ovaries ↓ specimen for HPE ↓ Pathologist will tell stage ↓ Surgical staging	Pab smear ↓ Positive ↓ Colposcopy (Definitive test) ↓ Positive CT, MRI, PET Scan etc ↓ Staging ↓ Clinical staging	Remove uterus + both tubes + Both ovaries + Omentum ↓ Specimen for HPE ↓ Pathologist tell stage ↓ Surgical staging
Treatment	Treatment after surgery ↓ Radiotherapy	Earlier Stages Advanced Hysterectomy (Wertheim Hysterectomy) Radical Hysterectomy **Advanced Stages** → No Surgery → Do Radiotherapy But Before Giving Radiotherapy ↓ We give CISPLATIN to increase the sensitivity of cells to radiotherapy Cisplatin acts as radiosensitizer and instead of radiotherapy it is better to call it as **chemoradiation** (Best) 2nd best answer: Radio therapy	Treatment after surgery ↓ Chemotherapy
Most common of death	×	→ Renal failure → 2nd most common cause of death ↓ Haemorrhage	×

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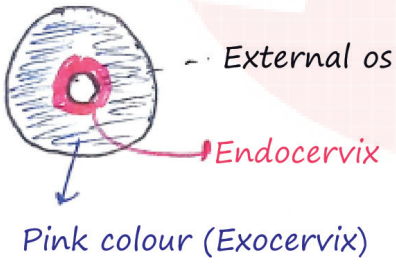
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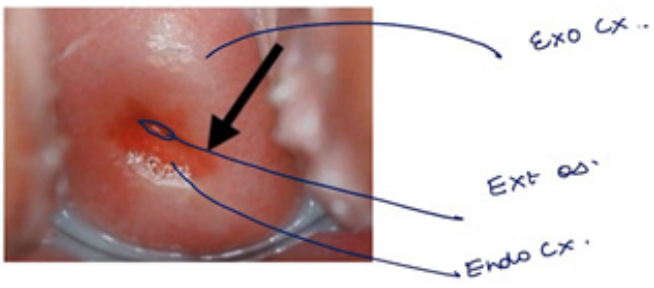
MALIGNANCY OF FEMALE GENITAL TRACT (PART-3)

Important Points on Cancer Cervix (0.30)



On Per speculum Examination





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The place where columnar epithelium of Endocervix

↓

Changes to squamous epithelium of Exocervix

↓

called as Squamocolumnar Junction/ Transformation zone

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Transformation zone

→ Lies near the external os
→ Appear white/pale on per speculum examination
→ Most common site of cancer cervix (squamous cell variety)

Student's Space

Key concept

This means in all females:

Columnar epithelium of Endocervix

↓ Changes to

Squamous epithelium of Endocervix

This change in epithelium is called as Metaplasia.

METAPLASIA in Cervix

→ Happens in all female
→ Physiological
→ It is not precancerous.

But during Metaplasia: If HPV infection is present

↓

Then metaplasia occurs in disorganized manner

↓

called as DYSPLASIA

DYSPLASIA

→ Happens in few females
→ Not physiological
→ It is precancerous.

4 Grades/Types

Involves less than 1/3 of cervical epithelium ↓ CIN 1	Involver 1/3-2/3 of cervical epithelium ↓ CIN 2	≥2/3 of epithelium ↓ CIN 3

If entire cervical epithelium becomes dysplastic

- Overlying membrane is intact → Cancer in situ
- Overlying membrane is broken → Invasive cancer cervix

CIN 1
CIN 2
CIN 3
Cancer in situ
} Precancerous condition

As per new BETHESDA Classification (18:34)

CIN-1 → is called as LSIL: Low squamous intraepithelial lesion

CIN-2
CIN 3
} HSIL: High squamous intraepithelial lesion

CIN 1
CIN 2
CIN 3
} age - 21-30 years

10-15 years

Cancer in situ age: 30-35 years

Cancer cervix age:
- 35-39 years
- 60-65 years

Screening Method for Cancer Cervix (21:22)

1. Universal screening → all females should be screened
2. Age to begin screening = 21 years — Pap smear →
   - Normal
   - Repeat every 3 years
   - Till 30 years of age

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3. From 30 years: After this: Pap smear + HPV DNA testing should be done

Normal ← (COTESTING)

↓

Repeat every 5 years

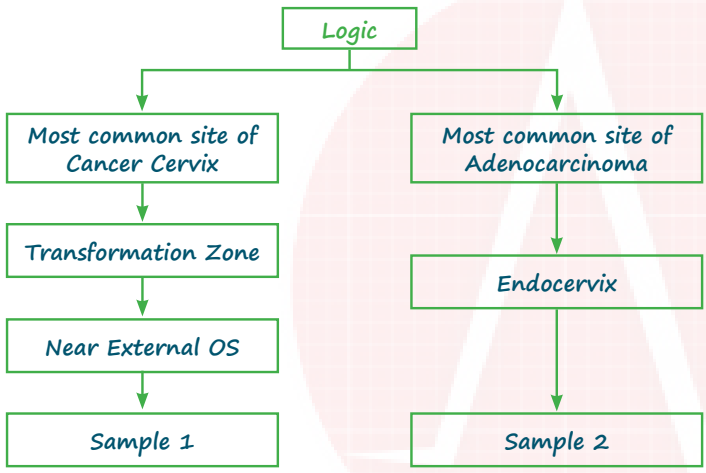
4. Screening to be done: Till 65 years of age
5. In HIV positive females: Annual screening
6. In females who have had hysterectomy for fibroid/prolapse.

↓

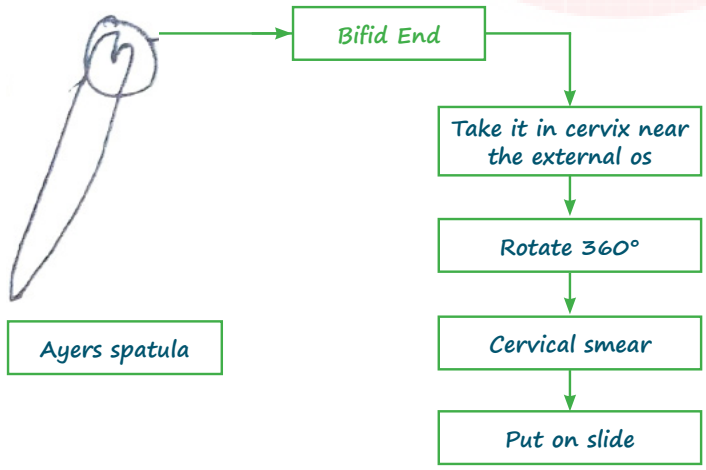
stop the screening after hysterectomy

7. After HPV vaccine + Screening should be continued as usual.

How is Pap smear done (33:51)?



Instrument

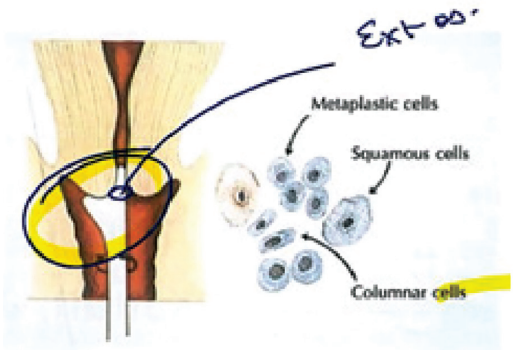


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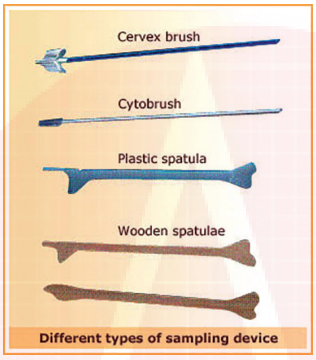
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Now Take

LIQUID Based cytology





Different types of sampling device

Endocervical Brush/cytobrush

↓

Take it in Endocervix

↓

Rotate

↓

Spread it on some slide

↓

Send slide for Histopathological examination.

* Before doing Pap smear:

1. Do not do a per vaginal examination
2. Not going to use the lubricant
3. Not going to Air dry slide
4. Fixative used in Pap smear: 95% ethyl alcohol

+

5% ether

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Report Pap smear

NORMAL
↓
Repeat 3 yearly till = 30 years of age

ABNORMAL
↓
LSIL, HSIL, CIN
↓
Pap smear is only a screening test
↓
No treatment is given till confirmatory test is done
↓
CONFIRMATORY TEST → COLPOSCOPY (Colposcopic directed Biopsy)

Colposcope (44.23)



Magnifying instrument
↓
→ Magnification 5 times
→ OPD procedure
→ First see the cervix with colposcope
↓
If you get any rough area
↓
1. Take biopsy from that area
2. Colposcope has green filter
↓
Abnormal blood vessels are seen
↓
Take Biopsy

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3. Apply Acetic acid on cervix
(3–5%)
↓
Dysplastic cells
↓
appear white in color (Normal cells + appear pink in color)
↓



Acetowhite appearance
↓
Biopsy

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Colposcopy Report

CIN 1	CIN 2, 3/HSIL	Cancer cervix
↓ Wait for 2 years ↓ If it does not resolve ↓ CO_2 introduced at very low temperature ↓ CRYOABLATION	Treatment is needed ↓ **LLETZ** (Large Loop Excision of Transformation Zone) ↓ Hysterectomy is not done for CIN	**Early stages:** Advanced Hysterectomy (Radical/ Wertheim) **Later stages:** Chemoradiation

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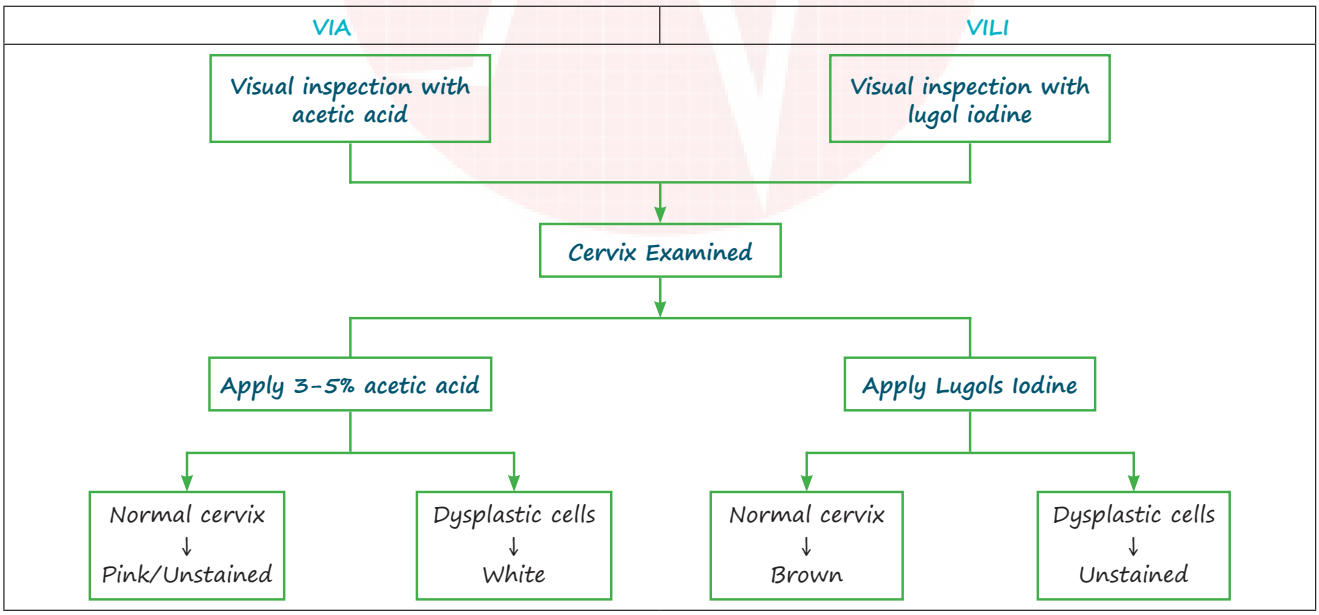
LLETZ (53:11)



→ OPD procedure
→ Under local anesthesia
→ No admission needed
→ No bleeding
→ wire loop through which cuts & coagulates at same time. Remove the Transformation Zone

Rural Area (58:57)

No facility for Pap smear
↓
Screening procedure for cancer cervix



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SYNDROMES IN GYNECOLOGY

Revision of Important Concepts

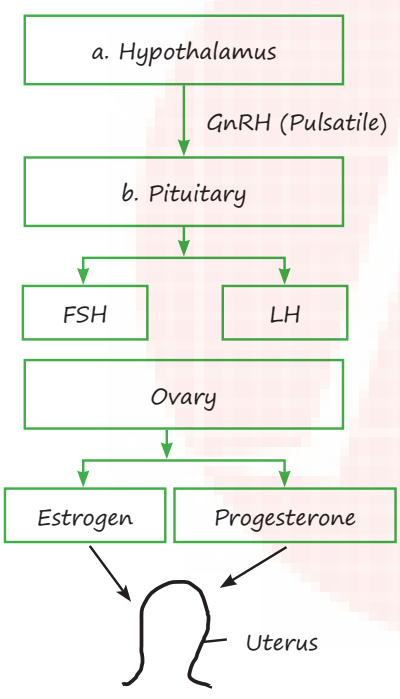
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→ **Primary Amenorrhea**
  → Means female has never had menopause.
  → No menstruation by 13 years of age in absence of breast or by 15 years of age irrespective of breast development.

→ **Secondary Amenorrhea:** Means female earlier was menstruating normally but now there is no menstruation for 3 months or for 6 cycles.

→ **Requirement for Menstruation:**



→ All should be normal
→ If there is a problem in any of them, female will not menstruate

→ Secondary sexual characteristic in female is breast. (for breast development hormone needed = Estrogen)

→ **Y chromosome Absent**
  → Then we call her female
  → Gonad = ovary

But for proper development of ovary
Both X chromosome needed.

→ Never give estrogen alone to a female if her uterus is present → it can lead to Endometrial cancer.
Always give → Estrogen & Progesterone.

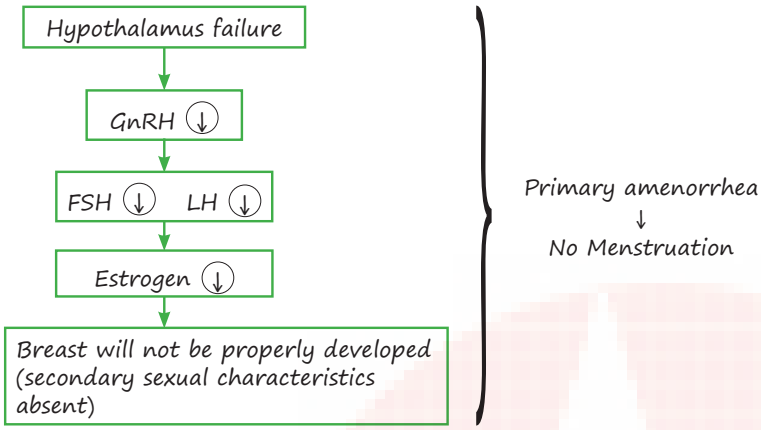
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Kallman Syndrome

Chromosome number: 46(XX) = Female

Gonads = OVARY = Normal

Problem



→ These patients have Anosmia (Inability to small)

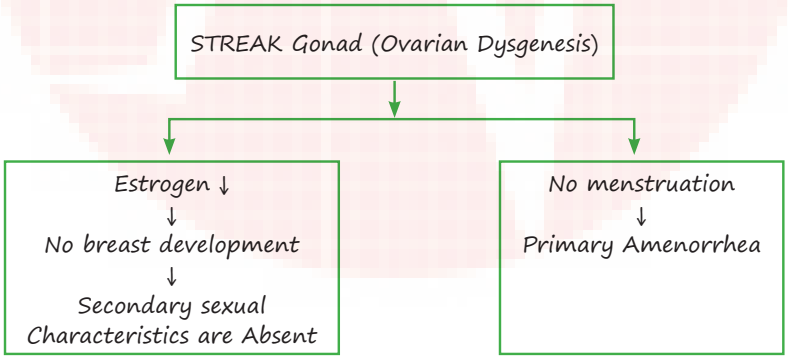
Patient will say:
Primary Amenorrhea + Anosmia + Secondary sexual characteristics will be absent (Breast absent)+ Height is normal
Diagnosis Kallman Syndrome

Turner Syndrome

→ **Chromosome number/Genotype:** 45(XO) = Female

→ **Gonads:** Ovary

→ **Problem:** Only one x chromosome is present, therefore ovaries are not property developed, called as



Additional Problems

→ Low ears

→ Low Posterior hair line

→ Micrognathia

→ Webbing of neck

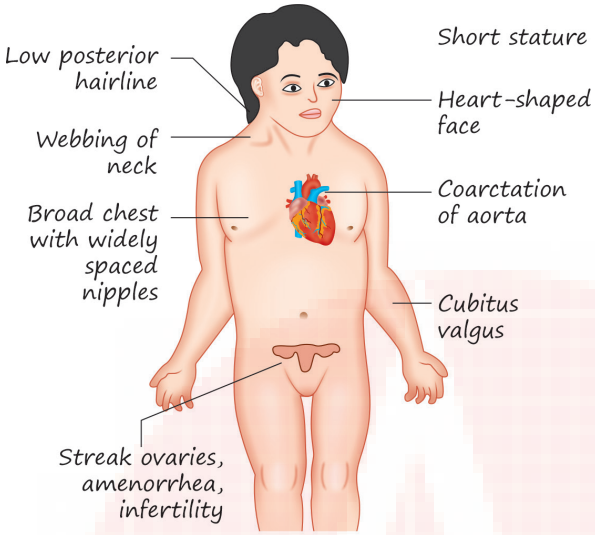
→ Shield shaped chest

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→ Breast absent - Nipples widely spaced
→ Congenital heart diseases
→ Edema of feet & legs
→ Height short
→ IQ: Normal





Important Points

Q1. Female, with primary amenorrhea with absent secondary sexual characteristic with normal height.

↓

Kallman syndrome

Q2. Female with Primary amenorrhea with absent secondary sexual characteristic with short height → TURNER Syndrome

Treatment

→ Give them estrogen + Progesterone
→ Height increase → Growth Hormone given.

Most common cause of primary amenorrhea in a young female

↓

Turner Syndrome (Ovarian dysgenesis)

→ Mullerian Agenesis/MAYER ROKINTANSKY KUSTER HAUSER syndrome (MRKH syndrome)

Genotype = 46(XX)

Gonad = Ovaries (Normal) = (Develop from Genital Ridge)

↓

Estrogen (Normal)

Secondary sexual charteristic = Normal

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Problem: Both mullerian ducts are absent.

↓

Both Fallopian tube ⊖ Absent
Uterus Absent
Cervix Absent

→ She complains of Primary amenorrhea

Upper 2/3rd vagina absent → Difficulty during intercourse

(Lower 1/3rd vagina is normal as it develops from urogenital sinus)

Patient Will Say
She has primary amenorrhea
+
Breast will be normal
+
Renal Anomalies + but her uterus is absent

Management: No Treatment for amenorrhea in this case but for her intercourse problem.

↓

Do vaginoplasty

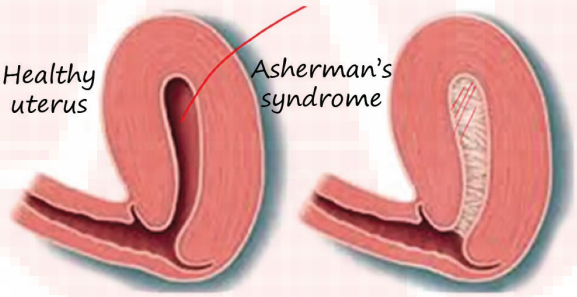
Q. Time for vaginoplasty: Just before marriage

Or

Just after marriage

Ashermann Syndrome

What is it?



1. Inside uterus adhesions are present
2. Endometrium is thin

Patient complains of = Decreased blood loss during menstruation

↓

Hypomenorrhea

↓

(Later on Secondary amenorrhea occurs)

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Cause

Most common cause: Curettage of uterus done after delivery

Other causes: Excessive curettage done anytime

Genital Tuberculosis

IOC: HYSTEROSCOPY

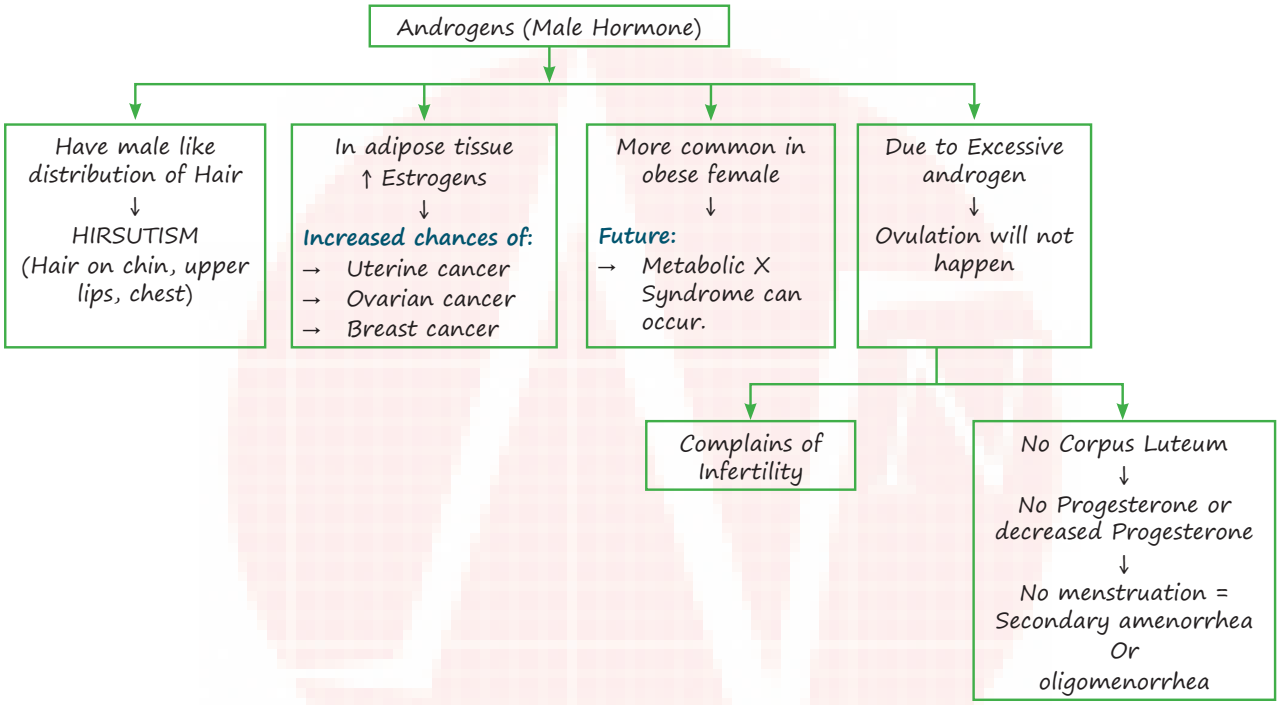
Treatment: Hysteroscopic Adhesiolysis

+

Estrogen and Progesterone (to build the endometrium)

PCOS (Polycystic ovarian Syndrome/STEIN LEVENTHAL Syndrome)

Problem: In these females ovaries produce excessive



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Some Other Important Points on PCOS

→ In these females there is Insulin Resistance

Acanthosis Nigricans
↓
Darkly pigmented skin in nape of neck or in Axilla.





In future they can have Diabetes

In PCOS patients = CH: FSH ratio
(LH is increased) 2:1 Or 3:1

→ As there is excessive Androgens in these patients:

Low Density lipid ↑
High Density Lipid ↓
} Chances of Heart disease in future Increases.

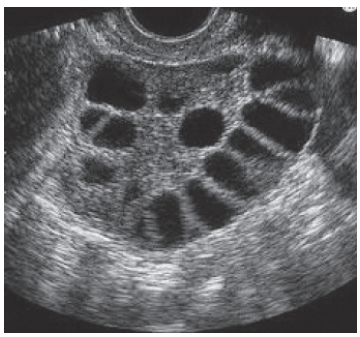
In PCOS:

HORMONE ↑	HORMONE ↓
→ Androgens (Testosterone)	→ Progesterone
→ Estrogen	→ FSH
→ LH	→ HDL
→ LDL	
→ Insulin	

Diagnosis of PCOS: Rotterdam Criteria:

If any 2 are present
↓
Then we diagnose PCOS
} 1. Increase Androgen
2. Menstrual problem = oligomenorrhea/secondary amenorrhea
3. USG of ovaries = Multiple cyst

Ultrasound of PCOS



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Shows multiple cysts arranged around periphery of ovary

↓

Necklace appearance

Management: 1. Advice patient to loose weight

Most common of Hirsutisum in young female

↓

PCOS

Problem	Treatment
1. Insulin resistance	Metformin
2. Irregular cycles	OCP (Estrogen + Progesterone)
3. Hirsutism	OCP
4. Infertility	**Best Treatment** = Ovulation Inducing drug
↓	CLOMIPHENE CITRATE
Due to Anovulation	↓ (SERM Drug)
	SIDE effect: Twin Pregnancy.

Future complication of ICOS

1. Ovarian cancer
2. Breast Cancer
3. Uterine Cancer
4. Metabolic X syndrome
5. Diabetes
6. Heart disease

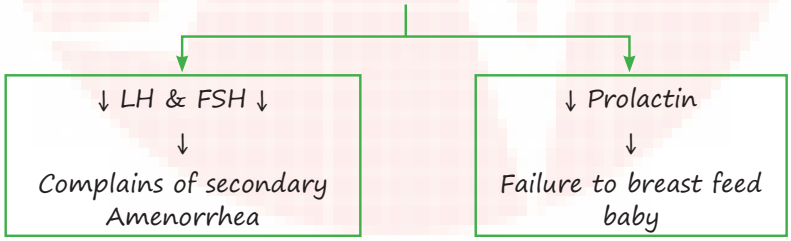
Complication not seen in PCOS: OSTEOPOROSIS

SHEEHAN Syndrome

Problem: Anterior Pituitary gland undergoes necrosis

Reason: Due to Excessive blood loss after delivery (Post-partum Hemorrhage)

Features: All Hormones produced by Anterior Pituitary will decrease:



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Plan RR

Rapid Revision Pack
(Crack AIIMS NORCET 2021
with Masterminds)



Midwifery & Obstetrical Nursing

RAPID REVISION (PART-1A)

Antenatal Care (00:03:10)

Antenatal Visits

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Ideal (12–15 visits)

→ Till 28 weeks: 1 visit every 4 weeks

→ 28–36 weeks: 1 visit every 2 weeks

→ ≥ 36 weeks: 1 visit every week

Recommended by GOI

→ Minimum 4 visit

→ 1st visit- Registration visit 8-12 weeks.

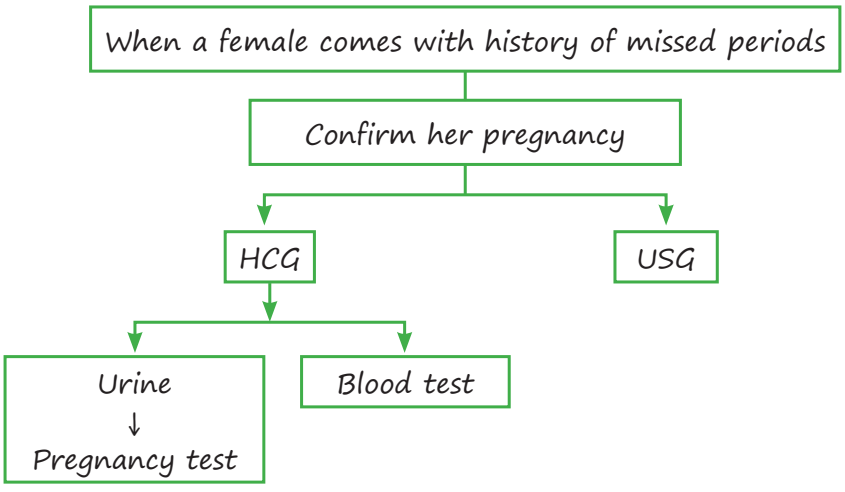
→ 2nd visit - 24-26 weeks

→ 3rd visit - 32 weeks

→ 4th visit - 36-38 weeks

Recommended by WHO

→ Visits



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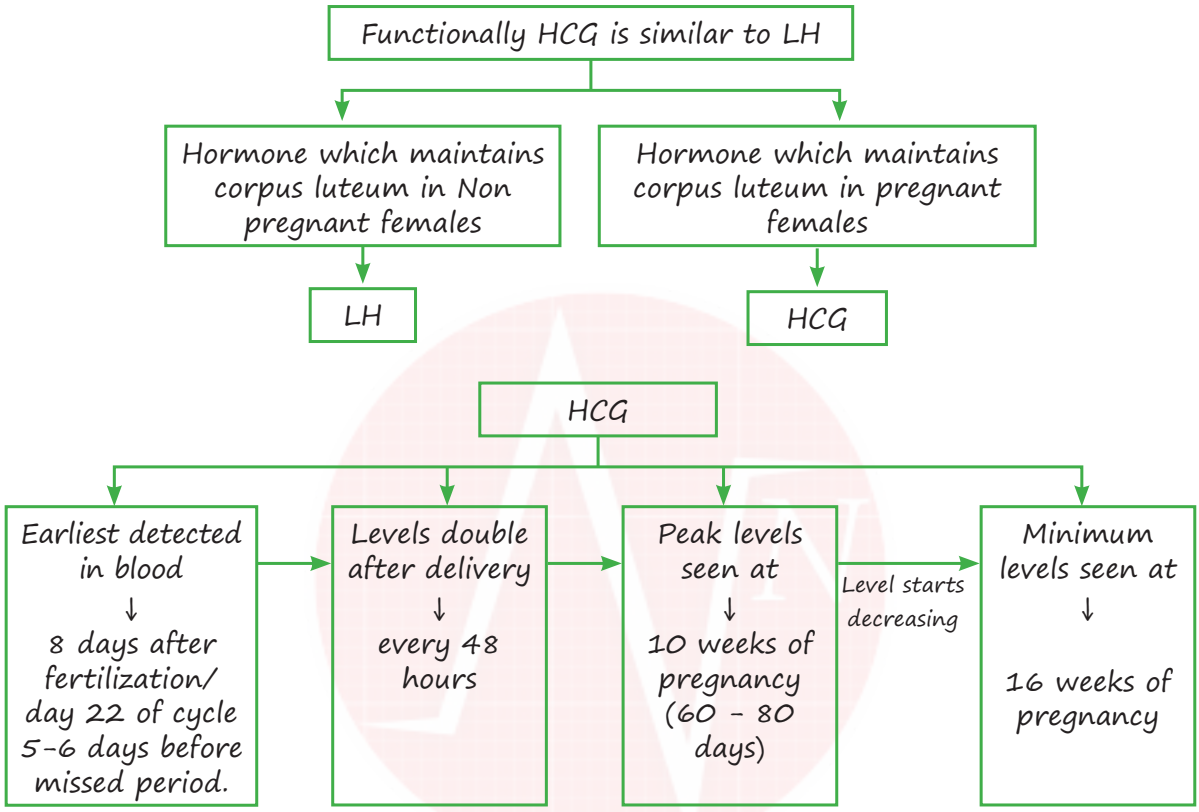
HCG (00:06:42)

→ Synthesized by– Synctiotrophoblast/Trophoblast/Placenta

→ Has 2 subunits

→ α Non specific (similar in LH, FSH, TSH)

→ β Specific subunit.



→ Pregnancy is calculated from the day of 1st day of last menstrual period.

HCG Disappears From

Urine		Blood
24 - 48 hrs	After delivery	2–4 weeks
	After abortion	2 weeks
	After molar pregnancy	7–9 weeks after evacuation

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HCG Levels (00:00:18)

Non pregnant- Not detected

Pregnant

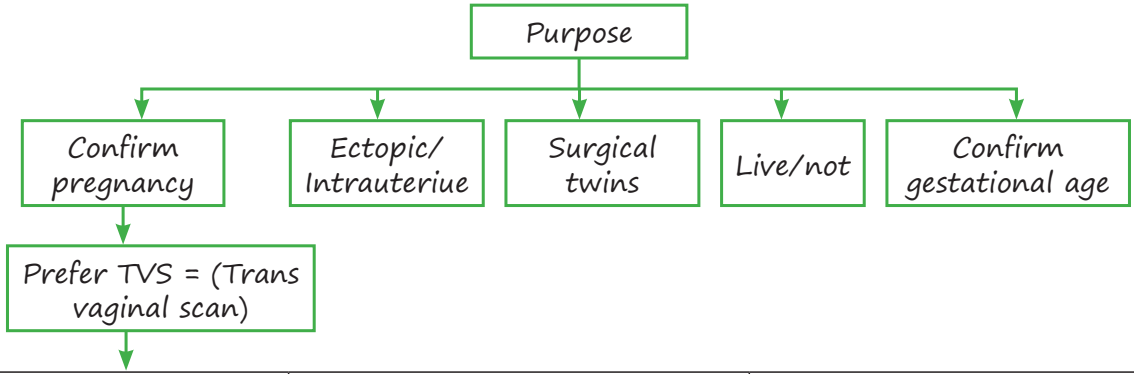
More than normal pregnancy		Less than normal pregnancy	
High	Hydatidform mole	T	Trisomy 18 - Edward syndrome Trisomy 13 - Patau syndrome
Court	Choriocarcinoma	E	Ectopic pregnancy
Demainds	Down syndrome (Trisomy 21)	A	Abortion
Riyas	Rh negative pregnancy		
Testimony	Twin pregnancy		

Tests for Pregnancy HCG

Urine Pregnancy Test		Blood Test	
Test	2 site sandwich Immunoassay	Test	Radio Immunoassay (RIA)
Sensitivity	30–50 mIU/ml		.001 mIU/ml
Earliest positive on	Day of missed period		5 to 6 day before missed period.

USG in Pregnancy (00:24:35)

1st USG: Dating scan (6–8 week of pregnancy)



Structure	Visible on TVS	Transabdominel Scan
Gestational sac	4 weeks of Pregnancy	+ 1 week
Yolk sac	5 weeks of Pregnancy	+ 1 week
Cardiac Activity	5-6 weeks of Pregnancy	+ 1 week

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For gestational age (00:29:30)

- Parameter used to calculate gestational age/fetal age

Trimester	Parameter used
1st Trimester	Crown rump length
2nd Trimester	Biparietal diameter
3rd Trimester	Femoral length

- Best time to do USG to estimate gestational sac
  - 1st term USG
- Overall best parameter of gestational age
  - Crown Rump length (CRL)

2nd USG done in Pregnancy

TARGET Scan/Anomaly scan

Level II USG

- Detect
  - All congenital malformation in fetus
- Time
  - 18-20 weeks of pregnancy (16–20 weeks)
- Best USG

Once pregnancy is confirmed

↓

Ask patient: Her 1st day of last Menstrual Period (LMP)

↓

Calculate **Expected Date of Delivery (EDD)**

↓

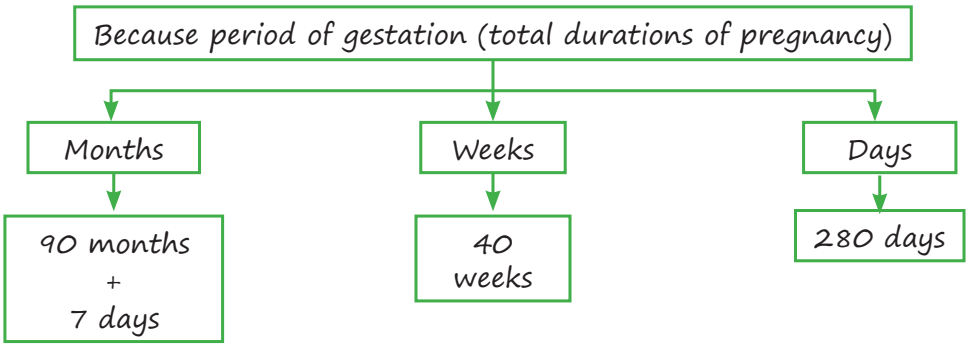
Using **NAEGLE's formula**

1st day of LMP + 9 months

+7 days = EDD

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Why??



Note: It delivery occurs at <37 weeks

↓

Preterm delivery

It delivery occurs at ≥42 weeks/>294 days

↓

Post term delivery

What % females deliver on exact EDD?

4%

1st step to be done when female comes with history of Post-term pregnancy

→ Review her Menstrual history

Period of viability- India - 28 weeks

WHO - 24 weeks

Next step: Write the obstetric score or formula

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Obstetric Formula (00:45:58)

Gravida

→ No. of times a female conceives irrespective of outcome.

→ Present pregnancy is included calculating gravida

→ Twins: Counted as single pregnancy.

Parity

→ Number of pregnancies which have gone beyond period of viability (≥28 weeks in India)

→ Present pregnancy is not Included.

→ Twins- counted as single pregnancy.

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Note: If pregnancy is terminated before 20 weeks– due to any reason— Ectopic, Molar pregnancy called as abortion.

Method of Writing

G: Gravida

T: Term Pregnancy 37–41 weeks, + 6 days delivery (Previous)

P: Preterm Pregnancy <37 weeks (Previous)

A: Abortion at <20 weeks and Ectopic pregnancy or Molar pregnancy

L: No. of living children

(01:01:12)

→ Any female who becomes pregnant for the first time at ≥35 years of age is called elderly Primigravida.

→ Such pregnancies are associated with greater risk.

Risks Associated with Advanced Maternal Age:

Antenatal	Intrapartum	Postpartum
Abortion- early pregnancy loss	Uterine inertia	Failed lactation
Hypertensive disorders complicating pregnancy	Instrumental deliveries	
Diabetes in pregnancy	Cesarean section	
IUGR of Fetus		
Chromosomal Anomalies in fetus like trisomy		

Do: Per speculum examination

↓

To see the cervix.

Pervaginal Examination

→ Can be done in Early pregnancy when uterus is intrauterine organ to diagnose pregnancy.

→ To assess size of uterus

→ To rule out pelvic pathology.

Contraindication

- → In case of Antepartum Haemorrhage.
- → Any bleeding Per vaginal
- → H/O previous abortion
- → On USG – Low lying Placenta
- → Patient has H/O of leaking of fluid from vagina.

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Investigation Done

	1st antenatal visit	Repeat visits
1.	Hb/Hematocrit ↓ If Hb < 11 gm% - anemia in Pregnancy	→ Repeat in every Trimester 1st term 2nd trimester 3rd trimester
2.	Blood glucose Testing ↓ As per - DIPSI	If Negative - Repeat at 24–28 weeks in high risk cases.
3.	VDRL (Syphillis)	
4.	HIV testing (opt out approach can be done)	
5.	Urine → Routine Microscopy → Protein → Sugar Proteinuria Indicates ↓ Preeclampsia → Pus cells → RBC cast ($\geq 10^5$/ml) If Pus cells are present and patient doesn't have any symptom of UTI ↓ asymptomytic Bacteriuria ↓ Has to be treated as it can lead to 1. Preterm labor 2. Pyelonephritis	Repeated at every visit
6.	ABO, Rh	

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Special Test

1. **Down Syndrome:** Should be done in all pregnant female if they can afford.

	Screening test		Diagnostic test
1st trimester hcg High	DUAL Test 1. PAPPA (Pregnancy associated plasma protein A) 2. hCG USG: To detect Nuchal Translucency	+ve	KARYOTYPING (Chromosome no = 47) 1 extra chromosome 21 → Material obtained by chorionic villi sampling (10-12 weeks)

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RAPID REVISION (PART-1B)



2 Trimester

Screening Test	Diagnostic Test
1. Triple test/Bart test/Kettering test a. Alpha feto protein ↓ b. HCG ↑ c. Unconjugated Estriol↓ ⊕ Inhibin A I = Inhibits increased Downs ↓ Quadruple test/Quad test 2. USG: 2nd Trimester: Check nuchal skin fold thickness.	Karyotyping → Positive Sample obtained in 2nd trimester by ↓ Amniocentesis (15–20 weeks)

Other Optional Tests

→ Maternal serum Alpha Feto Protein

↓

Done as a screening test for Neural Tube defects

→ Time = 15–20 weeks

→ Imp: If its levels are raised in mother blood

↓

Suspicious of NTD in Fetus

↓

To confirm: Do Level 2UGG/Targetted scan/Anomaly scan

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→ Test for group B streptococci

↓

Vaginal swab after 36 weeks.

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Remember (00:26:30)

Rubella Antibody Testing

It should be tested in a female before pregnancy, to know whether she was vaccinated or not.

Antibody titre	
≥ 1:8 ↓ Considered as positive ↓ ie. person is immune to Rubella	<1:8 ↓ Considered as negative ↓ Not vaccinated earlier Give Rubella Vaccine

Rubella Vaccine

Live Vaccine	
Contraindicated In Pregnancy	After Vaccination ↓ Minimum duration after which female should get pregnant 1 Month

Remember: All live vaccine are contraindicated during Pregnancy.

Vaccines Absolutely C/I in Pregnancy (00:35:23)

1. Mumps
2. Measles
3. Rubella
4. Small pox
5. Chicken pox
6. BCG

Vaccines Safe in Pregnancy

H- Hepatitis
I- Influenza
T- Tetanus
Toxoid Diphtheria
Rabies
Yellow Fever } Normally are contraindicated by pregnant female
Typoid } traveling to an area endemic.

In 1st antenatal visit: Our National Guidelines = DIPSI guidelines

↓

Test for diabetes

↓

Procedure - Irrespective of previous meals (i.e. no fasting needed)

↓

When pregnant female visits for 1st time

↓

Called as 2 hrs 75 gm G.T.T — Give 75 gm of oral glucose

↓

Check for blood sugar level after 2 hours

↓

After 2 hour if blood sugar (levels)

<140 mg/dL	140–200 mg/dL	≥200 mg/dL
Not Diabetic	Gestational Diabetes	Overt Diabetes

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OVERT diabetes (00:41:45)		Gestational diabetes
Female had diabetes before pregnancy also	Meaning	Female did not have any diabetes before pregnancy. During pregnancy she has become diabetic due to Insulin Resistance
High Chances Chance depend on HbA_1, C **Most Common:** VSD > NTD **Most specific:** Sacral agenesis (Caudal Regression syndrome)	Congenital malformations in body	No chance
Immediately start Insulin ↓ even in 1st trimester No role of Diet modification	Treatment	1st step: Diet modification × 2 week **Goals** FBS < 90 1 hr PP < 140 2 hr PP < 120 HBA/C ≥ 6.5 HbA_1C ↓ Not achieved ↓ Insulin

Remember

- → In Pregnancy DOC for treating Diabetes: Insulin
- → Oral Hypoglycemic drugs can cross placenta and lead to hypoglycemia in fetus, therefore they are contraindicated.
- → Insulin requirements Increase as period of gestation increases.
- → During pregnancy
  - → Insulin secretion ↑ in mother
  - → There is Insulin Resistance
    - → Due to: Human placental Lactogen (HPL) Secreted by synctiotrophoblast
    - → Mainly = 24 – 28 weeks of Pregnancy.

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Complication common to overt diabetes and gestational diabetes (00:55:50):

Maternal	Fetal	Neonatal
1. Increase chances of infection 2. P.I.H 3. Polyhydramnios (↑ amniotic fluid) → Preterm labor → Premature rupture of membrane → Abruptio placenta → PPH 4. Increase chances of Type 2 Diabetes mellitus in fetus	1. Macrosomia (≥ 4 kg) 2. Should dystocia (difficulty in delivery of shoulder) 3. ↑ Abortion chances (Fetal death ≤20 weeks) 4. ↑Intrauterine death (Fetal death ≥20 weeks) 5. Still Birth (During labor)	1. Hypoglycemia 2. Hypocalcemia 3. Hypokalemia 4. Hypomagnesemia 5. Respiratory distress syndrome 6. Hyperviscosity syndrome = Polycythemia + Hhyperbilirubinemia

Diabetic mother = ↑ glucose

↓

Goes to fetus

↓

↑ Glucose

↓

Fetal pancreas form ↑ Insulin

↓

↓ Surfactant fetal lungs ↓ ↑ respiratory distress syndrome in new born ↓ After Birth ↓ Umbilical Cord is cut ↓ No glucose coming from mother But in Baby body - Insulin ↓ ↓ glucose levels ↓ Hypoglycemia in neonate	Hormone needed for growth of fetus is Insulin ↓ Macrosomic

Note:

1. Mode of delivery in diabetic patients: Always vaginal delivery except of weight of body is >4.5 kg.

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2. Mother: Hyperglycemia
   Fetus: Hypoglycemia
   Neonate: Hypoglycemia
   ↓
3. Insulin secretion begins in fetus at 12 weeks

Common Symptoms: 1st Trimester (01:12:20)

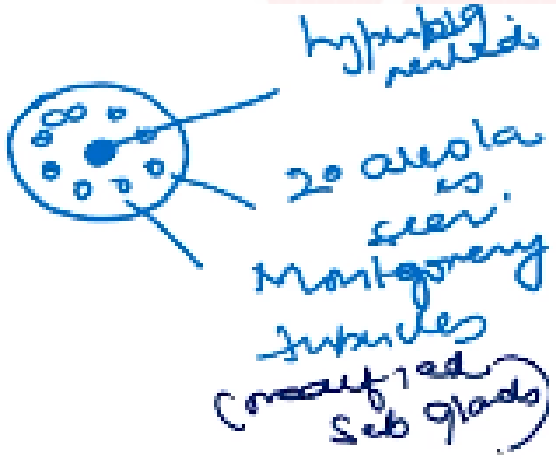
U: ↑ Urinary frequency
- 1st trimester: growing uterus presses the bladder
- 3rd trimester:
  Fetus head comes down into pelvis
  ↓
  irritate bladder

Are - Amenorrhea (↑ progesterone)

My - Morning sickness (due to HCG) By 16 weeks subsides ↑ HCG = ↑ vomiting = weight loss hyperemesis gravidarum)

Best - Breast enlargement

Friend - Fatigue



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1. Milk secretion: Prolactin
2. Milk ejection: Oxytocin

RAPID REVISION (PART-1C)



Some Uncommon Complains (00:01:27)

1. ↑ Salivation – Ptyalism
2. Implantation Bleeding: HARTMAN sign
   Placental sign
3. Craving for abnormal food articles PICA

Signs in Pregnancy (00:04:19)		
Presumptive Symptoms of pregnancy like amenorrhea, morning sickness	Probable	Definative/Positive signs

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Probable Sign	Definitive sign
1. Softening of cervix ↓ Goodell sign (at 6 weeks of pregnancy) 2. Bluish discoloration of vagina ↓ Chadwick sign/Jacquier sign (at 8 week of Pregnancy) 3. Pulsation in lateral fornix of vagina ↓ Osiander sign 4. Asymmetrical/unequal growth of uterus. ↓ PISKACEK Sign 5. On Bimanual palpation: With one hand in vagina and one per abdominally ↓ Fingers of both hand touch each other ↓ Hegar's Sign (6-10 signs)	1. Palpation of fetal parts (20 weeks of Pregnancy) 2. Hear fetal heart sound ↓ By stethoscope at 18-20 weeks Doppler at 10 weeks 3. On ultrasound pregnancy confirmed 4. X-ray shows fetal skeleton **Pseudocyesis:** False pregnancy none of definitive signs will be same (X-ray is contraindicated in pregnancy) Maximum permissible radiation exposure in pregnant female ↓ 5Rad HSG (Hysterosalpingography) Barium Enema IVP (Intravenous pyelography) Gadolinum MRI CT Scan } Contrain-dicated

Advices:

1. **Weight gain**
   - → Total: 10-12 kg
   - → Net weight gain: 5-6 kg
   - → Maximum weight gain: Third trimester
2. **Extra Calories** + 350 kcal/day

   Non pregnant= 2200 kcal/day

   Pregnant = 2550 kcal/day

   Not needed in 1st Trimester

Dietary Advice: As per socioeconomic status / As per cultural Habit

- → Balanced diet
- → 1 diet + ¼ more (not for 2 people)
- → Extra calories +350 (not for 2 people)

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→ Total calories = Non pregnant: 2200 KCal/Day
Pregnant: 2550 Kcal/Day
In 1st trimester No Extra Calories

→ **Protein Requirement:** Non pregnant: 1g/kg/Day
Pregnant: 1.2 to 1.5/kg/Day

→ **Calcium Requirement:** Non pregnant - 500 mg/Day
Pregnant = 1000 mg/Day

Folic Acid Supplementation (00:18:49)

In all pregnant female (even if she is diabetic)	Pregnant female with previous History of NTD in Baby
400 mg/day PROPHYLACTIC dose To prevent NTD	Therapeutic dose of Folic Acid

1 month before conception — when to start — 3 month before conception/patient plans pregnancy 4mg/day

400 mcg/Day — Dosage→ 4 mg/day

3 months after conception — Till when to give — 3 months after conception

4. Exposure to drugs, smoking, alcohol, Radiation
↓
No drugs, alcohol, smoking or radiation exposure in 1st Trimester

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Entire pregnancy is divided into:

3 Trimesters
→ Calculated from 1st day of last menstrual period (LMP)

3 Fetal growth period
→ Calculated from the day of fertilization

1st day	14 day	28 day
1st Trimester: 1st day of LMP to 13 weeks + 6 days **2nd Trimester:** 14 weeks to 27 weeks + 6 days **3rd Trimester:** ≥ 28 weeks	Ovulation	**Period of fertilized ova:** Day of fertilization till 2 weeks after that **Embryonic period:** 3 weeks to 8 weeks after fertilization **Fetal periods:** ≥ 9 weeks after fertilization until delivery

1st day	14 day	28 day
1st Trimester: 1st day of LMP to 13 weeks + 6 days **2nd Trimester:** 14 weeks to 27 weeks + 6 days **3rd Trimester:** ≥ 28 weeks	Ovulation	**Period of fertilized ova:** Day of fertilization till 2 weeks after that **Embryonic period:** 3 weeks to 8 weeks after fertilization **Fetal periods:** ≥ 9 weeks after fertilization until delivery

Most Teratogenic period

1st trimester Embryonic period

Student's Space

Hematological Changes During Pregnancy (00:36:50)

Increase	Decrease
1. **Blood volume** Solid → RBC volume↑ (20-30%) Liquid → Plasma volume↑ (40-50%) **Physiological Anemia** ← **Hemodilution during pregnancy** E.g.	Increase is more in liquid component than solid component ↓ **Hemodilution during pregnancy** ↓ Viscosity of blood (Decrease)

Patient A		Patient B
12.6g/dl	Pre-pregnancy Hb	12.6g/dl
11.6g/dl ↓ Hb↓'s but remains above 11g/dl Physiological Anemia ↓ Hb is nerve less then 11g/dl Due to Hemodilution for Blood	During pregnancy	10.6g/dl ↓ Hb is <11g/dl ↓ Pathological Anemia ↓ Hb is always <11g/dl Due to Iron deficiency Anemia

Student's Space

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RAPID REVISION (PART-1D)



Increase	Decrease
→ Amount of Hb (gms) (as RBC volume↑) ↓ Oxygen carrying capacity↑	Hematocrit/Plasma cell volume $\frac{\text{RBC volume}}{\text{Plasma volume}}$ ↓ Hb concentration (g/dl)
→ WBC count	→ Platelet count decrease ↓ called as Benign Gestational Thromcytopenia
→ Amount of Plasma Protein (gms)	Plasma protein concentration (g/dl)
→ Globulin Thyroid binding globulin	→ Albumin
Normally albumin: globulin ratio 1.7:1 In pregnancy albumin: globulin ratio 1:1	
→ All clotting factors increase during pregnancy ↓ Pregnancy is Hypercoagulable states	Except factor ↓ Factor 11, 13
→ Factor 1: (Called as Fibrinogen) → ESR (↑)	Bleeding time and Clotting time "N" in pregnancy.

About Essential Medications (00:00:08)

1. Patient with mechanical valves is on warfarin and becomes pregnant.

   ↓

   Warfarin crosses placenta lead to Congenital/Malformation in fetus

   a. **Till 12 weeks** of Pregnancy = Heparin does not cross placenta
   b. **12-36 weeks** = Warfarin

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c. **After 36 weeks** till patient goes into labour = Heparin

d. Restart either Heparin or Warfarin after 24 hours of delivery

2 Patient with Hypothyroidism becomes pregnant.

↓

Continue thyroxine throughout pregnancy and dose of Thyroxine to be increased

3. Patient with Hyperthyroidism becomes pregnant.

↓

DOC during pregnancy = Propylthiouracil

4. Patient with TB becomes pregnant.

↓

Continue Antitubercular drugs from 1st trimester

only Except → STREPTOMYCIN

↓

Contraindicated in pregnancy

→ Total amount of Fe needed in pregnancy = 1000 mg

Duration pregnancy = 280 days

Per day = **4-6 mg/day**

→ 1st trimester → No extra Iron

→ 2nd trimester } 6-7 mg/day

→ 3rd trimester }

Only 10% of dietary iron is absorbed

= Diet = 60-70 mg/Day

↓

Impossible

Iron supplementation is mandatory in pregnancy

Govt. of India = Fe + Folic Acid (Free of cost)

Student's Space

Anemia Mukt Bharat Programme

Fe = 60 mg
+
Folic acid = 500 mcg } Every pregnant female 1 Tab/day

When to start: 4th month of pregnancy (2nd trimester)

⇓

Continued × 180 days (6 months)
(Continue it throughout pregnancy)

+

Give it for 180 days after delivery
(to replenish Fe stores)

Dose 1 Tab/day all Pregnant female who does not have Pathological Anemia (Hb >11 gm%)

If pregnant female has Anemia (Pathological)

Hb <11gm%

Severe Anemia Hb <7 gm%

Very Severe Anemia Hb <4 gm%

→ Most common cause of Anemia in Pregnancy

↓

Iron Deficiency Anemia

Most common cause of Anemia in Pregnancy in India = Fe + Folic acid deficiency = DIMORPHIC anemia

→ **1st sign of IDA in Pregnancy:** Decreased Serum Ferritin

→ **When oral iron is given:** The first marker to increase is Reticulocyte count

→ **Treatment:** of Iron Deficiency Anemia

↓

2-3 tablets/day

↓

Continue till Hb becomes Normal

↓

Then put patient on maintenance dose = 1 Tab/day

↓

Throughout pregnancy + 180 days after delivery

After taking oral iron Hb increased after 3 weeks and increase will be 0.7 to 1 gm/dl

Patient < Iron / Calcium } at least 2 hours difference

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→ Pregnant patient at 36 or ≥ 36 weeks of pregnancy with severe Anemia (Hb < 7g/dl)

↓

Rate of Increase in Iron by oral Parenteral Iron is same.

↓

TOC → Blood Transfusion

Tetanus Immunity (00:33:20)

Tetanus Toxoid + Diphtheria Toxoid

1st dose

Td_1: Early in Pregnancy

2nd dose = Td_2 ↓ After 4 weeks

Td Booster: (In 3rd Trimestr) If pregnancy occurs within 3 years of last pregnancy 2 Td doses were received

(No need to give Td_1 and Td_2)

Dose = 0.5 mL

Site = Upper arm

WHO now recommends Tetanus + Diphtheria Toxoid to given Together in all pregnant female

Govt. of India: – has also adopted Td

↓

(Tetanus + Diphtheria together)

Important days (00:36:50)	Development
Day 7-8 after fertilization:	Day 7 = Ectoderm formed Day 8 = Endoderm formed
Day 14	Mesoderm formed
Day 17	Fetoplacental circulation is established
Day 21	Cardiac activity will be seen in fetus
Day 30	Neural tube closed

Important weeks (from 1st day after LMP)	Development
→ 7 weeks of pregnancy	→ Fetal body movement begins → Fetal limbs are formed
→ 8 weeks	→ Ovaries and testis are formed → Organogenesis occurs → Fetus looks like human baby
→ 11 week	Fetal breathing movement begin
→ 12 week	S – Swallowing movement begin U – Urine production begins I – Insulin secretion T – Thyroxine secretion E – External generation begin to form
	Male 14 weeks **Female 12 weeks**

Sex of Baby identified on USG = 14 weeks

(00:44:25)

Weeks	Weight of fetus in grams
4	½ gm (0.5)
8	2 gm
12	20 gm
16	100 gm
20	200 gm
24	600 gm
28	1200 gm

Student's Space

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RAPID REVISION (PART-2)

Bleeding in Pregnancy

Pregnant female women with complaint of bleeding her vagina

- 1st trimester/2nd trimester
  - Abortion
  - Ectopic Pregnancy
  - H. mole
- Third trimester at > 28 week
  ↓
  Antepartum haemorrhage

First trimester Bleeding/2nd Trimester Bleeding

+

Urine pregnancy test

(1) See the height of uterus as compared to gestational age

- Height of uterus equal or less than gestational age
  - Abortion
  - Ectopic pregnancy
- Height of uterus is more than gestational age
  ↓
  Molar Pregnancy

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First Trimester Bleeding

Complains

- → Excessive vomiting
  Or
- → PIH
  Or
- → Hyperthyroidism
  Or
- → B/L Theca lutein Cyst in ovary
  ↓
  Molar pregnancy

Abdominal pain (most consistent symptom)
+
Amenorrhea
+
Bleeding per vaginal
_____
Unruptured ectopic pregnancy

Abdominal pain shoulder tip pain
+
Amenorrhea
+
Bleeding for vaginal
+
Shock
↓
Ruptured ectopic pregnancy

Why is pain seen in ectopic pregnancy (00:09:40)

- Unruptured
  ↓
  Pain is due to stretching of fallopian tube by growing zygote
- Ruptured
  - Sharp pain in abdomen
  - \+
  - Blood collected in peritoneum
    ↓
    Irritate diaphragm
    ↓
    Shoulder tip pain

Student's Space

Molar Pregnancy (00:11: 50)

Fertilization

Sperm + ova → Zygote

Undergoes cell division 2, 4, 8, 16 celled zygote

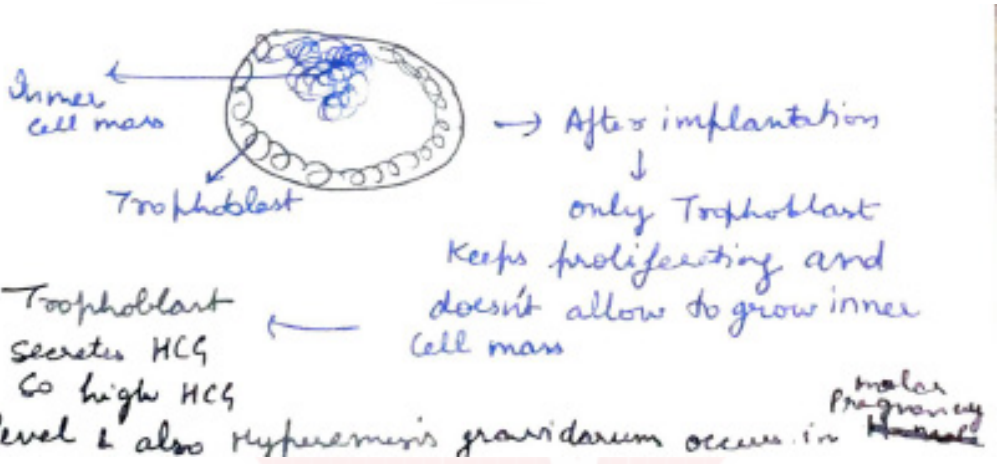
Zygote

↓

MORULA (mulberry shaped)

↓

Blastocyst



Molar Pregnancy	Ectopic Pregnancy
→ Proliferation of trophoblast and this fills up the entire uterus	→ Implantation of zygote at site other than uterus at at site other than uterus m/c = fallopian Tube

→ **Partial mole**

69 XXY (triploid) ← Types → Ruptured ectopic / Unruptured ectopic

Complete mole

46 XX (Diploid)

→ **Snow storm appearance**

IOC = USG ← USG → → Empty uterus / → Gestational sac or cardiac activity in tubes

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→ More than period of gestation ← BHCG → Less than period of gestation

→ Suction evacuation ← Treatment → Unruptured: Methotrexate injection
Ruptured: laparotomy



Molar Pregnancy (00:19:28)

Trophoblastic diseases

Benign (Molar pregnancy)

1. Partial mole
   - → Chromosome no: 69XXY
   - → Some fetal tissue (Present)
2. Complete mole
   - → Chromosome 46 XXY
   - → No fetal tissue

Malignant

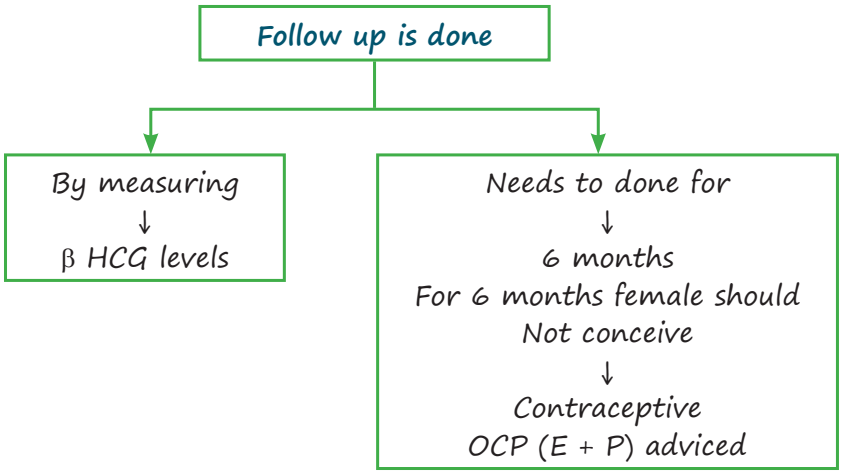
1. Invasive mole (m/c)
2. Choriocarcinoma

Complete mole = vesicular mole = Hydatidiform mole

Hydatidiform Mole (00:22:13)

→ Treatment of choice → suction evacuation

→ Can become malignant



→ Tumor marker for choriocarcinoma = HCG

→ Treatment of choriocarcinoma = chemotherapy

Important One Lines: Ectopic Pregnancy

1. Most common site of ectopic pregnancy= Fallopian tube
2. In fallopian tube = most common site = ampulla
3. Most common risk factor of ectopic pregnancy = Infection of fallopian tube = salpingitis/PID
4. Highest risk of ectopic pregnancy is with = previous H/o ectopic pregnancy or Previous H/o tubal surgery
5. Is use of contraceptive a risk for ectopic pregnancy?

   = No

   Failure of contraceptive method results in ectopic Pregnancy

Whenever a female with Urine pregnancy, test +ve, pain in abdomen, shoulder tip pain, vaginal bleeding comes in shock: In early weeks of pregnancy

Student's Space

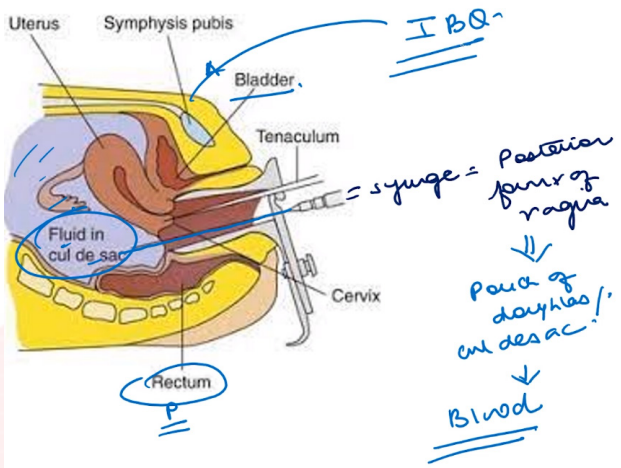
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Ruptured Ectopic

Investigation

- Do not wait for USG
- Can do **culdocentesis**



Resuscitate

+

Management: Immediate laparotomy

↓

and remove the fallopian tube which is damaged called as salpingectomy

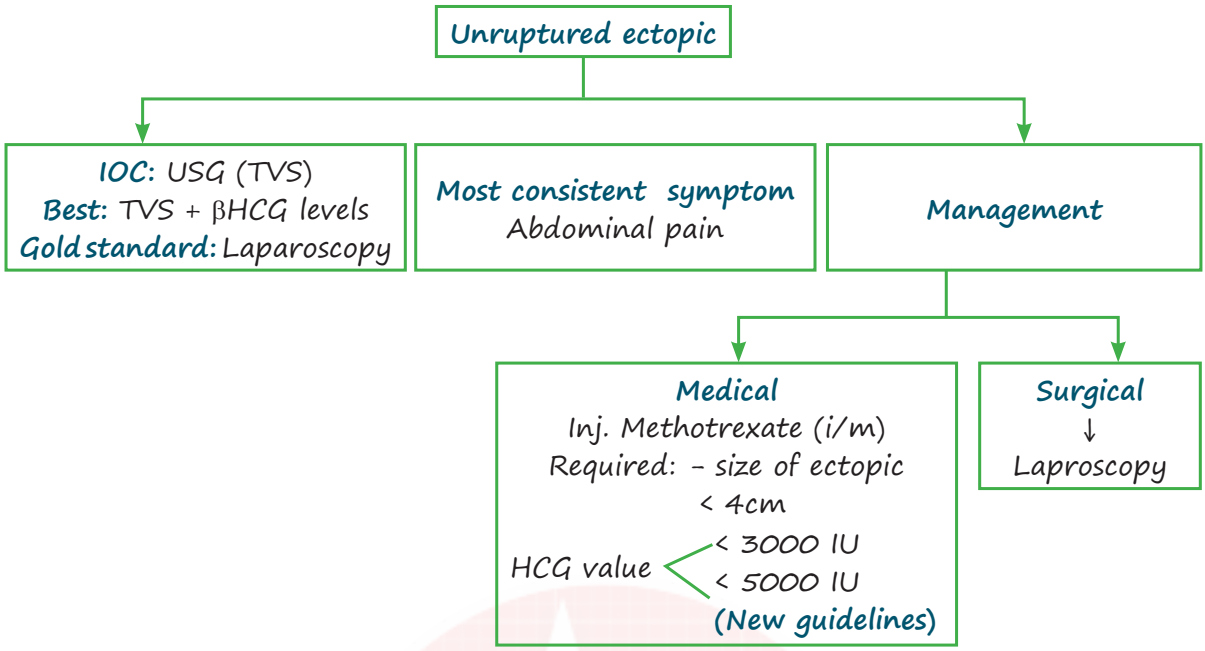
In ruptured Ectopic: No role of

1. Conservative management
2. Medical management – (Methotrexate)
3. Laparoscopy

   Do you remove ovary = No

Student's Space

Student's Space



ABORTION (Imp Points) (00:48:10)

Definition

1. Pregnancy loss at <20 weeks

   or

2. Pregnancy loss with weight of fetus < 500 gms

   → Most common time of abortion: 1st Trimester (1st–8th weeks)

   → Most common cause of abortion

In 1st trimester: Fetal defect/germplasm defect/germplasm defect

↓

Chromosomal number (Aneuploidy)

2nd Best Answer = Trisomy

3rd Best answer = Monosomy X

4th Best answer = Trisomy 16

→ Recurrent abortion > 3 Abortions

→ M/c cause of 2nd trimester recurrent abortion: cervical incompetence

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TORCH Infects Never Lead to Recurrent Abortion

Types of Abortion

1. **Threatened abortion:** Process of abortion begins but it can be reversed
2. **Inevitable abortion:** Process of abortion begins and it cannot be reversed
3. **Incomplete abortion:** Process of abortion begins, product of conception start coming out
4. **Complete abortion:** Entire process of abortion complete on its own
5. **Missed abortion:** Fetus is dead, inside mother but she is unaware

Type of abortion	Symptom	P/A Exam	Internal OS	USG
1. **Threatened Abortion Advice:** Bed rest No sexual contact	Spotting of blood +/– pain abdomen	Height of uterus = period of gestation	Closed	Fetus present cardiac activity present
2. Inevitable abortion	Bleeding + Pain	Height of uterus period = of pregnancy	Open	Dead fetus
3. Incomplete abortion	Bleeding + pain+ product of conception coming out	Height of uterus has period of gestation	Open + product of conception can be seen coming out from it	Incomplete fetus
4. Complete abortion	Bleeding + Product of conception come out later on bleeding stopped	Height of uterus less than period of gestation	Closed	Empty uterus
5. Missed abortion	Dirty brown discharge	Height of uterus less than period of gestation	Closed	Dead macerated fetus

Student's Space

Pregnant Female Complains of Bleeding in Third Trimester (1:13:17)

↓

>28 weeks and until delivery

↓

Antepartum Haemorrhage

↓

Is patient having
Pain in abdomen

NO	YES
↓	↓
Placenta previa	Abruption placenta

Student's Space

Placenta (01:14:37)

- → Human placenta
  - → Disc shaped: Discoid
  - → Has to shed after delivery: Deciduate
  - → In contact with maternal blood hemochorial
- → Weight of placenta at term = 500 gm
- → Volume of placenta at term = 500 ml
- → Ratio of weight of placenta: Fetus at term 1: 6
- → Gestational age at which weight of placenta = weight of fetus at 17 weeks of pregnancy

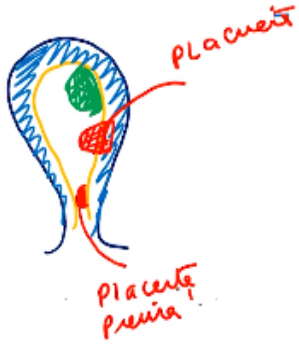
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→ Normal placenta

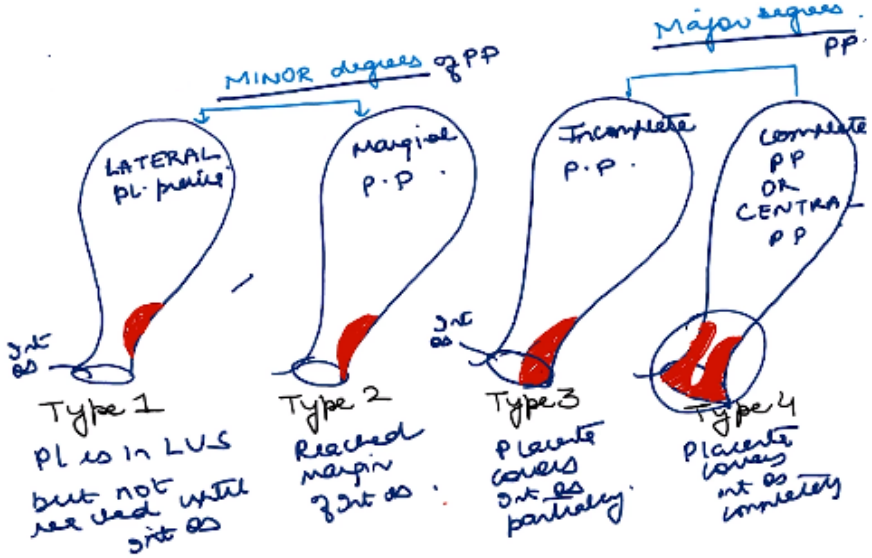
Attached to
↓
Upper uterus segment
→ If placenta is attached to lower uterine segment
↓
Placenta previa



Attached to
Endometrium of uterus
↓
If placenta is attached to myometrium of uterus
↓
Placenta acreta
Such placenta does not Seprate after delivery
↓
Remove uterus (Hysterectomy)

Placenta Previa (01:19: 04)

Condition where placenta lies in the lower part or uterus



Risk Factors (01:21:47)

→ Mother–
- → ↑ matemal age
- → ↑ matemal parity
- → Smoke

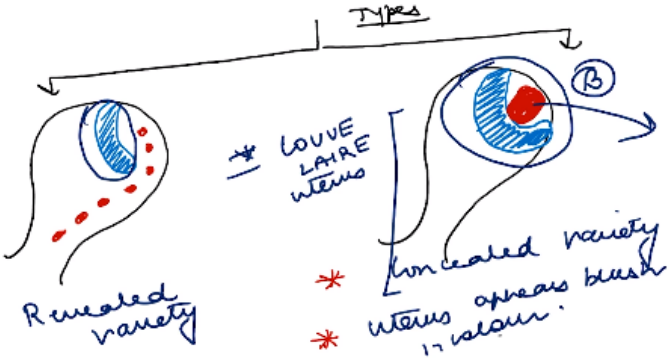
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- → Fetus–
  - → Turin pregnancy
- → Placenta–
  - → Size big = Diabetes
  - → Placenta succenturiata
- → Previous surgery–
  - → Previous cesarean
  - → Previous myomectomy
  - → Previous D & C

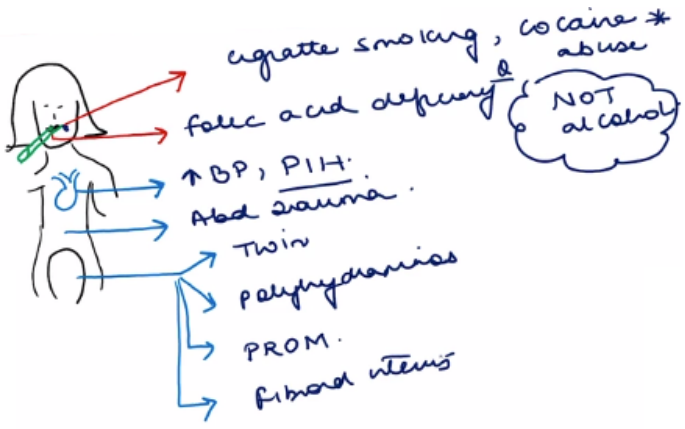
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Abruptio Placentae (01:24: 36)

- → Placenta is located normally in upper uterine segment
- → But it starts separating before delivery of baby



Abruptio Risk Factors (01:28: 53)



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Placenta previa (01:31:20)		Abruptio placenta
1. **Painless bleeding** 2. Causeless bleeding 3. Recurrent bleeding } 3rd trimester (≥ 28 weeks)	Complain	→ Pain in abdomen bleeding
		→ H/o → PIH (↑BP) Trauma
		→ Not recurrent
4. Initially small amount known as warning hemorrhage		
General conditions		
→ Not in shock		Concealed variety Less bleeding: Patient shock
→ Bleeding α general conditions N Normal	FHS	Fetal distress/fetal death
Uterus soft, relaxed FHS easily heard / Fetal parts palpated easily	Per abdominal Exam	Uterus = Tensed and Tender FHS Not easily heard / Fetal Parts not palpable easily
→ Height of uterus = Period of gestation		→ **Concealed variety** Height of uterus > period of gestate on
Contraindicated	**Per vaginal exam**	**Contraindicated**

In patients with antepartum haemorrhage/Placenta previa = per vaginal examination is contraindicated

Student's Space



Placenta previa		Placenta abruption
USG	IOC	→ Clinical finding → USG
2optious Terminate Pregnancy (Active management) → > 37 weeks of pregnancy → Bleeding present → Maternal condition shock → FHS: Fetal distress Continuing Pregnancy (Conservative Management till 37 weeks/expectant) → Gestational age <36 weeks → Bleeding stops → Maternal condition stable → FHS – Stable	Management	Only one management ↓ Immediate termination of pregnancy
Conservative management of placenta previa called as Macaffee and Johnson regime ↓ 1. Hospitalized, bed rest 2. Arrange blood 3. Fetus lungs mature: Corticosteroids 4. If uterine contraction present Tocolytic	Mode of delivery	Cesarean/ vaginal delivery But if: → Fetal distress is present → Cesarean section → DIC: Vaginal delivery Note: Abruptio placenta ↓ When placenta separates ↓ Thromboplastin released ↓ Lead to DIC (Placenta previa doesnot lead to DIC)

Major degree of placenta Pravia: Cesarean section (type 3, 4)

Minor degree of placenta previa: Vaginal delivery

Type 1, 2 < Anterior — Cesarean section ↑
Posterior (Dangerous variety of placenta previa)

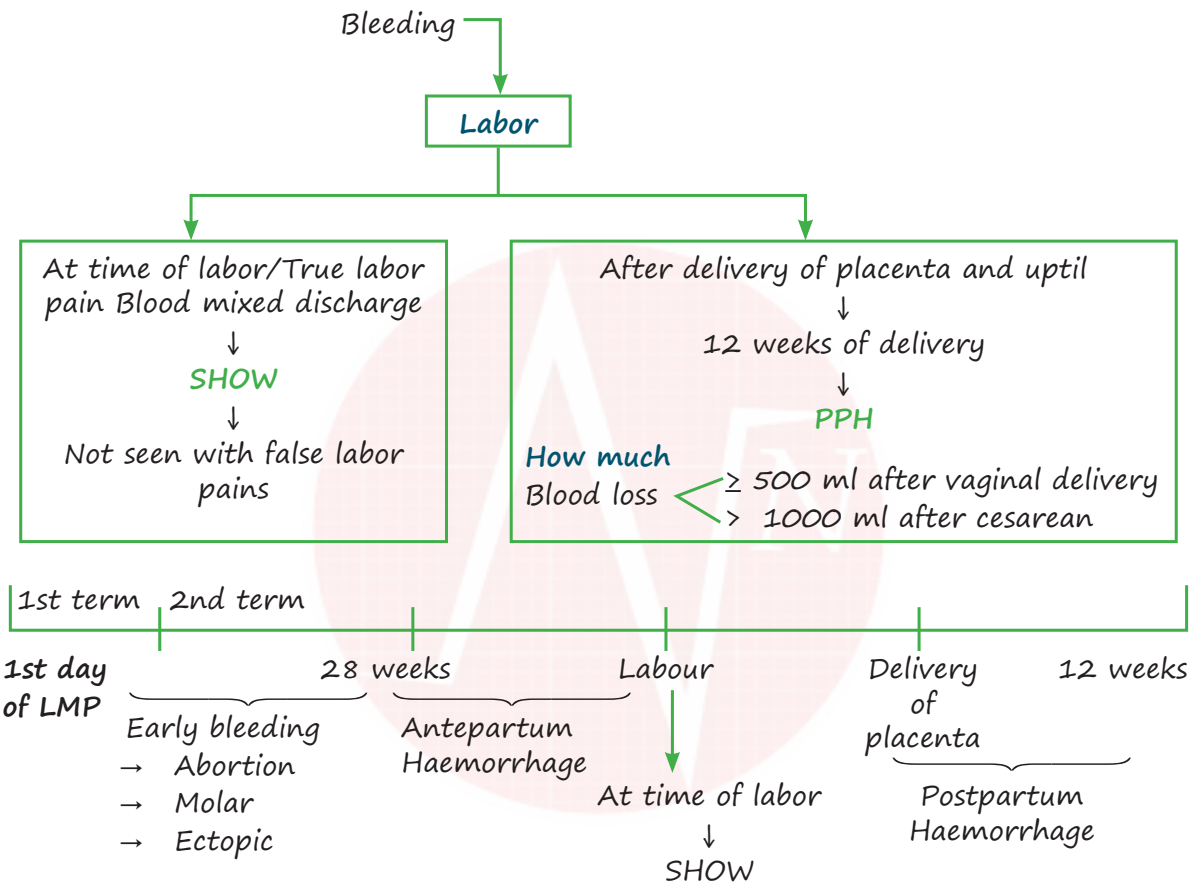
Obstetrical causes of DIC (01:51:50)

1. Abruptio placenta
2. Intra uterine death of fetus

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3. Septic abortion
4. Amnotic fluid embolism
5. Severe pre-eclampsia/eclampsia/ HELLP syndrome
6. COVID -19

Bleeding During Labor and After Labor (02:03: 25)



How to Differentiate between show and APH (Antepartum Haemorrhage) (02:07:29)

Show (Blood Mixed Mucus Discharge)

→ Pain in abdomen due to uterine contraction
→ Dilation of cervix
→ No fetal distress

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Antepartum haemorrhage

Placenta previa
- → No pain in abdomen
- → No dilation of cervix
- → No fetal distress

Abruptio placenta
- → Pain in abdomen
- → No dilation of cervix
- → Fetal distress present

PPH (Post partum Haemorrhage) (02:09:44)

Primary PPH
↓
Occurs within 24 hrs of delivery

Secondary PPH
↓
after 24 hours of delivery but uptil 12 weeks of delivery

- → Most common cause of PPH: Atonic uterus
- → Most common cause of primary PPH: Atonic uterus
- → Most common cause of secondary PPH: Retained tissue

Risk Factors of PPH (02:11:16)

Maternal
- → Anemia
- → PIH in this pregnancy
- → Over distended uterus
  - → Twin
  - → Polyhydromnios
  - → Big size baby
- → Present pregnancy – APH
- → Previous H/o PPH

Labor
1. Prolonged labor
2. PRECIPITATE Labor entire delivery in 3 hours
3. Excessive use of oxytocin

Placenta
- → Big placenta
- → Succenturiate lobe
- → Placenta accreta

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Management of PPH (02:14:16)

Non Specific Management

Resuscitate

1. 2 large I/v canula
2. State RL/NS

Not is dextrose 5%

3. Take out blood sample
4. Arrange for blood
5. Catheterize blood

Specific management

1st step = uterine massage

+

(non specific) Inj. Tranexa

+

1st line inj oxytocin

↓

Still bleeds

Give inj. Prostaglandin

1. PGF 2 (= carboprost inj
2. PGE1 = Misoprost

Who Guidelines:

→ Best method to prevent PPH

↓

Active management of Third stage of labor (AMTSL)

1st Line Dny to

Prevent PPH ↓ 10 IU	1 ml of oxyto un has 5 IU ↑ Oxytocin ↓ Syntocinon pitocin → Never give I/V bolus → Give 1/m or I/V infusion	Treat PPH ↓ 40 IU
Other drugs		
0.2 mg 1/m	Methylergometrine (methergine)	0.2 mg 1/m (uptil 5 doses) Interval: 20-40 hus)
600 mcg	Misoprost (PGE)	800 MCg (sublingual)
250 mcg (i/m)	Carboprost (PGF 2α) injection	250 mcg i/m (Maximum 8 doses)
Most patent drug	ORDINOPROST or HEMABATE	(2 mg)

Note

1. Methylergometrine is never given I/V

↓

Leads to ↑BP

2. Contraindications of Methylergometrine

T After delivery of 1st twin

O Organic heart disease

P Preeclampsia

E Eclampsia

R Rh negative pregnancy

If bleeding is uncontrolled by drugs

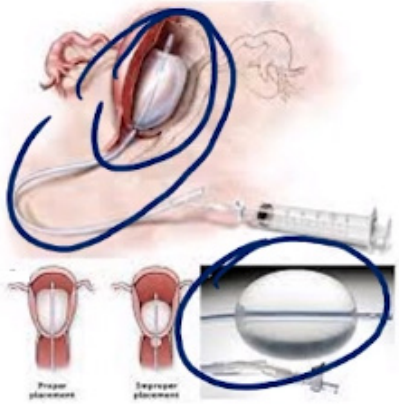
↓ for 30 mins

Student's Space

Next step:

Press the uterus i.e. mechanical method

- Bimanual compression of uterus
- Bakri Balloon Catheter
- Balloon Catheter filled with Normal saline



Maximum capacity of Bakri balloon catheter

↓

500 ml of NS

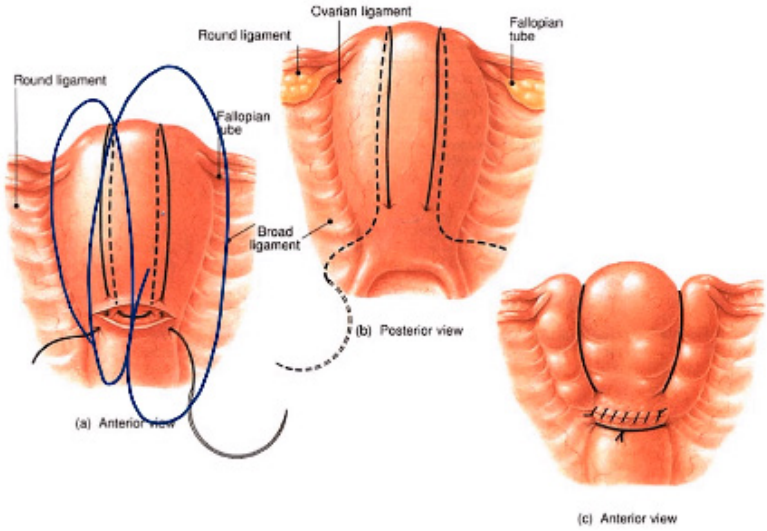
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→ If still bleeding doesn't stop

Surgery

If patient wants future pregnancy ↓ Apply: Sutures on uterus Called as B– lynch structure	If family of patient is complete ↓ Hysterectomy (Remove uterus)



→ Most common cause of Maternal Mortality in India. Haemorrhage (PPH)

→ Most common to Indirect cause of maternal mortality in India: Anemia

Blood Supply of Uterus

1. **Most important:-** Uterine artery which is a branch of Anterior division of Internal Iliac artery
2. **Other:-** Ovarian Artery

Student's Space

RAPID REVISION (PART-3)

Complicated Pregnancy (00:00:10)

Rh Negative Pregnancy (00:08:21)

Problem: If mother is Rh-ve and fetus is the Rh + ve

↓

NO PROBLEM

→ 1st Pregnancy ← If mother is Rh –ve & Fetus is also Rh -ve

↓

→ That is uneventful → If mother is Rh +ve & fetus is Rho-ve

If mother is Rh -ve Fetus is Rh +ve

Problem
↓
In Fetus:-
Hemolysis
↓
(RBC destruction)
Fetal Anemia
Fetal jaundice
Hepatosplenomegaly

Can Detect
The Hemolysis by

Antenatally
↓
By doing
↓
Indirect coombs test on mother's Blood

After delivery
↓
After doing
↓
Direct coombs Test on Baby's Blood

Prevention
Hemolysis
↓
By giving Inj. Anti D to mother

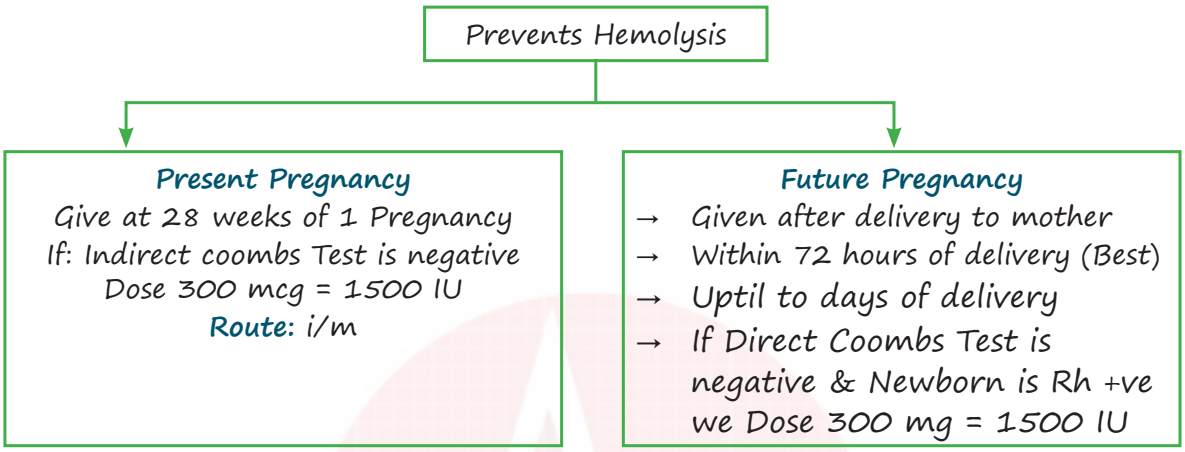
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Injection Anti D (00:05:30)

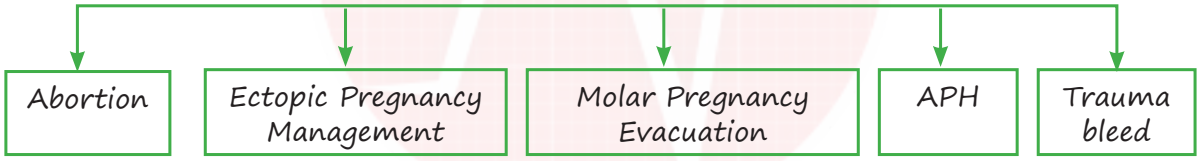
1. Given to Mother when she is Rh-ve & fetus Rh + ve
2. Only if Indirect Coombs test negative & Direct Coombs Test Negative.

Role



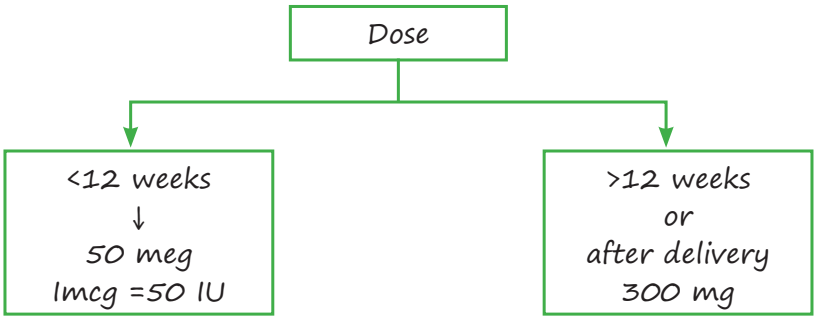
Other Cases Where Anti D is Given to Rh -ve Female

1. If Pregnant female is Rh -ve female has had bleeding due to Any Reason

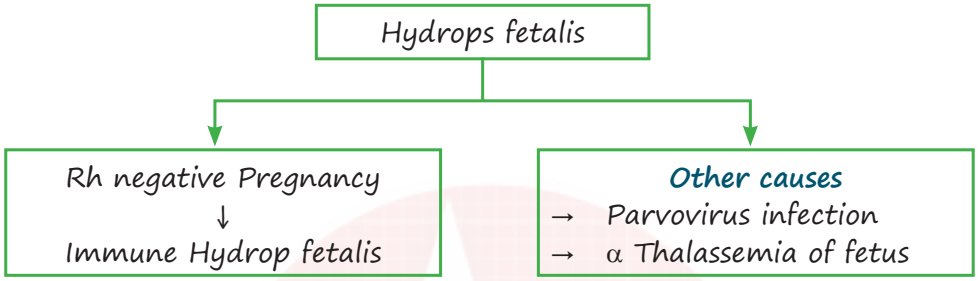


2. If any procedure is performed on Rh-ve pregnant female
   - → Chorionic Villi sampling
   - → Amniocentesis
   - → External cephalic version
   - → Manual removal of Placenta
   - → MTP
   - → Vaginal delivery
   - → Cesarean section

* Whenever we give Anti D to pregnant female Rh -ve



→ Where homolysis occurs in fetus = called as



Amniotic Fluid (00:12:30)

→ Main Contributor → fetal Urine (1) (at < 12 weeks Maternal Plasma)

→ Amniotic fluid is : (2) (12-20 weeks o fetal skin)

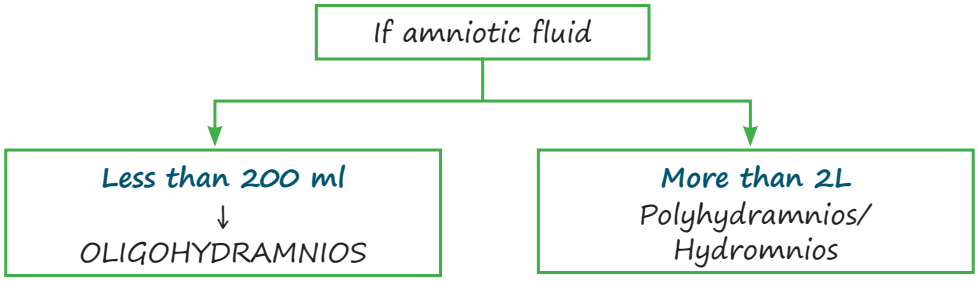
colourless (3) (2-20 weeks Fetal wire)

Straw coloured

99% water pH is alkaline

Colour of amniotic fluid	Seen in
→ Green	Fetal distress breech transverse lie
→ Golden yellow	Rh negative pregnancy
→ Tobacco juice	Intrauterine death of fetus
→ Yellowish green	Postparturm pregnancy (>42 weeks)

→ Maximum volume: 36-38 week of pregnancy



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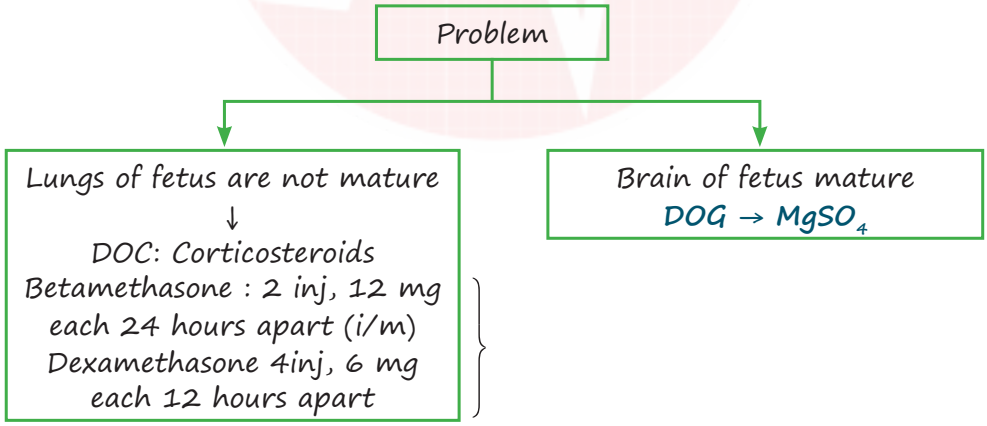
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On USG:	
→ AFI: <5cms ↓ (Amniotic fluid Index)	→ Amniotic fluid Index ≥25
→ Single largest & Vertical Pocket <2 cms	
Most important cause ↓ Renal. defect in fetus **Other cause:-**	**Most common cause** ↓ Swallowing defect in fetus → NTD → Oesophageal atresia
→ **Mother** - PIH/↑BP → PROM → Pregnancy ≥42 weeks → IUGR	→ **↑Urine Production** → Twin → Diabetic Mother → Rh -ve Pregnancy

Preterm Labor (00:26:10)

→ Process of Lobor beigns at <37 weeks

→ m/c cause → Infections → UTI, asymptomatic Bacteuria
Other: Polyluydramnios
Twin
PROM



Student's Space

Contraindication of Corticosteroid

→ Chorioamnionitis

To decrease strength of uterine contractions

↓

(TOCOLYTICS)

↓

Best:- Ca channel Blocker Nifedipine.

Student's Space



PROM (00:29:20)

→ Normally membranes Rupture at end of 1st stage of labour when cervix is fully dilated.

→ If membranes rupture before process of labor beigns is called Premature Rupture of Membrane (PROM)

→ If membranes rupture before 37 weeks of pregnancy is called as Preterm PROM (PPROM)

Pregnant Female with PROM

1. Never going to do i/v examination (contraindicated)
2. 1st exam - sterile Perspeculum Examination
3. **Management:-** - Induce Labor
   +
   Antibiotics
   ⊕
   If PROM → Corticosteroid injection

Hypertension in Pregnancy (00:32:02)

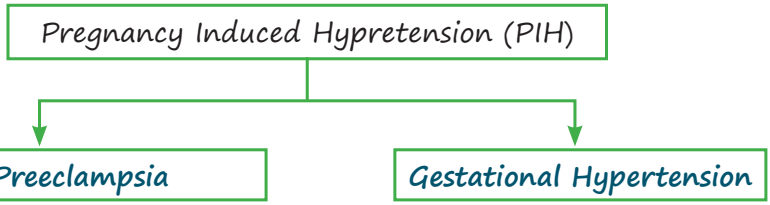
BP ≥ 140/90 mmHg on → 2 occassions 4 hours apart

Chronic Hyptertension in Pregnancy → Before Pregnancy also patient = BP↑	PIH. Before pregnancy BP normal → BP Increased after 20 weeks of Pregnancy

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Chronic hypertension in pregnancy	Pregnancy induced hypertension
1. BP↑ seen before 20 weeks of Pregnancy	1. After 20 weeks of - pregnancy BP↑
2. BP does not come back to Normal within 12 weeks of delivery	2. BP comes back to normal to within 12 week of delivery



Proteinuria (≥ 300 mg/24hr urine)
OR
Signs of End organ damage
→ Absent

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Signs of End Organ Damage:

1. Liver enzymes increased to 2 times than Normal value
2. S. Creatinine ≥1.1
3. Platelet count <l lakh
4. Cerebral/visual symptom
5. Pulmonary edema

Preeclampsia (00:38:15)

Mild	Severe
→ BP 140/90 mm Hg but less than 160/110 mmHg	→ BP >160/110 mmHg
→ No signs of End Organ Damage	→ Signs of End organ Damage

Severe preeclampsia

(+) → Convulsion ↓ ECLAMPSIA

(+) → Hemolysis Elevated Liver enzymes Low Platelet - Count HELLP syndrome

Chronic Hypertension with Superimposed Preclampsia (00:40:10)

Pregnant female it with chronic Hypertension, suddenly at 20 weeks.

→ Becomes uncontrolled BP

→ Develops proteinuria

→ Develops End Organ Damage.

Treatment:-

→ Doc for PIH/PE = Labetalol

→ DOC for Chronic Hypertension in pregnancy = labetalol (Best)

α Methyl Dopa (2nd Best)

→ DOC for Eclampsia → $MgSO_4$

→ DOC for preventing convulsion in hypertensive pregnant female = $MgSO_4$

→ DOC for treating convulsion in hypertensive pregnant female = $MgSO_4$

Mild Pre-Eclampsia	Severe Preeclampsia
→ Anti Hypertensive +/-	→ Anti Hypertensive +
→ $MgSO_4$ – → Delivery at ≥37 weeks	→ $MgSO_4$ + (to prevent convulsion) → Delivery at >34 weeks

Definative Treatment

Signs of Impending Eclampsia

→ Headache

→ Nausea/vomiting

→ Epigastric Pain

→ Visual symptoms

→ Urine Output decreased

Antihypertensives Contraindicated in Pregnancy:

1. ACE inhibitors: Enalapril Captopril
2. Diuretics
3. Diazoxide

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Management of Eclampsia

1. 1st step:- Airway management
2. $MgSO_4$ → To treat convulsion
3. Anti Hypertensive (Labetalol i/v)
4. **Definative Management:** - Immediate delivery irrespective of gestational age.

$MgSO_4$ (00:48:11)

Pritchard Regime

Loading dose:- 4 gm i/v + 10 gm i/m (5 gm in each buttock)

(14 gm) (20%) (50%)

Maintainence dose: - 50 gm of 50% solution in alternative buttocks every 4 hourly until 24 hours of seizure

Therapeutic Range = Narrow: 4-7 meg/L

Parameter to check before giving loading dose =

1. Deep tendon reflexes +
2. Respiratory rate ≥ 12/min
3. Urine output ≥ 30 mL/ hour.

First sign of Toxicity:- Loss of Deep tendon reflexes (knee Jerk) (Mg >10 meg/L).

Antidote:- Calcium Gluconate

Twin Pregnancy (00:58:48)

Most common Type = Dizygotic > Monozygotic

Dizygotic	Monozygotic
↓ Always dichorionic diamniotic	→ Division at <3 day DCDA
	→ 4-8 day MCDA
	→ 8-12 day MCMA
→ Fraternal Twins	→ ≥12 day by conjoined twins
→ m/c	→ Identical Twin
→ Incidence vary region to region	→ Less common
	→ Incidence same 1 in 250 delivery OR 4 in 1000 delivery

Hellen's How -

Incidence Twin = 1 in 80 pregnancy

"Incidence triplets = 1 in $(80)^2$ pregnancy

"Incidence quadruplets - 1 in (80^3)" pregnancy

Prognosis Good:- Dichorionic Twins

Prognosis Bad:- Monochorionic Twins

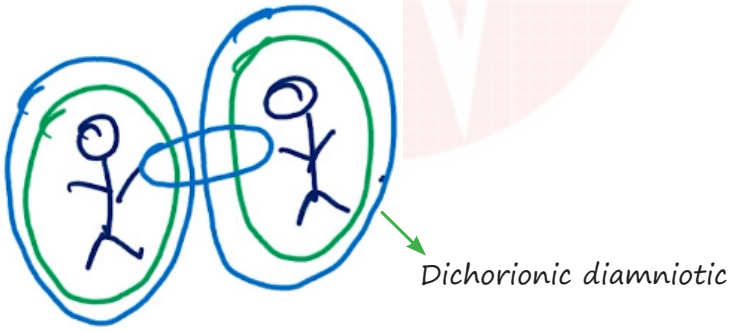
Complication
- Monochorionc Diamniotic (1 chorion 2 amnion)
- Twin To Twin Transfusion Syndrome
- Monochorionic Monoamnotic (1 chorion 1 amnion)
- CORD entanglement

To determine chorionocity 1 O C = **USG** → at 11 to 14 weeks



Chorion Blue

Green = Amnion



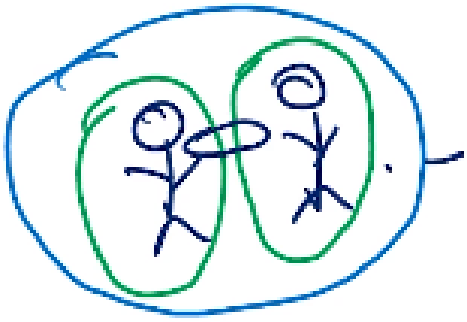
a. **Dichorionic Diamniotic**
   = 4 Layers of membrane
   → Best prognosis

b. Monochorionic Diamniotic 2 layers of membrane = Thin membrane
   → Prognosis: Bad
   → Twin To Twin transfusion Syndrome

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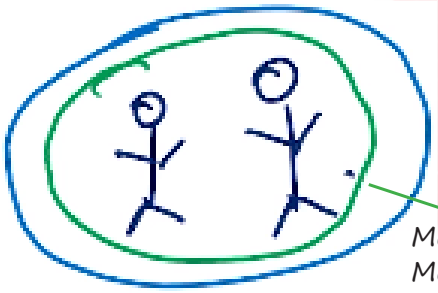
Student's Space



Monochorionic diamniotic

c. Monochorionic Monoamniotic

- → No layer of membrane
- → Bad Prognosis
- → Cord entanglement
- → Always do cesarean sector section



Monochorionic Monoamniotic

→ Most common variety of Twins – Dizygotic > Monozygotic

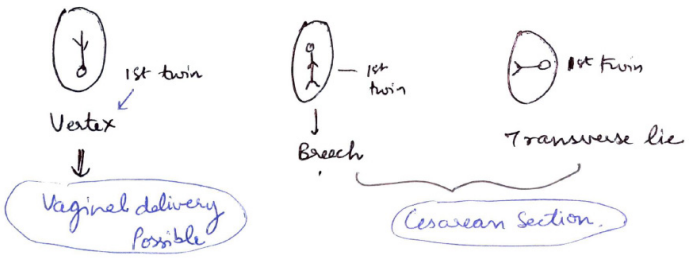
→ Most common variety of Monozygotic Twins:- Monochorionic Diamniotic

→ Most common variety of Conjoined Twins:- Thoracopagus (Thorax)

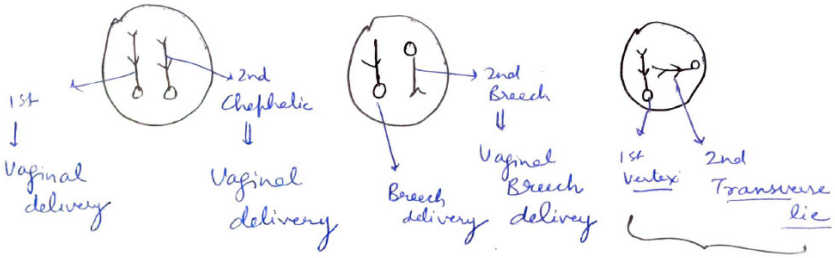
→ Least common variety of conjoined Twins:- Craniopagus (Head)

→ Cesarean sections
- Monochorionic Monoamniotic
- Conjoined Twins

→ Management in Labor:-



When 1st Twin Vertex: 3 Situations



1st turn cephalic,
2nd Transverse lie

↓

After delivery of 1st twin give GA to mother (general anesthesia)

↓

Take hand inside uterus, hold leg and make it Breech

Internal Podalic Version

1. Only done when 2nd twin Transverse lie
2. Membrane should be ruptured
3. Can lead to uterine rupture
4. Not done in previous cesarean section case
5. Done in OT, Under General anesthesia

Student's Space

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RAPID REVISION (PART-4)



LABOR

Pelvis (00:00:45):

Student's Space



- → Female Pelvis is called as:- Gynecoid
- → Best pelvis for vaginal delivery:- Gynecoid
- → Most common Type of pelvis:- Gynecoid
- → Male pelvis is called as:- Android Pelvis
- → Least common type of pelvis = Platypelloid pelvis

Caldwell Moloy Classification

4 Varieties:-

1. Gynecoid
2. Android
3. Anthropoid
4. Platyheloid → Platypeloid

Student's Space



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In Gyorcoid Pelvis (00:02:05):

AP diameter of Inlet

Diameter from upper Border of Public Symphysis to sacral promontory	Diameter from middle pubic Symphysis to sacral promontory	Diameter from lower Border of Public Symphysis to sacral promontory
↓	↓	↓
TRUE Conjucate 11 cms	Obstetric conjugate 10-10 5 cms	Diagonal conjugate 12 cms
	↓	↓
	Smalled AP diameter of inlet	Longest AP diameter of inlet

→ AP diameter which can be measured clinically Diagonal, conjugate

→ If obstetrical conjugate in <10 cms

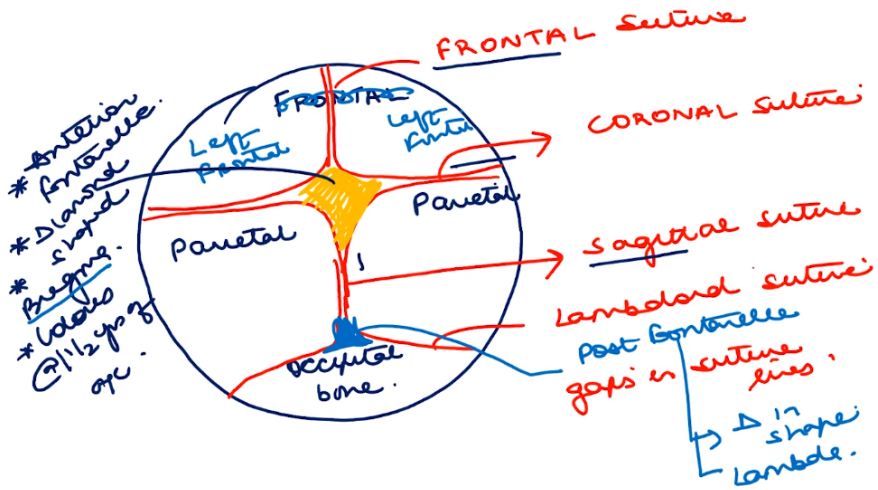
↓

Vaginal delivery not possible

↓

Pelvis is called as
Contracted Pelvis
Management - Cesarean section

Fetal Skull (00:06:15)



Posterior Fontanelle

→ Triangular shaped

→ Lamda

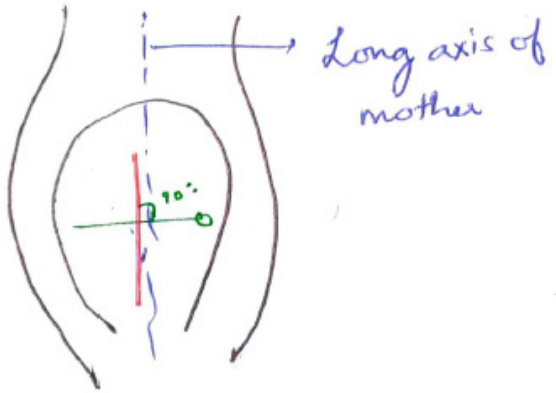
→ Closes at time of birth

→ At time of Birth total Fontanelles (6)

→ **Important Terminologies**

Relationship between long axis of mother and long axis of fetus in die

→ m/c Lie » Longitudinal die



Lie in which you always have to do Cesarean section (baby dead or alive) → Rransverse lie

→ Part of fetus which occupies the lower part of uterus is called as = PRESENTATION

→ M/c Presentation + **CEPHALIC PRESENTATION**

↓

Any presentation other then cephalic is called "Mal presentation"

m/c malfresentation - **Breech**

→ Presentation in transverse lie → Shoulder presentation always have to do Cesareon section.

→ The term used for the part of presentation which lies directly over internal os → PRESENTING PART

→ M/C presenting part → Vertex

→ Others = BROW, FACE

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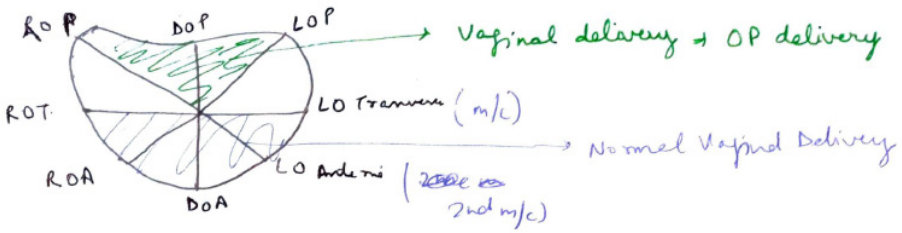
When presentation is Chephalic

There can be 3 presenting parts

- **m/c vertex**: Part of fetal skull which lies between Anterior Fontanelle & Posterior Fontanelle → Vaginal delivery
- **BROW**: Between Anterior Fontanelle and Root of Nose → always cesarean
- **FACE**: Part which lies between Root of Nose & Chin
  - Chin anteriorly (Mentoanterior) → Vaginal delivery
  - Chin posterior (Cesarean)

Relationship

- of most prominent point of presenting part to pelvis → POSITION → In Pelvis
- Different parts of fetus to each other → Attitude → m/c Flexion



Important Points on Position

1. Most common position in Labor → Left occipito transverse
2. 2nd most common position → Left occipito Anterior

3. Normal vaginal delivery occurs where position is

LOT
LOA
DOA
ROA

4. When position is ROP
DOP } - Vaginal delivery occurs is called as Occipito posterior delivery
LOP }

→ If during delivery on P/V examination is detected that:
'OP' position is present

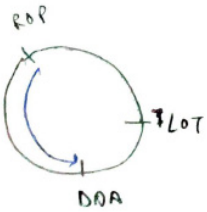
↓

Next step

↓

Wait & watch

↓



automatically baby head will turn by 3/8th of circle become DOA

↓

Vaginal delivery will occur

↓

But it will take longer time.

Sometimes while rotating = From occipito posterior

↓

OA (Occipito anterior)

Head of Baby gets stuck at occipito transverse position and does not move further inspite of good uterine Contractions.

Deep Transverse Arrest

- m/c Pelvis: Android pelvis
- Best Management Cesarean Section
  2nd Best:- Vacuum delivery

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Normal Labor (00:35:09)

→ Pregnant female in Labor is called as:- PARTURIENT

→ Onset of Labor is marked by:-

Labor Pains		
True labor pains		False labor pains
Lower abdomen + to Radiate to back & thigh Increase	1. Felt in 2. Radiate 3. ↑in intensity duration & frequency with	Lower abdomen Does not radiate → Decrease or remain constant

True labor pain		False labor pain
√ Most important	Lead to dilation of cervix	×
√	Regular & rhythmic	Irregular/instant
√	Blood mixed discharge	×
√	Bags of water	×

→ False labor pains:- are relieved by

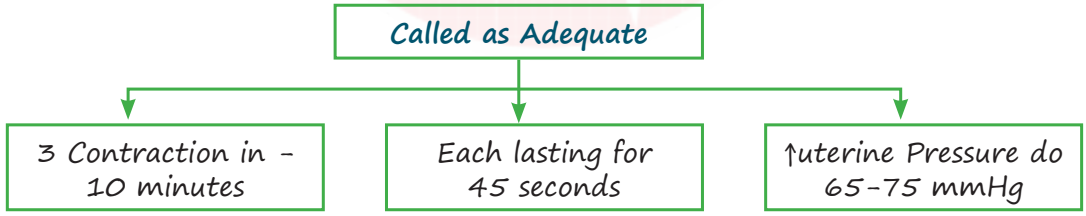
→ Enema

→ Rest/Sedate

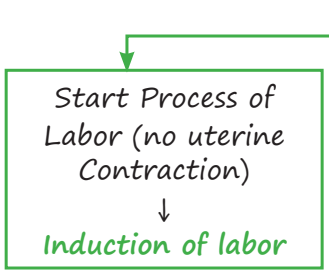
→ True labor pain cannot be relived by sedation/enema

→ True labor pains are due to uterine contractions

Uterine Contractions (00:31:31)



→ In a pregnant female



Student's Space

Induction of Labor

Best drug prostaglandins
- PGE_1: MISOPROST
- PGE_2: DINOPROSTONE (cerviprime gel)

Before Inducing labor :- Do "BI: SHOP SCORE" Delhi = Dilation of cervix

Police = Position of cervix

Employed = Effacement of cervix

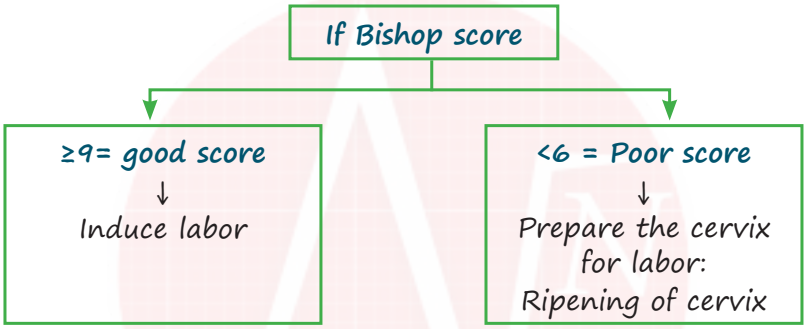
Special = Station of fetal head

Commandos = Consistency of cervix (score 1 to 3)

Now a days = We use **"Modified Bishop score"**

↓

Only one change: Cervical effacement has been replaced by cervical length



Induction of Labor:

Contraindicated in:-

1. Contracted Pelvis
2. Cephalopelvic disproportion
3. Placenta previa
4. Active Genital Herpes infection
5. Transverse lie/Brow Presentation

} Where cesarean is mandatory

India = Pregnant female having HIV positive

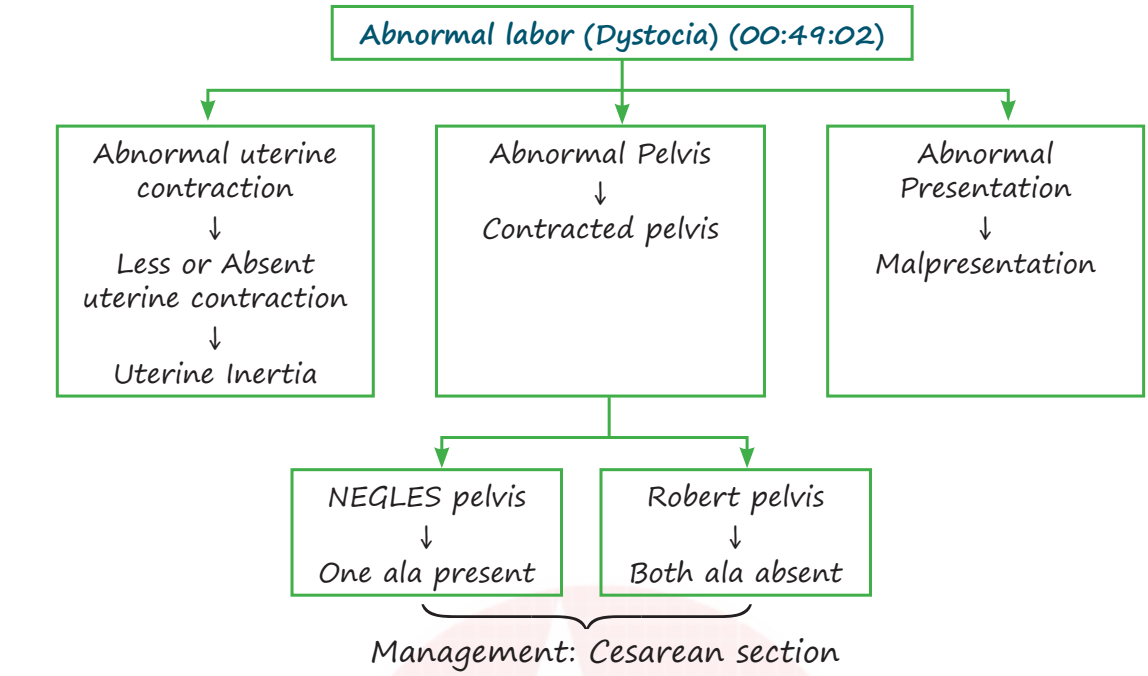
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Vaginal delivery

Student's Space

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Management:- Augmentation of labor

- Oxytocin
  +
- ARM (Artificial rupture of membrane)

Student's Space

Malpresentation (00:52:46):

→ Most common malpresentation - Breech

→ Most common cause of Breech - Preterm delivery

→ Bony point of Reference in Breech - sacrum

→ Most common Position in Breech = Left Sacro anterior position

→ Sequence of delivery of parts in Breech:-

1st Butlocks

2nd Shoulder

Last-Part-Head (After coming head of Breech)

→ Most common cause of death in death in Breech:- Intracranial Haemorrhage

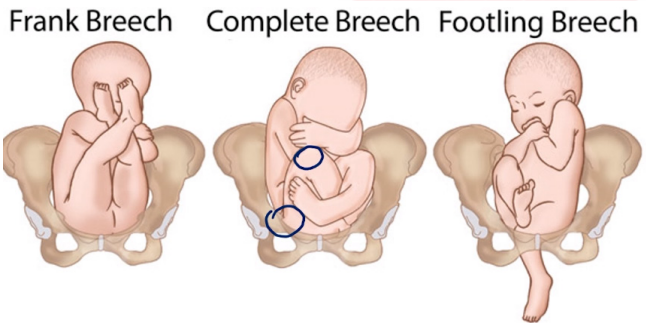
Maneuvers used for Delivery in Breech (00:54:25)

PART	_MANOUVER used
1. Butlocks: →	→ Flexed → GROIN traction → Extended = PINARD manner
2. Shoulder →	LOVSET maneuver
3. Head →	1. Burn Marshall Technique 2. Malar flexion shoulder Traction 3. PIPER Forceps

Types of Breech (00:57:56)

Legs flexed + Hip joint flexed ↓ Flexed Breech OR Complete Breech m/c in multigravida	Legs flexed + Hip joint flexed ↓ FRANK Breech m/c in primigravida	Legs flexed + Hip extended ↓ Knee Presentation	Both Hip and leg extended ↓ Footling presentation

Indication for Cesarean section:
↑ Chances of Cord Prolapse



Student's Space

Indications of Cesarean in Breech (01:00:31)

1. Footling Presentation
2. Knee Presentation
3. Head is extended in Breech

STAR GAZER Breech

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4. 1st twin breech
5. Preterm with Breech
6. Breech with previous cesarean
7. Primigravida with Breech.

Cesarean to be done

1. Transverse lie/Shoulder Presentation
2. Brow Presentation
   ↓
   Engaging diameter:- Mentovertical diameter (largest AP diameter of fetal skull = 14 cms)
3. Face
   ↓
   Mento posterior
   Note: In face if there is mentoanterior
   ↓
   Try vaginal delivery

Fetal skull diameter (01:03:00)

AP diameter
↓
Always AP diameter are larger than Transverse diameter
↓
Largest:- Mentovertical 14 cms

Transverse diameter
Mis - Bimastoid
Tina - Bitemporal
So - super sub parietal
Pretty - Biparietal (9.5 cm)

2nd largest:- Submentovertical
= Occipitofrontal
= 11.5 cm

Student's Space

Normal Labor Stages (01:06:20)

1st Stage:-

Begins: With true Labor Pains
Ends:- Full dilation of cervix (10 cms)
Main event:- Dilatation of cervix.

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1st stage
- **LATENT Phase** = Ends at 3 cms dilatation of cervix
  WHO/Partogram
- **Active Phase** 4 cm dilation of cervix.

↓

Rate of dilatation of cervix

Primi 1.2 cm/hr

Multi 1.5 cm/hr

WHO minimum rate 1 cm/hr

→ Softening of cervix = Ripening of cervix occurs in:-

Best Answer- Pre Labor stage

2nd Best Answer:- 1st stage of Labor

→ When do membranes rupture = at end of 1st stage of Labor

Second stage of Labor:

Begins - After full dilation of cervix

Ends. - Delivery of Baby

Main event - **Delivery of Baby**

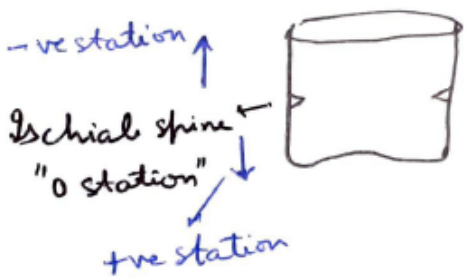
↓

1st step:- Head of fetus crosses the pelvic brim

↓

Engagement

Engagement		
Time:-	M/C reason for Non - Engagement of Head:-	When P/V examination done ↓ Head is at level of Ischial spine = '0' Zero station
PRIMI:- 38 weeks (mother relieved from respiratory distress) ↓ **(Lightening)** MULTI: at onset of labor	Best Answer:- Deflexed Head 2nd Best Answer:- Cephalic position 3rd Best Answer:- cephalic-pelvic disproportion	



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→ **Ischial shine Q's**

1. Internal rotation of fetal head during labor occurs at level of Ischial spine
2. Pudendal nerve block given at level of Ischial spine
3. Deep transverse arrest occurs at level of Ischial spine.

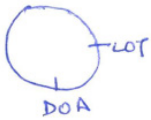
Student's Space

→ Movement which fetus undergoes at the time of labor:- **CARDINAL movements**

↓

1st step:- Engagement

↓



Internal Rotation hat level of Ischial spine occurs by 2/8th of circle)

↓

Head of Baby in delivered

By **Extension**

↓

untwisting of neck = "**Restitution**"

→ To facilitate delivery of head

↓

incision given at perineum to enlarge vaginal outlet

↓

Called Episiotomy

m/c site Right mediolateral episiotomy Angle: = 60° (45-60°)	Muscle not cut in Episiotomy 1. Ischiococcygeus 2. Ischiocavernosus + Anus	Does not Prevent PPH

If Incision was not given:- Perineum tears on its own

↓

PERINEAL TEAR

Classification of Perineal Tear

1. Only vaginal mucosa torn
2. Only vaginal mucosa + vaginal muscles torn

} Repaired in Labor Room under LA

3. Vaginal mucosa and Vaginal muscles + Anal sphincter < Internal, External } → **Complete Perineal Tears** → OT, under general Anesthesia
4. Vaginal mucosa, muscle, Anal sphincter + Rectal mucosa is torn
5. Important

WHO:- **doesnot recommend:-**

→ Use of Episiotomy in all females to prevent perineal tear

WHO recommend:- Episiotomy should be given only if indicated

Ritgen Maneuver
- → Perineal support with one hand and controlled delivery of head of fetus
- → With other hand to prevent tears.

Third Stage of Labor

Student's Space

Begins:- After delivery of Baby

Ends:- With delivery of Placenta

Main Event:- Placental separation

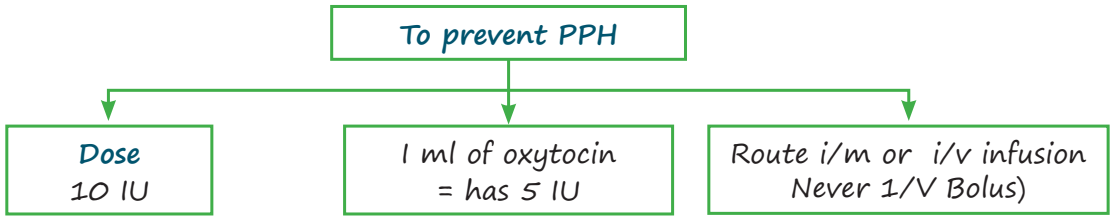
Signs of Placental Separation:

1. Fresh vaginal bleeding
2. Fundus of uterus becomes round
3. Height of Uterus increased
4. Lengthening of cord
5. Super Pubic Bulge

→ After delivery of placenta give injection oxytocin (pitocin/Syntocinon) to mother

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Oxytocin is also one of the good method of doing MTP between 13-20 hours)

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Third stage We do:- Active Management of Third Stage of labor

Steps:

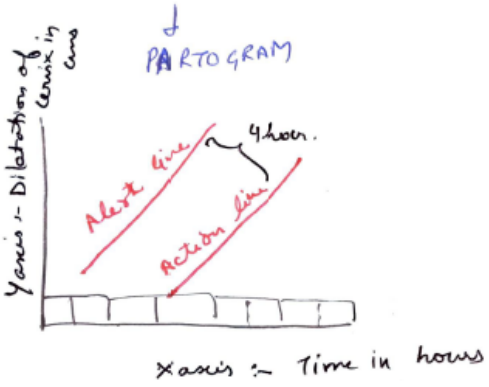
1. Inj. oxytocin to mother after delivery of shoulder of baby
2. Delayed cord clamping
3. Delivery of placenta by:- Controlled Cord traction
4. Intermittent assessment of uterine Tone (Earlier : uterine Massage)

4th Stages of Labor

→ 1 Hour of observation period after the delivery of placenta.

→ Mother will experience Physiologic chills.

For Monitoring Progress of Labor



→ Time duration between alert line and Action line = 4 hours

If Progress of Patient:

1. Lees to left of Alert line: NORMAL progress Nothing to worry
2. Toucher alert line or lies to its right or between alert line and action line: Alerted shift Patient to higher centre
3. Crosses Action line/right of action line: Now obstetrician should take action.

Student's Space



Principles on which WHO Partograph is Based (Modified)

1. Plotting not be done in Latent Phase (cervix <4 cm)
2. Plotting beings in **Active phase**

   ↓

   as per WHO 4 cms
3. 1st plotting will be done when patient is 4 cms dilated = on alert line

   OR

   Left of Alert line
4. Minimum rate of dilation of cervix in active phase = 1 cm/hour

Following are Plotted on Partograms:

Maternal

→ Uterine contraction

→ Oxytocin

→ Pulse rate

→ BP

→ Temperature

Fetal → fetal Heart Rate.

ARM = Rupture time of membrane.

Amniotic fluid colour

Do not plot presentation fetal lie and presentation on Partogram

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Puerperium

→ Period after childbirth and uptil 6 week after delivery

↓

Immediate	Early	Remote
Within 24 hows	Uptil 7 days	Uptil 6 weeks after delivery

→ Vaginal discharge for until after 15 days after delivery is called as **LOCHIA**

15 days 2nd Best answer

Best → 24-32 days



Student's Space

Sequence of Lochia:

1. Lochia Rubra (Red) (1-4 days)
2. Lochia Serosa yellow) (s-9 days)
3. Lochia alba (White) (10- 15 days)

In first few days after delivery - yellow coloured fluid comes out from breast → **[COLOSTRUM]**

↓

Rich in Immunoglobulin

has everything more in comparison to breast milk except:

K^+

Fat

Carbohydrate

→ Back to normal size and location **INVOLUTION**

→ Just after delivery → Just below umbilicus = 1000 gms

→ Becomes pelvic organ at 10th day after delivery

→ Weight after 1 week = 500 gm

2 week = 300 gm

3-5 week = 100 gm

> 6 week = 80 gm



Puerperal Pyrexia (01:59:45)

→ Temperature

→ ≥ 100°4°F
→ ≥ 38°F
} × 2 times; 1 day apart

Most common cause:- Genital infections (Puerperal sepsis)

Most common organ:- uterus Endometritis

Most common organism:- Group A streptococcus

Treatment:- Clindamycin + Gentamycin
(900 mg) (15 mg/kg i/v)

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RAPID REVISION (PART-5)



GYNECOLOGY

Student's Space



1. Phases of MITOSIS are (00:00:25)

   Prime Prophase
   Minister Metaphase
   Against Anaphase
   Terrorism Telophase

2. Time taken for spermatogenesis 70–75 days
3. Spermatogenesis begins at:- Puberty
4. **Terminologies**
   - → No sperm in semen Azoospermia
   - → No semen Aspermia
   - → Sperm concentration <15 million/ml oligospermia
   - → Sperm concentration <5 million/ml severe oligospermia
   - → Where does sperm attain motility & maturity: Epididymis
   - → Viability of sperm + 48–72 hours
5. **Oogenesis:** Begins in intrauterine life
   - → Maximum number of oocytes = 5th month of Intrauterine
     - → Life (20 weeks of Pregnancy)
     - → Number 6–7 million
   - → At time of birth number of oocytes: 1–2 million

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→ At puberty no. of oocytes: 4-5 lakh

→ Release of Secondary oocyte from Primary oocyte is called as → **Ovulation (at Puberty)**; Oogenesis begins in Intrauterine life but get arrested

The Primary oocyte cannot change to secondary oocyte in Intrauterine life

1°oocyte → 2°oocyte

↓

MEOSIS I

MEOSIS I: Get arrested in **Prophase**

→ This arrest gets over at puberty & ovulation occurs

MEOSIS II: Get arrested in **Metaphase**

↓

arrest gets over

only at time of Fertilization

↓

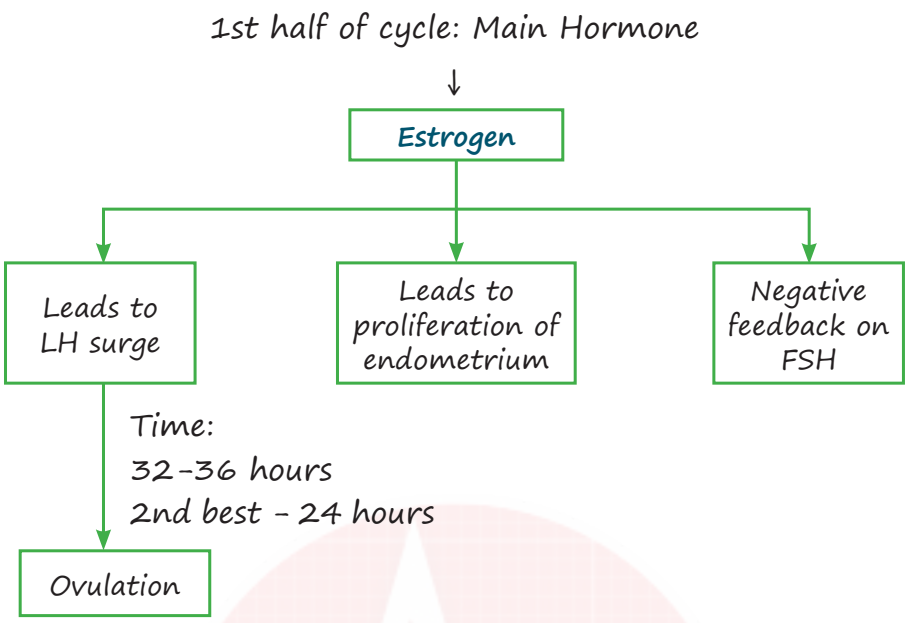
2° oocyte → ova (female pronucleus) + 2nd Polar Body

Fertilizable span of ova/Female Pronucleus/2°OOcyte → 24 hours

Hormones (00:13:06)

1. GnRH released → Arcuate Nucleus of Hypothalamus
2. LH, FSH, Prolactin released by → Anterior pituitary gland
3. Oxytocin released by → Anterior pituitary gland
4. Ovarian cycle initiated by → FSH
5. Main estrogen in reproductive female → Estriol (E_3)
   - → Main estrogen in Pregnancy: Estriol (E_3)
   - → Main estrogen in post menopausal femele:
     - → All estrogen are 1 m/c = E_1 = Estrone
   - → Main source of progesterone
     - → Non Pregnant female → corpus luteum
     - → Pregnancy → uptil 6 week = corpus luteum of pregnancy
       ≥8 weeks → placenta

Menstrual Cycle (00:17:26)



Ovulation (00:20:00)

→ Due to LH surge

→ Occurs 1° oocyte (46 XX) → 2° oocyte (23X) + 1st Polar Body released

Meosis 1 is completed

Meosis 1 is arrested in Prophase

→ Day of ovulation: Length of menstrual cycle 14

→ Mid cycle pain in abdomen is due to ovulation called MITTESCHMERZ syndrome

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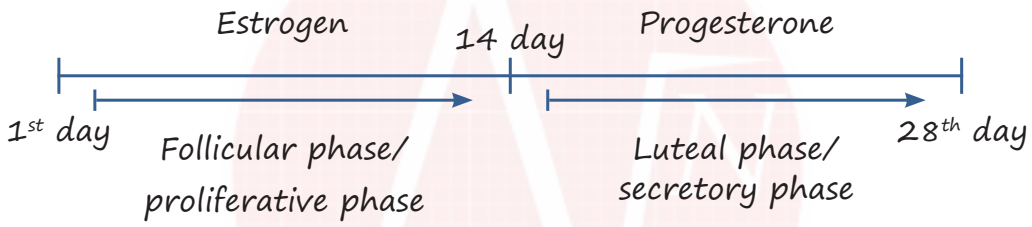
At time of ovulation

↓

Corpus luteum formed

Hormone form	In under control of which hormone	Maximum size of corpus luteum seen on	Life span of corpus luteum
Main: Progesterone Others: Estrogen inhibin	↓ LH (non pregnant) In pregnant (HCG)	↓ 8 days after ovulation = Day 22 of cycle	↓ 12-14 days

Menstrual Cycle (00:25:34)



If a female has pain + vomiting + Tachycardia just before menstruations: called as

↓

Premenstrual Syndrome

Premenstrual syndrome

Occurs in 2nd half of cycle	Luteal phase/ secretory phase	Relieved once Menstruation begins

Student's Space

→ Pain at time of Menstruation

Dysmenorrhea

Primary

- → No pathological reasons for pain
- → Seen in young girls
- → Management
  1. NSAID'S
  2. OCP's

Secondary

- → Pathology responsible for pain
- → M/C = Endomstriosis
  Adenomyosis
  PID
  Fibroid
- → Mostly seen in reproductive age females >30 years
  Management → treat the cause

Characteristics of Normal Menstrual Cycle

Cycle length = 21-35 days

- <21 days ↓ Polymenorrhea (frequent menstruation)
- >35 days ↓ oligomenorrhea (infrequent menstruation)

Average length: 28 days (15% females)

No. of days of bleeding = 2-7 days

- <2 days — **Scanty bleeding hypomenorrhea**
- >2 days — **Heavy Bleeding Menorrhagia**

Average no. of days → 4-6 days

Student's Space

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Normal Blood Loss

5-80 mL

- <5 ml → Scanty bleeding hypomenorrhea
- >80 ml → Heavy bleeding menorrhagia

→ Average Blood loss

→ Best → 35 ml

→ 2nd best 50 ml

→ Terminology used for Irregular bleeding/Intermenstrual cycle

↓

METRROHAGIA

Some Important Terminologies

Puberty: Age when male/female becomes capable of reproduction

- Normal age in female 10.5 years
- First sign ↓ appearance of breast budding THELARCHE
- Precocious puberty ↓ when beast budding appears at <8 years in female m/c cause → Idiopathic Treatment → continuous GnRH

Sequence

Breast Budding (Thelarche)

appearance of pubic hair (Pubarche)

Height Increase (Peak Height velocity)

Menstruation = (Menstruation)

↓

Menarche = 12.5 years

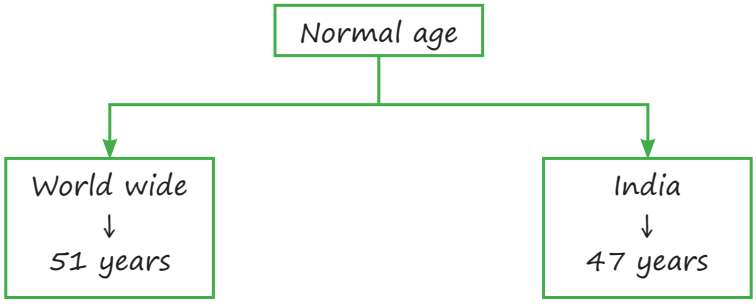
Student's Space

→ Menerche: 1st onset of menstruation in a female

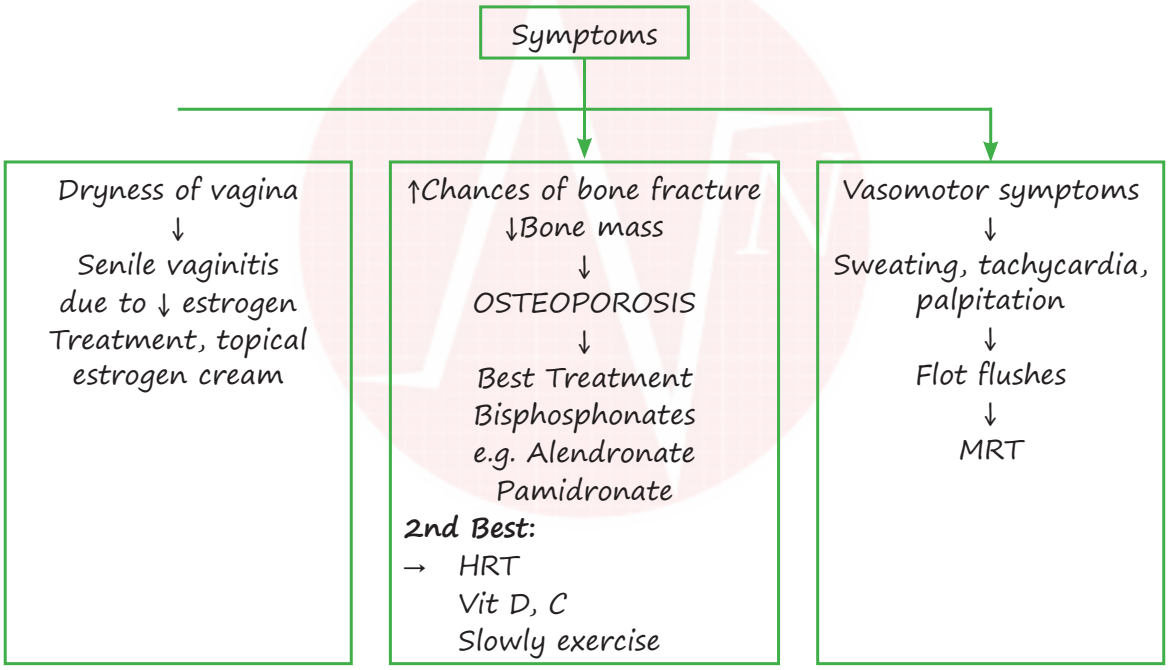
Normal age = 12.5 years

→ Precocious Menarche: Onset of menstruation at <10 years of age.

→ Menopause: Permanent cessation of Menstruation in female



Menopause (00:40.03)



Osteoporoses

1. ↓ Bone Mass (due to decreased estrogen)
2. ↑ Chances of fracture
   - → Pelvic fracture
   - → Vertebral fracture
   - → Fracture head of femur.

Student's Space

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Risk factors

1. Alcohol
2. Smoking
3. ↑ Steroids
4. ↓ Calcium
5. ↓ Vitamin D
6. ↓ Physical activity (Immobile)
7. ↓ Body weight

Diagnosis: DEXA Scan (Bone Mineral Density)

HRT (Hormone Replacement Therapy)

→ Hormone whose deficiency leads to all symptoms = Estrogen

→ But if estrogen is given to a female who has uterus lead to proliferation of Endometrium = Endometrial Cancer,

→ HRT

→ Uterus Present → Estrogen Progesterone

→ Uterus absent → Estrogen only

Remember: HRT does not protect against Heart disease)

Premature Menopause

Menopause in a female at <40 years of age

→ For diagnosis of menopause

→ Clinically

→ Amenorrhea X 12 months

→ Lab investigation

→ FSH↑ (≥40 IU)

→ Estrogen↓

→ Post menopausal bleeding

Any bleeding occuring after menopause

Student's Space

→ M/C cause of Post menopausal bleeding senile endometritis/atrophic endometrium

→ Investigation done in post menopausal bleeding:

1st → Transvaginal ultrasound

IOC → Endometrial Biopsy

Others → Pap smear

Student's Space



Surgical Menopause Occurs

Only after Both ovaries are removed

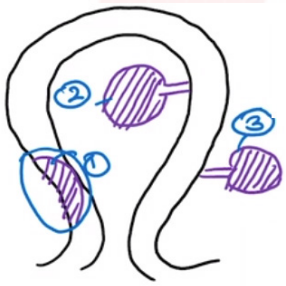
↓

B/L oophorectomy

B/L salpingoophorectomy + ovary

Fibroid (00:57:51)

Smooth muscle tumor of uterus = K/a leiomyoma



Types

- Most common
  1. Intramural
- 2nd most common
  2. Submucous
- 3rd most common subserosal

→ Most common presentation of fibroid: Asymptomatic

→ Most common symptoms of fibroid: Menorrhagia

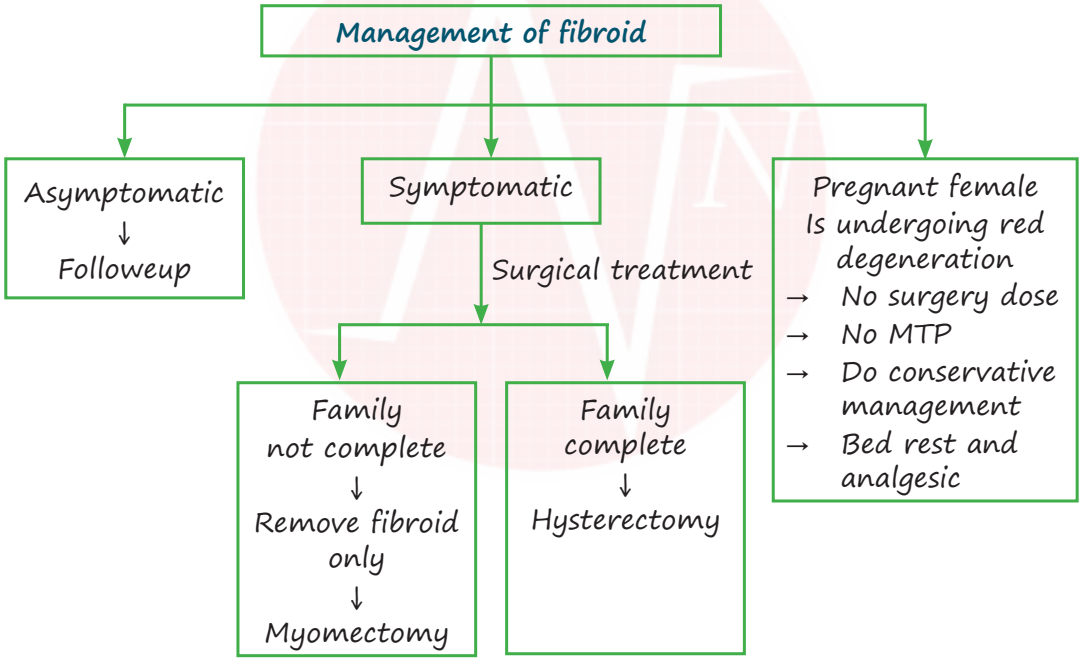
→ Metrorrhagia/Intermenstrual bleeding is not seen in fibroid

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- → Most common fibroid to cause symptoms:
- → Most common fibroid to cause Abortion:
- → Most common fibroid to cause Infertility:

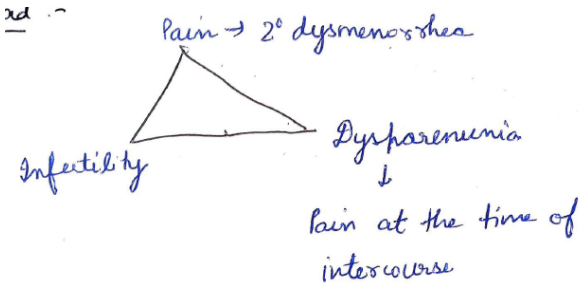
  (Submucous)
- → Most common fibroid to become malignant: Intramural
- → Most common fibroid to undergo Torsion: Pedunculated Subserosal fibroid
- → Least common change in fibroid: Malignant Transformation
- → Fibroid undergo degeneration:
  - → Most common degeneration
    - → Hyaline
  - → Red degeneration
    - → Seen in pregnant female 2 times m/c
    - → Fibroid becomes painful
- → IOC in Fibroid → Transvaginal Ultrasound (TVS)



Endometriosis (01:05:30)

- → Occurence & Endometrial tissue outside uterus
- → Most common site: Ovary
- → 2nd most common site: Pouch of Douglas
- → M/C = 30 yrs (Reproductive age) + Nulliparous

Clinical Triad



First Investigation: USG (TVS)

Investigation of choice: Laparoscopy

Student's Space

Management

Medical management is TOC

↓

1st drug = Progesterone

Doc → Continous GnRH

Presence of Endometrium inside myometrium.

Adenomyosis (Endometriosis Interna)

→ Treatment: Hysterectomy

→ MC → elderly female

Vaginitis (01:12:09)

1. Bacterial vaginosis: No inflammation (not complain of Pruritis)
   - Normally in vagina + Bacteria: K/a Doderlein Bacteria
     ↓
     Lactobacilli
   - → In Bacterial vaginosis doderlein bacteria are replaced by other bacteria e.g. Gardnella (coccobacilli). Mobilincus

Patient complains of

→ Whitish grey discharge

→ malodourous/foul smelling

→ No itching

→ PH of discharge >4.5

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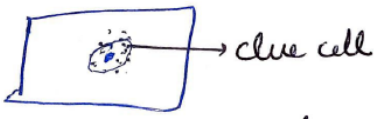
Characteristic

Student's Space

Under microscope

↓

Vaginal epithelial cell with bacteria attached to it.



Add KoH to discharge = get fishy odour

WHIFF test Positive

Treatment

Tab. metronidazole to patient (no treatment for partner)

Candidiasis (01:16:40)

Causative organism → candida albicans

Symptoms

→ Curdy white discharge
→ Itching (severe)
→ pH <4.5 of discharge
→ Can be transmitted sexually
→ M/C in vaginitis
→ Pregnant female
→ OCP uses
→ Diabetics
→ Immunocompromised
→ Steroid use

Treatment → Fluconazole

Trichomonas Vaginitis → caused by (01:18:12)

Trichomonas vaginalis (Flagellated protozoa)

Student's Space

Symptoms

Frothy yellowish discharge

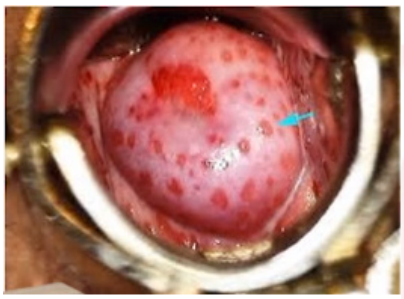
+

Itching

+

PH > 4.5

Characteristic: Strawberry Vagina



Treatment: Metronidazole to both partners

Cancer Cervix (01:21:25)

→ Most common cancer in female in India → Breast cancer

→ Most common genital tract cancer female in India → Cancer cervix

worldwide → Cancer cervix

Cancer Cervix Risk Factors

1. Low socio-economic status
2. Multiparity
3. Multiple sex partners
4. Immunocompromised state
5. Human papilloma virus
   - → M/C: HPV 16
   - → 2nd m/c HPV 18

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6. Young age of intercourse

HPV 6 & 11

→ Low Risk subtypes

→ Lead to genital warts

→ Not leads to cancer cervix

Student's Space



HPV Vaccines

→ Cervirax → Bivalent HPV 16, 18 (Protect against Cancer Cervix but not genital waits)

→ Gardasil → Quadrivalent

HPV 6, 11, 16, 18

→ Gardasil 9 → NONAVALENT

HPV 6, 11, 16, 18, 31, 33, 45, 52,58

Age = 9 - 26 year

Best 11-12 years

Not given to pregnant female

Oral Cancer

Penis cancer

→ Most common variety of Cancer Cervix Squamous cell carcinoma

→ 2nd most common variety of cancer cervix Adenocarcinoma

→ M/C symptom: Irregular Vaginal bleeding

→ 2nd most common symptom Bleeding after intercourse

→ M/C cause of death in cancer cervix Renal Failure/Uremia

→ M/C site of cancer cervix → Squamocolumnar Junction/Transformation Zone

Treatment of Cancer

→ Early stages → Wertheins Hysterectomy

OR

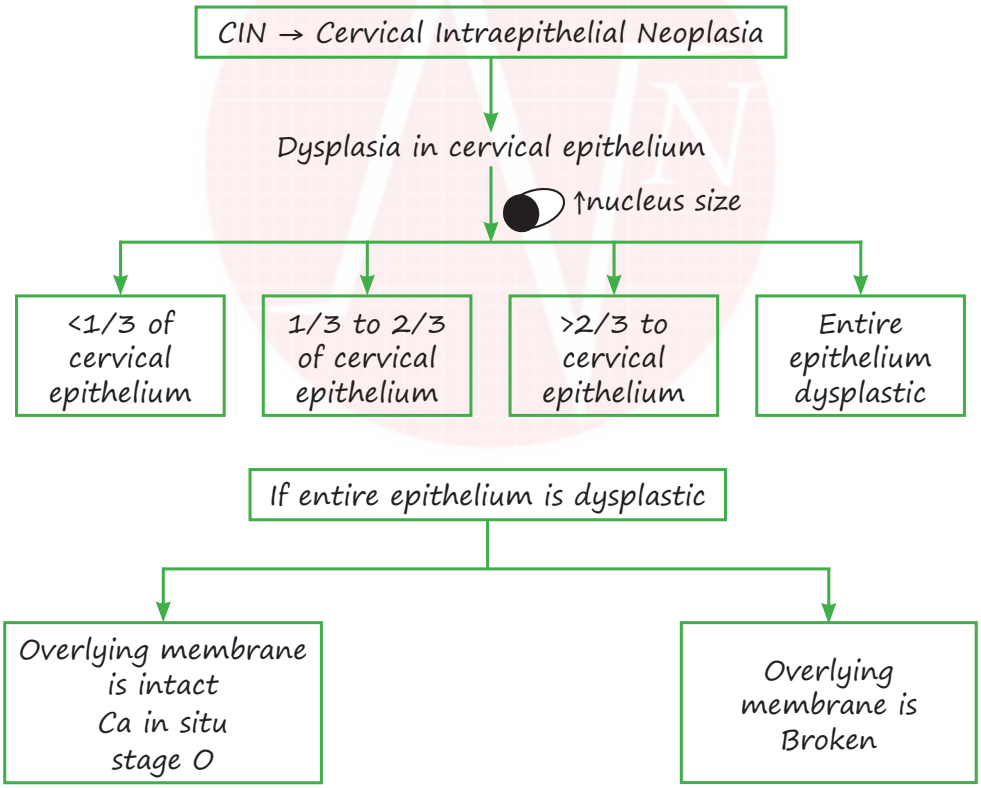
Radical Hysterectomy

→ Later stages → Chemoradiation > Radiotherapy.

Stages of Cancer Cervix

Stage 0	Cancer in-situ
Stage 1	Cancer is limited to cervix
Stage 2	Cancer beyond cervix into upper vagina but not involved pelvic side wall
Stage 3	Lower vagina OR Pelvic side walls OR Ureter } Involve
Stage 4	Metatasize → Bladder/Rectum

Premalignant Lesion of Cancer Cervix



Screening Method for Cancer Cervix : (Universal all females screening should be done)

1. PAP smear → Age = 21 years → 65 years
   Repeated every 3 years

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2. HPV DNA → Age 30 years

   HPV DNA + Pap = every years

3. VIA → Visual inspection with Acetic Acid
4. VIL → Visual inspection with Lugols Acid

Age 21 years → Pap smear

↓

Repeat X 3 years

↓

Till 30 years

≥30 years = HPV DNA + Pap smear

Repeat every x 5 years

↓

Till 65 years of age

Best method:- Pap smear + HPV DNA 30 years

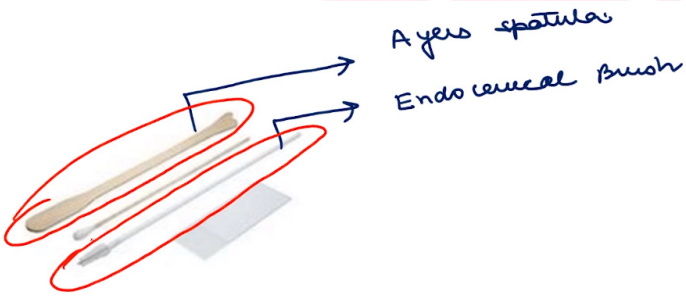
↓

2 year

Student's Space



Pap Test



Fixative

95% ethyl alcohol

± 5% ether

If Pap Test shows Abnormal is Present

↓

Then it should first confirmed by

COLPOSCOPY

Treatment

CIN 1: Observation

CIN 2, CIN 3 → **LLETZ** or **LEEP**

- **LLETZ** ↓ Large loop excision of Transformation zone
- **LEEP** ↓ Loop electro Excisional procedure

→ Hysterectomy is not done for CIN

Student's Space



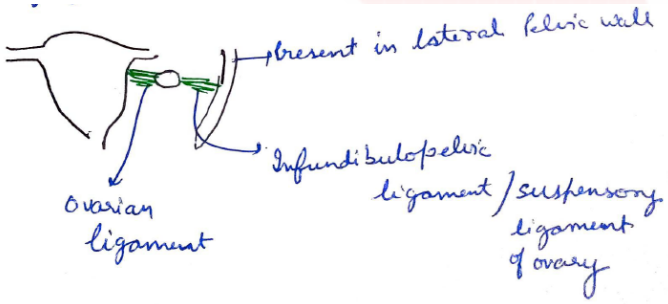
Important Points on Anatomy of Female Genital Tract (01:46:14)

→ Female internal genital organs
- → Fallopian tube
- → Ovary
- → Uterus (cervix)
- → Vagina

→ Formed by mullerian duct.

Ovary

Formed by genital ridge



Fallopian Tube

Length: 7 to 12 cms (≃ 10 cms)

Histology:

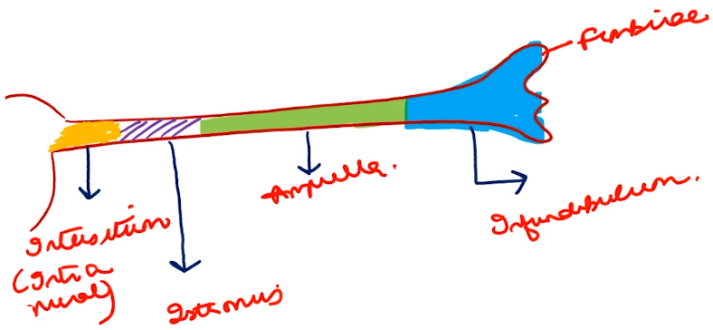
→ Ciliated columnar epithelium

→ Peg cells

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Medial to lateral: Parts are:



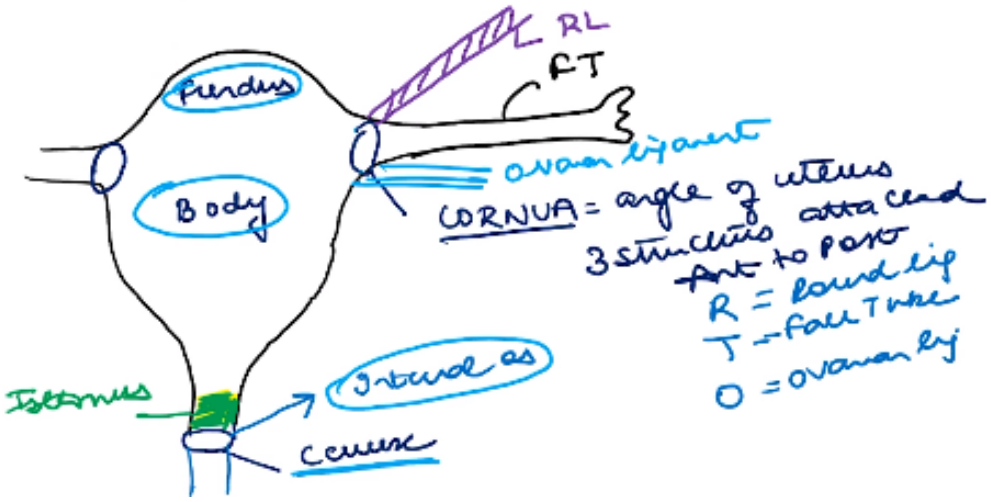
→ **Longest & widest part:** Ampulla

→ **Narrowest hart:** Interstitum 2nd Narrow used + Isthmus

→ Fertilization occurs in Ampulla

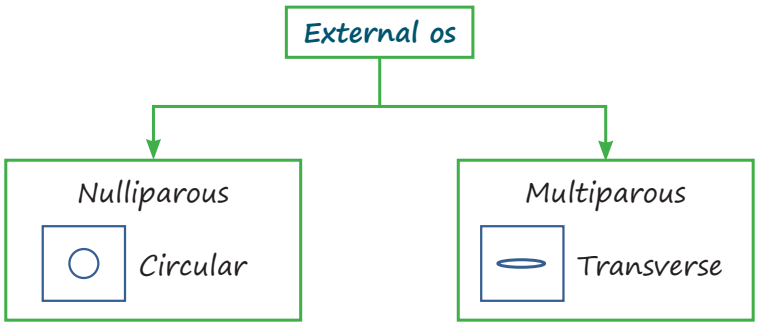
→ **In Tubectomy/Tubal Ligation:** Isthmus

Uterus



→ The place where uterus opens into cervix **Internal os**

→ The place where cervix opens into

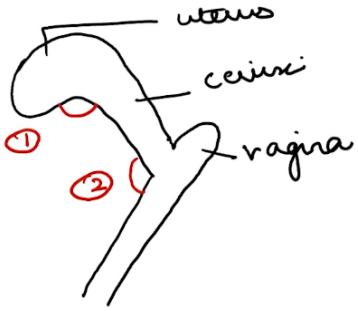


→ **3 layers of uterus:**

Innermost: Endometrium

Middle: Muscular → Myometrium

Outermost: Serosa



1. Angle between uterus & cervix
   ↓
   Angle of **Ante flexion** (120°)
2. Angle between cervix & Vagina
   ↓
   Angle of Anteversion (90°)

Uterus in anteverted a Auteflexed.

Weight of uterus: 50-60 gm

Size of uterus: 3.5 X 2.5 x 1.5 inch.

Supports of uterus (01:55:44)

Main support

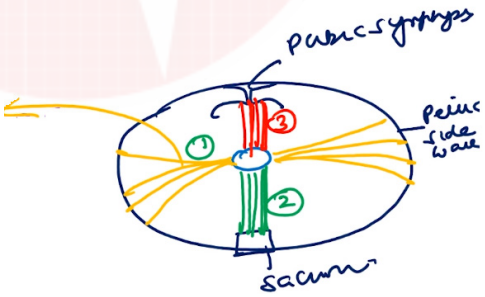
→ Levator ani muscle (most important : overall support)

Ligaments

1. Cardinal ligament = Transverse cervical ligament = mackenrodt ligament
2. Uterosacral ligament
3. Pubocervical ligament

Secondary support
↓
Round ligament

No support
↓
Broad ligament



Fertilization occurs in Ampulla of Fallopian tube

↓

Zygote formed

↓

Stays for 3 days in fallopian tube

On day 4 + Zygote enter uterus

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(Day 18 of cycle) due to peristalsis of Fallopian Tube + movement of cilia

→ In form of Morula (16 celled)

↓

gets attached to endometrium called as **Implantation**

Implantation (02:01:42)

→ Time: 6-8 day after fertilization (20-22 day of Cycle)

→ Type in human → Interstitial Implantation

→ In inform of → Blastocyst

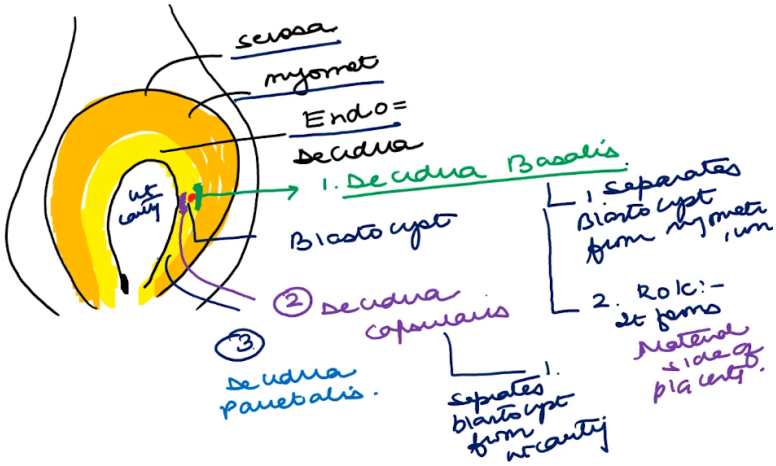
→ Most common site of implantation: Posterior upper wall of Uterus

Some females have bleeding at time of implantation called as HARTMANN sign Placental sign

After implantation:

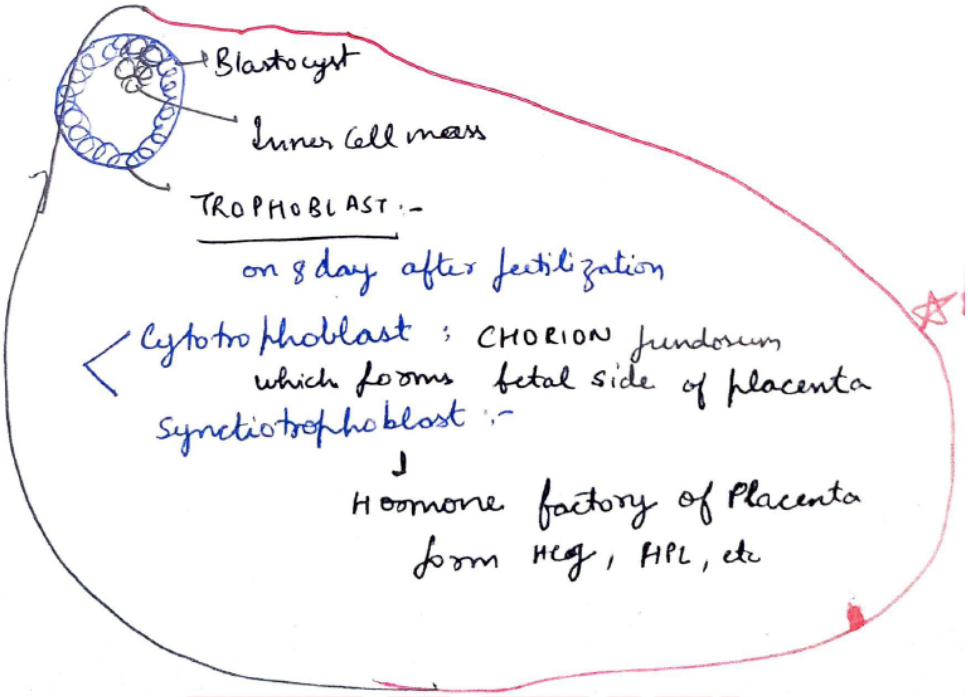
Endometrium is called as **Decidua**

Decidua has 3 Parts



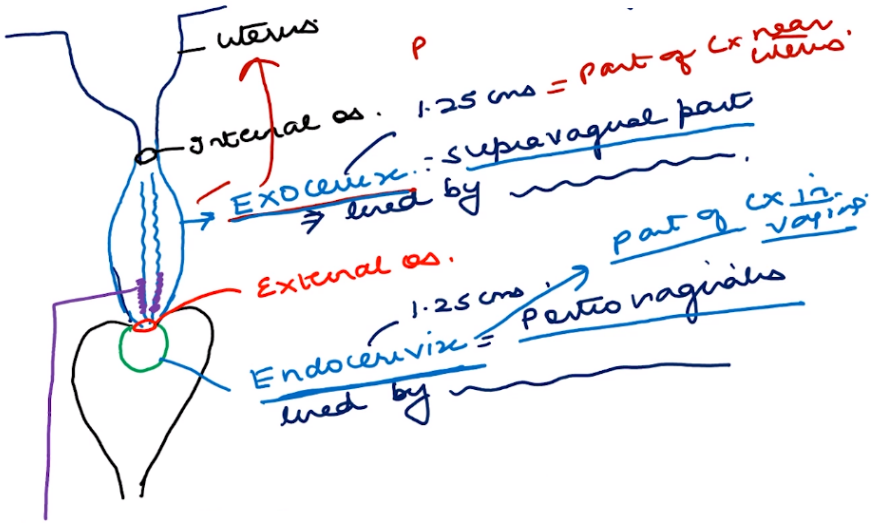
Student's Space

Blastocyst



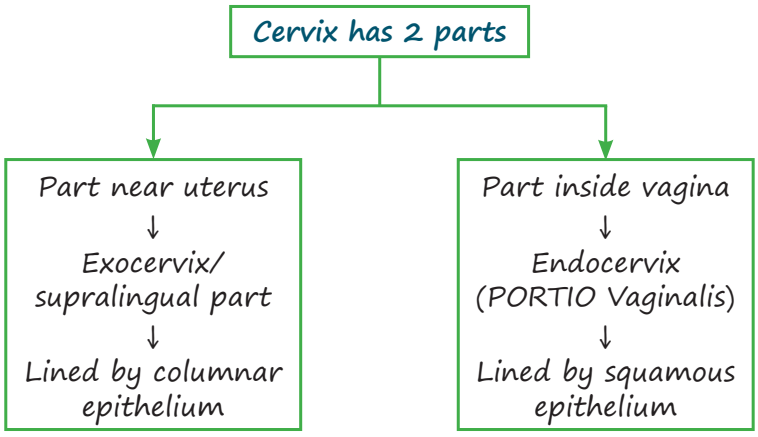
Cervix

Length 2.5 cms in non pregnant in Pregnant 4-5 cms.



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The place in cervix where columnar epithelium.
Changes into squamous the epithelium → Transformation zone/ squamocolumnar junction
↓
most common site for Cervical Carcinoma.

Cervix: Corpus ratio

Before Puberty	2:1
At puberty	1:2
In Reproductive age	1:3/1:4
Menopause	1:1

Corpus: Cervix ratio = opposite or reversed ratio

Vagina

1. Has No glands (vaginal discharge = cervical gland discharge)
2. Lined by → stratified squamous epithelium
3. Posterior wall is longer than Anterior wall by 2 cms
4. Has inhabitant Bacteria called as **DODERLEIN Bacteria**

↓
which are lactobacilli
↓
Convert glycogen in vaginal epithelium to lactic acid
↓
pH of Vagina is acidic

Age grown	PH
Childhood	Alkaline (6–8)
at Puberty	Alkaline → acidic
Reproductive age	4:5 pH
Menstruation	Menstrual Blood alkaline (6-8)
Pregnancy	Acidic ≤4.5
Menopause	Alkaline 6-8

Homologus Organs in Male and Females (02:19:25)

↓

Organs with same embryonic origin

Embryonic structure	Male	Female
Genital Tubercle	Penis	Clitoris
Genital swelling	Scrotum	Labia Majora
Genital Fold	Penile urethra	Labia minora

Male

1. Prostate gland → Skene glands/Paraurethral glands
2. Bulbo urethral gland/ cowpers gland → Bartholin gland

Female

Student's Space

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