25/4/18 OBS & GYNAE ①

RELEVANT ANATOMY

GONADS

Internal genitalia

External genitalia

Internal Genitalia :⇒ Uterus; cervix; Fallopian tube; vagina

embryological structure from which it develops :→

↳ Mullerian ducts
⇓
Also " ParaMesonephric duct"
— Female Internal genitalia
⇓
Uterus; Fallopian tube; vagina; cervix.

Wolffian duct
⇓
" MesoNephric duct"
— Male Internal genital
⇓
S ⇒ Seminal vesicle
E ⇒ Ejaculatory duct
E ⇒ Epididymis
D ⇒ Ductus deferens/ Vas deferens.

* Both the ducts appear in every foetus @ 6 weeks.
↳ either ♂ or ♀
* Mullerian duct is Lateral to wolffian duct,
* Mullerian disappears in ♂ @ 9 weeks & wolffian disappears in ♀.

Mullerian ducts

Disappear ⇒ In Male

Why?? Testis

MIS (Mullerian Inhibiting Substance)

↳ * Ipsilateral

Released by "sertoli cells"

↳ Start producing @ 7 weeks

- Mullerian duct will present In female b/c of Absense of MIS

Wolffian duct

In Female

Why?? b/c absense of testosterone

- Wolffian duct is persist In Male child

Testes

Testosterone → Leydig cells @ 8 weeks

Cause development of wolffian duct

* Estrogen is Not Required for development of Uterus; Vagina; Cx etc ; for it absense of testosterone Required.

* Remnants of wolffian duct In Female

i) Epoophoron – Cranial Remnants of Mesonephric tubules

ii) Paroophoron – Caudal Remnants of Mesonephric tubules

iii) Gartner's duct – caudal Remnants of Mesonephric ducts

Paroophoron ↳ Medial part of broad Ligament

Klay" organ of Rosenmuller"

- Epoophoron
- Gartner's duct
- Hydatid of Morgagni

} Lateral Part of Broad Ligament

all contents of broad Ligament

* Gartner's duct sometimes prt. as cyst in the vagina

* Gartner's cyst ⇒ In Antero Lateral wall of vagina (2)

D/D → Bartholin's cyst ⇒ In Posterior Lateral wall of vagina

M/c cyst of vagina / vulva ⇒ Inclusion cyst

↓

Located @ Lateral wall.

* Remnant of Mullerian duct in Males ⇒

While { Appendix of testis = Klas. "Hydatid of Morgagni".

Appendix of epididymis is Remnant of wolffian duct. }

* Mullerian duct ⇒ 2 in No.

↳ both ducts fuse & form uterus in 10 weeks

We can differentiate External genitalia @ 10 weeks

→ direction of Fusion — Fusion begins from centre then it Moves cranially / caudally.

direction is from caudal to cranial.

* Initially Uterus is solid organs; Later cavity formation occur @ 18-20 weeks.

↓↓

by dissolution of a midline fibrous septum

↳ Potential cavity

↳ to accommodate something.

* if Fundus is convex upwards ⇒ No fusion Abnormality

if Fundus is dipping ⇒ Fusion Abnormality seen.

* Complete septate defect ⇒ 

* Incomplete septate defect ⇒ 

* M/c Mullerian Anomaly ⇒ Septate Anomaly

* 2nd M/c Mullerian Anomaly ⇒ Bicornuate Uterus

Septate Anomaly: two uteri, one cervix

Bicornuate unicollis: two uteri, one cervix

Bicornuate bicollis: two uteri, two cervix

* M/c Mullerian Anomaly a/w abortion
* M/c Mullerian Anomaly a/w Infertility
* Worst Reproductive outcome

* In Didelphius uterus both Mullerian duct form Anomaly (Complete Lack of Fusion)

↳ Complete failure of Fusion

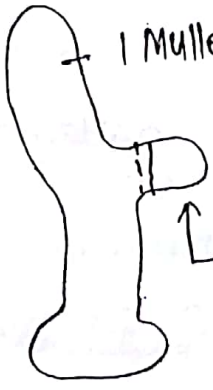
* Mullerian Anomaly & vaginal septum ⇒ Didelphius

* Bicornuate Uterus has good Reproductive outcome
  ↳ What pregnancy complication: !→ Pre-term Labour / Abortion
  Most Likely to do

* Didelphius Uterus also has good Reproductive outcome
  ↳ What pregnancy complication !→ Pre-term Labour
  Most Likely to do

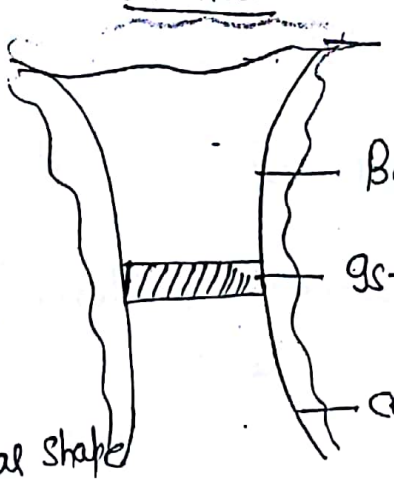
* Usually Corrective Surgery is Not Required
  ↳ if we want then do Unification Surgery
  ⇊
  "STARSSMAN METROPLASTY"

* Unicornuate Uterus !→



1 Mullerian duct = develops → May cause ectopic pregnancy
Unicornuate — Communicating
Unicornuate — Non-communicating
↳ 2nd Rudimentary
↳ May cause severe dysMenorrhoea (Unilateral dysMenorrhoea)

UTERUS



Pear shaped Uterus

cavity ⇒ Triangular shape

Length of Uterus ⇓ 6–8 cm Long***

Wt. → Multiparous (80 gm)

→ Nulliparous (50–70 gm)

↳ In pregnancy (term) = 1000 gm (1.1 kg) / 1 kg

} dl+ hypertrophy > hyperplasia

Volume of Non-pregnant = 10mL

Volume of Pregnant = 5L

} dl+ hypertrophy >> hyperplasia

QQ Weight of Uterus six week after Post-partum = 80 gm

* Body ⇒ Is Made up of Smooth Muscle (Myometrium)

inside → Endometrium

outside → Serosa

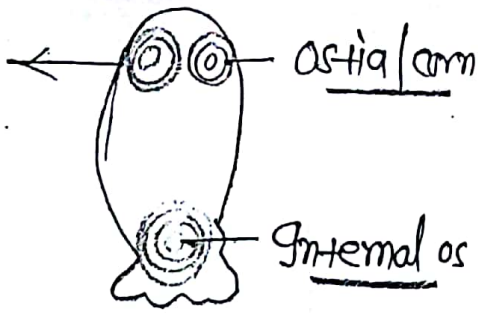
- Myometrium = 2–2.5 cm thick

3 Layer ⇒ Inner – Circular Muscle

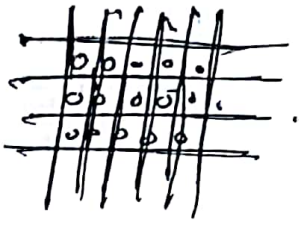
Middle – criss-cross

Outer – Longitudinal

Few Inner Muscle
Works as sphincter



⇒ Middle Layer – criss-cross
⇓
Work as Living Ligature**



⇒ EndoMetrium

↳ Gland + Stroma
⇓
Simple tubular

↳ Single Layer columnar epithelium
cilia prt. only Near gland opening

↳ Superificial Layer = Functional ⇒ Shed off every Month
on Menses

Basal Layer = Not Shed off
↳ function = Regeneration
↳ so thickness of endometrium changes

		Thickness
Just after Menses (D_5)	=	0.5mm
Periovulatory	=	2-3mm
Secretory	=	5-6mm
Implantation	=	10-12mm

Vigrous curettage ⇒ damage the basal Layer

⇓

Result in Intrauterine Adhesion

↓

Result in Asherman's Syndrome

↳ Highest Risk in to Manage the Post-partum hemorrhage

Post partum hemorrhage

Pt. is with Amenorrhoea infertility

Asherman's Syndrome

Pt is Amenorrhoea infertility.

⇒ outside part of Myometrium = Serosa

Anteriorly Loose fold of Peritoneum ⇒ Uterovesical fold

Posteriorly Loose fold of Peritoneum ⇒ Rectouterine Pouch

* At what Level uterus opens - Into cervix ! → Internal os

- Anatomical (Above)
- Histological (Below)

0.5 cm ⇓ constriction ⇓ Kla "Isthamus"

* Isthmus is brt b/w Anatomical & Histological Internal os.

* Isthamus — Stretch — LUS

↳ Lower Uterine segment

In term LUS Isthmus (7cm) + Cervix (3cm) ; cervix comes above in cervical effacement (taking up of cervix).

(5)

Cervical effacement

↳ Shortening + Softening

* At term LUS ⇒ 5cm

In complete (Manual Labor) LUS = 10cm

* LUS shortly forming after 1st Trimester.

L.S.C.S. ⇒ At Lower segment

How to identify??

by Loose fold Peritoneal

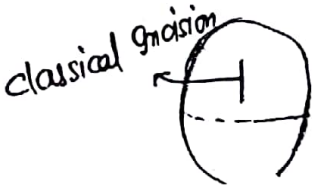
Most common Incision ⇒ Low Transverse Incision

Shape ⇒ Transverse or Transmeter

↳ Kias " Kerr's Incision"

Low vertical Incision

↳ Kias " Kronig's Incision"



classical Incision

↳ Kias " classical Incision"

Risk of Rupture

* Low transverse Incision ⇒ 0.2-0.9%
* Low vertical Incision ⇒ 1-7%.
* Classical Incision ⇒ 4-9%.
  ↳ Weakest Incision

* Classical Incision / scar is already given
  ↳ it is Absolute Indication for Repeat cesarean section
  but Not an Indication for Repeat classical Incision

* Indication of classical ⇒ ① ♀ ⊂ CaCx;
  ② Dense Adhesion b/w bladder & Uterus (May Injured bladder)
  ③ Repaired vagino-vesical fistula
  ④ Post Mortem C.S.

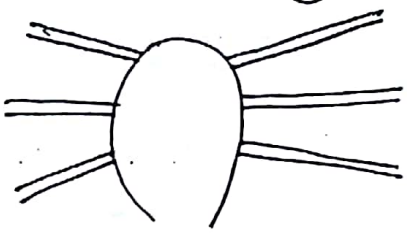
N.B: Anterior Located Placenta previa (only if a Not trained enough doctor)
↳ So; for Anterior Placenta previa ⇒ LSCS do

* On other side of Uterus 3 structures are attachment :-

(6)

Mnemonics ⇓ RTO

- Round Ligament
- Fallopian Tube
- Ovarian Ligament



Adnexa ⇒ Fallopian tube + ovary

Antero-Posteriorly ⇒ Round Ligament → Fallopian tube ↓ ovarian Ligament ⇓ Utero ovarian Pedicle

Superio-Inferior ⇒ Fallopian tube ↓ below it Round Ligament / ovarian Ligament @ same Level

They assist you in tubal Ligation Surgery

↳ M/c cause of failure of Tubal Ligation Sx ⇒ Ligation of wrong structure

FUNDUS :→ Part of Uterus Lies above the attachment of Fallopian tube

Round Ligament Path ⇒ Upper Uterus → deep Inguinal Ring ↓ Inguinal canal ↓ Superficial Ring ↓ Inserted on Labia Majora

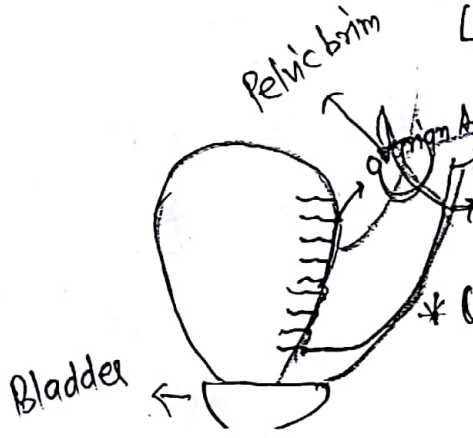
Pulling Uterus Anteriorly i.e. in Anteverted position.

* ✱ CANAL OF NUCK (Present in Fetus only) :
Fold of Peritoneum in fetus that contains Round Ligament & extends into Inguinal canal.
It carries Round Ligament.

✱ Round Ligament } developed from Gubernaculum
Ovarian Ligament
⇓
Proximal ⇒ ovarian Ligament
Distal ⇒ Rand Ligament

Not derived from Mullerian duct.

Blood supply ⇒ Uterine A.
↳ Branch of Anterior division of Internal iliac Artery.



2nd M/c site of ureteric injury *
"Water under bridge" ⇒ Danger Area
✱ Uterine A. is crossing over the ureter
⇓
M/c site for ureteric injuries

* Location of "water Under bridge" Area ⇒ 2 cm Lateral to cervix
OR
1.5 cm Lateral to fornix.

* Ureter is Posterior to ovarian & Uterine Artery; (7)
but it is Anterior to Internal iliac A

⇒ Branches of Uterine A. ⇒

U ⇒ Uterine A.
↓
A ⇒ Arcuate branches ⇒ Supply outer 1/3rd of Myometrium
↓
R ⇒ Radial branches ⇒ Supply inner 2/3rd of Myometrium
B ⇐ Basal ⇒ Supply Basal endometrium
S ⇐ Spiral ⇒ Supplies the Superficial / Functional endometrium

- Always do B/L Ligation & do @ the Level of Internal os.
* Uterine A gives a special branch ⇒ Sampsons A ⇒ for Round Ligament
- Nerve supply ⇒ T_{10}, T_{11}, T_{12}, L_1
  - ↳ Pain during Uterine contraction travels via this Root
  - ↳ Pain Relay via ⇒ "Frankenhauser ganglion"

We give "Labour Analgesia" (Level of block for vaginal delivery ⇓ T_{10})
↳ via Epidural Anesthesia
give "Bupivacaine"
↳ "0.125 - 0.25%" (Dose)
↳ Sensory block; if given more than Motor block.

* Level of block for cessarean Section

⇓

At T_4 (b/c to knockout the peritoneal Nerve supply)

M/c Anesthesia ⇒ Spinal Anesthesia

* Labour Analgesia may Prolong Labour (Active phase by 1hr)

↳ but doesn't ↑ Incidence of cessarean section,

* When we apply forceps (outlet/Low) – Pudendal N. Block

done only when complete dilatation head @ +3. to block it we

pierces Sacrospinous Ligament

. Direction of Needle (Posterior Medial)

⇓

S_2, S_3, S_4

⇓

Previously K/as "Saddle block"

* Lymphatic Drainage ⇒ Internal iliac + Ext. iliac L.N

Fundus ⟶ Para-aortic L.N.

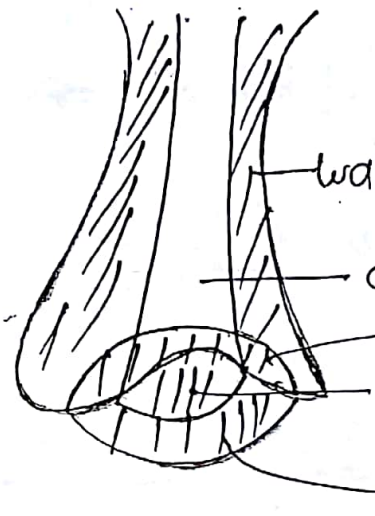
ostia ⟶ Superficial Inguinal L.N

CERVIX ⇒ 9t opens into vagina *

⇓

@ external os ** (8)

- Conical in shape
- 3cm Long
- Cavity ⇒ Spindle shape/ Fusiform



Compound Racemose glands

Tall columnal epithelium

Made up of Numerous branching glands

↳ Arbor vitae appearance

(Endocervix)

Ectocervix

⇓

Stratified squamous Non-Keratinized epithelium

External os ⇒ Shape

- Nulliparous ⇓ Circular
- Multiparous ⇓ Transverse slit

- Wall of cervix ⇒ Made up of connective tissue (collagen)

⇓

10-15% Smooth Muscle

Result in effacement (there will be ↓ in collagen & ↑ in hyaluronic acid / & ↑ water content & ↓ in dermatan sulfate)

⇐ Softening & taking up

* Broad Ligament is a potential space; contains blood vessels etc.

* Angle b/w cervix & vagina ⇒ Anteversion
  ↓
  90°.

* Angle b/w Long axis of body of Uterus & cervix ⇒ Anteflexion
  ↓
  120° @ Internal os

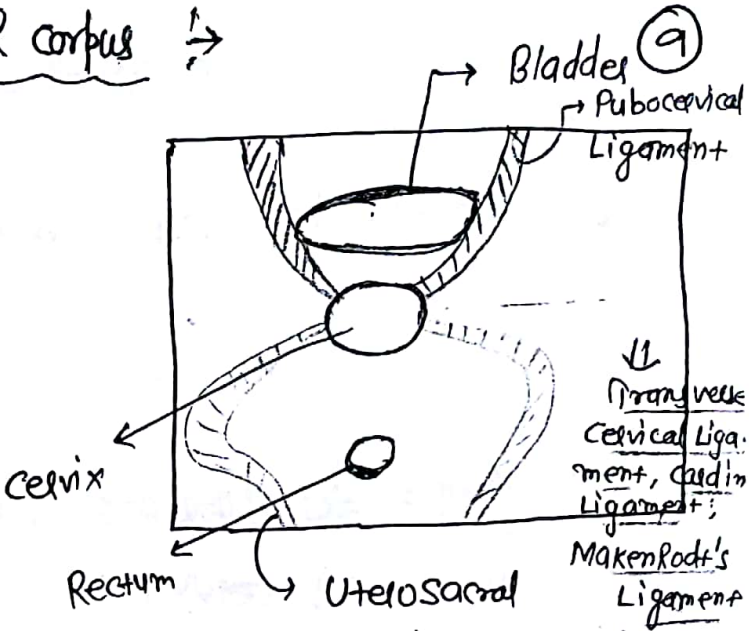
* In 80% women Anteverted & Antiflexed uterus ⊕
  ↓
  Two Ligament Responsible for it
  - Round Ligament
  +
  Uterosacral Ligament.

* If Fundus is More towards Bladder ⇒ Anteflexion
  If Fundus is More towards Rectum ⇒ Retroflexion.

* In P/V examination ⇒ Which Lip you hitting 1st
  - Anterior Lip ↓ Anteversion
  - Posterior Lip ↓ Retroversion.

* Ration of Cervix & corpus :-

At birth = 1:1
Prepubertal = 2:1
after Puberty = 1:2
Reproductive Life = 1:3
Post Menopausal = 1:1



* Main Support of Uterus :-

Anterior ⇒ Pubocervical Ligament
Posterior ⇒ Uterosacral Ligament
Lateral ⇒ Transverse / cardinal / MackenRodt's Ligament
Inferior ⇒ Levator Ani

Hammock / Triradiate Ligament = Pubocervical Ligament + Uterosacral Ligament + Cardinal Ligament.

QQ All are Main Support except

↳ Round Ligament (Support, but Not Main)
Broad Ligament (Not a support)
↳ False Name

↳ It is Nothing, but fold of Peritoneum

* Broad Ligament is a potential space; contains blood vessels etc.

* Angle b/w cervix & vagina ⇒ Anteversion
  ⇓
  90°.

* Angle b/w Long axis of body of Uterus & cervix ⇒ Anteflexion
  ⇓
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  - Anterior Lip ⇓ Anteversion
  - Posterior Lip ⇓ Retroversion.

FALLOPIAN TUBE **

(10)

- Unfused part of Mullerian duct*
- Length = 10 cm (10–12 cm)*

* Part of Fallopian tube (Medial – Lateral) :→

- Intramural / Intersitial part (1–2 cm) = Narrowest part of Fallopian tube
  ↳ 0.7mm diameter
- Isthmus ; (3 cm) = 1mm diameter
- Ampulla ; (5cm) ⇒ Widest part of Fallopian tube = 6mm
- Infundibulum
  ↳ Fimbrial end

→ Site of fertilization / M/c site of Ectopic ♀
↓
b/c here fertilization takes place & dt Mucosal fold ⊕nt @ Ampulla (K/as "plicae")

* M/c site of Ligation ⇒ Isthamus.

* Conceptus Remains in Fallopian tubes ⇒ 3 days
* Conceptus enter the Uterine cavity on the 4th day.
  ↳ Post-fertilisation
* Anatomical Sphincter of Fallopian tube ⇒ Intramural part.
  Physiological sphincter of FT ⇒ Isthamus

QQ Main Reason for transport of Conceptus

↳ Tubal Peristalsis *

Anything that ↓ Tubal Motility Leads to "Ectopic ♀" ***

↓

In Pelvic Inflammatory disease;
Tubal Surgery;
Progesterone only pills;

- Epithelium of Fallopian tubes :-

↳ Single Layer ciliated Columnal epithelium.

3 cells - Secretory
ciliated
Peg cells → Resting cells of Fallopian tubes.

* Direction of ciliary Muscle is towards Uterus **

- Blood supply ⇒ Dual blood supply *

Medial 2/3rd ⇒ Uterine A.

Lateral 1/3rd ⇒ Ovarian A

↳ dilates 3 times in ♀
↳ Site of Ligation for Management of PPH.

- Lymphatic drainage ⇒ Paraaortic Lymph Node * (11)

Intramural + ostial

↳ Superficial Inguinal Lymph Node *

extra edge

* N. Supply ⇒ T_{11} T_{12} L_1 .

⇓

Pain Sensation from Unruptured ectopic (tubal stretch)

* Ectopic is Vascular accident

↓

dies d/t

VAGINA **

Embryological development →

Upper 1/3rd of va from Mullerian duct (Mesoderm)

Lower 2/3rd of vagina ⇒ from Urogenital sinus (Endoderm)

↳ from Sinovaginal bulb

Hymen is Remnant of this

* Mucous Membrane of vagina ⇒ from Endoderm of urogenital sinus

* Muscles of vagina ⇒ from Mesoderm of Mullerian duct.

Vagina has four walls ⇒ Anterior
Posterior
Lateral - 2 in No.

7-10 cm Long

- Posterior wall is Longer than Anterior wall by 2cm.*
- A-P wall apposed together
  - ↳ after cut "H" shaped

* Cervix comes inside vagina & Space b/w them k/as "Fornix"

Recess = Fornix
⇓
Total 4 in No.

4 in No. (Ant, ; Post; 2 Lateral)
— Posterior fornix is deepest*

if More than 100ml collection in Pouch of douglas ⊕
↳ it is significant **

Pouch of douglas | Cul-de-Sac ⇒ Culdocentesis
⇓
Recto uterine fold Posterior to Vagina

if we get blood — which doesn't clot
↳ Hemoperitoneum.
→ used in Ruptured ectopic.
if blood clot ⇒ then it comes from blood vessels.

Colpotomy ⇒ Opening of the Pouch of douglus to drain Pelvic Pus. (Abscess) (12)

Enterocele ⇒ Prolapse of bowel wall (Pouch of douglas herniates)
↳ Upper 1/3rd of Posterior wall

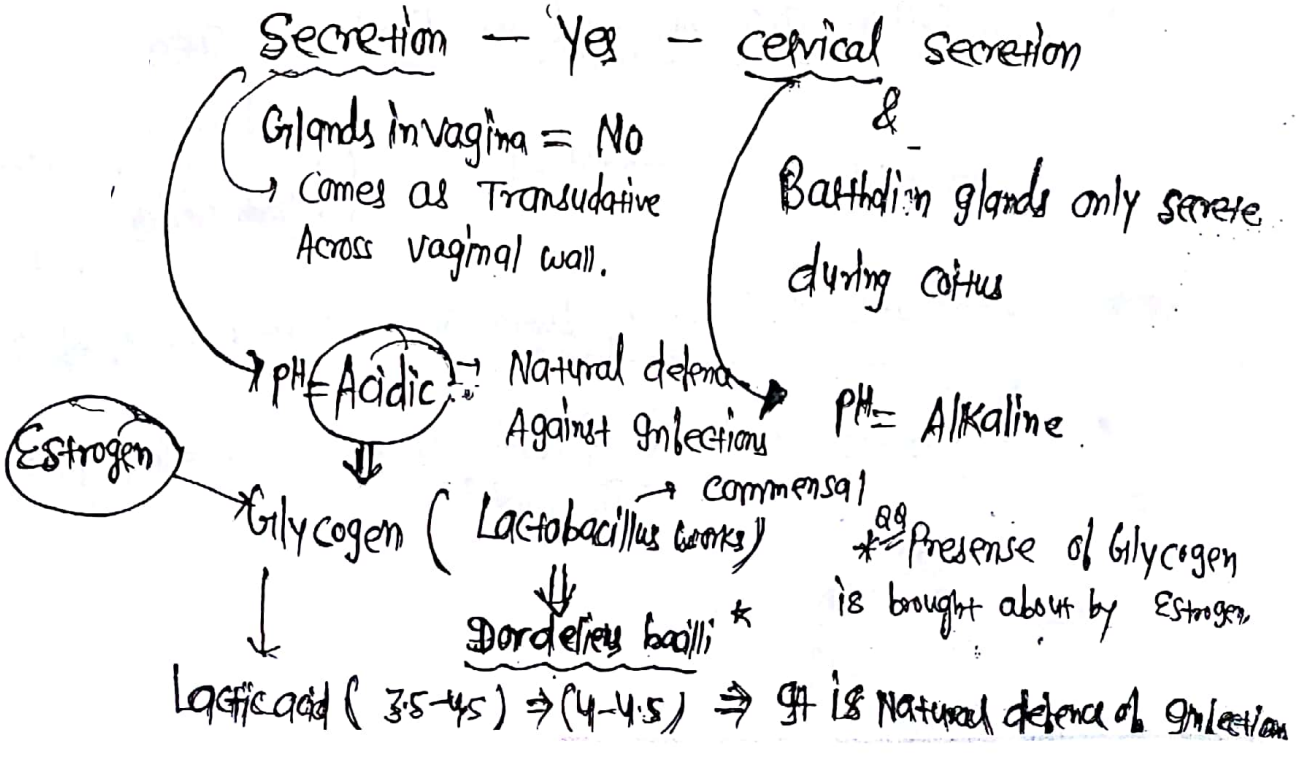
QQ. Which of the following is Cystocele??
↳ Protrusion of bowel wall into the Upper 2/3rd of Anterior wall of Vagina.

a) ~~Upper~~ 2/3rd of wall;
b) Lower 2/3rd of wall;
c) Upper 1/3rd of wall;
d) Lower 1/3rd of wall ⇒ Urethrocele
↳ Protrusion into Lower one-third of Anterior vaginal wall.

* Rectocele ⇒ Prolapse into Middle 1/3rd of Posterior vaginal wall

* ∠ the H/3-line passing through Pelvis, vagina forms ⇒ 45°

* Epithelium of vagina ⇒ Stratified Squamous Non-Keratinized



QQ. Deficiency of 5α Reductase :→

Male Pseudohermaphrodite (Genotype – Male
Phenotype – Female)

* by looking external genitalia we differentiate Male & female by 12 weeks.

Female		Male
* Bartholins gland	Homology	Bulbourethral gland (Cowper's gland)
* Glands of Skene (Para-urethral)	Homologus	Prostate.

* Lymphatic drainage of clitoris ⇒ Superficial Inguinal Lymph Node
* Lymphatic drainage of Glans clitoris ⇒ Deep Inguinal Lymph Nodes (Lymph Nodes of Cloquet)
* Lymphatic drainge of Labia Minora ♀ glands ⇒ Deep Inguinal L.N.
* Lymphatic drainage of Labia Majora ♀ glands ⇒ Superficial Inguinal L.N.

Vaginal part	Blood supply	Lymphatic drainage (13)
Upper 1/3rd	Descending Uterine Artery	External + Internal iliac
Middle 1/3rd	Inferior vesicle Artery	Internal Iliac
Lower 1/3rd	Middle Rectal Artery	Superficial Inguinal

EXTERNAL GENITALIA

	Female	Male (Homologus structure in Male)
Genital tubercle → @ 6 weeks	Clitoris	Penis
" Fold	L. Minora	Penile urethera
" Swelling	L. Majora	Scrotum
	Absense of DHT Require for Female like organs.	To convert in Male form Testosterone → 5α-Reductase → Di-hydrotestosterone → tubercle / Fold / Swelling.

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* Lymphatic drainage of Labia Majora ♀ glands ⇒ Superficial Inguinal L.N.

** VESTIBULE

(14)

⇒ Anteriorly ⇒ Clitoris

Posteriorly ⇒ Fourchette

Lateral boundry ⇒ Hart's line

⇒ Structures opening in vestibule ⇒ Urethral opening;
Vaginal opening;
2 Bartholin's gland opening;

* Bartholins gland cyst ⇒ Pea Size;

Bartholin gland ⇒ Located b/w L. Minora & L. Majora groove & @ the junction of Ant. 2/3rd & Post. 1/3rd;

- Cuboidal epithelium
- duct travels Medially & forward; & opens b/w L. Minora & hymen (@ 5 o'clock; 7 o'clock).
- @ opening its squamous; while along whole length it is transitional epithelium.
- all kinds of cancer seen in Bartholin gland cancer ⇓ by "HONANS CRITERIA".

i) Asymptomatic Bartholin cyst ⊕ ⇒ No Rx *

ii) Symptomatic | Recurrent cyst ⊕ ⇒ Marsupilization

⇓

Exteriorization of the duct to prevent Recurrence.

iii) Σ 40yr & have Bartholin cyst ⊕ ⇒ Excision

⇓

Tes Ca Risk *

Bartholin Abscess ⇒ i) E.Coli > Gonorrhoea ;

ii) Initial Tx = I & D

↓

Marsupilization on Later date

* Secretion of Bartholian gland ⇒ Alkaline ; ⌜ Released during coitus

b/c Acidic environment is spermicidal .

* they are content of Superficial Perineal Pouch ;

** RELEVANT EMBRYOLOGY

(15)

* Gonads 2 ⇒ develop by Genital Ridge – 5 weeks

Ovary (8 weeks)*
- Absense of Y chromosome

In XO genotype ⇒ ovaries appear Normally
↓
Abn functional
↓
Streak Ovaries
↳ Seen in Turner Sx.*

Testis
- Y chromosome
- SRY functional part of Y chromosome
↓
@ 6-7 weeks
→ Distal segment of short arm
↳ b/c "XX" genotype Require for function. of Y-chromosome

SRY ⇒ For testis *
WNT4 ⇒ For ovary

if Nothing Mention; differentiation b/w ♂ & ♀ @ 12 weeks of P.O.G.

* Gonads can be differentiated into ♂ & ♀ by 7 weeks
* Internal genitalia differentiates @ 10 weeks;
* External genitalia differentiates @ 12 weeks;

– Ovary prt. in "ovarian Fossa"
↳ prt. in Lateral Pelvic wall

* Posterior to ovarian fossa ⇒ Ureter; Internal iliac vessels;
Anterior to ovarian fossa ⇒ Obliterated umbilical A.; Mesovarium
Lateral to ovarian fossa ⇒ Obturator Nerve & vessels

Pain from ovaries Referred to Medial aspect of thigh b/c of Cutaneous br. of obturator Nerve.

Medial ⇒ Ovarian Ligament

Superior ⇒ External iliac vessels.

Inferior ⇒ Levator Ani

Ovaries ⇒ 3 Supports

→ Ovarian Ligament — Ovarian ligament

→ Infundibulo Pelvic Ligament — Infundibulum pelvis ligament
(Suspensory Ligament)
- Ovarian vessels (It carries ovarian A. & veins)
- to Lateral Pelvic wall (Attaches ovary to Lateral Pelvic wall)
- Cut - for oophorectomy

→ Mesovarium — False Ligament — False Ligament
Mesovarim
↳ Fold of Peritoneum
to posterior leaf of Broad Ligament.

OVARY ⇒ In Reproductive age Average 7-8 cc upto 20cc Normal.
in Post Menopausal age average 2-3 cc upto 10cc Normally

Blood supply ⇒ *Ovarian Artery ⇒ br of Abdominal Aorta @ L_2

Rt. ovarian vein

Ovarian vein ⇒ (Rt) drains into IVC (16)

(Lt) drains into Left Renal vein → IVC

Lt. ovarian vein

Varicocele ⇒ M/c on left side; b/c it makes 90°

↳ Lt. testicular vein joins at 90° Left Renal vein

↳ M/c Reversible cause of Male Infertility

(Lymphatic Drainage ⇒ Para-aortic group of Lymph Node)

Epithelium ⇒ Germinal epithelium

(Single layers cuboidal)

↳ Germ cells all formed here

1° Germ cells (Primordial Germ cell)

↳ Epiblast (Ectoderm) ⇒ older days from Yolk sac

* Ovary has — Cortex — Follicles
— Medulla — vascular

* Menopause ⇒ Follicles goes into Programme cell death cause it

↳ Max^m follicles @ intrauterine life 5th month (20 week) → 7 million

Epiblast
↓
Yolk Sac (@ 3 weeks)
↓
Genital Ridge (@ 6 weeks)
↓
oogonia (@ 9 weeks)
↓
1° oocytes (@ 12 weeks)
↓
Follicle formation begins (@ 14 weeks)
↓
Follicle formation complete (@ 24 weeks)

on Birth = 2 million (1-2)

on Puberty = 400,000

ovulate = 400 ovulate

1000 atresia / Month

Follicle / oocyte ⇒ Folliculogenesis → What is happening in surrounding cells

Oogenesis → What is happening in Germ cells

- 1° Follicle – Flattened granulosa cell
↓
1° Follicle – cuboidal granulosa cell.
↓
2° Follicle – Theca cells ⊕
↓
Antral Follicle – Cavity ⊕

* all follicles have 1° oocyte @ centre; but ovum have 2° oocyte.. *

- oogenesis begins IUL ⇒ @ 9 weeks

2n Oogonia
↓ Mitosis
1° oocytes – diploid
↓
Meiosis I

(17)

Meiosis – I

Arrested in ⇒ Prophase

↓

diplotene

↓

* Dictyotene → Arrested stage *

(Stage b/w Prophase & Metaphase)

When completed?? – just before ovulation

@ ovulation (3–4 hours before ovulation)

Ovum → More cytoplasm

2° oocyte (n)

I st Polar body → Less cytoplasm (n)

· Genetic Material equally divided

↓

Enters into Meiosis – II

Arrested – ?? – Metaphase *

Completed – After fertilization

Female ProNucleus * II nd Polar body

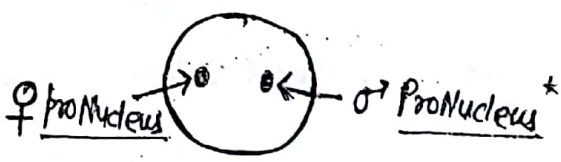


Fig. Fertilized ovum *

* Life span of ovum = 24 hr.

* Size of Mature ovum = 120 µm in diameter

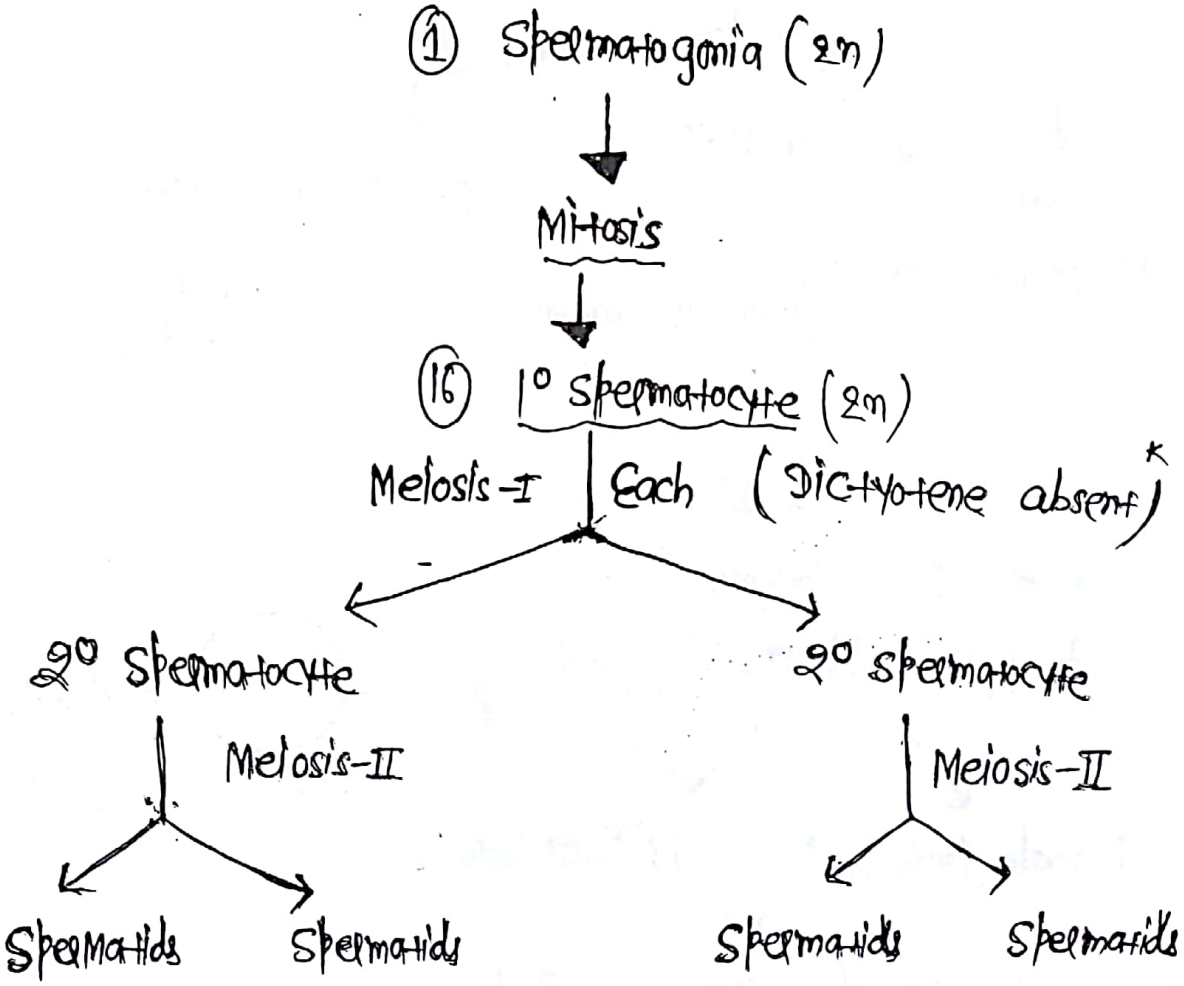
Size of Mature follicle = 18-20mm in diameter

Size @ which follicle Rupture = 18-20mm *

SPERMATOGENESIS

*Begins — Puberty in Seminiferous tubules.

*duration — 72 day



* One 1° Spermatocytes gives ⇒ 4 Sperms @ Spermatids.
* one Spermatogonia gives ⇒ 16 1° Spermatocytes* = 64 Sperm
* Fertilizeable Life span ⇒ 3 days; (18)
* Mature sperm ⇒ 55-60 µm Length (Smaller than RBC)

* No. of Sperms produced in one day = 100 million*
(Avelge Sperm count)

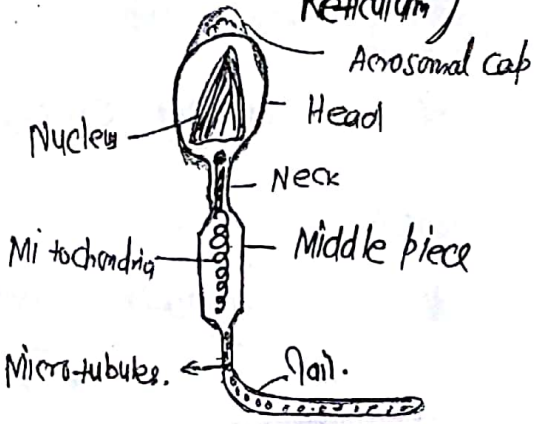
* Spermiogenesis ⇒ 12-14 days
↓
* gM Mature sperm → Site of Maturation & Motility
↓
Spermatids *
↓
epidydimis *(Tail/caudal part of epididymus)

⇒ Acrosomal cap → Golgi apparatus
Head → Nucleus
Middle piece → Mitochondria
* (energy house of Sperm)
Tail → Micro-tubules

. Sperms don't have @@ endoplasmic Reticulum (Rough endoplasmic Reticulum)

✓ gm Responsible for Motility of Sperm ⇒ Calcium @@

* Gene for Motility ⇒ CATSPER



** FERTILIZATION

Capacitation → begins in cervix *

- ↳ Major site = Fallopian tube
- ↳ Sperms = Reach the ampulla ∈/in 30 min
- ↳ takes 7 hours.
- ↳ cause ⇒ Sperms take ability to bind Zona pellucida
  - ↳ lost just before Implantation on D5
  - ↳ Prevent polyspermy
  - ↳ Receptor for sperm: ZP61
  - ↳ ZP6P-3

Sperms get the ability to undergo Acrosomal Rxn ⇓ Sperm Recep*

Memb. Permeability — Ca++

↳ hypermotility

* Acrosomal Rxn ⇒ Main Enzyme: Hyaluronidase QQ

* For all Embryological events :→ Days ⇒ from Fertilization
  → Weeks ⇒ from LMP (1st day)

3 Rules ⇒
① 28 day;
② 14th day - ovulation
③ days of ovulation = days of Fertilization

* 1st clevage occurs ⇒ 20-30 hour after fertilization
* Conceptus enters in Uterus ⇒ Morula stage @ 4 days
  ⇓
  16 cell stage > 8 cell stage
* Implantation occurs ⇒ in Blastocyst form
  ↳ on D6 begins (D6-D7)
  ↳ on D5 it form

(19)

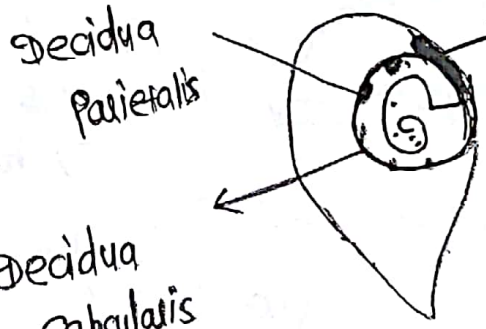
* Implantation occurs in 3 Phases :→

1. Apposition ⇒ Selectins
2. Adhesion ⇒ Integrins
3. Invasion ⇒ Matrix Metalloproteinase.

* Implantation completed @ D10.

* M/c site = Upper posterior wall (Eccentric*)
  ↳ one half bigger than other side.

* Endometrium of ♀ ⇒ K/as "Decidua"*



- Obliteration of uterine cavity by fusion of capsularis | parietalis
  ↓
  14-16 weeks** (After fusion K/as "Decidua Vera",

SUPERFETATION

- Fertilization of 2 ova by 2 different sperms by 2 different acts of coitus
  ↑ Different Menstrual cycle
  • Not documented in Human
- Theoretically twinning can happen upto 16 weeks.

SUPERFECUNDATION*

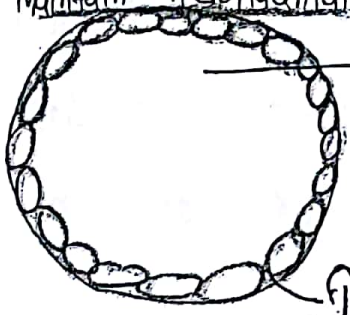
↑ 2 Same Menstrual cycles

* Embryonic phase lasts upto 8 weeks post fertilization & 10 weeks from L.M.P.

Implanted embryo ⇒ Invade Blood Vessels on placental bed, Make blood vessels Resistant to vasopressors, Maintain uteroplacental circulation.

Endovascular — Interstitial

Forms: Placenta — Goes into decidua & Myometrium

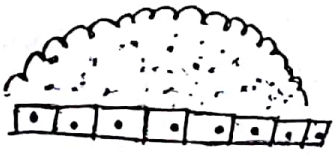


Inner cell Mass ⇓ Fetus proper

Villus — Extra-villus (outside placenta) — Trophoblast ⇓ Placenta / Fetal Membrane

In Pre-eclampsia ⇒ Invasion of trophoblast is Absent.

Cytotrophoblast — Syncytiotrophoblast ⇓



Source | Formed by Cytotrophoblast

exchange

Hormone → Protein / Steroid

Fetal Membranes

Amnion → i) Inner Most; ii) Avascular; iii) Tensile Strength; iv) Latest ⇒ Fetal ectoderm in origin

Chorion

Allantois

Yolk sac

Chorion Laeve ⇓ Fusion ⊂ Amnion

Chorion frondosum ⇓ Placental tissue

Form placenta ⇑ (Chorion frondosum + Decidua basilis (Placental bed))

Allantois ⇒ Diverticulum from hindgut grows into connecting Stalk. (2D)

↳ Umbilical vessels (it gives Rise Umbilical vessels).

Yolk sac ⇒ 1st site of hematopoiesis

↳ 3rd – 6 weeks (Portland, Gower 1, Gower 2)

$\zeta_2\gamma_2$ (I), $\zeta_2\beta_2$ (II), $\zeta_2\varepsilon_2$ (Gower 2)

> 6 wks – Liver ∴ HbF ⇒ $\alpha_2\gamma_2$

> 20 wks – Long bones

- Bigger in size & shorter in life span.
- ↳ higher affinity for O_2
- ↓ les 2,3 DPG & carbonic Anhydrase; Hb–O_2 curve shift to Left.

* Fetal Hb is Resistant to both alkali & Acid denaturation

ALKALI DENATURATION TEST	ACID DENATURATION TEST
APT (test) ⇓ 1% NaOH used	• KB (Kleihauer Betke) • Citric acid & PO_4 buffer used.
Bed side test	• Laboratory test
Qualitative test ⇓ differentiate Maternal blood & Fetal blood from each other (Mom's ⇒ ⊖ve (colour change); Baby's ⇒ ⊕ve (colour Resistant))	• Quantitative test ⇓ Fetal RBC from Maternal RBC → count ⇓ Used in Rh⊖ve ♀ to calculate dose of Anti-D.
• Singer's test (other kind of alkali test)	

In Antepartum hemorrhage we can do "APT test".*

* Fetal RBC ⇒ Larger in size
Shorter Life ⇒ 90 days*

- Hb of baby @ birth ⇒ 18 gm%.
↓
75-80% of HbF & Rest Adult Hemoglobin.

- @ 6 Month < 1% HbF prt. out of total.

PLACENTA*

- Hemochorial ⇓
  - Maternal & fetal blood doesn't mix.
- Deciduate ⇓
  - Sheds off
- Discoid ⇓
  - Shape

Wt. of term placenta = 500 gm
volume of term placenta = 500mL (volume)
diameter = 20 cm
Thickness = 2.5 cm

At term; Placenta: Fetal wt = 1:6

Maternal side

⇓

Facing decidua

⇓

Lobes (divided into 15-20 Lobes).

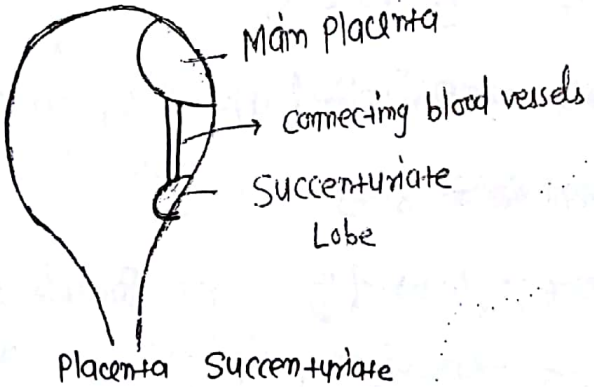
⇓ → each lobe divided into 3-5 Lobules

Lobules (Functional unit)

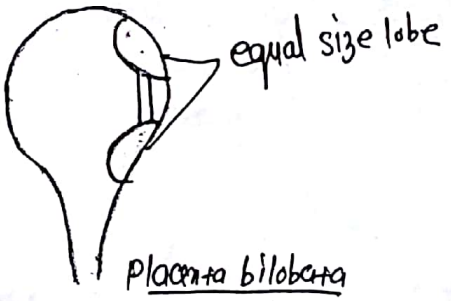
↳ Kias "cotyledon"

* **Placenta bilobata** :⇒ placenta is separated into lobes;
  - division is incomplete & the vessels of fetal origin extends from one lobe to the other before uniting to form umbilical cord.

* **Placenta Succenturiate** ⇒
  ↳ having Accessory Lobe; which is connected to the Main part of placenta by blood vessels.



Placenta Succenturiate



Placenta bilobata

CS-do ← Obstetric emergency

Fetal side

⇓ (21)

Facing the fetus

⇓

Identify ⇒ Smooth / shiny (b/c of Membrane)

- Umbilical cord attached

⇓

(a) centre of Placental disc

- if cord attached to the periphery ⇒ Battledore Placenta

⇓

It can cause Post partum hemorrhage ‼

- **Velamentous Placenta** ⇒ if fetal vessels travel outside the cord for some distance before Reaching placenta (∴ More Chance to injury).

- **Vasa previa** ⇒ vessels are travelling over the internal os.
  - type of velamentous placenta;
  - Rare type of APH (Fetal blood Loss).

⇓

Result in severe Fetal stress

* Intervillous space ⇒ Maternal blood *

Inside villi ⇒ Fetal blood *

1° villous ⇒  → Solid — D_{13}

2° villous ⇒  → Mesodermal core — D_{16}

3° villous ⇒  → Blood vessel — D_{21}

* Fetal blood flow through placenta ⇒ 400 ml/min.

Fetal circulation Established @ D_{21}

Uteroplacental circulation = D_{12}

↳ @ Term = 450–650 ml/min.

* Intervillous space ⇒ 140 ml blood

↓

· PO_2 in Intervillous space

↓

- 35–40 mm of Hg.

→ 120 spiral arterioles ⊕ Inside.

O_2 Saturation = 65–75%

Low pressure = 10 mm of Hg

↳ Invade spiral A

↓

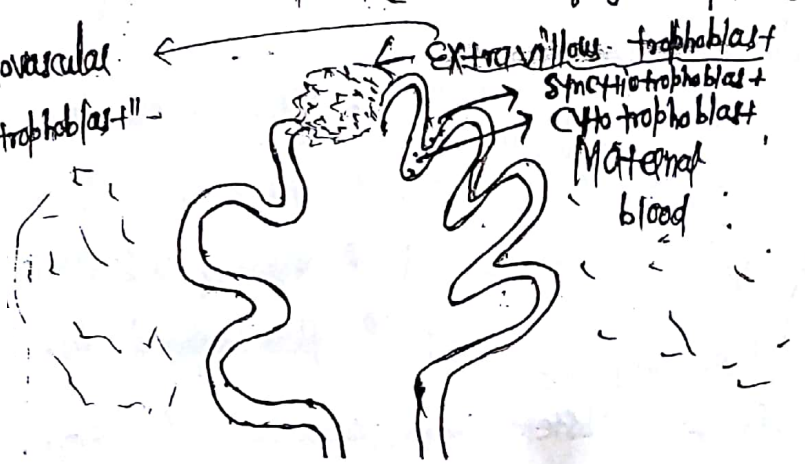
Permanent vasodilatation

↓

Good Uteroplacental circulation

↓

Vascular Remodelling

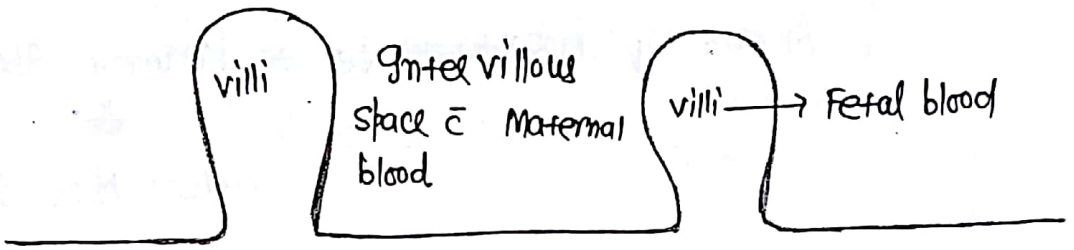


* Vascular Remodelling is controls by decidual Natural Killer cells.. (22)

* completed 2 phases — 12 weeks
                    — 16 weeks

* Absent Vascular Remodelling ⇒ Pre-eclampsia
                                IUGR

* (AbN) Vascular Remodelling ⇒ Adherent Placenta*



PLACENTAL FUNCTIONING* · Placental formation begins @ 6 weeks.

Anatomically – Placenta completly formed by 16 weeks.

Physiologically – Maturation continues

↑ POG ⇒ · Cyto-trophoblast ↓ — term (X) → No Cyto-trophoblast @ term
· Syncytio-trophoblast Thickness ↓ (thin)
· ↓ Stroma
· ↑ Fetal blood vessels.
  ⇓
  also keep Moving towards periphery of villus
· Hofbauer cells (+)
  ↳ Fetal Macrophages

Function of Placenta ⇒ Nutritional
Excretory
Respiratory
Endocrinal (Most imp)

Progesterone | Estrogen | HPL | HCG
HPL ↳ Human Placental Lactogen

Progesterone ⇒ Maintainence of ♀
↳ Smooth Muscle contracts
↳ ↓ Amount of progesterone ↓es ⇒ Recurrent Abortion
⇓
Luteal Phase Defect (L.P.D.)
↳ also do decidualization (Hypersecretory change)
⇓
on HPE ⇒ "Arias Stella Reaction"
↳ No Progesterone
⇓
No Arias Stella Reaction.

* Source of Progesterone in early ♀ ⇒ Corpus Luteum
Natural late ⇒ Luteolysis *
Pregnancy ⇐ HCG ⇐ Rescue the corpus luteum from Luteolysis
HCG Maintain it corpus Luteum survive
⇓
Pregnancy

(23)

* Placenta will take over the function of corpus luteum.
  ↓
  8 week (8-10 week)*
  ↳ Make Progesterone by precursor ⇒ Maternal LDL cholesterol**

* corpus luteum of pregnancy will Regress
  ↳ 12 wks

* Ovarian cyst of 1st Trimester ⇒ May be enlarged corpus Luteum
  ↳ Observation & Resolve after 12 weeks.

Estrogen ⇒ Specific to ♀ = E_3 Estriol.*
E_2 = also formed; but Not specific

↳ Growth of Uterus
- ↳ Mask of ♀ = Melasma
  ↓
  Hyperpigmentation
  (Stimulates Melanocytes)
- ↳ Retain salt/water
- ↳ obstetric cholestasis
- ↳ Thyroxin binding globulin ↑es.

* Placenta can't synthesize estrogen on its own
  - ↳ b/c 17α hydroxylase Lacks
  - ↳ dependent on the fetus for synthesis of estrogen.
    - ↳ Fetal DHEAS (from Adrenal glands)
      - ↓
      - Placenta
      - ↓
      - Sulphatase / Aromatase → Estrogen (E_3)
      - ⇓
      - Tells about fetal well being

HPL (Human Placental Lactogen) | HCS (Human Chorionic Somato Mammotrophin)

∴ ⇒ It tells about i) Placental functioning

⇓

As P.G.Tes ⇒ Matures ⇒ ↑HPL

Peak = 36 wks.

QQ Which hormone is produced by placenta in Max^m Amount at term = HPL (1gm/day).

ii) endocrinal function ⇒ Main function

↳ Insulin Resistance in ♀

(Plasma cortisol: Growth hormone)

QQ. Which hormone is Responsible for fetal growth (24)

⇓

Insulin like growth factor / IGF

* Promotes Maternal Lipolysis – Levels of free fatty acids are ↑ which mother utilizes as a source of energy ; sparing glucose for fetus.

HCG Hormone ⇒ Glycoprotein hormone

⇓ (α|β)

(Human Chorionic Gonadotropin) → (α) Identical

(β) Specific

α Subunit ⇒ LH | FSH | TSH

↳ Non-specific

Syncytiotrophoblast

↙

as early as 8 days post-fertilization (ovulation) it Secretes "HCG" (8-9)

QQ

→ This hormone has highest Carbohydrate content of Any human hormone

If we want to take hCG before 8 days

↳ do Serum hCG ⇒ Quantitative

Very sensitive

↳ detect 1 IU/L.

Urine hCG ⇒ Qualitative

↳ 20 IU/L ⇒ ⊕ve after Missed Period.

↙

based on "Sandwich ELISA"

* Serum Sensitivity ⇒ F.I.A > R.I.A > ELISA = RRA > IRMA

F.I.A ⇓ Fluorescent Immunoassay

R.I.A ↑ Radioimmunoassay

ELISA ⇓ Radio Receptor Assay

IRMA ↑ Immuno Radiometric Assay.

⇒ hCG Value ↑es as β-O.G. ↑es → normal ↑es

Max^m = @ 10 wks.*

After 10 weeks = ↓es

Min^m = @ 16 weeks

After 16 weeks = Plateau

Doubling time of β-hCG

↓↓

48 hrs.

↳ it Means ↑es in 55-66% Min^m after 48 hrs..

↳ it does N't Mean 100% or double

v.v.g.

Qq

1st $\mathcal{D}_1 | \mathcal{D}_3$ — ↑es by 55-66% ⁇

(N) Intrauterine Pregnancy

2nd $\mathcal{D}_1 | \mathcal{D}_3$ - ↑es by <55% ⁇

Ectopic ♀

3rd $\mathcal{D}_1 | \mathcal{D}_3$ - ↓es

Non-viable ♀ / Abortion

* Critical value of hCG for TVS = 2000 I.U.

TAS = 6500 I.U.

If hCG is More than or equal to these value & we don't see Sac In the Uterus ⇒ Likely to be ectopic ♀.

(25)

* QQ. Condⁿ where hCG ↑es than Expected

- Multifetal ♀
- GTD (Gestational Trophoblastic Disease)
- Down's Syndrome
- Hyperemesis gravidarum
- Underexpected Gestational Age.

* condⁿ where hCG ↓es than Expected

- Non-viable
- Ectopic ♀
- over expected gestational Age
- Trisomy 18.

- Functions of hCG ⇒ . Maintainence of ♀ ;
  - ↓ Uterine contraction ;
  - Growth & development of umbilical cord ;
  - 1st stimulus for Release of testosterone from Male Testis – hCG
  - Immunosuppressant

QQ Why the conceptus Not Rejected ??

i) Villous trophoblast Lacks HLA (MHC) ;

ii) EVT (Extravillous trophoblast) – that have HLA-G → only in Human Shell Immunosuppressive

Hin decidua → NK cells have deficient cytotoxicity.

↱ M/c insertion ⇒ center.

UMBILICAL CORD (Attached to fetal side of placenta).

- Average Length = 55cm (30–70 cm)
- 3 vessels ⇒ 2 Umbilical A. (deoxygenated blood)
  1 Umbilical vein (Left) "Right U. vein disappear
  ↳ oxygenated blood

* Short cord < 30 cm
* Long cord > 70cm

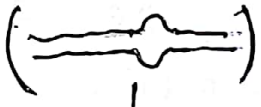
Umbilical vein from placenta → ductus venous → GVC → Heart

* Maxm O_2 Saturation prt. in ⇒ Umbilical vein ⇓ 80%.
* M/c Vascular Anomaly of cord ⇒ SUA (2 vessel cord) (Single Umbilical A)
  then check
  GICA (Gross Congenital Anomaly)
  ↳ CVS ⇓ M/c gross Anomalies
  Renal ⇒ M/c Anomalies c SUA
  Not gross

* If we see SUA + GCA (26)
  ↳ ↑ Risk of Aneuploidy * (Trisomy 18) **

* Isolated SUA ⇒ doesn't Tes Risk of Aneuploidy *

* Incidence of SUA is higher in ⇒ Twin ♀ / Multifetal ♀
  ↓
  ↑ Risk of true Knot of Umbilical cord.

()
↓
False Knot ⇒ Protrusion of Wharton's Jelly containing loop of umbilical vessels.
↳ No clinical significance

True Knot ⇒ Tes the Risk of still birth;
↳ Cause ⇒ Fetal Movement.
↳ d/t Active fetal Movements
↳ Tes in Twin.

1st Umbilical Artery
↓
Umbilical vein
↓
Ductus venosus
↓
Ductus Arteriosus
↓
Foramen ovale

DOWN'S SYNDROME *

- Trisomy 21.
- Causes ⇒ Most common cause * ⇒ Non-dysjunction (95%) (during Meiosis-I)
  - It is by chance; so; Non-heritable in Nature.
  - Recurrence = 1%.
- H/o 1st baby down's → Antenatal testing done in Next ♀.
- 5% → Inheritable
  - 4% → Translocation
  - 1% → Mosaicism

Q) 1st baby Down → (Translocation 21, 21) (Robertsonian Translocation seen in Down Sx.)

↓

Risk = 100%

↳ Abortion. (in 2nd baby)

* all ♀ women

↳ offered down's screening. (Opt-out Screening).

SCREENING :→

1st Trimester

USG

- NT ≥ 3mm ⇒ +ve ⇐ (Nuchal translucency) ↳ Fluid collection behind Neck;
- 11–13+6 weeks.

Dual test ⇒ @ 11–13 weeks
- β HCG ⇒ ↑es
- PAPP-A ⇒ ↓es

(Pregnancy associated Plasma protein A)

* USG for NT + Dual test ⇓ Combined test*

Maternal Serum Markers → Triple test
- ↳ hCG
- AFP
- UE3 (Unconjugated Estriol)

↳ do @ 15–22 wks.

→ Quadruple test
- ↳ hCG
- AFP
- UE3
- + Inhibin A ↑es
  - ↳ Produced by Placenta during ♀ & corpus luteum in Non-pregnant female

**

2nd Trimester (27)

SOFT MARKERS* (Not specific)

≥2 Soft Markers ⇓ ↑es Risk of Aneuploidy

- 15–20 weeks ♀♀

*Soft Markers ⇒ Absent Nasal bone (Hypoplastic) ⇒ can be seen @ 1st trimester also

Most imp.. ⇐ Nuchal fold thickness ↑ed. ↳ (≥ 6mm) → Screening +ve

- echogenic cardiac foci
- echogenic bowel foci
- Short femur
- Short Humerus
- Short frontal lobe
- Short ear length
- Simian crease (single palmar crease)
- Short 4th middle phalanx (clinodactyly)
- Sandle gap
- Pyelectasis (Mild dilatation of Renal pelvis)

QQ M/c Congenital cardiac Abnormality in Down's Sx child ⇒

Endocardial cushion defect > VSD > ASD

↳ Not central (More towards one side)

QQ Gastroschisis is Not seen in Down's Sx patient ??

Omphalocele ⇒ Covering Membrane (+)

↳ central

* Confirmatory test ⇒ Karyotyping

M/c Method :- "G Banding"

↓

In Metaphase

↓

Drug: colchicine

1st Trimester

↓

Chrionic villous Sampling

⇒ ≥ 10 weeks

M/c ⇒ 11-13 weeks

don't do before 9 weeks

↓

b/c it May cause

↓

Limb defects

- can Result in Fake +ve test (Placental cell Late hain)
- Riskly betal loss 1-4
- easily Result trophoblast (48-72 hr)

2nd trimester

↓

Amniocentesis

≥ 15 weeks

M/c = 16-18 weeks

don't do 11-14 weeks

↓

early amniocentesis

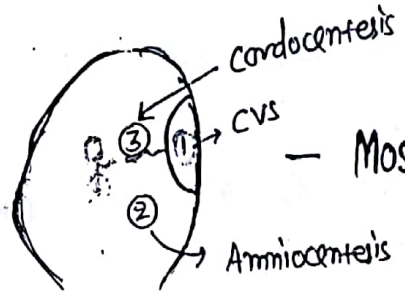
↳ Betal Loss

- More accurate
- More Safe < 0.5%
- delayed (7-10 days) Result

↓

Amniocytes Fibroblast

* Cordocentesis → Umbilical cord blood cells
⇓ (28)
from Umbilical vein (placental end)
⇓
b/c it is stable end.



– Most Risky ⇒ 3% fetal Loss.

* Amniocentesis all USG guided procedure; Not blind-procedure.

* NIPT (costly) (Non-Invasive Pre-Natal test) :⇒

- Genetic Material ⇒ cell free fetal DNA
- done on Maternal blood (Some amount of cell free DNA circulating in Maternal blood)
- ≥ 10 weeks
- this test is used as 2° screening (costly)
- has to be followed by confirmatory test;
- takes 7-10 days in Results.
- tells us about Trisomy 13, 18, 21
  Monosomy – XO

*** PHYSIOLOGICAL CHANGES AFTER PREGNANCY

Presumptive sign ⇩
- Women experience
- Result (eg ⇒ Amenorrhoea; Morning sickness etc)

Probable sign ⇩
- Seen by doctors

Positive sign ⇩
- Confirmatory
- Earliest Dx = hCG (Serum / Urine)
- USG
- O/E ⇒ Fetal parts
  - ↳ Fetal heart Rate

Probable sign ⇒
- i) **Hegar's sign** ⇒ Softening of Isthmus (on Bimanual examination)
  - ↳ Seen on 6th week
- ii) **Good sign** ⇒ Softening of cervix
  - ↳ Seen on 6th week
- @ 8th weeks
  - iii) **Chadwick's (Jaquemier's sign)** ⇒ Bluish discolouration of vagina / vulva
  - iv) **Osiander's sign** ⇒ Lateral vaginal fornix Pulsations
  - v) **Piskacek's sign** ⇒ one half of uterus feels more enlarged (Asymmetrical)

(29)

vi) Palmer's sign ⇒ Regular Rhythmic uterine contraction
↙
@ 8th week (No Pain ; only felt by examinee)

vii) Hartmann's sign ⇒ Implantation bleeding (Not a problem)
↳ @ 8th week

On USG ⇒ 1st sign of Pregnancy on USG *

⇓

Gestational Sac **

On TVS ⇒ 4-5 weeks (± 1-3 day)
↙ empty bladder

On TAS ⇒ 5 weeks
↘ Full bladder

TVS is ∈ higher frequency (≥ 5 MHz)

TAS is ∈ Lower frequency (3 MHz).

Intradecidual sign ⇒ Marker of (early) Intra-uterine ♀

Yolk Sac appear ⇒ TVS = 5-5 week

TAS = 6 week

Fetal Pole ⇒ Cardiac activity → TVS ⇒ 5-6 weeks
→ TAS ⇒ 6-7 weeks

* Double-decidual sac sign ⇒ Marker of early Intra-uterine ♀.
↙ Decidua capsularis
↘ Decidua Parietalis

* Double bleb sign ⇒ Sign of early gestation ♀.

↙ ↘

Amnion Yolk sac

QQ. earliest to see Gestational sac on USG ⇒ 5th week

QQ. Earliest time Gestational sac can be identified on TVS from LMP ??

QQ. Earliest time Gestational sac can be identified on TVS from fertilization ??

↳ LMP - 15days = 30 - 15 = 15days

⇒ What ever seen on TAS can be seen in TVS (vice versa is Not true)

⇒ Gn Ectopic : Ring in Uterus ⇒ Single Ring in Uterus

⇓

"Pseudosac" ⇒ present in centre of Uterus.

General changes ⇒ ① Additional calorie Requirement

⇓

350 Kcal/day

↳ Gn 1st Trimester = No additional calorie Requirement

Gn ♀; everywhere Progesterone except ⇒ Obstetric cholestasis ⇒ estrogen

Brought about by ⇑ Retain salt/water ⇒ salt & water Retention ↑

② Average wt gain

↳ 12 Kg (10-14 Kg)

③ BMR ⇒ ↑ by 20%

④ salt/water ⇒ 6-5 L

(4) Plasma osmolality ⇒ ↓ves (10 mosm/kg)

(5) Plasma volume → ↑40%.
Red cell Mass → ↑20%.
⇓
Hemodilution condition ⇒ Anemia of Pregnancy

Anemia ⇒ Hb < 11 gm%; Hematocrit < 33%
↳ M/C = Iron deficiency Anemia *

Total Fe Requirement = 1000 mg
300 mg (Ferus)

Best test = S. Ferritin

Prophylaxis = IFA (100 mg Fe (in Ferrous form) + 500 Mg FA)
→ 1 tab
→ 6 month during Pregnancy
6 month after delivery

Tt of Anemia ⇒ IFA tab (2 tabs) iv/ Acute blood loss & Hg < 6 gm%
↑ Blood transfusion

Parenteral
i) If the patient is Not compliant by oral tab
ii) Not tolerating oral tab
iii) Malabsorption sx.

Blood transfusion
i) if > 34 weeks @ & Hg < 7 gm (even ∧ Heart failure No sign/symptom)
ii) if < 34 weeks @ & Hg < 5 gm (even No sign/symptom of Heart failure)
iii) Anytime sign & symptom of CHF.

30

⑥ TLC ⇒ ↑es (It doesn't Mean Infection)

↳ 15,000 during Trimester

25,000 after Post-partum.

⑦ DLC ⇒ Neutrophilia

ESR ↑

CRP ↑

⑧ Platelet count ⇒ Average platelet count ↓es

↳ Not Causes Thrombocytopenia

⑨ Clotting factors ⇒ all ↓es except ⇒ Factor II & IX.

⑩ Insulin Resistance ⇒ Hyperinsulinemia

↑as Polo ↑es

Significant > 24 weeks

↳ Fasting - Hypoglycemia

Post-prandial - Hyperglycemia

QQ

* Anemia : < 11 gm/dl

Severe Anemia : < 7 gm/dl

Very severe Anemia : < 4 gm/dl

Systemic *

CVS **

(31)

↳ Plasma Volume ⇒ ↑40%
Red cell Mass ⇒ ↑20%
Cardiac output ⇒ ↑40%

O_2 demand of tissue = ↑20%

O_2 carrying capacity = ↓ves *
← feature of Hb; Not of Red cell Mass

A-V O_2 gradient of tissue = ↓ves

- all heart Sounds are loud = Loud S_1
- S_3 (gallop Rhythm)
- Systolic Murmur (Ejection systolic Murmur)
  ↳ Physiological upto grade 2.

Diastolic Murmur
↳ almost/ Always Pathological

- Heart Rate ↑es (by 16-18 beats/m above baseline) (<100)
- split S_1
- Apex beat ⇒ heard @ 4th ICS (b/c Heart is Rotated Anteriorly & Pushed up).

on CXR ⇒ cardiac Silhoutte (appears big)
Cardiomegaly ⇒ always pathological

On ECG ⇒ LAD ⇒ Physiological
↳ Left Axis deviation**

- Blood pressure = DBP > SBP ↓es (Both Fall)
(10 mm Hg) (all vasopressure ↓es)

E|P (Estrogen | Progesterone)
→ i) Vasodilation
ii) Resistance against vasopress.

begins – 5 weeks (↓ in DBP begins @ 5 weeks)
Maxim = 24-26 weeks
after 26 weeks = begins ↑es
(come back to Prepregnancy value)

* > 20 weeks ⇒ Supine hypotension syndrome
⇓
Gravid uterus compresses IVC
Changes position to Left Lateral Position
↳ ↑es Utero-placental circulation
Fetal O2 saturation by ↑

* Preload ⇒ ↑
afterload ⇒ ↓ (dt fall in systemic vascular Resistance)

* Ejection fraction = No change

- Central venous Pressure = No change (32)
  ⇓
  Persistently distended Neck veins
  ⇓
  Pathological Always *

- CHF (Highest Risk)
  ⇓
  Cardiac output Tes Seen
  (Immediate Post-partum (3rd stage) > 2nd stage of Labour > 32 weeks)
  ↳ CO is Not Tes Until it goes to 2nd stage of Labour. after 32 week of P.O.G.

QQ CO is Maxm @ :-
a) 28 week; ~~b) 32 week~~; c) @ term; d) 36 weeks

QQ Pre-eclampsia Not Commonly dx in
↳ 3rd Trimester.

26/4/18

KIDNEY

⇒ Tes Renal blood flow by 80%.
GFR Tes by 50%.
S Uric acid Level ⇒ No change b/c Reabsorption.

⇒ S creatinine / BUN | Tes;

* S. Creatinine ↑ } Pre-eclampsia*
  S. Uric acid ↑ }

* Kidney - enlarge by 1cm

* Hydroureter - b/c of Progesterone
  ↳ Smooth Muscle Relaxant
  ↳ Rt side > Lt side; Why??
  gn ♀ Uterus becomes dextro Rotation towards Rt. side
  ↳ compresses Right Ureter @ the Pelvic Brim.
  ⇓
  Bladder Pressure ↑es
  ↳ From 8cm H_2O
  ↳ To 20cm H_2O.
  but still doesn't become gn continel as Urethral pressure also ↑s

* Urinary Stasis ↳

Urine — Routine — Asymptomatic Bacteriuria > 10^5
       Microscopic
  ⇓
  Treat; if we don't treat than chances of Pyelonephritis becomes high.

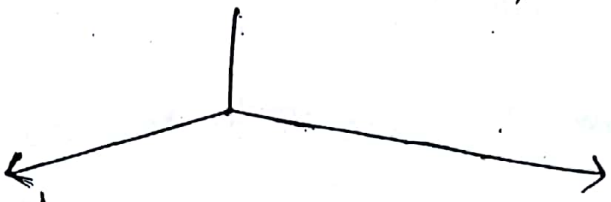
* Glycosuria - b/c Renal threshold ↓es.

* Proteinuria - ≥ 0.3 gm/24 hr of Urine Sample
  ↳ Not Physiological; it is Pathological

Respiratory system

(33)

* Tidal volume ↑es
* Minute ventilation ↑(40%)



No change in Respiratory Rate

↑ depth of Respiration
⇓
By Progesterone
⇓
↑ sensitivity of Respiratory center to CO_2

PCO_2 ↓ } Mild Respiratory
PO_2 ↑ } Alkalosis

pH = No change ; b/c Renal excretion of HCO_3^-
S. HCO_3 ↓es (to 22 mmol)

* Diaphragm Rises by 4cm
↑ transverse thoracic diameter = 2cm

Total Lung capacity = ↓es
Vital capacity = No change

So; ERV ↓es ; IRV = No change — pH / RR (Respiratory Rate) / FEV_1 / PEWP
RV ↓es

* Diphragmatic Excursions ⇒ ↓es in Pregnancy.

GIT

* GERD Seen ⇒ b/c LES tone ↓es by Progesterone & Gastric Pressure ↑es.

* Gastric emptying time shows No change in all trimesters.

* Nausea, vomiting = d/t hCG hormone
  - ↳ 1st Line drug in ♀ = Pyridoxine
    - ↓ No Response
    - Doxylamine + Pyridoxine

* Hyperemesis Gravidarum ⇒ Nausea & vomiting causes either ≥ 5% wt. loss &/or Ketonuria
  - ↳ d/t hCG
  - ↳ Infection of H. Pylori
  - Seen in Multifetal ♀ ; & female sex Fetus ;

* 2 vit. deficiency → Vit. K – Coagulation defect
  → Vit B_1 – Wernicke's encephalopathy,

- Can Cause Esophageal tear (Mallory-Weiss tear);
- Renal failure - (Acute Renal failure). (34)

Rx ⇒ Stop all oral Intake
give i/v Fluids + i/v Antiemetics.

* Liver ⇒ ALP ↑ Gross Tes
↳ b/c Placental-ALP
↳ Not a Marker of cholestasis (it is Physiological Tes)

- Tes Production of Albumin/Globulin
- S. proteins → Fall (b/c Production is less than Volume Tes)
- AST; ALT both ↑es

Endocrine System*

Pituitary ⇒ N In Size 135↑

b/c Lactotroph ↑↑ (Vascular supply ↑↑)

In Severe PPH — Vascular supply — ↓ to Pituitary
⇓
Infarction
⇓
"Sheehan's syndrome"

Sheehan's Sx ⇒ M/c Presentation ⇒ Failure to Lactate

2nd M/c ⇒ Amenorrhea

Usually – Ant. Pituitary affected

⇓

Post. Pituitary spared.

⇒ if a ♀ doesn't Lactate – Menses by 6-8 weeks.

S. Prolactin Level – Higher

- Pregnancy
- Lactation

⇓

After delivery S. Prolactin ↓ by 50%

Prolactin – Milk Synthesizing hormone

Oxytocin – Milk Let down / ejection hormone

1st Stimulus ⇒ Initiation of Lactation

(↓ E+P)

Fall of E&P also causes ⇒ Post-Partum depression (Blues)

THYROID ⇒ · Thyroid binding globulin ↑ (d/t Estrogen) (35)

· Total T_3 & T_4 ↑
· Free T_3 T_4 ↑ (slightly)
} ⇒ ↑ Production from the gland

· TSH ↓es (slightly)

Why ?? ⇒ b/c of hCG

⇓

α = TSH (Same as TSH)

· I_2 Requirement ↑ (♀ & Lactation) both have RDA = 250 µg/day.

Pregnancy is Euthyroid condition

· I_2 excretion ↑es.

* M/cc of hypothyroidism in ♀ ⇒ Hashimotos ds

M/cc of hyper thyroidism in ♀ ⇒ Graves ds.

Q K/c/o hypo-thyroidism ; L. thyroxine 25 µg

Dx = Pregnancy ⇒ ↑es ∧ by 50% (b/c Some part of Thyroid become degenerated) doses

Hypo-thyroidism May cause abortion.

Maternal Nerve Injury ⇒ M/c in Lithotomy position

⇓

Common Peroneal Nerve

* M/c in Post-partum / Peri-partum / Intra-partum / extended Lithotomy position

⇓

Lateral Cutaneous N. of thigh > Femoral N.

* Foot drop in ♀ is dft "Lumbosacral plexus compression."

*

Fetal Swallowing ⇒ 10 weeks

Fetal breathing Movement ⇒ 11 weeks

Fetal Urine production ⇒ 12 weeks

Fetal Meconium production ⇒ 16 weeks

IgM production in baby ⇒ 20 weeks

by Mother ← IgG transfer in baby ⇒ 16 weeks

Surfactant synthesis begins ⇒ 20 weeks

Surfactant appears in Amniotic Fluid ⇒ 28 weeks

Glucagon production ⇒ 8 weeks

Insulin production ⇒ 12 weeks

H-P (circulation) ⇒ 12 weeks *

AMNIOTIC FLUID

(36)

Major Source ⇒ Fetal Urine

Major Removal ⇒ Fetal Swallowing

Major Source → in 1st 12 weeks ⇒ Ultrafiltrate of Maternal plasma.

In 12–20 weeks ⇒ Transduate across fetal skin

in 720 weeks ⇒ Urine.

* 98% Amniotic fluid ⇒ Water (Nutrition)
  ↳ Not help in Nutrition.

* Colour of Amniotic fluid ⇒ Straw coloured

Green colour = Meconium-Stained

Dark = Abruption

Golden = Rh Incompatibility

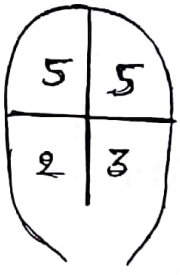
Tobacco Juice (Dark brown) = GUD

Greenish Yellow (Saffron) = Post Maturity

* pH = 7–7.5
* Osmolality = 260 mosm/.
* Water is Replaced in every 3 hrs.

	AFI (Amniotic Fluid Index)	DVP (Deep Vertical Pocket)
Normal	5-24 cm	2-8 cm
Polyhydramnios	≥ 25	≥ 8
Oligohydramnios	≤ 5	≤ 2
	More common Method	Better (No quadrant so; Less error)

AFI :→



⇒ divide in 4 quadrant Arbitrarily

15 = Amniotic fluid

DVP → Not divided in quadrant; only Pocket division.

* Absolute value ⇒ Polyhydramnios = 2L

Oligohydramnios ≤ 200 mL

* In twin ♀; We can't use AFI ; only use DVP;

↳ b/c we don't know about quadrant of both Fetus.

(37)

Mild — Poly. — Idiopathic
— oligo.

Moderate - Severe — Poly → Gross congenital Anomaly
— oligo.

Gross congenital Anomaly
⇓
{GIT > NTD} Leakage of CSF in Amniotic Fluid.
⇓
b/c of Fetal Swallowing Problem
duodenal Atresia
⇓
double bubble sign.

oligo → B/L Renal Agenesis
Posterior Urethral valve
↳ "Key hole sign" on USG seen.
Urethera ← Bladder (dilated)

Lady comes c Poly | oligo (Moderate - Severe)
⇓ ↳
diabetes ↳ Leaking Amniotic fluid
⇓
Seeby Per speculum examination.

* Polyhydraminos have high Risk of → (Moderate - Severe)

① Maternal Respiratory distress;

② Pre-term Labour - <37 weeks

③ PreMature Rupture of Membrane — Membrane Rupture before Labour.

Pre-term preMature Rupture of Membrane - <37 wks & PROM.

④ Abruption — Sepration of Placenta from Underlying decidua.

↳ prevented by Controlled ARM

⇓

Multiple pin prick holes into the Membrane

⑤ Cord prolapse

↳ Obstetric emergency b/c of temperature change to → vasospasm cord

↳ Severe fetal distress.

⇓

do emergency C.S.

i) Reposit the cord above the presenting part;

ii) Fill the bladder;

iii) elevate the buttock;

iv) Og by mask v) IV fluids given.

* We do emergency c.s ; depends on (38)
  - ↳ Cord pulsation (Absent)
  - Fetal heart Rate (Absent)
  - ↳ do vaginal delivery.. (GUD case)

6. Malpresentation ;
7. PPH ;
8. GCA ;
9. Diabetes ;
10. Amniotic fluid embolism

* Oligohydraminos have high Risk of :-
  1. Pulmonary hypoplasia ;
  2. Fetal distress (cord compression)
  3. Malpresentation
  4. GUGR
  5. PE (Pre-e
  6. Early in pregnancy oligo.
     - ↳ viral infection (TORCH/zika)

Association c oligo. b/c of Uteroplacental insufficiency. (UPI)

⑦ Amniotic band sequence :⇒

tears in Amniotic Membrane

↓

Severe oligohydramnios (clt leakage)

⇓

Bands & tight wrap around fetus.

M/c Anomaly in Amniotic band sequence ⇒ Limb Anomalis > craniofacial Anomalies

⑧ Amnion Nodosum

↳ S. oligo + Yellowish Nodules on the Membrane
↳ severe

⑨ compression defect ⇒ CTEV (club foot)

QQ Diagnostic Amniocentesis :→ ① Karyotyping;

② Neural tube defect → AchE/ AFP *

Best screening test for NTD ⇒ USG

Best test for NTD ⇒ AchE/AFP (Amniocentesis)

other screening test for NTD ⇒ Serum Alpha-fetoprotein
16-18 wk

* AFP Peak — In Fetus — 13 weeks (39)
  — In Mother — 32 weeks
  ↳ $t_{1/2}$ = 5-7 days.

* ↓ Level of AFP seen in ⇒ Down's Sx;
  Diabetes;
  obesity;
  Molar ♂♀;
  GUD.

(3) Lung Maturity ⇒ M/c = L/S Ratio ⇒ > 2 ⇒ Mature
  ↳ Best test ⇒ PG (Phosphatidyl Glycerol)
    ↳ Not affected by presence of Contaminants.
    ↳ in Diabetes Mothers.

(4) Hemolytic Anemia ⇒ In Fetus

(5) ASKs of acute viral infection in fetus
  ↳ Amniotic fluid Polymerase chain Reaction.

In Acute Maternal Infection ⇒ 4 fold Rise in Ab titre in Paired sera.

— Avidity test.

(6) Chorioamnionitis

P.O.G. –	Amount of Amniotic Fluid
* 12 wk →	50mL
16 wk →	250mL
20wk →	400mL
32 wk →	1 Litre (Maxm)
36wk →	900mL
Term | 40wk →	800mL
42wk →	200mL

POST- PARTUM HEMORRHAGE

(40)

3rd Stage ⇒ Placenta expulsion

↳ Avg. time - 15-20 min

Prolonged > 30min.

Signs ⇒ ① Gush of blood;

② Lengthening of cord; ← Best sign — Apparent

③ Suprapubic bulge; — Permanent

④ Fundal height Tes

Best sign ⇒ Placenta lying in vagina > Lengthing of cord

Ⓝ Avg. Blood Loss ⇒ Vaginal delivery = 500ml

C.S. = 1000ml

Twin vaginal delivery = 1000ml

PPH

1° — < 24 hrs of deli — M/c cause ⇒ Uterine Atony

2° — > 24hr upto 12 weeks — Retained Placental tissue

Placental Abnormality which is RF for PPH ⇒ "Succenturiata" "Bilobata".

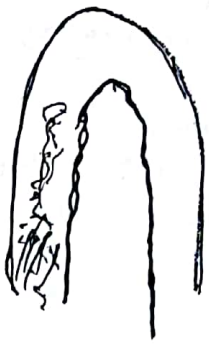
4 Ts — Tone (Uterine Atony)
Trauma
Tissue (Retained placental tissue)
Thrombosis (defect)

* R/F for Atonicity :→ i) Multifetal ♀
ii) Macrosomia
iii) Polyhydramnios
iv) Induction of Labour
v) Augmentation of Labour
vi) Precipitate Labour
(onset - expulsion ≤ in 3 hours)
vii) Any kind of APH
viii) Multiparity
ix) Diabetes Mellitus
x) Pre-eclampsia
xi) Chorioamnionitis

* Most important things for placental separation
↳ Uterine contraction.

Plane of Placental separation ⇒ Spongiosum (41)

Methods by which placenta separates :→ Layer of decidua*



Placental separation ↳ Starting @ centre	Starts @ Periphery
Schultz Method*	Duncan's Method*
External bleeding — after complete separation	begins & onset of separation
Blood loss ↓ (Total)	Total blood loss ↑↑
Side presents @ vulva = Fetal side ⇓ Shiny	Maternal side ⇓ Dirty ↳ Duncan's Method*
Shiny side ↳ Schultz* 80% Cases (M/c separation)	20% Cases
Retroplacental clot or, is formed	Absense of Retroplacental clot.

* M/cc of PPH ⇒ Atony > Genital tract Trauma > Retained tissue > Inversion > Rupture Uterus > Amniotic fluid embolism.

QQ Prevention of PPH (AMTSL)

↳ by WHO
Active Management of Third stage of Labour.

Components ⇒

I) give Uterotonic Agent immediately after delivery
↓ ⇓ c/in 1 min.

a) Doc: Oxytocin
↓
10 IU — I/m bolus — onset c/in 3min — duration 3hr
↘ i/v - infusion immediate 1hr.
↳ Not give bolus b/c it is R/F for = Hypotension
↓
Reflux Tachy. | Arrythmia | MI | cardiac Arrest QQ

MOA ⇒ by Ters intracellular Ca^{+2}
• Oxytocin causes Release of $PGF_{2\alpha}$ from decidua.

- Naturally synthesis oxytocin ⇒ Nonapeptide
  Artificially Synthesis oxytocin ⇒ octapeptide
- Synthesized from - hypothalamus
  ↓
  Paraventricular Nucleus
- t1/2 = 3min (3-5 min)
- Stored in cold chain (2-8°C)
  ↓

(42)

b) Methergin (ergometrine)

↳ 0.2 mg i/m

↓

don't give i/v → causes transient severe hypertension

So; C/I in ⇒ Pre-eclampsia

Eclampsia

CVS disease

Peripheral vascular disease

tetanic contraction (Acts More on LUS; while oxytocin on all Uterus).

Brown colour – b/c of Photosensitive Nature.

↓

c) Syntometrine (5 U oxytocin + 0.5 mg Methergin)

- Very Potent
- Not Doc → expensive
  → Not available

↓

d) Carbetocin = Synthetic oxytocin

↓

Octapeptide / Longer t1/2

↳ 100 µg Slow i/v over 1 min.

↓

e) Misoprostol = PGE_1 analogue

↓

Prophylaxis = 600 µg (per oral)

Route = oral (In India ⇒ per Rectal)

Asthma is Not a C/I.

M/c side effects ⇒ ** Hyperpyrexia (fever ± chills).

↳ directly proportional to dose

Other side effects ⇒ Nausea; Vomiting; Abd. Pain; Hypotension.

II) Delivery of placenta by Controlled Cord traction :

Also " Modified Brandt Andrew Method "

↳ do only when trained birth staff present.

eg
Rt. hand ⇒ Hold cord
Lt. hand ⇒ Push Fundus up.

III) Delayed cord clamping :⇒

↓

≥ 60 Sec. (1-3 min)

↓

Goes More blood to fetus (80 ml)

↓

↑ Hb by 2 gm% ← 50 mg Fe

In HIV patient ⇒ Delay cord clamping done

↳ transmission happen during Labour.

Never done acc. to AMTSL in Normal Labour.

early cord clamping

↓

≤ 1 min to 60 sec

Indications ⇒

- Baby Needs Resuscitation
- Rh Incompatibility
- Baby is known case of Heart disease

(43)

IV) Intermittent Uterine tone assessment ⇒

Uterine Massage = Not done

↳ Not a component of AMTSL.

QQ Most Imp. component ??

(A) I; (B) II; (C) III; (D) IV

Management of PPH (Shock Index = Heart Rate / SBP

↳ (N) = 0.5–0.7

if > 0.9 ⇒ Immediate Resuscitat.

Symptomatic T/t

i) 2 Large bore i/v Cannula (14/16 Gauge)

ii) i/v fluids – crystalloids

iii) Arrange blood & blood products;

iv) Catheterize – Urine output

v) Blood group/ Rh / CBC / Coagulation Profile

⇓

to decrease Morbidity & Mortality Rate.

Specific T/t (Algorithm)

↓

BiManual

) B/M Uterine Massage

+

Call for help

+

Utero-tonics given

↳ Doc T/t

↳ oxytocin

⇓

20IU — 40IU / 500ml of NS/RL

Not in 5% dext.

⇓

If we give Large doses } in
Large duration } in
electrolyte deficient media

⇓

Result in water intoxication.

↓ if Not Responding

Inj. Tranexa (Tranexamic Acid)

↳ Anti fibrinolytic drugs

↓

Anti fibrinoly

1gm slow

↓ if Not Responding

Methergin 0.2 mg (i/m) | carboprost (Methyl PGF2α)

⇓

0.25 mg (i/m)

↳ H/O Asthma ⇒ Not given; Pt. dies of bronchoconstriction

Diarrhoea (M/c side effect of carboprost)

↓ if Not Responding.

Misoprostol → to be used when i/m ; i/v can't be given.

↳ Tt = 800mcg (Sublingual)

Not given P/V (Per vagina)

Can give P/R (Per Rectal)

* All drugs trial to happen upto 30min.

↓ if Not Responding.

(44)

Placenta – completeness

⇓

Uterus feel like Intermittent atonicity

⇓

- i.e Not tonically contracted blc of Retain placental tissue

Genital Tract trauma

⇓

PPH ⇒ Uterus tonically contracted then Reason is

No trauma

Placenta complete

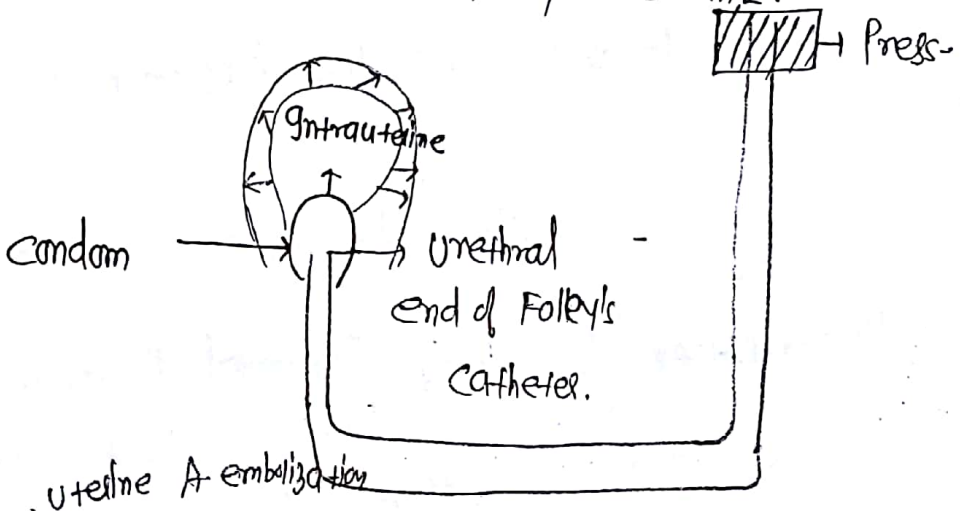
⇓

Balloon Tamponade

- Bakri Balloon tamponade
- Sengstaken Blakemore

⇓

Maxm Fluid capacity = 500mL.



Uterine A. embolization

do UAE ⇐ Minimally invasive Method if Not Responding

⇓

. do in hemodynamically stable pt.; Surgical Method

. Availability.

Surgical Management

- Uterine compression Suture (B-Lynch suture) → Brace

⇓

Applied on Uterus & helpful only in Atonic PPH.

↓ if Not Responding

B/L Uterine A. Ligation

↓ if Not Responding

B/L - Anterior division of Internal iliac

↳ 4 5cm distal to bifurcation of common iliac

↳ It ↓es Pelvic Pulse pressure by 80%

↓ if Not Responding

Hysterectomy (Possible $\frac{to}{do}$ Sub total Hysterectomy

(Remove Uterus – spares the Cervix

K/as "Supracervical Hysterectomy"

↳ to Improve sexual life of female

↓ if bleeding continues think about "D.I.C."

9-CU.

↳ DIC **

TRAUMA :→ Perineal tear differ from episiotomy (45)

Perineal tear
⇓
to prevent
① do Routine episiotomy ⇒ No
② one hand = Support the perineum
③ other hand = Maintain flexion of head
④ tell the Mother Not to push @ the time of head delivery.
⑤ NICE ⇒ application of warm
Guidelines Perineal compresses

episiotomy
⇓
It is surgically planned incision.
· done in special cases
⇓
Forceps ; Breech condn

MedioLateral
· ↑ Pain
- ↑ Dyspareunia
- breaks down easily
- ↑ Blood loss
- Poor cosmetics

Median
⇓
extends
⇓
Rectum sphi -ter & Mucosa

Degree of Perineal tear ⇒

Repaired In Labour Room.
- 1st degree — Vaginal Mucosa & Skin
- 2nd degree — Perineal Muscle

Complete Perineal tears
- 3rd degree — A — <50% EAS torn
  B — >50% EAS torn
  C — Both IAS & EAS torn
- 4th degree — Upto Rectal Mucosa

Complete Perineal tears ⇒ obstetric emergencies
c in 24 hrs
↳ 3 types

1st to be Repaired ⇒ Rectal Mucosa
↓
Internal Anal Sphincter (IAS)
↓
External Anal Sphincter (EAS)
↓
Vaginal Mucosa
↓
Muscle
↓
Skin

Episiotomy

Sphincter ⇒ End-end Anastomosis

Mucosa = Continous suture
Muscle = Interrupted suture
Skin = Mattress suture

M/c used suture = Vicryl (Polygalactin-910)

* Another Tear ⇒ Hematoma

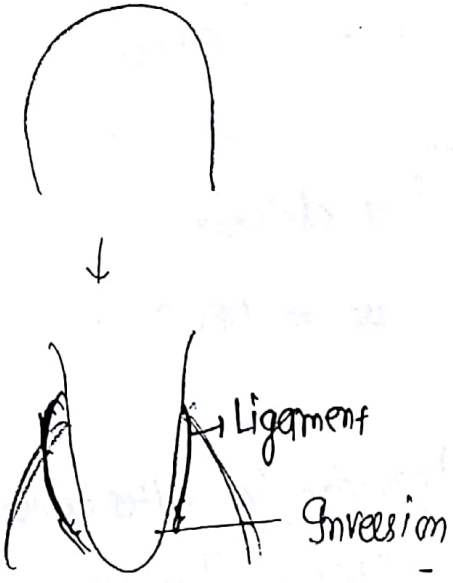
↳ M/c Presentation = · Pain
· Inability to Pass Urine

↳ Rx = Analgesics
Monitor
ice-packs
vasoconstriction
Local applications

- Looks like bluish tender swelling
- Surgical Mx = ① shock
② expanding in size
③ excruciating Pain (hematoma expanding internally)
↳ Muscle.

(46)

* In Inversion ⇒ Stretch on the Ligament
⇓
Neurogenic shock (1st shock to develop
↳ Hemorrhagic shock
↳ death.



Rx ⇒ do Manual Repositioning
(Johnson's Method)
· Part which comes out Last;
has to be Reposited first.
↓ ib fails
Hydrostatic method (O sullevian Method)
↓ ib fails
Surgical Management

Surgical Mangement for Invesion — Haultain
Huntington
Spinelli

- emergency; give general Anesthesia ; Not Spinal Anesthemia
↓
Relaxes uterus

also In Invesion
Manual Removal of Placenta
Hemodynamically Unstable patient
↓ death
QQ. Pt. goes into shock after delivery
Most probable cause ⇒ PPH

QQ Pt. goes into shock Immediately after delivery
- Most probable cause ⇒ Invesion

QQ Pt. goes into shock (unexplained) after delivery
Most probable cause ⇒ Amniotic fluid embolism
(Very Rare / diagnosis of exclusion)
K/as "Anaphylactoid syndrome of Pregnancy"

→ No Lab test to confirm or Refute diagnosis.

* clinical diagnosis of AFE :- (47)

1st phase ⇒ Sudden onset of breathlessness

⇓ highly Mortality

↓ hypotension

↓ Cardiac arrest

↓ Coma

2nd phase ⇒ Pt. goes into DIC + Hemorrhage

⇓ death seen

Test we can do ⇒ Sample from Pulmonary vessels

⇓ Lanugo / vernix / amniotic fluid seen

DIC

M/cc = - Abruption

also by = AFE

Massive Hemorrhage (APH / PPH)

Sepsis (septic abortion)

GVD (≥ 4 weeks ↑ Risk of DIC)

Management of GUD ⇒ wait & watch

↓

Must go into spont. Labour < in 2 weeks

↳ signs ⇒ Robert's sign ⇒ comes @ 12 days

↳ gas in Major blood vessels

Spalding sign ⇒ comes @ 7 days

Ball sign ⇒ Hyperflexion of spine

Buddha sign ⇒ Subcutaneous edema

↳ seen in hydrops fetalis

↳ Not a sign of GUD.

PRE ECLAMPSIA

(48)

* Gestational HTN ⇒ i) BP ≥ 140/90 on 2 occasions; 4-6 hr apart

ii) BP high > 20 weeks;

iii) Return to (N) ∈ in 12 weeks Post-partum.

iv) No evidence of Proteinuria

* Blood Pressure should taken in sitting position.

* 5th Korotkoff Sound heard

* Pre-eclampsia ⇒ i) BP ≥ 140/90 on 2 occasions; 4-6 hr apart

ii) BP high > 20 weeks

∈ Any of the following

Proteinuria

= ≥ 0.3 gm / 300 mg

in a 24 hr Urine Sample

or

Urinary protein / creatinine ≥ 0.3

OR

Dipstick (1+)

End-organ damage

(It could be Any of the following).

i) platelet count < 1 Lakh;

ii) Serum creatinine > 1.1

iii) Liver enzymes all More than twice the (N) value

iv) Pulmonary edema

v) cerebral / visual symptoms

* Pre-eclampsia → Mild

→ Severe either / or both

1. BP ≥ 160/110mm Hg
2. End organ damage

→ CH

all Removed ∴ GUGR

Proteinuria ≥ 5gm/24hr

Oliguria

* Eclampsia ⇒ Pre-eclampsia + Seizures

* Chronic HTN in ♀ ⇒ i) If BP is high before conception;

ii) BP is high in 1st 20 wk;

iii) BP Remains high > 12 week post partum Period.

* Chronic HTN ± Superimposed Pre-eclampsia ⇒

i) New onset proteinuria beyond 20 weeks.

ii) End organ damage > 20 weeks

iii) Uncontrolled HTN > 20 weeks

- Impending eclampsia ⇒ if she has Any of the following sign & symptom ⇒ i) epigastric pain (49)
  ↳ Stretching of Liver Capsule.
  Spontaneous subcapsular hematoma

ii) Headache / dizziness
  ↳ cerebral hypoxia

iii)

Blurring / diplopia / Blindness — Central — occipital Lobe hypoxia
  scotoma — Peripheral = Retinal detachment
  ↳ Hypertensive Retinopathy

iv) HELLP Syndrome
  ↳ Mostly – Feature of severe Preeclampsia
  ↳ Blood pressure in 15% of patient is (N)

Criteria ⇒ all should be present in Patient ⇐
- H = Hemolysis (a) Peripheral Smear
  ↳ Schistocytes (Helmet cells);
  b) S. Billirubin ≥ 12
- EL ⇒ Elevated Liver enzyme (ALT ≥ 70 gu)
- LP = Low Platelet count (Plt. count < 1 Lakh)

* M/c Presentation ⇒ Pain → epigastric Pain (Rt. upper quadrant)

↓↓

Seen in 3rd trimester

D/D ⇒ ~~i)~~ Acute Fatty Liver of ♀ (closet to HELLP)

of HELLP Sx ii) Hepatitis

iii) obstetric cholestatsis

differentiated by presence of

① Hypoglycemia

② Hepato Renal Sx

③ Coagulation defect

④ Pancreatitis

Pathophysiology ⇒ i) AbN of β-oxidation of Fatty acids — Mother (Mitochondrial)

Mainly in 3rd trimester

(More severe form Liver injury) ... ii) LCHAD enzyme deficiency — Fetus

by Postmortem Liver Biopsy confirmed if.

M/C cause of Acute Liver failure in ♀ = AFLP

- High Mortality Rate

* Acute hepatitis

↳ have Prodromal symptom. (50)

- Liver enzyme Raised
- Bilirubin - Markedly Raised

M/c Acute hepatitis in ♀ ⇒ Hepatitis E

↳ high Mortality Rate

* Obstetric cholestasis

- M/c symptom ⇒ Pruritis
  - ∴ seen in 3rd Trimester
  - Estrogen
  - Mutation in genes ABCB4, ABCB11
- Serum bile acids become accumulating
  - ↳ Diagnostic test
- TH ⇒ Ursodeoxycholic Acid

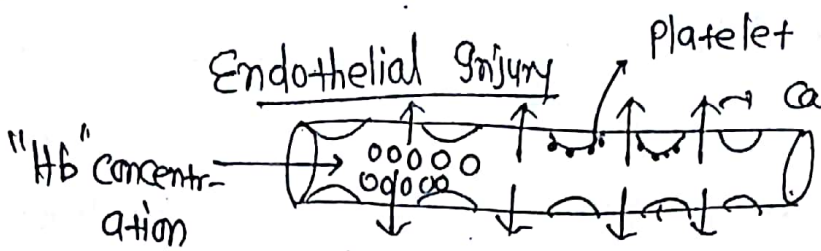
↳ Most Risky for Fetus = Preterm Labour;
Irritate the bile acids; ⇐ Sudden still birth;
Result in the all of three. Meconium Aspiration syndrome

Termination of ♀ ⇒ (≡) 37 weeks ⟶ (≤) 38 weeks
In obstetic Cholestasis

** Recurrence Risk of HELLP = 4-7%.
Obstetric Cholestasis = 70%

* Pathophysiology of Pre-eclampsia :→

Vascular Remodelling
Absent
⇓
Vessels in Decidua Basialis
↓ ↳ it means Remain sensitive to vasopressin
Result in Utero placental Insufficiency
↳ Pt Ischemic → Inflammatory Mediators Release
↓ → SFlt-1; S-Eng both ↑es
- Pale & Small Placenta Seen in Pre-eclampsia,
- S-Flt-1 (Soluble FMs like tyrosine Kinase) } both are vasoconstricters
S-Eng
↳ Soluble-endoglin
↓
Endothelial activation
↓ ↑ Ris, Eff-1 → HTN
↓ NO availability ←
1st sign & Symptom in Pre-eclampsia
- PLGF, VEGF ↓es ← vasodilators



(51)

fluid ⇒ Edematous patient

Edema & Hb concentration } Not criteria or Predictors; only bindings

if this capillary supply kidney

Cause End-organ damage

1st & M/c organ affected in Pre-eclampsia

Kidney shows "Glomerular Endotheliosis" on HPE.

↑ Serum Uric acid ⇒ also a ~~criteria~~ binding not criteria

* Immune theory :-

- Normally ⇒ ↓ TH_1 ⟶ ↑ TH_2 Response

In pre-eclampsia – this shift doesn't happen

⇓

so; ↑ TH_1

⇓

altered Immune Response to paternally derived Antigen.

- **Risk factor** :→ i) Primigravida; (b/c 1st time exposed to Antigen)
  - ii) Molar pregnancy (Extra paternal chromosome)
    - ↳ can develop Early onset Pre-eclampsia;
  - iii) APLA
  - iv) Multifetal ♀
  - v) Chronic Hypertension
  - vi) Renal disease;
  - vii) Diabetes Mellitus;
  - viii) obesity
  - ix) extremes of age <18; >35 yr age
  - x) Previous H/o Pre-eclampsia

- **Protective factor** :→ i) Smoking
  - ii) ♀ has ⊖ve association ⊂ Placenta previa;
    ♀ has ⊖ve association ⊂ Abruption.

- **Predictors of Pre-eclampsia** :→ i) ↑ sFlt-1
  - ii) ↑ S-eng
  - iii) ↓ PLGF
  - iv) ↓ VEGF
  - v) Uterine Doppler
  - vi) ↓ Urinary Cate excretion,

* Uterine A. Doppler (52)

(N) → Notching — disappear by 22 weeks

Persistent Notching — beyond 22 wk — Predictor for Pre-eclampsia

Prevention of Pre-eclampsia ⇒ • Aspirin

⇓

150 mg — once in a day

— start in 12th wk

↳ continue throughout ♀

↳ only indicated for high Risk patient for Pre-eclampsia

• Ca Supplementation

↳ Prevent Pre-eclampsia only in women who have Ca^{+2} deficient

— Salt Restriction
— Omega 3 Fatty acids
— Vit. C, E

} No Role in prevention.

* Management of Pre-eclampsia !⇒

- **Symptomatic**
  - Anti-hypertensive
  - Anti-seizure
- **Specific**
  - Termination of ♀
    - Stop progression
    - Reverse the damage

Anti hypertensive

i) When do you start Anti-hypertensive
↳ if BP persistently ≥ 150/100 mm of Hg

ii) Which drug — DOC
↳ Labetalol (α+β β-Blocker)

But; in chronic Hypertension
↳ Methyl dopa (safest Antihypertensive in Pre-eclampsia)

DOC for Acute HTN in ♀ (≥ 160/110 mm of Hg)
↳ acc. to ACOG, Any of these we use as 1st line drug

① i/v Labetalol > ② i/v hydralazine > ③ Sustained Release Nifidipine

(53)

iv Labetalol

↓

20 mg i/v

↓ after 10 min

40 mg —after 10 min→ 80 mg ⟶ 80 mg upto total 300 mg/24 hr.

④ i/v Nitroglycerine ⇒ used in Pulmonary edema

⑤ Last Resort Refractory ⇒ Sodium Nitroprusside
Anti hypertensive drugs cause CN^- (Cyanide toxicity)

* Methyl dopa is Not given in Acute HTN
↳ b/c

iii) drugs not to be used as Antihypertensive →

i) ACEi ;
ii) ARBs ;
iii) Diuretics ;
iv) β Blockers ;
v) Diazoxide

iv) Target Blood Pressure ⇒

Systolic blood pressure = 120–130 mm of Hg

Diastolic blood pressure = 80–90 mm of Hg

TERMINATION OF PREGNANCY

Gestational Hypertension / Mild Pre-eclampsia ; well controlled BP

↳ @ 37 weeks

Severe Pre-eclampsia — well controlled — TOP — @ 34 weeks

* Indication of Termination of ♀ Irrespective of Gestational age

i) Impending Eclampsia;

ii) Eclampsia

iii) HELLP Syndrome;

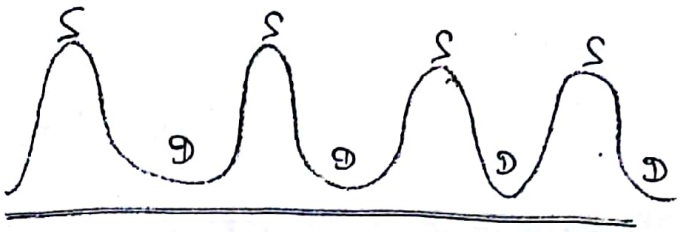
iv) Abruption / Fetal distress

v) Uncontrolled HTN / Rising serum creatinine

vi) REDF – Reversal of End diastolic Flow

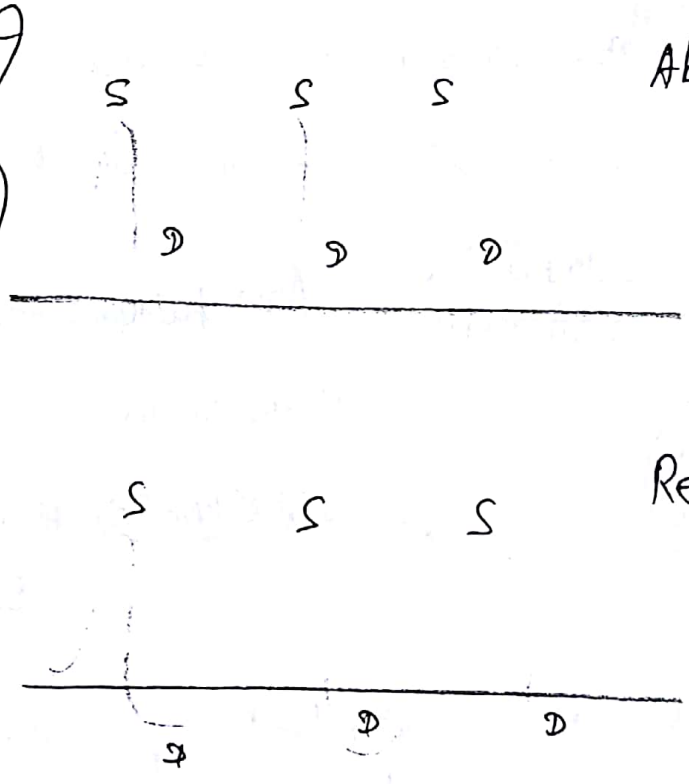
↳ doppler of Umbilical Artery.

(N) Umbilical Artery Flow ⇒ $\frac{S}{D}$ Ratio (54)



In (N) Pregnancy ⇒ $\frac{S}{D}$ Ratio ↓es as POI ↑es

In UPI ⇒ $\frac{S}{D}$ Ratio ↑es (≥30 $\frac{S}{D}$ ≥3)



death ↑in 48hr. ⇐
- Anomalous condition
- TOP irrespective of POI

* Whenever Possible do Vaginal delivery >> cesarian section
(High Risk
Anesthetic complication
Blood loss

* In C.S.
  - epidural Anesthesia given
    - if Not given then
      Mark Neuraxial Anesthesia

Never give General Anesthesia

ECLAMPSIA

Preeclampsia + Seizures
- GTCS (Grand mal)

1st Seizure ⇒ Antepartum (M/C)
Intrapartum
Postpartum ⇒ It Means within 48 hrs Seizure comes

Causes ⇒ Cerebral hypoxia + Cerebral edema

Rx ⇒ MgSO4 ⇒ Central Action
- ↙ vasodilatation: does not do any Peripheral
- ↙ NMDA Receptor
- ↘ Cerebral vasodilatation

* On Periphery $MgSO_4$ ⟶ Ca channels (55)

⇓

So; don't club Ca^{+2} channel blockers (for HTN) & $MgSO_4$

⇓

Causes "Neuromuscular Paralysis"*

↳ So; $MgSO_4$ gives & Labetalol (as anti HTN)

* 1st ly ... looks for vitals

↓

Stabilize the position (by tie her legs & hands)

↓

Secure Airway — Mouth GAG
Suction
Oxygen by Mask

↓

Inj. $MgSO_4$ + Anti-HTN

↙

Pritchard's Regimen

↙ ↘

Loading dose

↓

14 gm

⇓

4 gm - Slow i/v @ 1 gm/min — Monitor by Heart Rate
& 5 gm - i/m (5 gm in each buttock)

Maintainence dose given every 4 hourly until 24 hr after delivery or 24 hr after last seizure (if case)

⇓

before giving dose check ⇒ Patellar Reflex ⊕
RR > 12/min
Urine output > 30 ml/hr

⇓

then give 5 gm i/m dose (@ Alternate site) → to check abscess formation

If Any of the Patellar Reflex ⊖nt
RR > 12/min
Urine output > 30ml/hr
→ any Absent
↓
Omit the dose
⇓
Send serum Mg^{+2}
⇓
Therapeutic Level = 4-7meq

@ 9-12 meq
- @ 10meq = Patellar Reflex Absent → Warmth, diaphoresis
- @ 12meq = Respiratory distress → Slurring of speech

Antidote for $MgSO_4$ ⇒ 10ml of 10% I/v Ca gluconate

* Indication of Prophylatic $MgSO_4$ ⇒ In Impending Eclampsia
In HELLP syndrome;
In Severe Preeclampsia

* oliguria is Not a toxicity symptom of $MgSO_4$.

QQ Primigravida 34 weeks gestation; casuality ⊂ headache × 4hrs; 2 episodes of vomiting o/E BP=160/110 mm of Hg; FHR-(N); Most appropriate step of Mx (56)
Fundal height = 34 weeks; Urine output Protein (2+).

(Firstly) Inj MgSO4 + Anti HTN + TOP

(≡) → then ⟨→ then

* Eclampsia is indication for TOP

⇓

vaginal delivery > C.S.

delivered ⊂ 24 hour

DIABETES in PREGNANCY

MELLITUS

Overt

Pregestational

Known case of "Diabetes Mellitus"

Gestational

1st time deranged sugar case in Pregnancy diagnosed

- Most common

Single Step

↳ both Screening & diagnostic

2hr OGTT

- National guideline DIPSI criteria

  - done @ 24-28 weeks
  - glucose load 75 gm (oral)
  - ± Fasting

after 2hrs → 75gm oral glucose	Blood sample
	> 140 – GDM
	≥ 200 – overt GDM
	120-140 = Impaired glucose tolerance of Pregnancy

* All ◎ Women Must Undergo 2 hour OGTT

↳ Universal Screening (57)

* Early testing — 1st Antenatal visit

① if she gives H/o baby ≥ 4kg

② if she gives H/o Still birth

③ if she gives H/o Macrosomic baby

④ if she gives H/o Diabetes — 1st degree

⑤ if she is obese

~~FBS~~

FBS
or
HbA1c

Fasting ≥ 126 ⇒ overt diabetes.

* Diabetes ⇒ High Risk

For Foetus

↑ Risk of Gross congenital Anomaly by
four fold in compare to (N) ♀

⇓

dt hyperglycemia (keto-toxic)

⇓

Free Radical Injury

* Risk of GCA Tes In overt b/c Gestational Tes after 24-28 weeks.

* M/c GCA ⇒ CVS > NTD

* Most Specific ⇒ Caudal Regression Syndrome (Sacral Agenesis)

* M/c CVS Anomaly In fetus of diabetic Mother ⇒ VSD

* M/c Specific Anomaly In fetus of diabetic Mother ⇒ TGA

* M/c finding In fetus of diabetic Mother ⇒ HOCM

Anencephaly

Frog eye sign | Mickey Mouse sign on USG

Anencephay — earliest ⇒ 10 weeks
\ diagnosed ⇒ 14 weeks

* Screening/ diagnosis ⇒ USG

* Recurrence Risk = 4% ; Recurrence Risk = 10%
In Previous 1 anencephaly baby — In Previous 2 anencephaly baby

(58)

* Maxm complication seen In female foetus excep ⇒

Macrosomia
Respiratory complication } In Male

* Anencephaly seen In Polyhydramnios ♀

↳ Post term Labour > Pre term Labour
(Initiation of Parturition ⇒ CRH)

↳ Mainly Face Maldevelopment seen.

* Banana sign
Lemon sign } seen in Spinal bilida & Arnold-chiari syndrome.

- Test - for Risk of Anomalies

HbA1c ⇒ @ 6.5 ⇒ Risk ↑es by 3%.
@ 7.5 ⇒ Risk ↑es by 4%
@ 8.5 ⇒ Risk ↑es by 8%.
> 9 ⇒ Risk ↑es by 15%.

* USG ⇒ for Anomalies diagnosis → Target imaging for fetal Anomalies
↳@ 18-20 weeks ↳ Level-II (TIFFA)

* Level-II USG do for all Preg. women

Prevention of Anomaly :→

- If we know that pt. is overt diabetes — Pregnancy — give Insulin
  ↓↓
  Tight glucose control

- give Folic Acid Supplementation

		Prophylaxis of NTD	IFA
overt diabetic previous H/o NTD Antiepileptics	4mg	0.4mg	0.5mg (RDA)

- When to start :⇒ as soon as they present preconceptionally
  Folic acid

* Minm Requirement :→ 1 month before to 3 month after

2. Macrosomia

Hyperglycemia —cross placenta→ Hyperglycemia in foetus

↓

Hyper Insulinemia ← Stimulates Fetal Pancreas

↳ Fat deposition — Shoulders
Abdomen

Pedersen's hypothesis

(59)

Diagnostic for Macrosomia

⇓

EBW ≥ 4Kg

⇓

On USG

↳ Single - Fetal growth

⇓

Abdominal circumference (Macrosomia / IUGR)

* USG also uses to calculate Gestational age

Best In 1st Trimester for Gestational age = CROWN-RUMP Length

2nd " = Bipariental diameter

3rd " = Femur Length

Best for Gestational Age = CRL

* Best for Gestational Age :-

(a) CRL for 16 weeks

(b) BPD @ 16 weeks

(c) Femur Length 30 weeks

(d) Abdominal circumference 30 weeks

* Macrosomia Patient presents ⊂ Shoulder dystocia

⇓

> 1min delay in the delivery of Shoulders after delivery of head

⇓

TURTLE SIGN 

↳ Sudden pulling back of head towards Maternal Perineum

* Mx of Shoulder dystocia ⇒

H — Call for Help

E — empty bladder [episiotomy do

L — 1St — Legs — Mc Robert's Maneouvr

↳ Sudden flexion & Abduction of Materal thigh on the Materal Abdomen

↳ ↑ ↑ space in A-P diameter

⇓

we Injured Lateral Cutaneous Nerve of thigh

⇓

Meralgia Paresthetica

P — Suprapubic pressure

Not fundus pressure

E — Enter — Wood's screw Maneuver

cork

R — Removal of Posterior Arm

R — Roll over on 4 limbs

⇓

Gaskin all fours

Last Maneuver ⇒ Zavanelli Maneuver

↳ Push head back & do C.S. into mother

* Theoretically – destructive procedure – Symphysiotomy
– Cleidotomy (60)
– Iatrogenic # clavicle

* M/c fetal Injury In shoulder dystocia ⇒ Brachial plexus

* M/c Maternal complication In shoulder dystocia ⇒ PPH

3) IUGR ⇒ Rare (common)

↳ In Diabetic vasculopathy } Utero placental Insufficiency
Pre-eclampsia

↳ Expected birth weight < 10th Percentile

(4) Still birth ⇒ Seen In Macrosomic baby, Male baby
(↑ O2 Requirement)

↓

Hypoxic episode

↳ Sustained – Still birth

⑤ Pre Maturity → Iatrogenic

Spontaneous → Poly hydramnios

→ Infections

M/c Neonatal Mortality

⑥ Lung Maturation is delayed

↳ Phosphatidyl glycerol ⟹

Not L/S Ratio

⑦ operative delivery

↳ ↑ Risk of Respiratory Problem

⑧ Immediately after delivery :- i) Hypoglycemia

ii) Polycythemia

iii) Hyperbilirubinemia

iv) Hypocalcemia } Prematurity

v) Hypomagnesemia }

vi) RDS

vii) HOCM

* Maternal complication of Diabetic Mother :→

(61)

i) Abortion ⇒ Uncontrolled diabetes

ii) Polyhydramnios — Causes → GICA
→ ↑ glucose in Amniotic fluid
→ Hyperglycemia in fetus (Polyuria)

iii) oligohydramnios (Uncommon)

Seen in → Diabetic vasculopathy } in Utero-placental
Pre-eclampsia } Insufficiency

iv) Pre eclampsia ⇒ 15% Risk Tes

v) Infections — UTI
— Candidiasis

vi) Complication of diabetes — Vasculopathy
— Retinopathy
— Nephropathy
→ Pre existing = Worsen in Pregnancy

vii) operative deliveries

- Vaginal
- C.S.

viii) PPH (over distension)

ix) Pt. can develop later overt diabetes (in 50% cases)

follow up → 6 week (Post partum visit) | 12 wk

by OGTT test

* Management of Diabetes Mellitus in ♀

Maternal Monitoring

- Blood Sugar Level

overt diabetes → Pregnancy → Insulin

GDM → only diabetes diet

40% = Carbohydrate

40% = Fats

20% = Proteins

↓ after 72 hr

do Sugar profile

Fetal Monitoring

- Staff to Monitor at - 32 wk

DFMC (daily fetal Movement count);

NST

BPP (Biophysical Profile)

USG ; Doppler Never use

only in

IUGR

UTI

(62)

Sugar Profile

Fasting ≥ 95 or

1 hr PP ≥ 140 or

2 hr PP ≥ 120

↓

Drug Rx

- DOC → Insulin
  - ↳ It doesn't cross placenta.
- OHA → Metformin, Glyburide

M/c Insulin use ⇒ Regular Insulin

Total dose

- 1/3 → Regular insulin → (Immediate Post Meal Hyperglycemia)
- 2/3 → Long acting insulin → Lente / Aspart / NPH (Maintain Basal level)

1–12 wk = 0.7 U/kg

12–28 wk = 0.8 U/kg

28–34 wk = 0.9 U/kg

≥ 35 wk = 1 U/kg

Target Levels

F < 95

1 hr PP < 140

2 hr PP < 120

Avg. glucose = 100

HbA1c ≤ 6.5%

* TOP = Gestational diabetes on diet alone = EDD = 40 weeks

overt / GDM on Insulin = 39 weeks

* Diabetes (Alone) is Not an Indication for C.S
* Expected birth weight ≥ 4.5 kg in a diabetic pregnancy
  ⇓
  Cesarean section

* In Non diabetic pregnancy ≥ 5kg

* Insulin Requirement in Labour :→ ↓es
  ⇓
  Stop Insulin in Labour
  & do Intensive Monitoring @ 2hrly.

ECTOPIC PREGNANCY

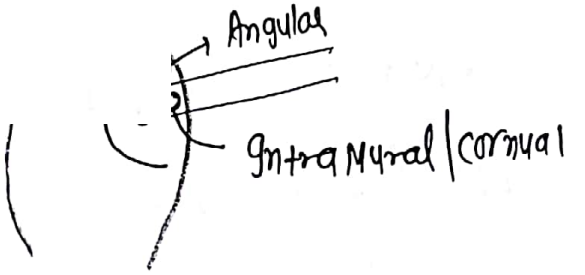
- Any Pregnancy is Implanted outside the Uterine Cavity. (63)

- Cornual Pregnancy → ectopic ♀

  Intramural part of Fallopian tube

- Angular Pregnancy → Intrauterine ♀

  ↳ (gle of Uterus



* Round Ligament is attached Lateral to the growth of Uterus

↳ Angular ♀

* Round Ligament is Medial to growth of Uterus

↳ Cornual ♀

* Heterotopic ♀ ⇒ 2 Pregnancy simultaneously @ different sites of Implantation.

Most common ⇒ Intrauterine + Intrafallopian tube (dif sides)

- Risk factors —

i> Highest Risk of ectopic — H/o Previous Ectopic

1 Previous History ↑ Risk by → 15%

2 Previous History " → 30%

ii> 2nd highest Risk — H/o Tubal Surgery

iii> M/c Risk factor — PID

iv> cervicitis

v> Infertility

vi> ART (IVF)

vii> Smoking

viii> Previous C.S

ix> Contraception & Ectopic

↳ all contraceptive ↓ Absolute Risk of ectopic;
certain ↑ Relative Risk of ectopic

↳ Tubal Ligation > IUD > POP

IUD → Intrauterine Device

POP → Progesterone oral pills

doesn't Inhibit ovulation

so; More Risk of ♀ (ectopic)

Order of GUD in decreasing order of Tes Relative Risk of ectopic ♀ ⇒ Progestasert > Mirena > Cu T (64)

Mirena ⇓

It has GUD & Progesterone both.

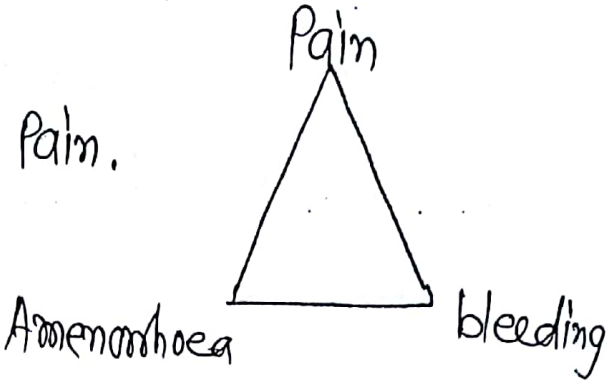
* M/c site of ectopic ⇒ Fallopian tube — M/c site = Ampulla; L/c site = Intramural
* L/c site of ectopic ⇒ C.S. Scar > cervical > Abdominal (I.A.)

<I.A

* M/c outcome of Ampullary ectopic ♀ = Tubal Abortion
  2nd M/c outcome of Ampullary ectopic ♀ = Rupture @ 8th week
* M/c outcome of Isthmic ectopic ♀ = Rupture @ 6th week
* M/c time of Interstitial (OR Intramural) ectopic ♀ Rupture = 12th week ⇓ Most Life threatening ⇓ Hemoperitoneum ↑↑

* Triad of ectopic ♀ ⇒ Seen in 50% of Patient

Most common / Most consistent } Pain.



- H/o Nausea; Vomiting
  Shoulder tip pain
  ↳ Hemoperitoneum
  ↳ Diaphragm
  ⇓
  Referred Pain via Phrenic Nerve

- Syncopal Attack

- Per Abdomen examination ⇒ Tenderness in Lower Abdomen
  ↳ Rigidity/ Guarding d/t Peritonitis
  ⇓
  i.e Ruptured ectopic

Per vaginal examination ⇒ Uterus – enlarged; less Period of gestation.
Cx Motion tenderness Salpingitis
⇓
differentiate by Pain ⇐ PID ⇒ close D/D for ectopic.

Adnexal tenderness
Adnexal Mass QQ

(65)

Investigation ⇒ UPT ⊕ve @ 99% times

Investigation of choice ⇒ Trans vaginal Ultrasound

⇓

1st finding ; which Raises suspicion

↳ empty Uterus

finding ; which Raises suspicion Agains

Not diagnostic of ectopic

↳ complex Adnexal Mass.

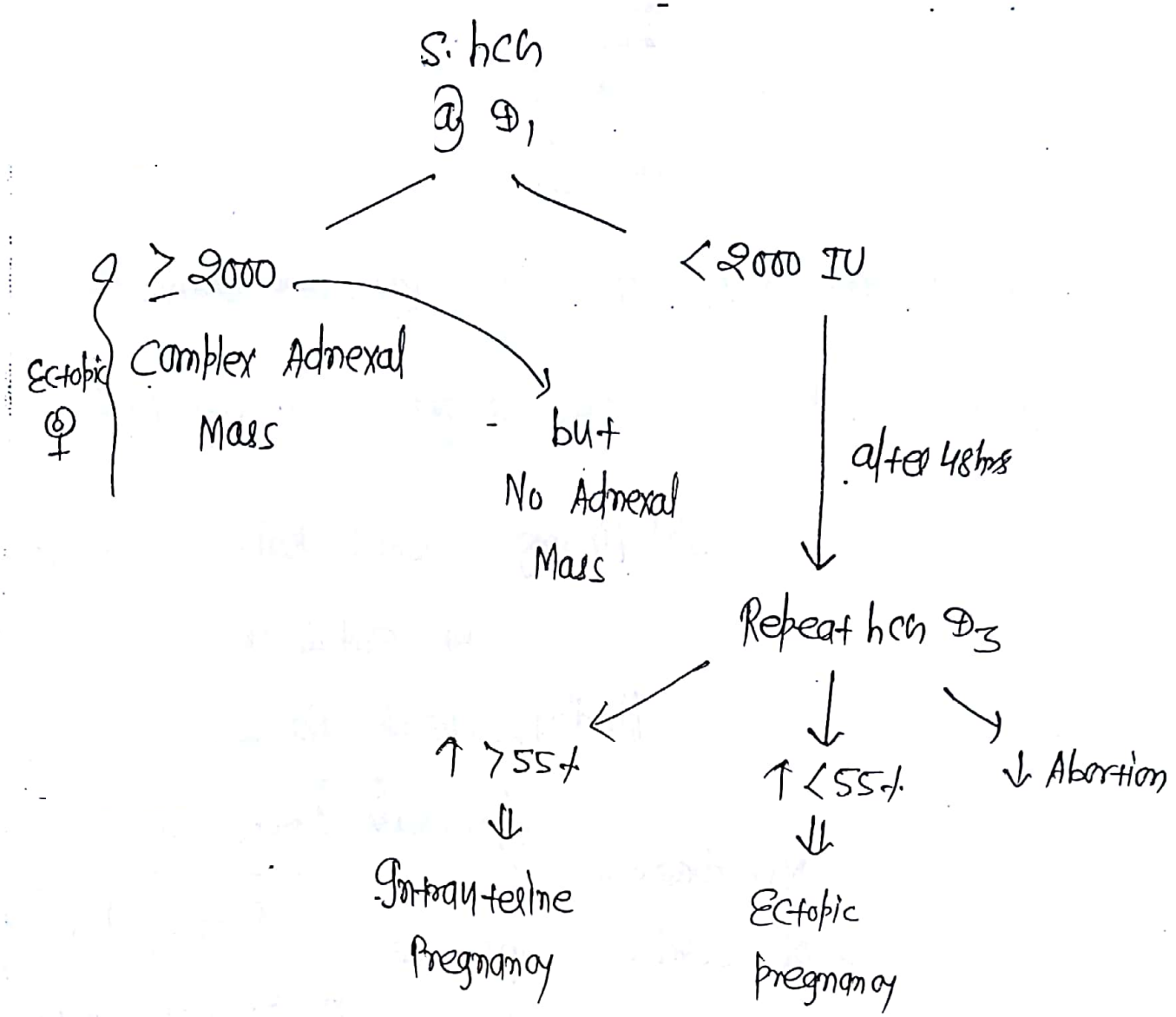
↳ Ring of fire sign on Doppler study

diagnosis finding in ectopic ♀ = Extra uterine gestation Sac + cardiac activity.

QQ No Intra Uterine Gestation Sac ; B/L Adnexa (N); Please correlate clinically.

⇓

Pregnancy of Unknown origin ; check S. hCG on ♀



* Repeat hCG till it crosses the critical value
* GOC = TVS (=) + Serial β hCG (=)
* Gold Standard test = Diagnostic Laparoscopy
* Serum Progesterone = > 25ng — Live Intrauterine ♀
  < 5ng — Abortion
  \ ectopic
* Culdocentesis — Ruptured Ectopic → (> 100ml ↳ significant)
  ↳ i) small collection ⇒ OSH; ii) Large collection ⇒ PA, Unstable

(66)

* Which test has No Role In Ectopic ♀ ?

i) Colotomy

ii) HSG

iii) Hysteroscopy

} clinically +ve patient

iv) all

Management

Medical | Surgical | Expectant

- Pre Requisites for Medical Mx
  - i) Stable
  - ii) hCG < 5000 IU
  - iii) Gestational sac Size
    - < 3.5 cm: ☇ cardiac Activity
    - < 4 cm: ☇ out cardiac activity
  - iv) Preferably absent cardiac Abnormality (Relative Requirement)

Drug ⇒ Inj. Methotrexate (1mg/kg) — D1 or 50mg/m²

Surgical Indications

i) Unstable Patient;

ii) Failed Medical Rx;

iii) criteria for Medical Mx ; Not Met

iv) Ruptured ectopic

v) Family complete

D_4 S. hCG

D_7 S. hCG

Management is Successful if S. hCG level fall by 15% from D_4 value

if D_7 value fall but less than 15% from D_4 value

⇓

give Inj. Methotrexate (D_1)

↓

D_4

↓

D_7 (if again less than 15% of D_4 value)

↳ give Inj. Methotrexate

Failed Medical Mx ⇒ Total of 3 Methotrexate Injections

Surgical Mx ⇒ Unstable vitals pt.

Next Most appropriate Step ⇒

a) i/v fluids & Medical Mx *

b) Immediate Laparotomy

c) Serial β hCG

d) FAST

if localizing sign ⊕ eg ⇒ Peritonitis — do Immediate Laparotomy

if No localizing sign ⊖ — do FAST

i) In general Laparoscopy is preferred over Laparotomy. (67)

↓

but if Unstable vitals ⊕ ⇒ go for Laparotomy.

ii) Salpingostomy - is preferred over Salpingectomy

↓

Small Incision (1cm)

on Anti-Mesentric border

(No closure of Incision)

↳ b/c chance of ectopic

Yes by Suturing ; suturing heal by fibrosis & Fibrosis ↑ chance of ectopic ♀

i) Family complete

ii) Ruptured ectopic

iii) ≥ 5cm

iv) if you can't achieve hemostasis

QQ. 6yr of Marriage — Infertility — Conceived. Ruptured ectopic ♀

a) Medical Mx

b) Salpingostomy

~~c~~) Salpingectomy — Partial

d) Expectant Mx

↓

Later date

↳ Tubal Reanastomosis.

* Expectant Management ⇒

Pt. is stable
βHCG < 200 IU & falling trend
No visible gestational sac
Monitor serial β-hCG

* Heterotopic Ectopic :→

Risk factor = ART (IVF)
Missed on USG
⇓
Late Diagnosed ⇒ by 16 weeks
↳ Big size sac
↳ Impending Rupture / Ruptured

TOC: Medical Mx is C/I;
Sx ⇒ Laproscopic salpingectomy

If we want to give drug in clinical trials ⇒ Inj. KCl
under USG guidance ← cardiotoxic
give to Ectopic child & kill.

(68)

* Cervical ectopic
  - ↳ Painless bleeding
  - ↳ Medical Mx (as long as Pt. is stable)
  - ↳ criteria for Dx of cervical ectopic
    - ↳ Paalmans (Rubins criteria)

* Abdominal ectopic ⇒ Pain ; No Bleeding
  - Studdiford criteria
  - Late - 3rd trimester (Abd. ♀)
  - 32 week Abd. ♀
    - ↓
    - Immediate Laprotomy
      - ↳ deliver the baby + Placenta in situ
        - ↳ Leads to Autolytic digestion

* Ovarian ectopic ⇒ Speigelberg criteria
  - ↳ Surgical Mx

ABORTION **

· Weight of baby @ 20 weeks ≤ 300 gms

< 20 weeks

≤ 500 gms (WHO)

Spontaneous Abortion (Sporadic)

→ means spontaneous

Most common cause of Abortion

↓

Chromosomal

↓

Also in 1st & 2nd Trimester Most common.

Recurrent Abortion (Habitual)

≥ 3 consecutive Preg. losses < 20 wk.

New guidelines: ≥ 2 loses documented ∴ ↓ confirmed ♀. Start evaluation)

* 50% of total abortion in 1st Trimester } Chromosomal
35% of total abortion in 2nd Trimester }

* Chromosomal

↓ → M/c chromosomal Anomalies cause Abortion

Aneuploidy (alteration in No. of chromosome)

M/c Aneuploidies cause Abortion ↑

↓

Trisomy (13, 16, 18, 21)

↓

Monosomy X – 20% Abortions

↓

Trisomy 16 – 16% Abortions

Single M/c/c

QQ - M/c cause of Abortions ⇒

a) Trisomy 16

b) Monosomy X

c) ~~Aneuploidy~~

d) Tetraploidy

* Most viable Aneuploidy = Trisomy 21

Most Lethal Aneuploidy = Trisomy 16 (69)

* M/c cause of Recurrent ♀ Loss ⇒ Idiopathic (75% cases)
(RPL)

↓

APLA – 16% RPL

↓

Uterine Anomalies — Congenital
\ Acquired

↓

Endocrinopathies

↓

Chromosomal – only 4% cases of RPL

M/C ⇒ Balanced Robertsonian Translocations

* Which of the following doesn't causes RPL?

i) Infections — Sporadic

⇓

TORCH Infections

Can't cause early RPL

Which Infection can cause RPL ⇒ "Syphilis"

⇓

Kassowitz Law

⇓

Every Successive ♀ in Syphilis POG of Loss Keeps Testing

Mainly cause Still birth; Not Abortion

if 1st child Pog / Loss @ → 10th wk

2nd " → " → 24th wk

3rd " → " → 32nd wk

4th " → Live born child (Stigmata syphilis)

Q. G5 A4 @ 12 weeks present c Missed Abortion. all her previous early losses ; all the following investigations for her evaluation except ⇒

① Karyotyping
② LAC
③ AEA
④ ~~VDRL~~

* Karyotyping should be done in patient of RPL

* APLA (Anti Phospholipid Antibody Syndrome) ⇒
  ↳ Single Most common cause of RPL.

Diagnosis of APLA ⇒ 1 clinical + 1 Lab criteria

↳ Any one of the following
  ↳ i) ≥3 ♀ losses of <10 wks
  ii) ≥1 ♀ losses >10 wks of a Morphologically Normal fetus
  iii) Atleast 1 preterm delivery (<34 wk)
    ↳ Secondry to Severe pre-eclampsia or Uteroplacental insufficiency
  iv) Venous & arterial thrombosis

Lab criteria ⇒ Antibodies

(70)

i) LAC ⇒ Lupus Anticoagulant
ii) ACA ⇒ Anti: cardiolipin Antibodies
} ⇒ M/c

iii) Anti β_2 GP$_1$ Antibodies ⇒ Most specific
↳ current disease activity

test to look for LAC ⇒ Russel viper venom test.

IgM & IgG ACA ⊕ve in Medium to high titres on 2 occassions done 12 wks Apart.

* if the pt. is K/c/o APLA syndrome & ♀ also

Heparin
Low Mw Heparin
(Unfractionated can be used)
↓
Started when Intrauterine ♀ confirmed

Aspirin
Low dose Aspirin
↓
Started when UPT ⊕ve

Continued throughout ♀

Heparin stopped @ onset of Labour

Aspirin stopped 7-10 days before Labour

2nd line ⇒ Should be used when only 1st line Rx fails.
⇒ Plasmaphresis
IvIg

DOC for APLA ⇒ Warfarin (Not given in ♀)
↳(Cause embryopathy)

DOC for APLA in ♀ ⇒ · Low Mw Heparin.

* Routine test Antibodies for APLA – In women c̄ RPL

* Most characteristics trimester for APLA – 2nd trimester

* UTERINE STRUCTURAL ANOMALIES CAUSES ABORTION

Congenital
- Septate Uterus
  ↓
  It can even cause 1st trimester abortions

Most characteristically cause 2nd Trimester Abortion

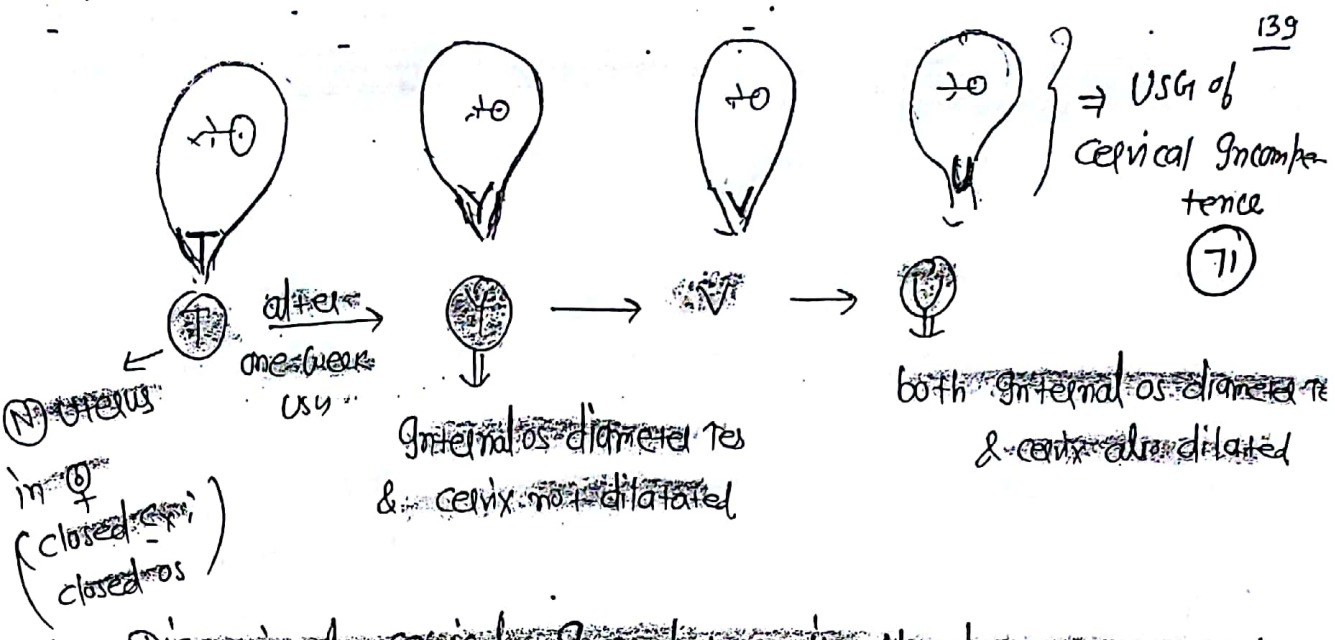
Acquired
- Cervical Incompetence → M/c Acquired cause abortion
- Fibroid (SubMucosal)
- Polyp
- Adhesion

Diagnosis of cervical incompetence

USG based diagnosis
i) do in 2nd Trimester & see cervical Length ⇒ if it is < 25mm;
& Internal os diameter > 2 cm

History based diagnosis
i) Causes 2nd Trimester abortions (Not causes 1st Trimester abortion)
ii) RPL
iii) Painless dilatation of cervix

[illegible]



* Diagnosis of cervical Incompetence in Non pregnancy State :-

i) Passage of No 8 Hagger's dilator through the Internal os ~~with~~ Resistance

↳ done in Pre-Menstrual Period

ii) No 16 foley catheter ⟶ fill the ballon ~ 2cc Normal Saline

⇓

Pull it out ~ Resistance from the Internal os

⇓

- Cervical Incompetence (+)

* Screening for Uterine Anomalies (Mullerian Anomalies)

HSG

Sonohysterography

⇓

do MRI / Hysteroscopy / Laparoscopy

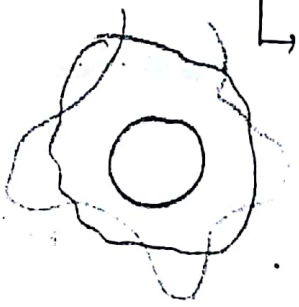
↳ for diagnosis

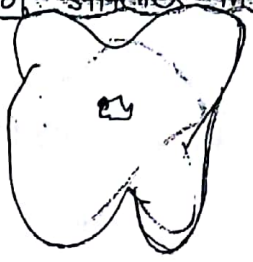
If Pt. has Cx incompetence ??

∴ do cerclage (cervical stitch)

↳ Mcdonald Procedure (Mc done)

↳ Placement of stitches in the cervix to hold it closed



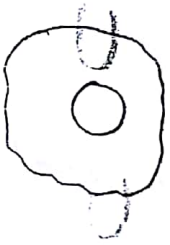


Purse string suture

⇓

Passes through all the walls of Cx.

Shirodkar cerclage ⇒ use Mersilene tape



only pass through A-P walls

↳ done when Mcdonald's fail.

Cervix index = Final Length / 1+endocervical Length

↳ 0·32 (N)

> 0·52 ⇒ cervical insufficiency

* Ideal time to do ⇒ 12-14 weeks (14 weeks)

Upto what time we put the cerclage ⇒ upto 24 weeks

At what level we put the cerclage ⇒ as close to internal os

Contraindication of cerclage ⇒ i) GTCA

ii) Current pelvic infection

iii) Ruptured Membrane

iv) placenta previa

Removal of Suture ⇒ @ 37 weeks

SOS if any of the following develop ⇒ Raptured Membrane

↳ Necessary

Chorioamnionitis

Onset of labour

* Gn - Non-♀ State ⇒ [redacted] Lash & Lash Surgery (72)
  Rx of cervical incompetence

QQ Should we do Sonohysterography/HSG in Recurrent Preg nancy loss

⇓

Yes (Should be done as a Routine in Non-♀

⇓

Gn ♀ ⇒ do USG

ENDOCRINOPATHIES CAUSES RPL

* Thyroid ↓ – Hypothyroidism

⇓

do TSH → as Routine Screening for RPL

↳ Subclinical Hypothyroidism → Abortions

* Diabetes → Uncontrolled diabetes

↳ Blood sugar is Not a Routine procedure

↳ do when pt. is Symptomatic / Significant Family History

* Prolactin → Hyperprolactinemia

S. Prolactin → Not a Routine test

Mc presentation in ♀ ⇒ Amenorrhea & Infertility

* L.P.D (Luteal Phase defect) → corpus Luteum is formed by secretion of Less Progesterone
  - ↳ Not a established cause of RPL
  - ↳ only : when S. Progesterone < 15 ng/ml.
    - ↳ Not a Routine test

* only ↳ established cause of RPL
  - ↳ APLA
  - Uterine Anomalies
  - Chromosomal
  - Hypothyroidism

* How does women c Abortion presents ⇒

Spontaneous Abortion

Missed — all presents c Amenorrhea + Pain + Bleeding

Threatened — Inevitable

* P/s examination
  - ↳ Os closed — os closed — os open
* Size of Uterus
  - POG — = POG — = POG

* In UGS examination Cardiac activity is absent (missing) = Cardiac activity is present

Q. Lady is 6 week Amenorrhoic; Pain + Spotting;
USG = Intrauterine gestation Sac ± embryo; ± No cardiac activity.

* if CRL ≥ 7mm & absent cardiac activity (73)
↳ Missed Abortion. ↳ Non viable Pregnancy.

but if CRL 5mm & absent cardiac activity
↳ Repeat USG after Some times (Min^m 1 week)

Non-viable ♀ ∴ ○ – Mean Sac diameter ≥ 25mm & No Yolk/embryo inside
↙
Blighted ovum (No yolk inside b/c of Avascular villi)
(empty sac)

Q. Missed Abortion is Missed b/c Symptoms presented after later date of Abortion; so; we missed to diagnosis.

Mx ∴ Induce Abortion (to open the os)
↳ In Missed Abortion

1. Empirical Rx (Bed Rest; Progesterone Supplements, i/m – weekly injection, Micronised oral tab)
avoid Intercourse
avoid Lifting heavy weight
→ In Threatened abortion ⇒ abort d/t chromosomal Abnormal
No Specific Rx ⇒ In Inevitable Abortion.

** Complete Abortion

** Incomplete Abortion

Amenorrhea + Pain + Bleeding + H/o expulsion of POC's

P/S examination

↳ OS closed

⇓

Symptoms improve after expulsion

USG

⇓

For confirmation

⇓

Uterine cavity empty

No Retained Product of conception (RPOC)

OS open

↳ Period of conception (POCs) can be seen in the cervical canal

Uterine size ↓ POCs

Bleed a Lot

↳ Unstable Vitals (Patient May present c Shock)

Mx → Symptomatic Rx

Mx → Specific

Complete the process

⇓

do Suction & evacuation (Digital evacuation could be life saving)

* Induced Abortion ⇒ MTP Act

⇓

Upto 20 weeks

Pt. Asked for Abortion for ⇒ Rape ⇒ Humanitarian

Contraceptive Failure ⇒ Social

MTP Act → Eugenic

Medical/Surgical disease → Therapeutic (74)

Who do Abortions ⇒ RMPs (Registered Medical Practitioner)

i) degree/diploma in field of OBG;

ii) 6 months of house surgeonship in department of OBG;

iii) assisted in 25 procedure of abortion in govt. hospital (out of 5 done independent)

<12 week ⇒ 1 RMP

12-20 week ⇒ 2 RMP

1st Trimester → WHO ⇒ 9 weeks

- Upto 7 weeks — Outpatient Medical Abortion

On D_1 ⇒ Mifepristone (Tab 200 mg oral)

D_3 ⇒ Tab Misoprostol (Tab 400 Mg; Pervaginal; Per oral; Sublingual; Buccal) → acc to WHO 4 800 Mg

Usually bleed after Misoprostol (so; observe 2-3 hr & send home)

D_{15} ⇒ History/Examination of Abortion;

* USG, before/After ∨ Not Mandatory

⇓

Only in Special circumstance

2nd Trimester

Medical

M/cly done

Adv:- No Anesthesia/Sx complication

Disadv:- Retained Products

May prt.

Rx

* Prostaglandin

↳ M/c :- Misoprostol PVE,

2nd M/c ⇒ Carboprost PVF2α

Surgical

Adv ⇒ one time Procedure

Disadv ⇒ Anesthetic/surgical complication

Rx

* D/E

⇓

Dilatation & Evacuation

- Beyond 7 weeks & upto 12 weeks
  - ↳ do" Suction & evacuation"
    - ⇓
    - Hegar's dilator ⇒ graduated blunt devices (if we perforate ⇓ it heals itself, wait & watch ⇓ Monitor the vitals
    - Karman's cannula ⇒ 600 mm of Hg pressure generated
      - ↳ white plastic devia
      - ↳ on P/V examination
        - ↳ Size of cannula = size of uterus on P/V examination
        - ↳ usually 1 less than POG's
      - ↳ if we perforate by karman's cannula ⇒ Immediate Laparoscopy ⇓ to check Avascular Necrosis of bowel loop

Medical Rx
Ex-tra amnio-i c
Ethamidene
Intra amniotic hyperosmolar saline
oxytocin

- End point of Suction & evacuation
  - ⇒ i) ↓ bleeding
    ii) Air bubbles in cannula
    iii) Gripping sensation on canula

- Check curettage ⇒ Sharp devices
  - ↳ give grating sensations

In village; alternative to Suction & evacuation ⇒ MVA ⇒ Manual vacuum Aspiration
- ↳ upto 12 wks we do
- Cannula in born of syringe (sterile)
- Syringe = 60 cc
- Pressure 600 mm of Hg = 600 mm of Hg

Dilatation & Evacuation

(75)

↳ ~~Ovum Forceps~~ ⇒ Spoon shaped forceps

No Locks ⊕

Piecemeal the products

* MOBIUS SYNDROME ⇒ ~~dil + Misoprostol~~

↳ Paralysis of Facial Muscle

(~~Facial Nerve affected~~)

* if Cx is Not open after giving Misoprostol & all drugs in Under 20 weeks

⇓

~~Opening of Uterus~~ — In early Gestation

⇓

~~Hysterotomy~~

(So; it gives Classical Scar; b/c @ 20 weeks we don't differentiate the Lower Uterine So; segment

after it always do cessarian section in Next ♀)

LABOUR

Initiation of Labour ⇒ Functional fetus Hypothalamic – Pituitary Axis

⇓

Release CRH

⇓

Cortisol

⇓

Placental CRH → M/c hormone for Initiation of Labour

→ down Regulation of Progesterone on uterus

→ Causes upregulation of Estrogen Receptors on uterus

→ Causes upregulation of oxytocin Receptors on uterus

→ Prostaglandin

→ Causes Release of Oxytocin

* Levels of the hormone doesn't change significantly

Oxytocin works via ⇒ Ca^{+2} influx

$PhF_{2\alpha}$ from the decidua

↳ Max^m oxytocin Receptors ⊕ @ 2nd stage of Labour

Expected date of delivery = 40 weeks (Naegeles formula)

↳ on EDD ⇒ 4% delivery occur

FDD + 1 week ⇒ 50% delivery occur

EDD + 2 week ⇒ 80% delivery occur

(76)

* Preterm Labour ⇒ before 37 weeks

Term ⇒ ~~Early term~~ ⇒ 37 - 38+6

Term ⇒ 39 - 40+6

~~Late term~~ ⇒ 41 - 41+6

~~Post term~~ ⇒ ≥ 42 weeks

* Non-Medically Indicated C.S. ⇒ don't do ~~before 39 weeks~~

* ~~Gravida~~ ⇒ No. of times the women has been ♀.

Parity ⇒ beyond period of viability.

* G - T - P - A - L → currently Living children.
  - G → gravida
  - T → term (≥ 37 weeks)
  - P → Preterm (20-36 wk)
  - A → Abortion (< 20 weeks)

Q. In twin ♀ None of the Parameters change; except ⇓ Currently Living children

Q. 2nd Pregnancy; 1st was twins 34 wk delivery; Both alive

$G_2 T_0 P_1 A_0 L_2$

* Patient comes c Uterine contraction

check

False Labour

- Uterine contraction
  ⇒ No↑ in frequency
  intensity
  duration
- No Passage of blood mixed cervical Mucus
- No Progressive Cx dilatation & effacement
- No Rupture of Membrane
- Sedatives ⇒ Uterine contraction will subside

True Labour

- Uterine contraction ⇒ ↑ in
  frequency
  intensity
  duration
- g↑ shows ⇒ Passage of blood mixed cervical Mucus
- Progressive Cx dilatation & effacement
  ⇓
  in↑.
  - g↑(cm)
  - Fully dilatated
    - 10cm

g↑ Primigravida → effacement → dilatation
g↑ Multigravida → both all simultaneously

- Rupture of Membrane
- Sedatives → Pain Perception ↓es, Labour will Progress

Best Sign ⇒ Progressive Cx dilatation > Rupture of Membrane

- ble of PROM ⇒ Rupture of Membrane before onset of Labour

Rupture of PROM ⇒ Per speculum examination (77)

⇓

- Leaking of Fluid from the OS.
- pH :→ Nitrazine Paper test
- OSC :→ Oligohydraminos
- dye test.
- FFN (Fetal fibronectin)
  - ↳ Marker of Pre-term Labour also.

PPROM :→ Rupture of Membrane before 37 weeks

⇓

Preterm PreMature Rupture of Membrane

Mx :→ PROM

⇓

> 34 weeks

Induce Labour

(Risk factor of chorioamnionitis)

+

Prophylactic Antibiotics

< 34 weeks

Antibiotics steroids

⇓

once >34 weeks

⇓

Induce Labour

Threatened PretermLab

< 34 weeks

Steroids + Tocolytics

⇓

No Role of Antibiotics

> 34 wee

⇓

Wait & wat

* Most Imp. R/F for Pre-term Labour
  - ↳ Previous H/o of Pre-term Labour
  - // Infection

Prophylaxis in high Risk previous pre-term Labour Patients
↳ Progesterone

* if patient is in True Labour; we know about :-

1st Stage

Onset of True Labour Pain to full dilatation of cervix

- Latent Phase
- Active Phase

	Cervical dilatation
0-5 cm	(Acc to) ≥ 6 cm
0-3 cm	(Wkt) ≥ 4 cm

↓ duration of Latent Phase

	Normal	Prolonged
Primi	24 hrs	20 hrs
Multi	8 hr	14 hr

↓ Rate of Cx dilatation
- in Primigravida (1.2 cm/hr)
- in Multigravida (1.5 cm/hr)

Rate of descent of head
- Primigravida: 1 cm/hr
- Multigravida: 2 cm/hr

(N) Progress = 1 cm/hr

2nd Stage

From full dilatation to expulsion of fetus

3rd Stage of Labour ⇒ From the birth of child to complete expulsion of placenta

4th Stage of Labour ⇒ Duration of observation of Mother : 1 hr

PARTOGRAM

153 B,B,B ⇒ Blood stained
M,M = Meconium stained
C,C,C,C,C,C. → Clear Amniotic fluid

Topmost part ⇒ tells about fetus

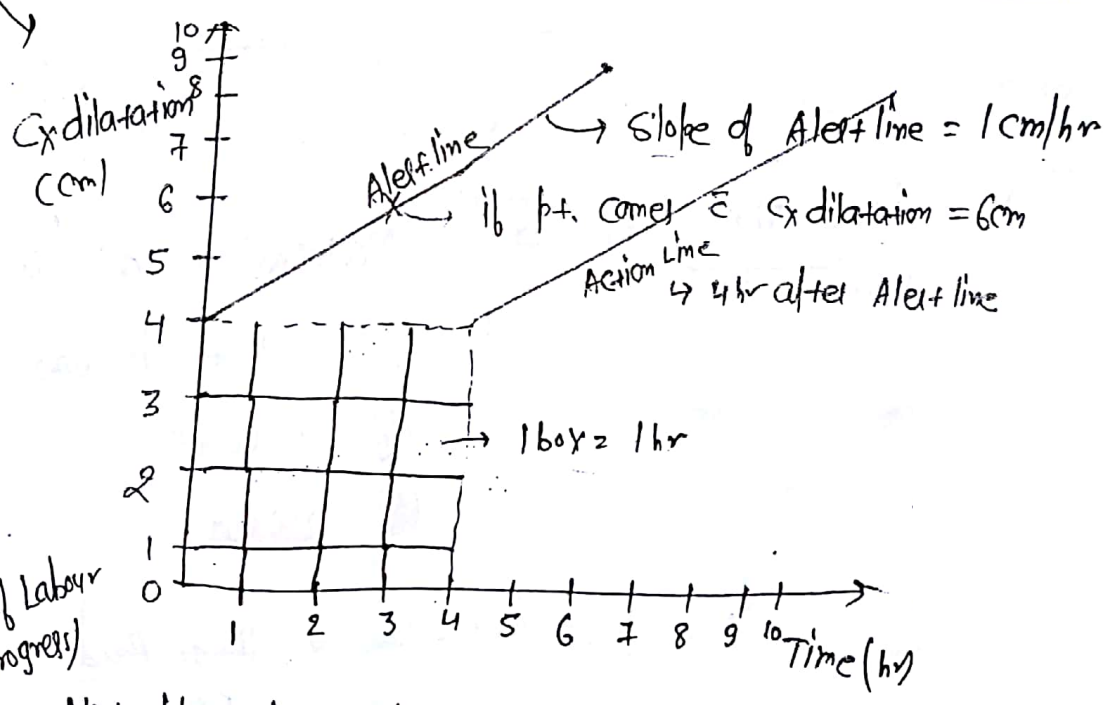
Middle part ⇒ Progress of Labour (Cx dilatation) (78)

Lower part ⇒ tell about Mother

tells about Moulding

- Grade 1 ⇒ Parietal bone touch each other
- Grade 2 ⇒ overlap; can be separated
- Grade 3 ⇒ overlap; can't be separated

Plotting always done on Alert Line



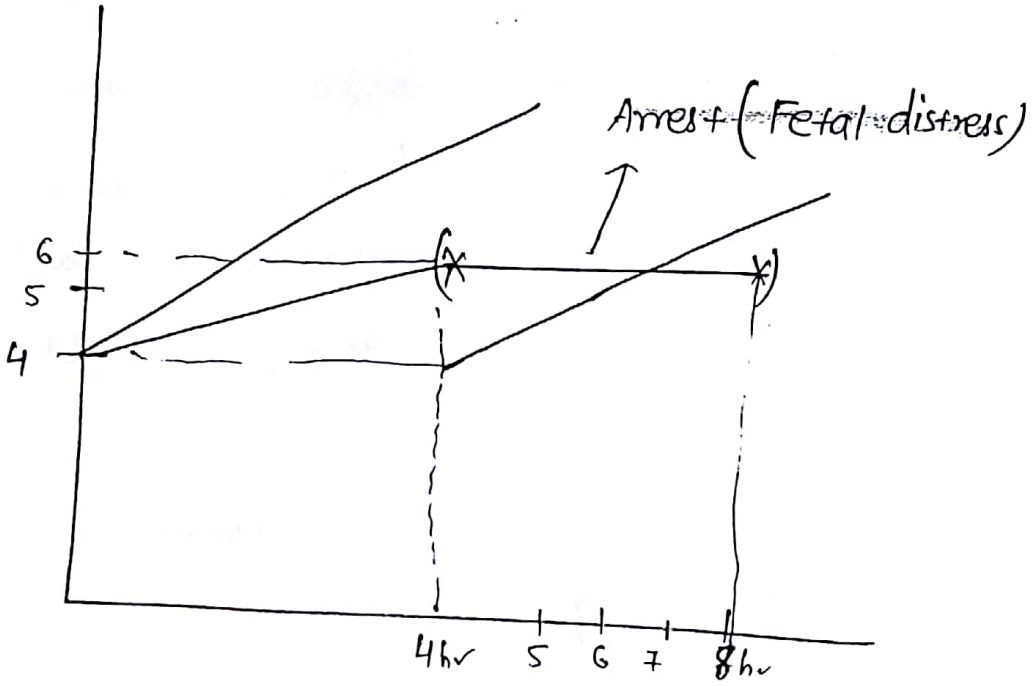
Dystocia of Labour (ALN Progress)

Not plot Latent phase in Partogram (Plot after ≥ 4cm)

- if Partogram is Right to Alert Line ⇒ Referral to higher center
- if Partogram goes to Right to Action Line ⇒ Intervention

Arrest of Active Phase ⇒ No change in Cx dilatation even after 4 hrs of Adequate Uterine contraction → only if FHR ⇒ (N)

→ Intervention → Ceasarean Section



* Lower Most Part ⇒ Maternal cond^n (Uterine contraction)

- <20 sec in one contraction
- 20-40 sec
- >40 sec

→ also tells about ⇒ Heart Rate
BP
temp
Urine output
drugs to be given

2nd stage of Labour ⇒ Avg. duration (79)

↳ 1 hr = Primigravida

30 min = Multigravida

Arrest of 2nd stage

↳ No descent of head in the presence of Adequate uterine contraction

for 3 hrs → Primigravida

2 hrs → Multigravida

do C.S. • Arrest of 2nd stage ∈ epidural Analgesia

4 hr ⇒ Primigravida

3 hr ⇒ Multigravida

* Progress of Labour → P/A → contractions — duration / frequency

examination → descent of head

Ruled Five

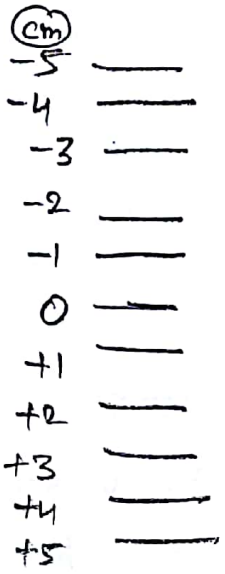
Numerator ↓ Parts Palpable

5/5	A ⇒	entire head above Pelvic brim
4/5	B ⇒	Sinciput high; occiput easily felt
3/5	C ⇒	Sinciput easily felt; occiput felt
2/5	D ⇒	Sinciput felt; occiput just felt
1/5	E ⇒	Sinciput felt; occiput Not felt
0/5	F ⇒	None of head Palpable

P/V examination → Cx dilatation

→ Descent of head

Descent of head in p/v examination ⇒



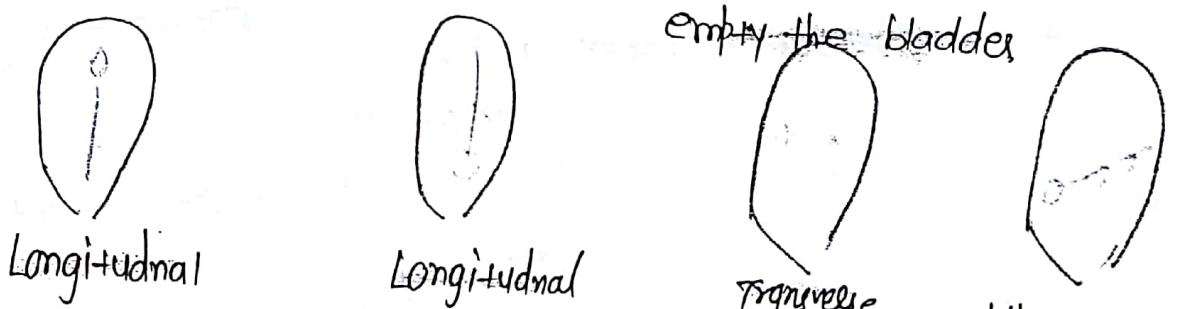
Station −2 ⇒ baby's head 2 cm above Ischial spine

Station +3 ⇒ baby's head 3 cm below Ischial spine

* LIE ⇒ Relationship of Fetus & Long axis of Uterus

⇓

firstly correct the detrotation & empty the bladder



Oblique lie = Unstable lie

⇓

Keeps changing even after 37 weeks

M/c/c ⇒ Idiopathic (↑50%)

2nd M/c/c ⇒ Placenta previa

Polyhydramnios

Oligohydramnios never cause Unstable lie

M/c/y lyndal location of placenta ↑

Presentation ⇒ Part of fetus which is foremost in the birth canal. (89)

Breech Cephalic Shoulder

Leopold Maneuver ⇒ Soft, broad part ⇒ buttock
Smooth curve ⇒ Back
Limbs ⇒ Knobby feel

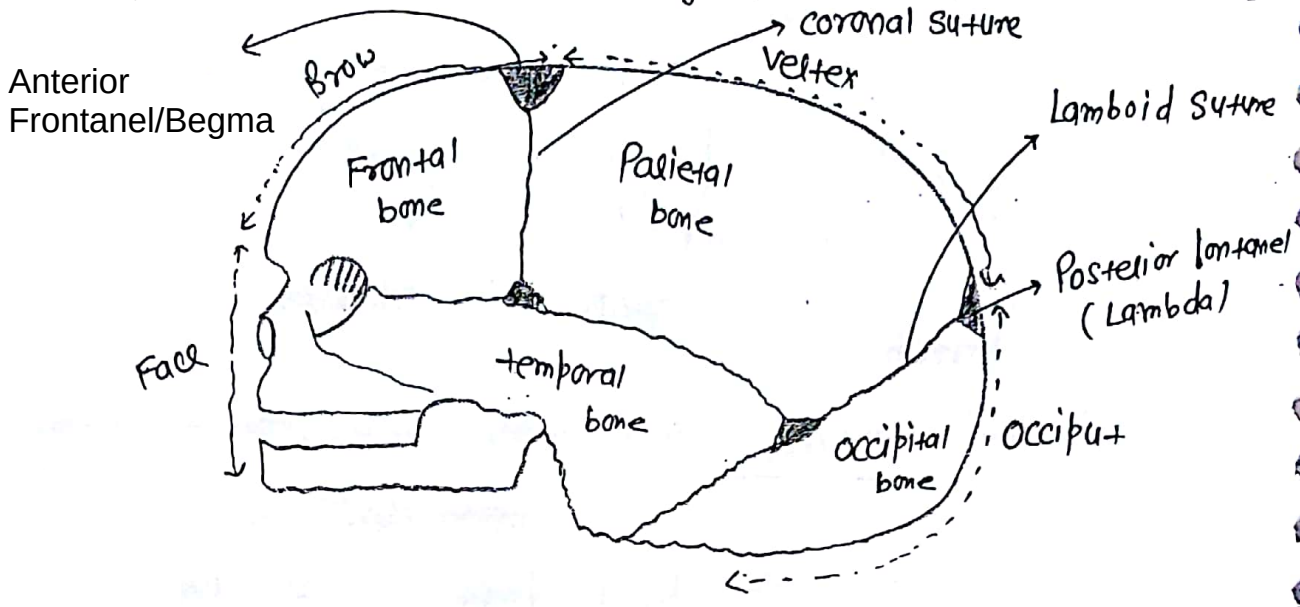
(A) Fundal grip (1st Leopold)
(B) Lateral grip (2nd Leopold) → is with single hand we do
(C) Pawlik's grip (3rd Leopold) → 2nd Pelvic grip
(D) Pelvic/deep pelvic grip (4th Leopold) → 1st Pelvic grip
↳ Both hand we use

* if head is in complete flexion ⇒ Vertex presentation
Partial flexion ⇒ Sinciput presentation
Partial extension ⇒ Brow presentation
complete extension ⇒ Face presentation

* Anterior fontanel ⇒ Bregma
Posterior fontanel ⇒ Lambda
Posterior boundary of Brow ⇒ Anterior boundary of vertex

* Anterior fontanel ⇒ diamond in shape

Posterior fontanel ⇒ Triangular in shape



Engagement ⇒ When the Largest diameter of the presentation crosses the Pelvic brim.

Largest Transverse diameter ⇒ ~~Biparietal diameter~~ 9.5cm

engaging dm in different presentation :-

Engaging diameter (AP)
↳ Antero-Posterior

Vertex
Suboccipito bregmatic (9.5cm)

Sinciput (Partial flexion/Deflexed)
- Occipito frontal (occiput to Anterior end of Anterior fontanel) 11.5 cm
- Sub-occipito frontal (10.5 cm)

complete extension/ Face
- Submento-bregmatic (9.5cm)

Brow
- Mento vertical (14 cm)

⇓
Largest dm of fetal head

(81)

* In Most of the Primigravida
  ↳ engagement @ 37 weeks

* free floating head @ 37 weeks in Primigravida
  ↳ d/t deflexed head; CPD; Placenta previa; Polyhydramnios.

* Engagement Rule out cephalo pelvic disproportion at the inlet. (CPD)

* when the head is Engaged; station = 0.
  ↳ on P/A exam; 2/5 is Palpable

* DENOMINATOR - Bony point on the presentation used to describe the position of head

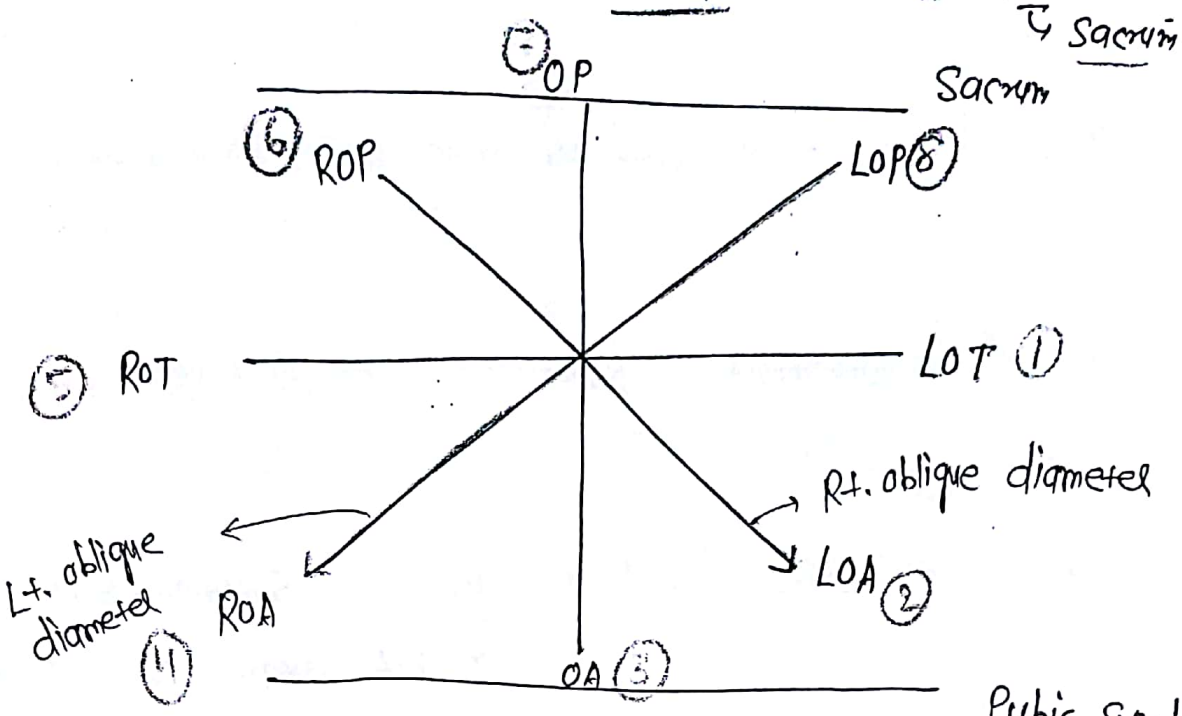
Presentation		Denominator
Vertex	→	Occiput
Breech	→	Sacrum
Brow	→	Frontal bone
Face	→	Mentum
Shoulder	→	Acromion process (Scapula)

Maternal Pelvis ⇒

occiput ⇒ for vertex presentation

if breach prt. ⇒ write "S" in place of "O"

↳ Sacrum

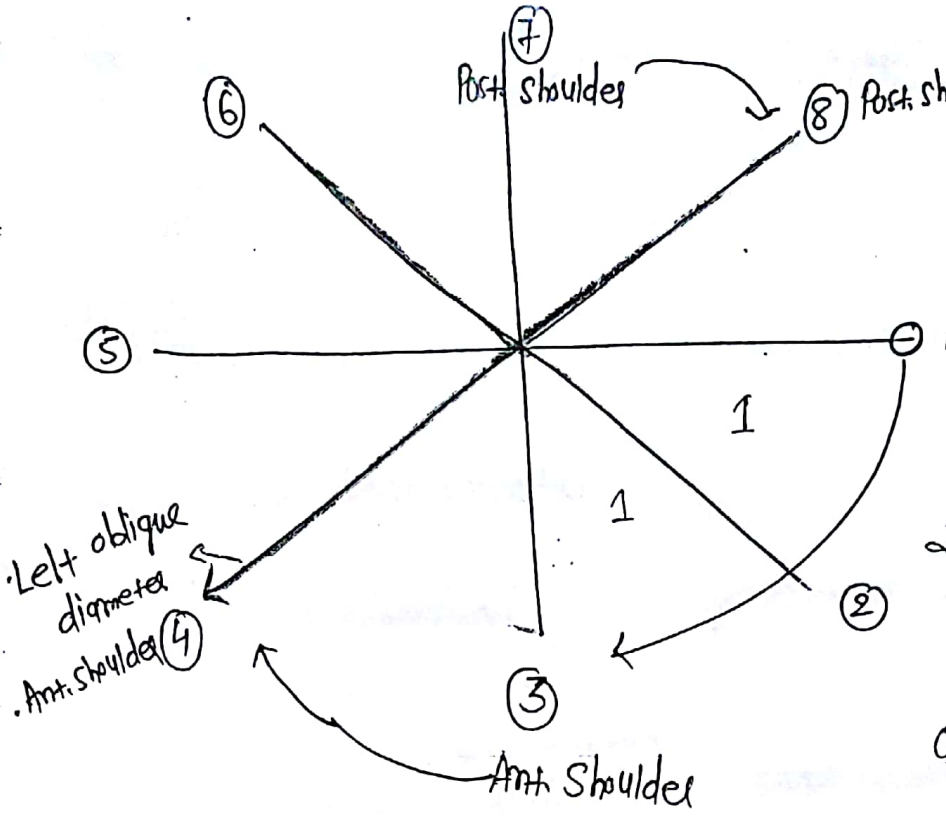


* In Routine exam"; Plv exam" done in active Labour 4 hourly.

* M/c position of (N) Labour ⇒ LOT**

Cardinal steps of (N) Labour

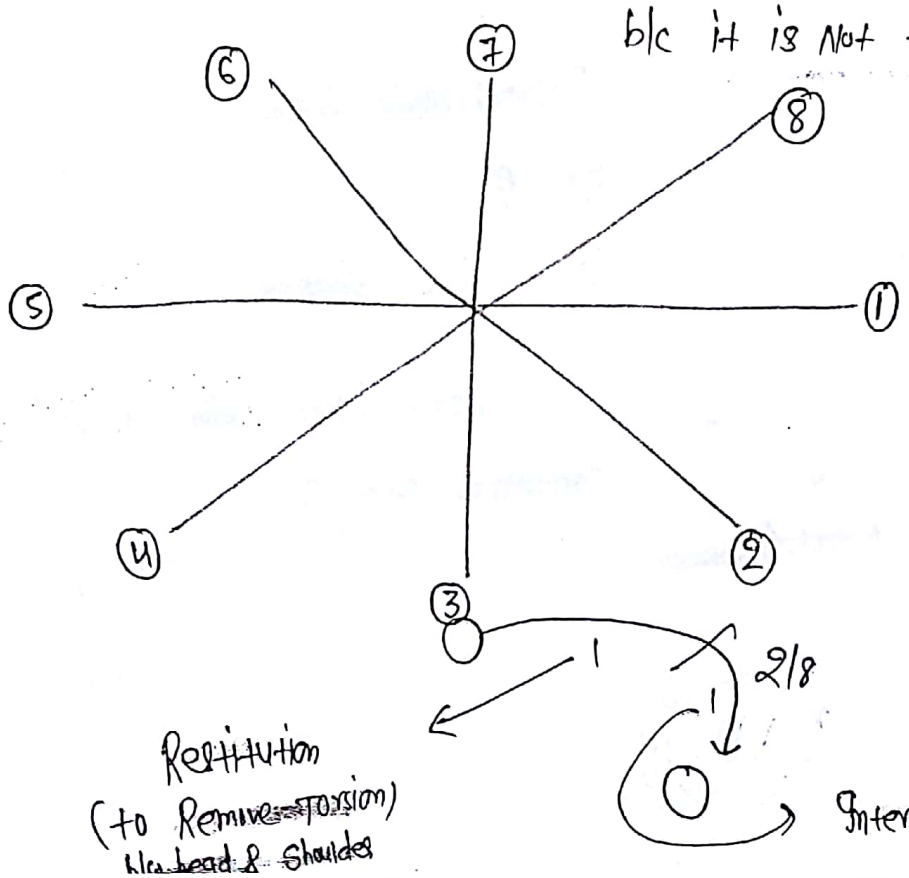
1. Engagement
2. descent
3. flexion
4. Internal Rotation
5. Extension ⇒ delivery of head (occiput → vertex → Forehead → Chin → Mouth → Glabella
6. External Rotation



2/8th Rotation (Internal Rotation) ⇓ occurs @ the Level of Pelvic floor but shoulder Rotate only by 1/8

* Relation of Internal Rotation to External Rotation 4 opposite direction.
* Relation of Restitution to External Rotation 4 same direction

* External Rotation :- Restitution is Not a cardinal Movement b/c it is Not the sepalate Movement



after external Rotation head goes back to original Position (LOT)

3 "P"s Require for ♀ labour :→ Passage

Push

Passengers

Passage ⇒ Maternal Pelvis ⇒ by Caldwell & Moloy

⇊

on the basis of inlet

M/c Pelvis in ♀ = Gynecoid Pelvis (circular Pelvis)

4 in 50% ♀

Transverse Diameter ≥ AP Diameter

2nd M/c Pelvis in ♀ = Anthropoid Pelvis

⇊

Antero-posteriorly oval Pelvis

in 25% ♀

AP Diameter > Transverse Diameter

Other = Android Pelvis

⇊

Typical Male Pelvis

20% ♀

Transverse Diameter > AP Diameter

Inlet = Heart shaped

Least common Pelvis in ♀ = 5% cases (Platypelloid Pelvis)

⇊

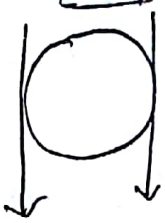
Transversly Oval Inlet

Flat Gynaecoid

Transverse Diameter >>>> AP Diameter

(83)

Gynecoid



Sidewall ⇒ Parallel

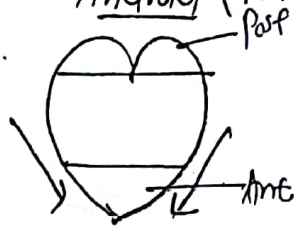
Ischial spine ⇒ Blunt

• DTA Not Seen

Subpubic Angle ⇒ obtuse
(90-100°)

Shallow Pelvis

Android (Male Pelvis)

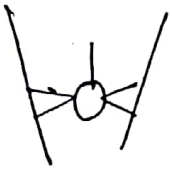


Convergent Side wall

M/cc of occipito Posterior ⇒ Android Position

(Posterior space is More than Anterior) Pelvis

Sharp



Deep transverse Arrest (DTA)
↳ M/c in Android

Acute
(85°)

Deep Pelvis

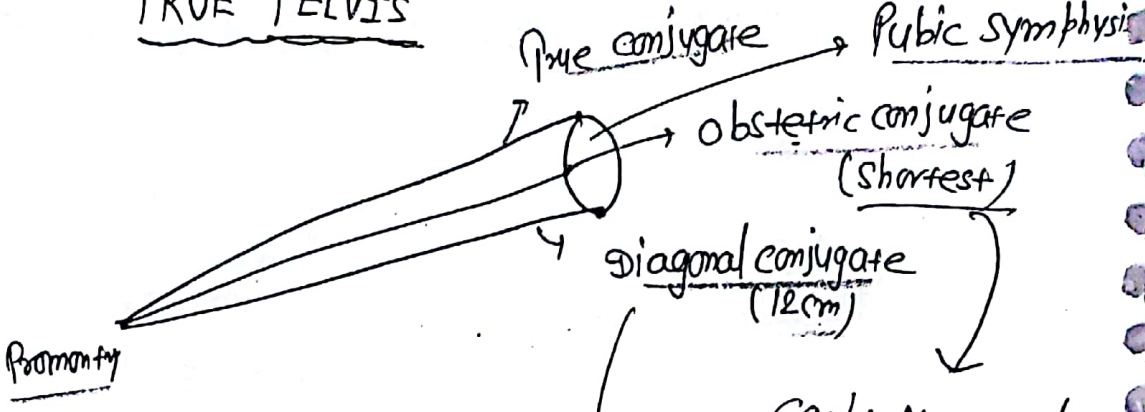
(*Deepest Pelvis ⇒ Anthropoid)

occipito posterior ⇒ Android

Persistant occipito posterior / Direct occipito posterior ⇒ Anthropoid

TRUE PELVIS

INLET :→



Can't Measured clinically

Can be Measured

10.5cm

~~DC — 1.5 = obstetric conjugate~~

~~DC — 1.0 = True conjugate~~

↳ 11cm

Cavity:

~~Inter Ischial spine diameter (IID)~~ → distance b/w Ischial spine

↳ 10.5cm

↳ ~~we Shouldn't able to touch the both Ischial spine Simultaneously Normally~~

~~Contracted Cavity~~ : IID < 8cm

OUTLET → ~~Intertuberous diameter~~ = 11cm

(Ischial tuberosity)

↳ "~~Four knuckle test~~" is ~~done to Measure~~ it,

Contracted Pelvis ⇒ Any 1 or More of the Previously Studied diameter are contracted (84)

↳ Inlet ⇒ <10cm (for diagonal conjugate it is less than 11.5)

Cavity ⇒ <8cm

outlet ⇒ <8cm

↳ do C.S.

to know about the contracted Pelvis; we will do "Pelvic Assessment"

⇓

In Primigravida; it do @ 37 weeks

In Multigravida; it do; when she goes in Labour

Q. $G_2 P_1 L_1$; Previous 1 C.S; done for contracted Pelvis; comes @ 37 week ANC ⇒ Recurrent Indication for C.S. (Never do VBAC)

* Cephalo Pelvic Disproportion (C.P.D) ⇒

↳ Best way to know ⇒ Trial of Labour

↓

MRI

↓

CT Scan

↓

X-Ray Pelvimetry

↓

Pelvic assessment

Q $G_2P_1L_1$; Previous 1 C.S. done for C.P.D; She presents C Labour & Pain 37 wk ; OS 1 cm dilate ; 70% effaced Vertex at $\Rightarrow -3$; What is $M_X = ?$

do VBAC

↓

Trial for VBAC

CPD is Non-Recurrent Indication for C.S

* Plane of Least Pelvic dimensions = obstetric outlet (Formy Roofs of obs. outlet)
= Ischial spine
(Passes Laterally to Ischial spine)
* Anatomic outlet = Ischial tuberosities
(Passes Laterally to Ischial tuberosity)
* Plane of Greatest Pelvic dimensions = Disc space b/w S_2–S_3

II. PUSH

Uterine contraction ; Pacemaker ⇒ Rt. cornu

Strongest ⇒ Fundus

Rate of speed ⇒ 2 cm/sec ; depolarise entire uterus in 15 sec

At what Intrauterine Pressure Contraction became Palpable ⇒ 10 mm Hg

At what grp contraction became Painful ⇒ 15 mm Hg

↳ Min Pressure Required to Initiate Cx dilatation

* Fundus can't be Intended ⇒ Moderate contraction
  ⇓
  40 mm Hg (85)

* end of 1st stage ⇒ 50 mm Hg
  2nd stage ⇒ 80 mm Hg

* Adequate Uterine contraction ⇒

i) 3 contraction in a span of 10 min & each is lasting for 45 sec;

ii) If contraction generates Pressure of 200-250 Montevideo Unit.

Montevideo Units ⇒ No of contraction in 10 min × P generated

Tachysystole ⇒ > 5 contractions / 10 min
↳ UPI → Fetal-distress

good or Bad?
↓
Bad

Tachysystole + Fetal distress — Hyperstimulation

↳ b/c Most of blood supply goes to baby in diastole

Rx
- 1st ly Stop the Infusion
- Left Lateral Posture
- O_2 by Mask
- I/V fluids
- Tocolysis (Stop the contraction)

* Augmentation of Labour

- Oxytocin given
- Misoprostol avoid
  - ↳ May cause hyperstimulation
    Rupture uterus

Managment of ⇒ LABOUR

FALSE
No change in Cx dilatation
⇓
Mx ⇒ Rest & Sedation

TRUE
Progressive Cx dilatation
What stage

Latent Phase
0-5 cm
(0-3) WHO
Amount of Cx dilatation ⇒
⇓
Rest & Sedation
↓
wait & watch

Active Phase
7-6 cm
↓
Is the Labour slow?

- Yes (<1cm/hr)
- No (1 cm/hr)

⇓
Contractions are Adequate or Not

- Yes
  Inadequate Labour
  ⇓
  Mx ⇒ Augmentation
  ↓
  ARM (Release Prostaglandin)
  ↓ after 4hrs of 3rd stage OXYTOCIN
- No (Adequate Labour)
  ⇓
  dlt CPD of Position
  ⇓
  do Repeat PV after 2hrs
  - Moulding
    Caput (Swelling of scalp)
    ⇓
    In Slow Labour
    ↳ Marked CPD.

Q. Pt comes @ 2PM. 6cm dilated Cx ; Tot effaced ; Vertex @ -1 ; Membrane absent, Liquor Clear, contracting 220 mv (Montevideo Units) (Ruptured) (86)

↓

@ 6PM ; 7cm 80% effaced ; Vx @ -1 ; caput (+) ; Moulding (++)

↓ do Trial of Labour

@ 10 PM ; Finding absolutely Same

↳ i.e Arrest of Labour

↳ do C.S.

OBSTRUCTED LABOUR

On General Physical examination ⇒ Exhausted
dehydrated
Tachycardia
Tachypnea
Acidotic breath

On P/A examination ⇒ Upper segment ⇒ Tonically Contracted
Lower Uterine segment = Stretched / Thinned out
B/w U.S & L.U.S = depression (Ring)
Bandl's Ring / Pathological Retraction Ring
Suprapubic bulge (Bladder)

FHR = Severe distress

Absent

P/v examination ⇒ Bleeding from vagina

Caput & Moulding

Hematuria

* If we put Folay's we can not be able to enter as it is Compressed by head we can Only able to put feeding tube 8 can see hematuria

Doesn't pass Urine is the earliest Marker of obstructed Labour

* obstruction is the absolute Indication for cs ; even if the fetus is dead

* Destructive Procedures → Not in Modern obstetrics

↳ do craniotomy

Symphysiotomy

If Not done cs ⇒ Rupture Uterus

* if Patient present c Not passing urine and told us about Bladder injury then we prove it as Not Bladder injury by

↳ VVF (vesicovaginal Fistula) in developing countries

↳ of obstructed Labour

In developed countries

↳ Gynecological surgeries (Malignancy ...)

III. Passenger

Fetus → Convert → (N) into (AbN) Labour (87)

- Vertex ⇓ (N)
- CPD
- Non vertex (AbN) Labour

Malpresentation ⇓ M/c ⇒ Breech

R/F ⇒ i) Multiparity;
ii) (AbN) Pelvis;
iii) PreMaturity;
iv) Poly/oligohydramnios
v) GICA
vi) Placenta previa

* M/c Malposition
  ↳ Occipito Posterior

BREECH

M/c Cause ⇒ PreMaturity

POG	Breech
28wk	→ 25%
30wk	→ 7–11%
Team	→ 3%

M/c type of breech ⇒ Frank breech (extended breech)
⇓
Hip joint = flexed; knee joint = extended
Pt ⇒ we don't feel Heel here

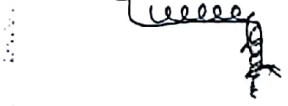
Complete breech (Flexed breech) ⇒ Least common type of breech.
⇓
Both Knee & Hip are flexed; P/V ⇒ Ischial tuberosity; Anal opening; Heel pad;

* Primigravida ⇒ Flank breach

Multigravida ⇒ complete breach

* Footling breach ⇒ Incomplete breach

↳ baby May have Cord prolapse



P/V ⇒ can see foot of baby

Cord Prolapse ⇒ Exposed to temp.

↳ Intense cord vasoconstriction

↳ Death of baby.

Higher Risk in Footling breach

Least Risk in Frank breach

* Indication of C.S in breach :-

Absolute Indication ⇒ ① Footling breach;

② Stalagel breach;

↳ Hyperextended head

Relative Indication of C.S.

↳ Vaginal is Not C/I; but C.S is preferred over vaginal delivery.

① Primigravida E Breach;

② Previous C.S E Breach;

③ Macrosomia E Breach;

④ Hydrocephalus

↳ do ventriculo Peritoneal Shunting by Pediatric Surgeons.

⑤ PreMaturity

Q. Primigravida ; 37 week ; ANC checkup; O/E = Breech presentation; FHR (N); Liq (N); Placental fundal ; Pelvis adequate; Mx = nil (88)

do ~~ECV (External Cephalic Version)~~

↙ can be done In Latent Phase of Labour.

↳ for all Non-Cephalic presentation.

if ~~Requirements Met~~.

⇓

done for ⓐ Single term ♀ ;

ⓑ ≥ 37 wk / 36 wk baby ;

ⓒ Liquor Adequate ;

ⓓ Membrane should be Intact ;

ⓔ FHR (N)

ⓕ No C/I for vaginal delivery,

Relative C/I for ECV ⇒ Risk More than Benefit

↳ avoid ECV ⇒ ⓐ Previous C-S

ⓑ GUGR

ⓒ Pre-eclampsia

* ~~ECV is always done under continous fetal Monitoring~~;
* ~~It is done under tocolysis (terbutaline inj)~~;
* ~~during ECV → if fetal distress ⊕~~

⇓

~~Revert baby to original Position~~

↳ ~~do C-S.~~

Q. $G_2P_1L_1$ 39 weeks Breach presentation

⇓

first try ECV

⇓

but if any c/I of ECV ⊕

→ Primigravida ⇒ C-S

→ Multigravida ⇒ Vaginal delivery

⇓

(Assisted) Breach vaginal delivery

↳ if fetus has extended Arms ⇒ Lovset Maneuver

extended Legs ⇒ Pinard's Maneuver

After coming head ⇒ Burn-Mauthall Maneuver

⇓

In this delivery of head by "Flexion", Not by extension.

Grab foot & goes 180° towards Pelvis of Mom; after head comes out by

* Burn Mauthall & Msv

⇓

only when baby is DorsoAnterior

Spine of fetus is Anterior & towards the obstetricians

After coming head ⇒ Mauriceau Smellie viet (Msv)

⇓

do Mallet bone flexion & Shoulder traction & delivery of head by "flexion"

In Dorso-posterior breach ; after coming head ⇒ Praques Maneuver

* Duhrssen's Incision ↳ 2 Small Incision on Cx

↳ done in preterm after coming head
↳ if most of the part of baby is delivered & only head is inside

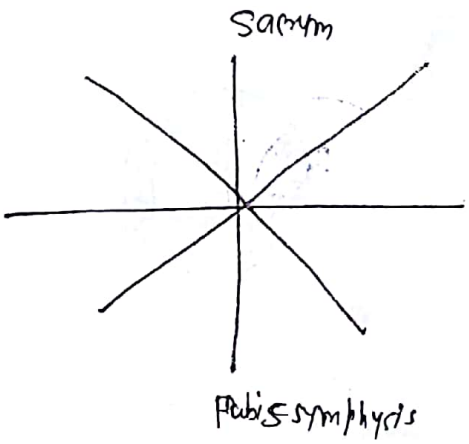
* Forceps delivery ⇒ Pipers Maneuver

* Last Resort ⇒ Zavanelli Maneuver

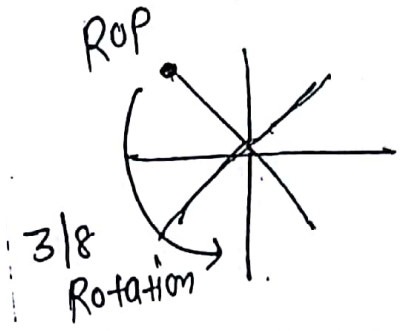
* M/c cause of Fetal death ⇒ Cerebral Hemorrage (ICH)
In breech

* O.P. (occipito Posterior) ⇒ Not Malpresentation ; Malposition
↳ M/c cause ⇒ Android Pelvis
2nd M/c cause ⇒ Deflexed head
⇓
Engaged diameter ⇒ occipito frontal
↳ 10.5

M/c in Primigravida
M/c Position — R.O.P.



1st outcome ⇒ all favourable — Push
— Passenger
— Passage



↳ so take much time; slow progress of Labour

⇓

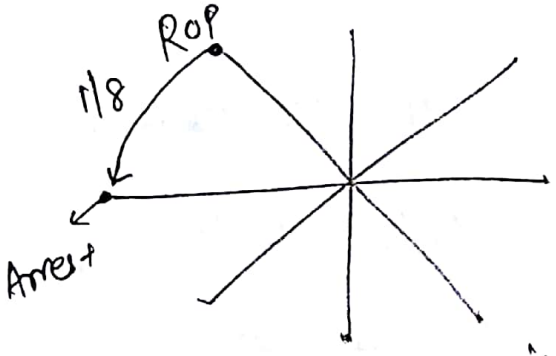
Rx :- Wait & watch ; when baby is Anterior then delives

2nd outcome ⇒ Deep transverse arrest

↳ d/t android Pelvis

⇓

do the C.S.



but if Pelvis is (N) ; then

i) if Inadequate contraction seen

↳ give oxytocin

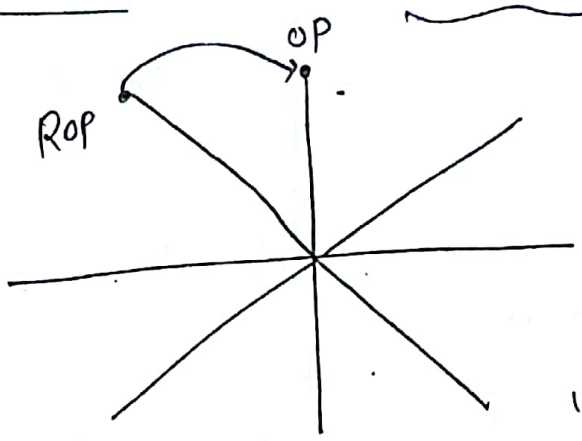
ii) if Contraction is Adequate

↳ Manual Rotation

Forceps Rotation

Vacuum device extraction

3rd outcome :- Persistant OP / Direct OP



↳ seen in Anthropoid Pelvis (90)

⇓

Mechn of Labours

⇓

"Face to Pubes" delivery

* In case spontaneous delivery (Not happening)

Forceps < C.S.

⇓

In Posterior Position ⇒ Incidence of Maternal Injuries & severity ↑es

* % of babies are in O.P. at onset of Labour = 20%

at the end of Labour = 5%

FACE / BROW PRESENTATION

*

M/c cause of Face presentation ⇒ Anencephaly;

Pelvis type; which favour it ⇒ Platypelloid

Anything that prevents flexion of head ⇒ Risk Factors (> 1 Loop of cord around Neck; tight loops /

* Mentum → Posterior
  - ↓ Anterior ⇓ vaginal delivery
    - Face → delivery by flexion
  - No Mechanism of vaginal delivery
  - C.S.

* Mentoposterior in Labour ⇒ C.S.
  Mentoposterior in early Labour ⇒ wait & watch
  - early → to Rotate gives time

* Brow presentation
  - engaging Diameter ⇒ Mentovertical = 14cm
  - No Mechanism of Labour
  - Brow in Labour → C.S.
    Brow in early Labour → wait & watch

TRANSVERSE LIE

M/C cause ⇒ Pre Maturity

M/C cause at term ⇒ Placenta previa

- Most Commonly Seen ≅ "Platypelloid" Pelvis.
- Highest Risk of cord prolapse

* Transverse Lie — In Labour — do C.S.

↳ Tries ECV (91)

↳ if Requirement Mets.

* Neglected Shoulder

↳ Upper segment ⇒ Tonically contracted

Lower Segment ⇒ Stretch

Bendl's Ring ⊕ in b/w US & LUS

⇓

Case of obstructed Labour

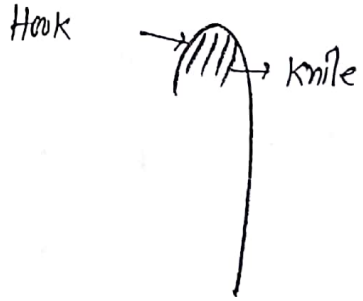
↳ FHR Absent

↳ do C.S.

Destructive procedure ⇒ i) Evisceration;

ii) Decapitation;

⇓



Q. Lady prt. ē Neglected Shoulder presentation ē dead baby. all the following can be done except ⇒

a) C.S.

b) Evisceration

c) craniotomy (b/c for it vertex presentation Require & her transverse lie prt

d) Decapitation

Q. Confusion of Breech presentation on P/V examination :-

Face presentation

↳ Frank breech Most commonly confuse.

↳ In it ~~three~~ two bony prominence & one opening (Mouth) Makes a triangle;

while in breech it forms straight line

INSTRUMENTAL DELIVERY

- do when we cut short 2nd stage of Labour
- Pre-Requisites :-

F → Fully dilated Cx

O → No Obstruction In the path

R → Ruptured Membrane

C → Good Uterine Contraction

E → Engaged head / Emkty bladder / episiotomy

P → Favourable presentation

Forceps delivery	Vacuum delivery
→ difficult	→ easier Application (92)
→ Maternal Exhaustion	→ Needs Maternal effort
→ we in heart disease	→ also we in heart disease; Not C/I

→ In Fetal distress (Forceps > vacuum delivery)

* In general Forceps prefer over vacuum

→ In preterm — if POG < 34 weeks; vacuum is absolutely C/I

→ Face presentation (MentoAnterior Position) — In Face presentation ↳ C/I.

→ After coming head of breech (Piper's Forceps)

→ More Maternal Injuries — More fetal Injuries

Q Which fetal injuries are M/c c Forceps delivery??

- IVH
- Facial Nerve Injuries
- Brachial Plexus Injuries
- Cornea of the eye

Q Injuries which see c vacuum Not c Forceps delivery??

- 6th Nerve injuries
- Cephalhematoma
- Retina injuries

* **Classification of Forceps delivery :-**

Outlet ≥ +3

Low +2

Mid cavity – b/w 0 & +2 } Not in Modern days

High – above 0

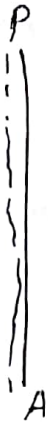
* Criteria for application of outlet forceps ⇒

① Scalp visible at introitus

② head on Pelvic floor } ≥ +3

③ Skull on Perineum

④ Saggital Suture should be preferably in A-P Position



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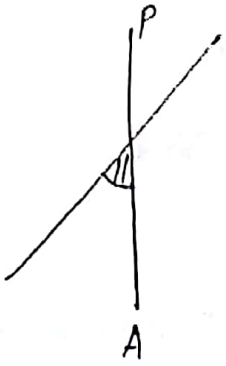


Rotational defect <45°

↳ apply outlet forceps

How to know that Forceps is correctly applied ?

(93)

⇓

Blades have to be equidistant from saggital suture

along which fetal diameter we apply Forceps blade

↳ occipitoMental (13.5 cm)

* Left blade of Forceps ⇒ Gntroduced first

↳ M/c Position = Left.

* M/c outlet forceps used ⇒ Wrigley's outlet forceps

↱ Not used in After coming head; b/c of short Nature

⇓

for both outlet & Low position,

short forceps & have English Lock

* Kelland's forceps ⇒ for Rotational defect

↳ Long forceps

* Piper's forceps ⇒ for after coming head

↳ Pelineal curve ⊕ (Baby body Rest here)

very long forceps

VACUUM DEVICES

- Use only plastic cup

  - Bell shaped
  - diameter = 5–7 cm
  - Silastic
  - Pressure generated = 0.8 kg/cm²
  - Centre of the cup @ Flexion Point
    - ⇓
    - 3 cm Anterior to Posterior fontanel
    - OR
    - 6 cm Posterior to Anterior fontanel
    - @ saggital suture

- The Margin of cup touches the Posterior fontanelle

Failed Vacuum ⇒ 3 Pulls – No descent of head
3 Pop offs.

* if one device fails we goes for C.S.

C/I of Instrumental delivery ⇒ a) Contracted Pelvis
b) CPD.
c) HIV ⊕ve Patient
d) K/c/o Coagulation defect } in baby
e) osteogenesis Imperfecta

ANTEPARTUM HEMORRHAGE (APH) (94)

* Bleeding from or into the genital tract beyond the period of viability
  ↳ In India ≃ 28 weeks

* Causes of APH ⇒ Abruption
  Placenta Previa
  ↳ Placenta Lying in the LUS

→ Premature separation of a Normally Located placenta (from Underlying decidua)

ABRUPTION

Previous history upto 15%
(Relative Risk)

Pre-eclampsia ; Thrombophilia
Trauma Folic acid deficiency
Polyhydramnios Fibroid
PROM
Long standing oligohydramnios

Advanced Maternal Age
Smoking
Multiparity
Highest Risk

High Risk

Early ♀ USG
↳ In Subsequent Scan ⇒ Placenta ⇒ Upper segment
dt differential growth of uterus
Placenta migrates

In Previous C.S.
↓
Migration abt
↳ So; RIF for Placenta previa

PLACENTA PREVIA

Previous history (5%)

Previous L.S.C.S.
(More the Number higher Risk)

Placenta May be Low Lying

- Endometrities
- Mullerian Anomalies

CLASSIFICATION

Placenta PREVIA -

↳ type-I ⇢ Low Lying
⇓
Lower segment of placenta is ≤ 2cm of Internal os

Anterior (A) ← Anterior wall

Posterior ← (B) Posterior wall

type-II → Marginal

type-III ⇒ Partial (Partially covering the Internal os)

type-IV ⇒ Complete/central (Completly covering the Internal os)

Other classification ⇒ → Mode of delivery ⇒ Vaginal

Minor Placenta previa ⇒ Type 1A ; 1B ; 2A

Major " ⇒ Type 2B ; 3 ; 4

↳ Mode of delivery ⇒ C-S

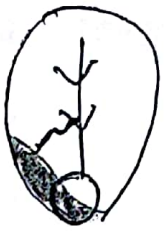
* Dangerous Placenta previa ⇒ 2B ⇒ Fetal distress

↳ Stallworthy sign ⇒ Pushing down of head produces a dip in FHR.

On type 2B ←


Type I


Type II


Type III


Type IV

(95)

Classification of Abruption

- **Revealed** ⇓ → Blood → expelled out
- **Concealed** ⇓ → Blood collects behind placenta (Retroplacental clot)
- **Mixed** → M/c

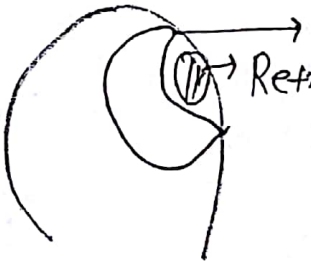
* **PAGE's classification of Abruption ⇒**

Type 0 ⇒ Retrospective diagnosis,

Type 1 ⇒ bleeding & Pain (FHR ⇒ (N))

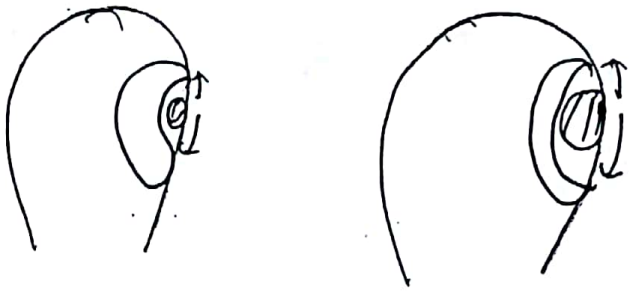
Type 2 ⇒ Bleeding + Pain + Fetal distress

Type 3 ⇒ Bleeding + Pain + UD + Shock (⇑ Maternal) ± DIC



decidua ⇒ tissue thromboplastin ⇓ Potent Utelotonic (Pain)

* Abruption is self propagating



Risk of DIC is dependent on how long Abruption to delivery time taken

* Termination of Pregnancy
  - ↳ only Mx of Abruption
    - ⇓
    - No Role of conservative Mx.

*Pt. comes ☹ APH; how to tells about P.P & Abruption?

P.P.		ABruption
Bleeding	M/c Presentation	Bleeding
↳ Painless		↳ Painful
Bright Red (Fresh bleeding)		→ Altered (dark coloured)
Causeless		→ Preceeding event
		↳ Pre-eclampsia
		Trauma
Hypotension M/c	⇐ General Physical examination ⇒	Hypotension is Not common (b/c bcoz BP is high)

P.P.	P/A examination	Abruption
Uterus Relaxed		Uterus tense tender (96)
Non-tense Non-tender		
Fundal height = POG <POG (Sometimes)		Fundal height > P.O.G.
Less common	Fetal Distress	More Common
Most Common (Fundal height < POG) Transverse Lie	Malpresentation	Less common
H/O warning hemorrhages		No warning hemorrhage (Acute event)
Should not be done in APH Until you Rule out Placenta previa.	P/S And P/V examn	
Transabdominal USG	IOC	

* TVS is Not C/I ; but it is More Sensitive for Posteriorly Located Placenta.

Qq Pt. comes c APH

↳ Pt. Not Low Lying (Fundal)

No RPC

ans: Still a case of Abruption

↳ P/v examination

↳ ARM

↙ ↘

Confirm → Induce Labour

⇓

Blood stained Liquor

* Placenta previa

↳ Mx ⇒ Are there any indications for TOP

⇓

Yes (if is in order to do TOP)

⇓

i) P.P. + Unstable vitals; (Mc indication for TOP) ⇓ do it Right Now

ii) P.P + Fetal distress;

iii) P.P. + > 37 weeks.

iv) P.P. + Continous Bleeding Per vagina

v) P.P. + Women goes into Active Labour

vi) P.P + GUS

vii) P.P. + GCA (incompatible for Life)

Q. $G_3P_2L_2$; 34 weeks APH (Bleeding P/V; Painless); on examination Fundal height = 34 weeks; Relaxed Non-tende Non-tense; Relaxed uterus; RR = 100/m; BP = 114/76. (97)

Usg = type 4 PP.

Mx ⇒ Conservative Mx.

* Indication of CS in APH :- i) Unstable Vitals;
ii) Fetal distress;
iii) Major degree of Placenta previa;
iv) Far from term (< 32 wk)

* Conservative Mx in Placenta previa

↳ Macaffee Regimen

i) Bed Rest

ii) Maternal Monitoring : Vitals;
FH (Fundal height)
AC (Abdominal circumference)
BPV-(Bleeding Per vagina)
Baseline Ix
Uterine contraction

(only bleeding is Not Indication of blood translusion; Anemia also a Indication)

iii) Fetal Monitoring : FHR

iv) if patient < 34 weeks ⇒ steroids for Fetal Lung Maturity

Dexamethasone (National guideline) ⇒ Doc

6 mg IM x 4 doses x 12 hr apart

Betamethasone – 12 mg × 1/m × 2 doses 24 hr apart.

↓ < 34 wk + Uterine irritable (Mild contraction)

↳ give Tocolytics (to buy time for steroids cover)

↳ also for ECV

Hyperstimulation

- DOC (Tocolytics) ⇒ Nifedipine
- Safest Tocolytic ⇒ "
- DOC of Tocolytics in heart dz ⇒ Atosiban (oxytocin Receptor Antagonist)
- Initially β-Agonists used as Tocolytics

↳ cause ⇒ Hyperglycemia AIIMS May 18

Hypokalemia

Tremors

Tachycardia

Arrythmia

Cardiac arrest

Pulmonary edema

only β-Agonist used as Tocolytic

Now a days

↓

Terbutaline

- Indomethacin

↳ Not given >32 week ← Premature closure of ductus arteriosus

- Halothane
- Alcohol
- Diazoxide
- $MgSO_4$ (acts as tocolytic @ 9–10 meq.) → it has Neuroprotective action (prevent cerebral palsy) ↳ for preterm babies

↳ given 4–7 meq

→ toxic dose for Mother

↓

So Not given as a tocolytic agent.

(98)

End point of conservative Mx

↳ 37 wks ⊕ or any other Indication of TOP

ABRUPTION ⇒ No Conservative Mx

↳ Indication for TOP

↳ No Role of Tocolysis

↳ Vaginal delivery is preferred 2°

⇓

ble she has high Risked DIC

&

Progress very quickly in Labour

(tissue thromboplastin)

Precipitate Labour (entire process of Labour c/in 3hr)

do CS: when ⇒ Unstable vitals

Fetal distress

Fal from term

If Intraoperatively we see Red Uterus

⇓

COUVELAIRE UTERUS

(Bleeding c/in Myometrium)

Seen in Uteroplacental Apoplexy / Abruption.

⇓

- It is Not an Indication of Hysterectomy
- It is R/F for PPH.

Q. 34 week ♀; Bleeding P/V ± Pain; O/E uterus 36 wk; tense, tender; FHR = 100 bpm; on Evaluation BT/CR/INR = deranged

Mx ⇒ pt is the case of DIC

Transfuse FFP and try for vaginal delivery.

in ceaserean section; Pt. Bleed Profusely from all the sites & dies on table.

Mc cause of DIC in obstetrynal ⇒ Abruption.

* Placenta previa → term

⇓

Mx ⇒ USG

OR

do " Double set up examination "

P/V in O.T

1 table

⇓

Ready for emergency C.S.

2nd table

⇓

on P/V ⇒ Fornices boggines (≥ 2 fornices)

⇓

we are done for Major placenta previa

if we don't get any fornices boggines

↓

goes upto the level of Internal os

⇓

If bleeding ⊕ or Placental tissue ⊕ Near Internal os.

⇓

do emergency C.S

⇓

If No placental tissue Near the Internal os (Minor)

⇓

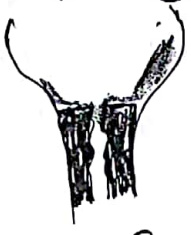
ARM → Labour Room

ADHERENT PLACENTA

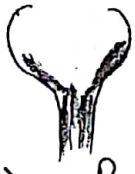
(99)

(N) Placenta is attached to Decidua; but here Placenta is attached to Myometrium & intervening decidua is absent

- Types ⇒ (1) Accreta ⇒ Attached to Myometrium
  - Most common
  - "Large intraplacental Lacunae" ⇒ Sonological findin



(2) Increta ⇒ Invades into the Myometrium



(3) Percreta ⇒ Penetrates through & through the Myometrium. It comes out in the serosal surface.
  - Least common

- Highest R/F ⇒ Previous L.S.C.S. + Placenta previa (current)

QQ Highest R/F for Adherent Placenta :-

(a) Previous L.S.C.S.

(b) Previous P.P.

Other R/F ⇒ Curettage
Scar
Multiparity
Increasing Age

IOC ⇒ USG + Doppler

- Heterogenous Placenta
- Intraplacental Lakes (Blood tissue in placental tissue)

if we have Any doubt / OR we want to know about depth

⇓

do MRI

On MRI ⇒ Absent / Incompletely developed Nitabuch's Membrane (Layer) ← (N) prt. b/w placenta & decidua

⇓

pt is fibrinoid degeneration b/w trophoblast & decidua

Mx ⇒ · Ko/o Adherent placenta

↳ Elective cs (classical) **

\+

Hysterectomy

↳ if we incise on Lus, Myometrium cuts & we damage placental tissue

· presentation in Undiagnosed case ⇒

deliver

↳ No Sign of placental separation

↓

if we try to Manual Removal

⇓

Pt. bleeds

↳ Refractory PPH (Pt. prt. with Refractory PPH)

⇓

do hysterectomy

* if Patient denies hysterectomy

↳ deliver vaginally

↳ cut the cord short as possible as close to placental end

leave the placenta ← pt will go autolytic digestion c/m 6 Months

(100)

MOLAR PREGNANCY

GTD ⇒ Gestational Trophoblastic disease

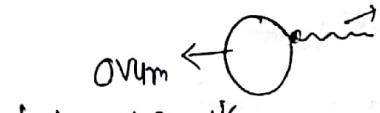
- Molar ♀
  - Partial
  - Complete
- GT Neoplasia
  - Invasive Mole
  - Choriocarcinoma
  - PSTT (Placental site trophoblastic tumor)
  - ETT (Epithelioid Trophoblastic tumor)

PARTIAL MOLE

- Chromosomal Make up of Molar ♀
  - ↳ Triploid (Gal.)
    - ↳ 69 XXY
  - 10% Tetraploid
- Extra set — Paternal
- Dispermic

COMPLETE MOLE

- Diploid (46XX) — Gal.
  - Monospermic
  - 10% 46XY (Dispermic)
- all genetic Material is Paternal



Bleeding (2nd Trimester ♀)

O/E ⇒ Fundal height ≤ POG

Mis diagnosed USG
- ↳ Missed Abortion

Mic presentation

IOC

Bleeding (Grapes Like vesicle) (2nd Trimester ♀)

O/E ⇒ Fundal height > POG

USG
- ↳ Snow storm appearance

PARTIAL MOLE

- Fetus Seen
  - ↳ dies d/t Multiple Anomalies

*If we can see focal hydropic in Placenta

Grossly → Transverse diameter > AP diameter

Molar ♀ Most commonly diagnose in 1st Trimester (Usg in 1st trimester)

- HCG > than expected (but Not Markedly high)

HPE — Gold Standard Investigation (Confirmation of diagnosis)

i) Less Marked trophoblastic Proliferation
ii) Focal hydropic degeneration of villi
iii) Fetus ⊕
iv) Vascular

- Trophoblastic Scalloping ⊕
  - ↓
  - Stromal Inclusion

Medical complication

X
X
X
X

COMPLETE MOLE

- No Fetus on USG Seen
- ovaries → Theca-lutein cyst in it.
  - ↳ in 25-30% cases

HCG — Markedly Raised (>10^5)

HPE

i) extensive trophoblastic Proliferation;
ii) complete hydropic degeneration of villi
iii) No Fetus
iv) Avascular

⊖

Medical complication

i) Thyroid Storm → d/t high hCG
ii) Pulmonary embolism
iii) Early onset Pre-eclampsia
  - ↳ d/t Paternally exposed Ag,
iv) Hyperemesis Gravidarum
  - ↳ d/t hCG

Partial	Complete
Partial Mole → GTN (3-5%)	Complete Mole → GTN (15-20%)
Partial Mole → Chorio Ca (< 1%)	Complete Mole → Chorio Ca (4%)

Mx ⇒ Suction & evacuation (do if Fundal height ≤ 12 wks)

⇓

if pt is ≥ 40 yrs + Complete Mole (+)

↳ do Hysterectomy (↓ Risk of chorio-Ca)

S/E ⇒ Pulmonary Embolism

Thyroid storm

to prevent Embolism ⇒ Start Suctioning first then followed by oxytocin.

Check curettage ⇒ Sharp

* Send Sample for HPE

↓

then follow up ē HCG

Weekly S. HCG ⇒ Until 3 (N) values

⇓

Monthly HCG

Total Surveillance ⇒ upto 6 Months

* Avg time to β-hCG to become (N) ⇒ 9 weeks

Avg time to β-hCG to become (N) in Partial Mole ⇒ 7 weeks

* Say patient Not to Conceive

↳ Contraceptive of choice ⇒ OCP

Barrier can be used

gud Avoid ↳ bleed bleeding

* CRITERIA FOR Diagnosis of GTN (Any 1) :→

① 4 consecutive HCG values shall shows of Plateau (Less than ± 10% values)

② 3 consecutive HCG value that shows a Rise (>10%)

③ HCG Remains elevated even after 6 months of Suction & evacuation

④ HPE → GTN

* clinical presentation of GTN :→

i> Bleeding Per vagina — Persistent

ii> Shock

iii> Persistant Theca Lutein cyst

↓

(N) Theca Lutein cyst shows Spontaneous Resolution within 2-4 months of Suction & evacuation.

iv Uterine Subinvolution

↳ Uterus doesn't go to (N) Non-P state after Suction & evacuation

v) Metastasis

* High Risk for conversion of GTN ⇒ (102)

i) ≥ 40 yr (Maternal Age)
ii) Fundal height > POG
iii) HCG > 10^5
iv) B/L Large (> 6cm) theca Lutein cyst

} Should Receive Prophylactically Chemotherapy ⇓ Actinomycin D OR Methotrexate

* M/c GTN ⇒ Invasive Mole

4c GTN ⇒ ETT

M/c GTN to develop after Full term ♀ ⇒ Choriocarcinoma

* Choriocarcinoma M/c develop after which type of ♀ ⇒ Complete Mole

Malignant
⇓
Metastasis seen (Cannon ball Metastasis on CXR)
↳ M/c site ⇒ Lung > vagina > Liver > Brain

2nd M/c finding on Choriocarcinoma on CXR Lung ⇒ "Snow Storm Appearance"
⇓
also seen in USG of complete Mole

* In vagina
↳ Bluish Suburethral Nodules ⊕
↳ don't take biopsy bc very vascular

* How to differentiate Invasive Mole from choriocarcinoma ?

(HPE) ↳ Presence of villi ⇒ Invasive Mole

Absent villi ⇒ Chorio carcinoma

Choriocarcinoma	PSTT
• M/c	Rare
• M/c after complete Mole	M/c after FTP (↳ Full term ♀)
Tumor Marker ⇒ HCG	HPL > PLAP (↳ Placental alkaline Phosphate; HPL ↳ Human Placental Lactogen)
Malignant	? / Benign
Dimorphic cells (Cyto/Syncytiotrophoblast)	Mononuclear Monomorphic cells (No Syncytial ones)
• Hemorrhage / Necrosis +	↓
• Chemo sensitive	Chemo Resistant
• TOC ⇒ Chemotherapy	Hysterectomy

* STAGING OF GTN ⇒

Stage I ⇒ Tumor is confined to uterus

Stage II ⇒ - Outside uterus but clin Pelvis

Stage III ⇒ Metastasis to Lungs (good Prognosis) (Metastasis ... vagina)

Stage IV ⇒ Metastasis elsewhere except → vagina

PNEI

Modified Ueda Scoring ↳

	Low Score (good Prognosis)	High Score (bad Prognosis)
i) Age	≤ 39 yr	≥ 40 yr
ii) HCG (≥ 40,000 ↓ ...)	≤ 10^3	≥ 10^3

(103)

iii)	Type of Antecedent ♀	Molar	FTP (Full term Pregnancy)
iv)	Duration from Antecedent Pregnancy	<4 month	>8 month
v)	Site of Metastasis	Lungs	Liver, Brain
vi)	No. of Metastasis	<4	>8
vii)	Tumor size	<3cm	>5cm
viii)	H/o Previous Chemotherapy	Single Agent	Multi Agent

If Total WHO Score ≤ 6

↳ Low Risk GTN

⇓

Single agent chemotherapy

⇓

Methotrexate

↓ if Pt. Resistant

Actinomycin D

also in stage I →

≥ 7

High Risk GTN

⇓

Multi Agent chemotherapy

E → Etoposide — D_1

M → Methotrexate — D_2

A → Actinomycin D — D_3

C → cyclophosphamide — D_4

O → oncovin (vincristine) — D_5

↓ if Resistant

E → D_1

M → D_2

A → D_3

E → etoposide

P → cisplatin

Follow up ⇒ Weekly hCG — till 3 Ⓝ value

End point of chemo. ⇒ 1st Ⓝ value — 3 More cycles of chemotherapy

After 3 Ⓝ value ⇒ Monthly follow up

Period of Surveillance for Low Risk GTN — 12 Month

" for high " " → 24 Month

Advice & contraception of choice is same as Molar ♀

↓ ↳ Combined ocp's

Not to conceive

Previous C.S.

Elective Repeat C.S.

Absolute C/I

↳ i) Classical C.S.

(Repeat C.S. but Not an Indication for Repeat classical)

ii) H/o Rupture Uterus

iii) ≥ 3 Previous L.S.C.S.

iv) ⊕ of C.P.D in current pregnancy

v) H/o Sx → Hysterotomy

Sometimes Myomectomy (when Uterine cavity is opened)

Trial for VBAC

↓

Anything other than elective Repeat C.S.

* Gmp. Prognostic Marker Success of VBAC ⇒ H/o Previous vaginal delivery.

Successful

emergency C.S ↓ do in impending

emergency Laprotomy ↓ do in Rupture

Q. $G_2P_1L_1$ c previous L.S.cs.; done for C.P.D. 40wk; Head is free floating Cx os closed & Unellaced Mx (104)

⇓

C.S. (b/c C.P.D ⊕ in current ♀)

vii) Where vaginal delivery is c/I (Contracted Pelvis / Major degree of Placenta previa)

* Relative Indication for Repeat C.S. (C.S. > V.D) :-

i) Previous L.S.C.S. — c Breech in current ♀

ii) " — c Macrosomia

iii) " — c Post-term

* Sign & Symptom of Impending Rupture :-

i) Non Reassuring FHR

↳ 1st FHR changages ⇒ Tachycardia

M/c FHR changages ⇒ Bradycardia

ii) evidence of Maternal Tachycardia;

iii) evidence of Scar tenderness (Pain);

become only significant if Non-Reassuring FHR ⊕.

⇓

If Intraoperatively; at the Scar site — all Layer of Myometrium have given way but overlying Serosa intact

⇓

Very imp. for Next ♀ ← "Scar Dehiscence"

* Sign & Symptoms of Rupture of Uterus :→

i) Maternal Tachycardia;
ii) ± Hypotension;
iii) Severe fetal distress / FHR absent;
iv) Fetal parts all superficially felt; (as the fetus is expelled into Abdominal cavity)
v) Uterine contour is Lost.
vi) Sudden stoppage of Uterine contraction;
vii) fresh bleeding per vagina;
viii) Catheterise → Gross hematuria
ix) Loss of station (Most characteristic feature of Rupture Uterus)

x ⇒ emergency Laprotomy (Tries to Repair)

* Can we do Induction in Labour (IOL) in previous C.S
↳ Not C/I
⇓
Spontaneous Labour > IOL
⇓
DOC ⇒ Oxy-tocin
Not be given ⇒ Misoprostol

* Can we do Augmentation of Labour
↳ Not C/I
↳ continous fetal Monitoring (to identify 1st sign of impending Rupture)

* Can we do ECV in Previous C.S.
  - ↳ Yes (Not CI) (105)
  - ↳ Relative CI for ECV

* Internal Podalic version (IPV) in Previous C.S
  - ↳ Absolutely CI in Previous C.S.

* Induction of Labour is CI in :→ Contracted Pelvis
  - ⇓
  - it Means we can't delivey vaginally.
    - Classical C.S.
    - H/o Rupture uterus;
    - Transverse lie;
    - Major degree of Placenta previa;
    - Category 3 FHR tracing
      - ↳ Ominous to baby
        - ↳ Immediate delivery

* Pre-Induction Score :→ to Induce Labour
  (Bishop's Score)

Cervix	Score 0	1	2	3
Position (Least Imp.)	Posterior	Mid-position	Anterior	
Consistency	Firm	Medium	Soft	
Effacement	0-30%	30-50%	60-70%	> 80%
Dilatation (Most Imp.)	closed	1-2cm	3-4cm	>5cm
Baby's station	-3	-2	-1, 0	+1, +2

Gn Modified Bishop ⇒ Cx effacement is Replaced by Cx Length

Gn Simplified Bishop ⇒ dilatation
effacement
station

* All Scores ≥ 9 (>8) ⇒ Favourable → Initiate Uterine contraction.

≤ 5 (<6) ⇒ Unfavourable

Total Score – 13

↳ firstly do cervical Ripening

Medical Methods

Mechanical Methods

- Cervidil gel (Dinoprostone) PGE_2
  - 0.5 mg
  - Ideal → Intracervical
  - Acceptable → Posterior fornix
  - Put 6 hrly Max^m 3 doses in 24 hrs
  - Mc used
  - ↳ do only Ripening; so; after Ripening; give oxytocin to Uterine contraction (after 6 hr.)

- Misoprostol (PGE_1)
  - ⇓
  - 25 µg per vaginally
  - Put every 4 hrly
  - Max^m 6 doses/24 hrs.
  - Better (do Ripening + Uterine contraction)
  - after 4 hrs we give oxytocin; if Uterine contraction is Not

⇓

- Laminaria Tents (osmotic dilators)
- Bulb of Foley catheters

TWINS PREGNANCY

* M/c type ⇒ Dizygotic (70%); klas "Fatemal twins"
  Monozygotic (30%); klas "Identical twins"

* In ART procedures ⇒ M/c type ⇒ Dizygotic twins

* Incidence of Dizygotic twins
  ↙ Varies
  depend on ⇒ Race
  ethnicity
  Family History
  ART

  Incidence of Monozygotic twins
  Constant
  M/c type of Monozygotic twins
  ↳ MCDA

* Dizygotic ⇒ Dichorionic
  Diamniotic
  M/c type ↗

  - depend on time of cell division
  C/in 72 hrs of Fertilization ⇒ DCDA
  C/in 4th-8th day " ⇒ MCDA
  C/in 8-12th day " ⇒ MCMA
  C/in >12th day " ⇒ Conjoined twins (Siamese)

* Monochorionic twins has higher Risk as compared to Dichorionic

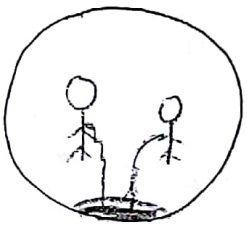
* Marker of Dichorionicity (to know chorionicity we do USG in 1st Trimester (<7wk))
  ↳ i) 2 separate Placenta on USG
  ii) Opposite sex twins;
  iii) Twin Peak sign (Lambda sign
  (Seen in 10-14 week) ↳ b/c chorion enters into

* In Monochorionic twins
  - Inverted "T" sign seen on USG

iv) 4 Layers in dividing Membrane
  2 Amnion 2 chorion

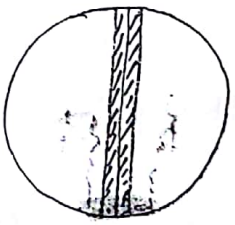
v) Thickness of dividing Membrane
  ⇓
  ≥ 2mm thick ⇒ Dichorionic
  if < 2mm thick ⇒ Monochorionic

* Monochorionic Monoamniotic twins



* M/c type of conjoint twins ⇒ Thoracopagus (to joint)

* Monochorionic Diamniotic twins



* M/c Risk to fetus in twin ♀ :⇒ Preterm Labour } compared to singleton ♀
  also ⇒ GICA ↑
  GUGR

(107)

* 2 things not seen in Multifetal ♀
  ↳ Post dated ♀
  Macrosomia

* Fetal Reduction :⇒
  - Ideal time to do ⇒ 10-13 week
  - Under USG guided Inject KCl into thorax
  - Converted into 2 fetus (Not less than twins)

* Monochorionic twin (specific) complication ⇒
  - TTTS
  - TRAP (Twin Reversed Arterial Perfusion)
    ↳ Also "Acardiac twinning"
  - TAPS (twin Anemia Polycythemia sequence)
  - Selective IUGR
  - ↑↑ Risk of GCA

TTTS (Twin twin transfusion Syndrome)

- It is seen in Monochorinic Diamniotic
  ↳ Reason for TTTS
  ↳ Vascular Anastomosis
  Deep Artery of one baby anastomoses with Deep vein of other baby

* 9m Monochorionic Monoamniotic twins

↳ Plenty of Superficial Artery - Artery anastomosis ⊕ ; so ; TTTS not seen in it

Diagnosis ⇒ USG

Simultaneously → Polyhydramnios (by DVP Method we see Amniotic fluid)
→ oligohydramnios

Deep Artery ⟶ Deep vein

Donor
⇓
Oligouria
⇓ oligohydramnios
Heart failure

Recepient
⇓ ↑ blood volume
Polyuria
⇓ Polyhydramnios
CHF
↳ d/t Cardiac overload

* QUINTERO STAGING ⇒ Staging of TTTS

Stage 1 → Poly/oligo + Bladder of oligo twin is visible + Doppler (N)

Stage 2 → Poly/oligo + Bladder of ~~oligo~~ twin is Not visible + Doppler (N)

Stage 3 → Poly/oligo + bladder Not visible + Doppler (ABN)

Stage 4 → Either/both hydrops fetalis

Stage 5 → Either/both IUD.

Tt ⇒ Feto Scopic Laser Ablation of the vascular Anastomosis. (108)

Stuck twin ⇒ alive; only stuck
Oligo twin of twin twin transfusion Sx.
↳ can't Move; so; Looks like Stuck

Vanishing Twin ⇒ Spontaneous abortion of one of the twin.

Fetus Papyraceus ⇒ One twin dies & is compressed by other twins.

Impending death
↓
do TOP
↓
take out both the babies; as other baby May goes to hypoxic injury

if one twin – already die
↳ gud
↓
Continues Pregnancy
+ Monitors the other twin
⇓
Baby May go hypoxic injury & Coagulation defect both

Superfetation ⇒ different cycle (Menstrual)

Superfecundation ⇒ Same cycle

OUTCOME OF TWINS ⇒ Lie of 1st Twin

1st Twin — Longitudinal — vaginal delivery
Non-Longitudinal — C.S.

* M/c combination In Labour ⇒ Vertex – Vertex
1st twin 2nd twin

Vertex – breech

QQ Mx = 22 ; if 1st twin = Breech ; 2nd = vertex

Vaginal delivery is Not c/I

C.S. > vaginal delivery

Complication ⇒ twin gnterlocking

QQ. Mx = 22 if 1st vertex deliver ; 2nd breech

⇓

Assissted Breech vaginal delivery

QQ. Mx = 22 if 1st vertex deliver ; 2nd Transverse lie

⇓

do Gnternal Podalic version (GPV)

& Breech extraction

↳ i.e No efforts by Mother at all

gives under GA (General Anesthesia);

Mother have no effect to push the baby; so; do Breech extraction

* The lie of 2nd baby is Not decided until 1st baby is delivered

QQ M/c complication of Monoamniotic twins are

↳ Cord Entanglement

↳ delivered by CS:

⇓

by 32-34 weeks

Rh ⊖ve PREGNANCY

(109)

♀ Husband ⊕ve → both Require for complication

↳ Feto maternal hemorrhage (FMH)

- occur in 1st ♀ @ delivery
- Sensitization of the Mother
  - 0.1 ml blood is Required to sensitization

⇒ 1st Ab produced by Mother after sensitization

↳ IgM (doesn't cross the placenta & Not cause affect in baby in 1st ♀)

Later she produce IgG (cross placenta)

⇒ Significant titre Require to damage fetus

↳ ≥ 1:16

- GCT done
  - ⊕ve Sensitized
  - ⊖ve Non-Sensitized
- Significant Anemia in fetus
  - ↳ MCA doppler tells about it
    - ↳ Peak systolic velocity
      - ↳ PSV ≥ 1.5 Mom (Multiple of Median)
  - Cause heart failure → Hydrops → death of Foetus

* Anti-D prevents Sensitization.

dose:
- FMH < 12 wks → 50 Mgm
- FMH > 12 wks → 300 Mgm

* 300 Mgm of Anti-D Neutralize
  - fetal blood - 30mL
  - fetal RBC - 15mL

* if we suspect FMH more than usual then to calculate dose of Anti-D — Kb test (Kleihauer Batke)

Case I :-

Rh ⊖ve
↓
Husband ⊕ve
↓
@ 12 week GCT ⊖ve
(Not sensitized)
⇓
GCT (28wk)
↳ ⊖ve
⇓
Anti-D 300 Mgm → Prophylactically
↳ this works for 12 wks ; so, she delivers after safely.
⇓
if Baby blood group ⊕ve
⇓
Anti-D 300 Mgm i/m. (ideally c/in 72hrs ; can be given upto 28 days)

(110)

Case 2 :→

Rh ⊖ve

⇓

Husband Rh ⊕ve

⇓

@ 12 weeks gCT ⊕ve (< 1:16)

(Anti-D has No Role in gCT⊕ve Patient ; it Means Sensitization already takes place)

↓

Repeat gCT X 4 weekly

if Rising trend ; Repeat 2 weekly

↓

deliver at term

Case 3 :→

Rh ⊖ve

↓

Husband Rh ⊕ve

⇓

@ 28 weeks gCT ⊕ve (> 1:16)

↓ followed up for Severe Anemia

PSV - MCA doppler

- ≥ 1.5 Mom
  - ⇓
    - P.O.G. ≥ 34 wk → ↓ deliver
    - P.O.G < 34 weeks → ↓ do cordocentesis → ↓ Intrauterine transfusion ← Hb < 8 gm%
- < 1.5 Mom → Repeat MCA doppler

if Hb level < 5 gm% of fetus ⇓ Hydrops fetalis

Hydrops fetalis ⇒ Most common cause (Non-Immune Mediated)

↳ M/c/c

↳ Immune Mediated

↳ CVS – abnormalities

Infection that can cause hydrops fetalis ⇒ Parvovirus B-19

USG diagnosis ⇒ Any ≥ 2 of the following criteria

i) Pleural effusion
ii) Pericardial effusion
iii) Ascites
iv) Subcutaneous edema

Scalp edema ⇒ Buddha sign.

Findings in hydrops fetalis ⇒ Placentomegaly
Polyhydramnios

* Gene for Rh factor Located on ⇒ Short Arm of chr. 1

HEART DISEASE IN PREGNANCY

(111)

Symptoms

- Orthopnea
- Paroxysmal Nocturnal dyspnea
- exertional dyspnea (Progressive)
  ↓
  It is Physiological; but progressive exertional dyspnea is Pathological

Signs

- Cyanosis / clubbing
- Diastolic Murmur
- Systolic Murmur > grade 2
- Cardiomegaly
- Atrial fibrillation / (AbN) Rhythm
- CHF
- Persistently distended Neck veins
- Pulmonary Artery HTN
  ↳ Loud P_2
- Wide Split S_2

* M/c heart disease in ♀ ⇒ Mitral Stenosis

M/c congenital heart ds in ♀ ⇒ ASD

M/c congenital valvular heart disease ⇒ Mitral valve Prolapse

* High Mortality Rate (> 50%) in ♀ :→

i) Marfan's Sx c Aortic Root Involvement
ii) Coarctation of Aorta c Aortic valve Involvement
iii) Eisenmenger Syndrome

→ TOP (Abortion)
in Severe MS (< 1.5 cm^2 ← valve Area)

v) NYHA Grade 3/4

vi) Ejection fraction < 45%

* Good outcome

↳ ASD — Corrected TOF
VSD — Mitral valve Prolapse
PDA — Ebstein Anomaly

* if a patient has Severe MS

↳ Ideally goes to — Valve Replacement → High Mortality Rate ≥ 30%

Sx preconceptionally

↓↓

Not be done during ♀

↳ if she wants to continue ♀

↳ do Ballon valvotomy

↳ Ideal time

↳ 18–20 weeks

* if she has valve Replacement

↓↓

Prosthetic heart valve → Pt. is on Anti-coagulation

↓ if she wants to Conceive

1–12 weeks → Heparin

12–36 weeks → Warfarin → Causes embryopathy in 1st Trimester (More Potent)

36– Onset → Heparin

↓↓

Chondrodysplasia Punctata (Stippled femoral epiphysis) also

On close to Labour; if warfarin given ; PPH happen

Antidote for heparin ↓↓ Protamine sulphate

Warfarin has No Antidote

* During Labour → Stop Anticoagulant (112)

However Restart the Anticoagulant In vaginal delivery ⇒ After 6hr
In C.S ⇒ After 24hr

⇓

Restart ≤ Heparin + Warfarin

⇓

Withdraw Heparin ; Corre-d INR ; As Warfarin has delayed onset of Action

* GENERAL PRINCIPLES :-

i) Maxm Rise of CHF :-

Immediate Post partum > 2nd stage > 32 weeks

ii) Vaginal delivery is preferred ;
C.S. is Reserved for obstetric Indication

iii) ≤ Heart disease Indication of C.S ⇒

1) Marfan's Sx ≤ Aortic Root Involvement
2) Coarction of aorta ≤ aortic valve Involvement
3) Aortic dissection
4) Severe As

In all Ejection fraction is affected

* In Eisenmenger's Sx ⇒ Vaginal delivery the

* Induction of Labour (IoL) is not Contraindicated in heart disease

↳ it is safe

however; Spontaneous Labour over IoL

Qq 38 wks – Heart failure; K/c/o Heart disease;

⇓

Mx ⇒ Stabillze the patient

⇓

Wait for Spontaneously Labour

iv) Propped up | Left Lateral Posture | O2 by Mask – Readily available

v) Restrict IV fluids @ 75 mL/hr

A.S ⇒ wet side

vi) Restrict the PV exams

vii) ARM — Can be done

Memb. Rupture — Prophylactic Antibiotics

(AHA guidelines) ⇓

⇓ Ampicillin + Gentamicin

Vaginal delivery safe

viii) Pain Management ⇒ Epidural Analgesia (Neuraxial)

(113)

ix) Cut Short the 2nd Stage of Labour

⇓

Forceps delivery > Vacuum delivery

x) Immediately after delivery → given Inj. Lasix (to ↓ Preload)

→ Avoid Methargin

Hang down the patient leg from delivery table (to ↑ Venous Return)

xi) C.S. ⇒ Anesthesia → SIE ⇒ Hypotension

↳ Epidural Anesthesia; but if Ejection fraction is low; give General Anesthesia

Severe A.R / Severe AS / Cyanotic H.D. } ⇒ Low Ejection fraction

* In Aortic dissection (emergency condn) do emergency C.S. under G.A.

PERIPARTUM CARDIOMYOPATHY

- Development of heart failure Around Labour in a women ∈ No Underlying Heart Disease
  ↳ 1 Month before delivery to 5 Month after delivery
- Ejection fraction – Low.
- Left ventricle May or Maynt be dilated
- Mainly in Pre-eclampsia patient; also in Multi-fetal ♀; advanced Maternal age
- Prolactin has some role to develop
- Mx = Same as Heart failure

Fetal Monitoring

Fetal Movements ⇢ Quickening (1st Fetal Movement)

↳ 16 weeks — Primigravida
18 weeks — Multigravida

↳ (N) ≥ 10 fetal Movement in a 2 hr Period of Rest
OR
≥ 10 fetal Movement in a 12 hr Period in Routine activity.

↳ Maxm fetal Movement ⇒ @ 32 weeks
Perceived by women

- earliest time for gus in Absense Fetal Movement = 12 hrs
  Maxm time for gus in Absense Fetal Movement = 48 hrs

- **Modified Biophysical Profile (BPP)** ⇢ ↓es Fetal Movement beyond 32 weeks

also klas "cardio-tocography"

NST ⟩⟩ AF ⇒ Amniotic fluid

NST ⇩ gn Acute gnjury

AF ↳ gn Chronic gnjury (UPI)

(N) Heart Rate = 110–160 beats/min.

Beat to beat variability = 5–25 beats/min

Acceleration ⇒ ↑ Heart Rate by 15 beats/min above baseline for 15 sec

(114)

Deceleration

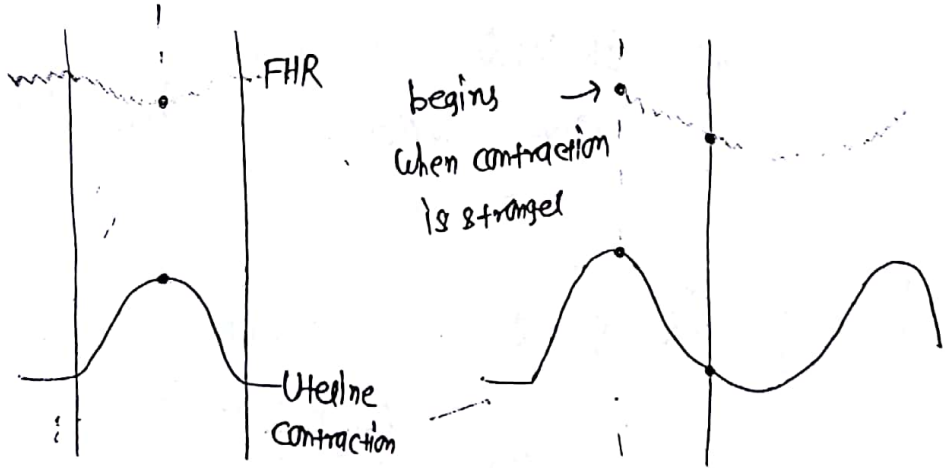
(3 types)

- Early ⇒ dip in heart Rate (d/t head compression)
- Late ⇒ dip persisting after the uterine contraction ends (d/t Uteroplacental insufficiency)
  - gradual dip in heart Rate
  - if is also bad outcome
- Variable ⇒ Abrupt dip in heart Rate (d/t cord compression)
- Sinusoidal Pattern ⇒ Marker of Severe fetal Anemia, Severe fetal hypoxia
  - ↳ Most ominous type of Pattern (worst outcome)

When variable deceleration is significant

↳ i) if HR < 70 beats/min × 1min

ii) Persistant Around ≥ 50% of uterine contraction



Early Deceleration

Late Deceleration

Reactive NST ⇒ two or More than two acceleration in a span of 20min.

Non-Reactive NST ⇒ < 2 acceleration in a span of 40 mins

↳ Physiologically if baby is sleeping

* Category 1

Beat-Beat variability (N)

Category 2 ↓

- Further assessment
- LLP (Left Lateral Posture)
- O2 by Mask.
- Stop oxytocin
- i/v fluids
- give tocolytics

Immediate delivery → C.S. ← ominous

Category 3

Absent c

Any one of the following ⇓

Bradycardia

Late deceleration

Persistant variable deceleration

Sinusoidal

NST in high Risk ♀ ⇒ twice a week (once in 72 hrs)

* BPP (Biophysical Profile) ⇒ Manning Score

↳ Report card of Fetus

(15)

→ USG for 30 min

↳ we a Score of +2 or Zero

- It has 5 components

⇓

Breathing Movement ⇒ At least one Movement Lasting 30sec +2

Gross Body Movement ⇒ 3 Movements +2

Tone ⇒ Flexion – Extension – Flexion +2

Amniotic fluid ⇒ Atleast 1 Pocket of 2 cm +2

NST ⇒ Reactive +2

; if Score is $\frac{8,10}{10}$ ⇒ (N)

$\frac{6}{10}$ ⇒ (N) Liquor = Equivocal = Repeat testing on the same day

$\leq \frac{4}{10}$ = Immediate delivery

* (AbN) In Acute hypoxic

⇓

Loss of Acceleration → Breathing Movement → Gross body Movement → Tone

⇓

1st to become (AbN)

* How frequently to be done in high Risk ♀
  ↳ once in week

DOPPLER ⇒ • M/C 1st vessel ⇒ Uterine A
  ↳ sign of UPI

• S/D Ratio
  ↳ Ⓝ ♀ S/D ↓ing

• UPI ⇒ S/D ↑es
  ⇓ ↓
  > 28-30 wk ≥ 3 ← UPI

REDF → TOP

• AEDF – TOP ≥ 34 weeks
  ↳ @ 34 weeks – gives steroid + further Monitoring.
  or less than 34 weeks

* **MCA Doppler** ⇒ Not best for UPI
  ↳ Ⓝ; blc in UPI ; foetus sends blood to vitals organs
  ⇓
  Early stage MCA doppler ⇒ Ⓝ
  ⇓
  Brain sparing effect

(116)

* REDF — Umbilical Artery
  - ↳ Steroids – 2days
    - ↓
    - Reversal in Venous Doppler → Last vessel to shows REDF
      - ⇊
      - Indicates Impending death.

* MCA doppler is best studied for fetal Anemia

* Best for Fetal Monitoring
  - ↳ Fetal Scalp blood PH
    - (N) ⇒ 7.25 – 7.35
    - 7.20 – 7.25 = Borderline → Repeat test after 30min
    - < 7.20 = Acidosis
      - ↳ Immediate delivery

* VAST (vibroacoustic Stimulation test) :-
  - High Intensity Sound waves
  - Released from Artificial larynx → on Maternal Abdomen for 1sec (to 2sec)
  - (N) Response ⇒ Yes from baseline by 15 bpm ↑ in 15 sec of stimulus

* M/c Method for Intrapartum Monitoring :→

∴ Intermittent - Heart Rate Auscultation.

	1st stage	2nd stage
In Low Risk ♀	– every 30min	every 15min
In High Risk ♀	– every 15min	- every 5min

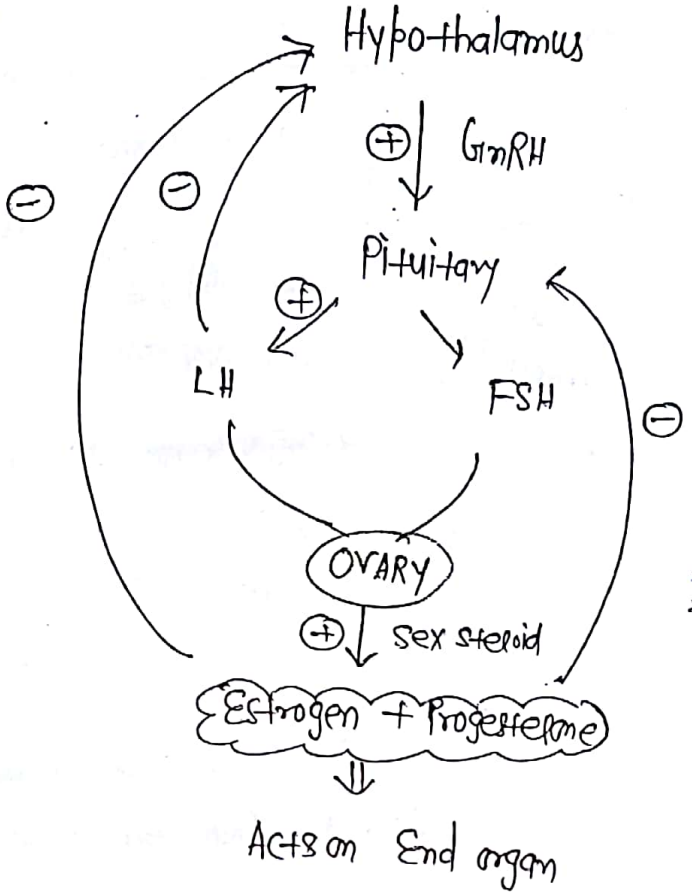
*Time to Heart Rate listen ⇒ Immediatly after contraction & Listen for 1 minutes (Not 15 sec x 4)

(117)

GYNAECOLOGY ⇒ Base of Gynae
↳ Hormones (118)

* Hypothalamic - Pituitaric - ovarian Axis (HPO axis) :-

↳ Not develop before Puberty.
Sensitive Around = 8-12yr
Fully established by = 13th yr



* Gn obese ♀ / Pubertal change occur early, dt ↑es Level of Leptin
↳ Hormone Made by Adipose cells that gnhibit hunger.

* Estrogen

* C_{18} steroids

Types ⇒ E_1 - Estrone - Predominant Estrogen in Post Menopausal
E_2 - Estradiol ↳ in Reproductive Life
E_3 - Estriol ↳ gn Pregnancy

Most Potent (Natural) ⇒ $E_2 > E_1 > E_3$

* Most Potent (Synthetic)
↳ Ethinyl Estradiol (EE)
↳ Used in Combined ocp's

Progesterone

C_{21} steroids

Progesterone (Natural)

Progestin (Synthetic)
⇓
C_{19} steroids (Androgens derived)
↳ ocp's contain it

* Classification of OCP's on the basis of Amount of Ethinyl Estradiol ⇒

High dose ≥ 50 Mgm

Low dose 30-35 Mgm

Very low dose ≤ 20 Mgm.

Lowest dose 10 Mgm (LoLoestrin)

* Classification of OCP's on the basis of Synthetic Progestin :-

1st generation ⇒ Norethindrone

2nd generation ⇒ Levonorgestrel (LNG)

3rd generation ⇒ Desogestrel (M/C used)

Used in Malan, Mala D

Used in Novelon Pills

↓

Least Androgenic

M/C OCP Pills

Gestodene

Norgestimate.

4th generation ⇒ Anti Androgenic

- Spironolactone derivative (Drospirenone)
- Dienogest

as generation ↑ Lipid profile side effect ↓ & Androgenic side effect also ↓

* Sources

E_1 ⇒ Post Menopausal

↓

Peripheral conversion

Androstenedione $\xrightarrow[\text{tissue}]{\text{Adipose}}$ E_1 (Aromatase)

E_2 ⇒ Reproductive Age

↓

- Comes from granulosa cells of ovary ↓↓ dependent on Theca cells } 2 cell 2 gonadotropin Theory.
- Corpus luteum

* Sources

- Ovary
  - ↳ Corpus luteum

↓

Formed by Luteinization of Granulosa cells.

- Gn ♀ ⇒ Produced by Placenta

↓

Precursor (Maternal LDL Cholesterol)

(119)

LH ↓ activate → Theca cells ↓ Androstenedione → Testosterone

FSH ↓ activate → Granulosa cells ↓ Progesterone ← if LH works on granulosa cell (Luteinization) → Estrone ↓ Aromatase → Estradiol

* Theca cell don't have Aromatase enzyme.

* Granulosa cells don't have 17-OHase enzyme ; so; can't make Androgen

* Placenta — E_3 (Fetal DHEA)
(Pregnancy) L E_2

* Most of estrogen → is in bound form (99%)
If in free form ↓
Mainly bound ē
SHBG
also ē Albumin → sex hormone binding Globulin

Estrogen ⊕ve → SHBG (Liver) synthesis

End products ⇒ Glycuronides (sulphonides)

* Bound; 2% free
L Mainly Albumin
(cortisol binding ← CBG globulin) Not with SHBG

End product
L Pregnanediol

* Receptor ?: Location
L Intracytoplasmic

Uterus

	(E)	(P)
Non-Pregnant	Endometrial Proliferation	Protective Stops Proliferation ↳ do secretory changes ⇓ decidualisation
	Growth of uterus	Growth of Uterus ⇓ Relaxation of Uterine Smooth Muscle

Cervical Mucous ⇒	Thin Copious (Large Amount) Watery Spinn barkeit (↕) Elastic can be stretched b/w fingers Ferning → Fern like pattern on Microscopic exam ↳ earliest (a) Dg Disappear by Dig ↳ Klas " Arborization". High amounts of NaCl Required ∈ estrogen to see if	Thick Scanty highly viscous No Spinn barkeit (X) Tack phenomenon (X) (No ferning) Cx Mucous breaks on stretching

* Periovulatory Cx Mucous is (E) type ⇒ highly fertile.
  ↳ test of ovulation
* Mechanism of POP's (Minipills)
  ↳ to Make the Cx Mucous thick
  (Alteration of Cx Mucous)
* Cx Mucus ⇒ Natural Method of contraception
  ↳ "Billing's Method of Contraception"

QQ Which Natural Method is best (least failure Rate) (120)

⇓

Symptothermal

⇓ ⇓

Cx Mucus | Basal body temp. (Progesterone rise by 0.5°F)

→ Cx Mucus is also impermeable to Micro-organism

⇓ (P) type ⇓ Natural defense Mechanism

→ Mirena will ↓ the Risk of Pelvic inflammatory disease

	(E)	(P)
Fallopian Tube	↑ Motility of Fallopian tube ↓ secretion	↑ Secretion ↓ Motility POP → R/F for ectopic ⊙

Vaginal Cytology ⇒ Superficial cells → Big cell, Nuclei become small; Pyknotic & lades → Pink in colour

- Cytoplasm May contain the vacuoles
- High karyopyknotic index (Small Nucleus)

In Intermediate cells

In Post-Menopausal ⇒ Parabasal/Basal cells

↳ Small cell, Big Nucleus

tells about Hormonal Status ↑

Parabasal cell : Intermediate cell : Superficial cell

Maturation Index

0 : 90 : 10 ⇒ ♀

0 : 30 : 70 ⇒ Perovulatory ♀

100 : 0 : 0 ⇒ Post Menopausal
Post partum.

	(E)	(P)
effect on Salt & water	Retention	Excretion
Cholesterol	↑ HDL ↓ LDL ↑ Triglyceride (Total cholesterol ↓es) ⇩ Cardioprotective	↓ HDL ↑ LDL
Bones	Causes Mineralization of bone - epiphyseal closure [Post Menopausal → osteoporosis Precocious Puberty → ↓ growth]	No effect on bone
S. Ca++ Level	⇩	
Urinary excretion	⇩	

(E) (P)

Coagulation Profile — Hypercoagulable state, Inhibits Fibrinolysis ⁂

2, 7, 8, 10

· No effect, so, can be used

(121)

H/o Venous Thrombo embolism
Stroke
CAD
} all absolute C/I of OCP.

Estrogen → Causes Upregulation of Progesterone Receptors on the Endometrium

Progesterone → Down Regulation of Estrogen Receptors on the Endometrium

Progesterone acts only on Estrogen primed Endometrium

Estrogen affects to higher centre ⇒

(E) ⊖ve → FSH

(E) In Low Amount → LH
⊖ve

In High Amount → LH
⊕ve

Neuroendocrine phenomenon

Initiation → LH Surge

High Amount of Estrogen

(P) Low Amount ⊕ve → LH/FSH

High Amount ⊖ve → LH/FSH

E | P $\xrightarrow{\ominus ve}$ GnRH

GONADOTROPINS

- Released by Anterior pituitary;
- Basophils cells secrete
- Pulsatile
- Protein hormone

(R) ⟶ Trans Membrane (GPCR)
(R)

FSH $t_{1/2}$ = 3-4 hr

LH $t_{1/2}$ – 20 min

FSH (R) — Gn females ⟶ Granulosa cells

Gn Males ⟶ Sertoli cells (Spermatogenesis)

LH (R) — Gn Females – Theca cells

Granulosa cells – appear only in Late Proliferative Phase

Gn Males – Leydig cells

↳ Produce Testosterone

FSH ⇒ i) do Selection of cohort of Follicle every Month

(○○○
(○○○)

ii) Selection & growth of dominant follicle.

(iii) Ovulation → Final Release of ovum by collagen breakdown is brought about by FSH

(122)

LH → Function

(i) Ovulation
(ii) Formation & Maintainence of Corpus Luteum
(iii) Final growth of Follicle

LH Surge —(36 hrs (24-36 hrs))→ Ovulation

LH Peak —(12 hrs)→ Ovulation

* LH Surge ⇒ Initiation by high level of Estrogen. (200 pg x 48 hrs)
↳ Amount of estrogen to cause LH surge

Maintainence of LH Surge ⇒ E + P

* When does Progesterone Synthesis begins
↳ Before ovulation (36 hrs) → Low in Amount
LH → Surge → Luteinization of Granulosa cells

Q. Just before ovulation; which is true ??
(a) ↑ LH ; ↓ FSH
(b) ↑ FSH ; ↓ LH
(c) Both ↑ (LH Peak >> FSH Peak) → Small amount of Progesterone gives ⊕ feedback.
(d) Both ↓

CORPUS LUTEUM ⇒ every Month ⇒ die

↳ Life span 14days (Constant Luteal phase)

QQ ib 36 day Menstrual cycle ; ovulation day ??

⇓

on 22nd day

QQ Which hormones Maintain the corpus Luteum

↳ (LH)

QQ Which hormones Maintain the corpus Luteum in ♀

↳ (HCG)

Rescue the corpus luteum from LuteoLysis

Corpus Luteum

↳ Progesterone

Estradiol

Relaxin

Inhibin A

Inhibin B → Secreted by Granulosa cell of the follicle

Inhibit the Release of FSH

- Peak activity of Corpus Luteum ⇒ 8th day Post ovulation

↓

Maxm Progesterone production

(123)

HYPOTHALAMUS → Release GnRH

GnRH — Arcuate Nucleus Released if (in Medial hypothalamus)

- decapeptide
- $t_{1/2}$ = 3-4min

- Neurons (GnRH) derived → "Olfactory Placode"

Olfactory N. ← Migration ⇓

Arcuate N. ←

Absent Migration

"KALL MANN'S Sx" (M/c Inheritance ⇓ X-linked Recessive)

Boys >> Girls ←

- No GnRH
- Anosmia
- No LH & FSH

↳ M/c gene involved ↳ KAL-1 gene

- GnRH Secretion in fetus ↳

At 12 weeks → LH/FSH → Initially Yes upto 20 weeks ↓ After

Suppressed ↓ child born

Withdrawal of E/P

Sudden GnRH Yes ↗ May born c bleeding P/V; enlargement of breast

↳ LH/FSH (elevated Max about 3-6 Months after delivery)

After this GnRH suppressed ←

↑ Until Puberty

* Activation of HP axis @ Puberty ⇒ ~~All Neurotransmitter~~

↓GABA → It keeps GnRH dormant before Puberty

↓NPY (Neuropeptide-Y)

↑Leptin

↑glutamate

↑kisspeptin

↓

Pulsatile Release of GnRH → Night time

↓

Release of LH → @ Night time

↓

LH/FSH → (@ Night/day)

Initial cycle May be Anovulatory b/c FSH Not Release; so; Mature Follicle Not Release ← Release of LH → @ Night time

* GnRH Agonist ⇒ M/c used

↓

Not effective orally.

↳ Leuprolide (Goserelin, Nafarelin, Buserelin)

give in two Manner

Continous

↓

1st Response ⇒ ↑LH/FSH (Flare Response)

↳ Persistently high (Inhibition HPO)

Pulsatile (i/v Infusion pump)

↓

Given in ⇒ Delayed puberty

Ovulation Induction

Continous

Endometriosis
Fibroid Uterus
Hirsutism
Precocious Puberty
Breast cancer
Prostate cancer

Pulsatile (24)

Kallmann's Syndrome

* GnRH Antagonist :- M/c used ⇒ ~~Cetrorelix~~*
  - No Flare Response (No Initial Tes)
  - Same ~~Antagonist~~ – orally active
  - Indication ⇒ Same as ~~Continous GnRH Agonist~~ Indication

* GnRH
  - (LH) ⇒ Pulse Frequency is high
  - (FSH) ⇒ Low Pulse Frequency

MENSTRUAL CYCLE

Ovary
- Luteal Phase → Secretory → Gn Endometrium
- Follicular Phase → Proliferative → Gn Endometrium

Luteal Phase → Start ⇒ Onset of LH Surge

LH Surge
- Maintains → Corpus Luteum → Progesterone 8th day Post-ovulation → Peak Level
- Ovulation

⊖ → Late Luteal Phase → LH ↓es → CL → Regress

Regress
- ↓es Progesterone → Progesterone withdrawal ***
- Corpus Albicans

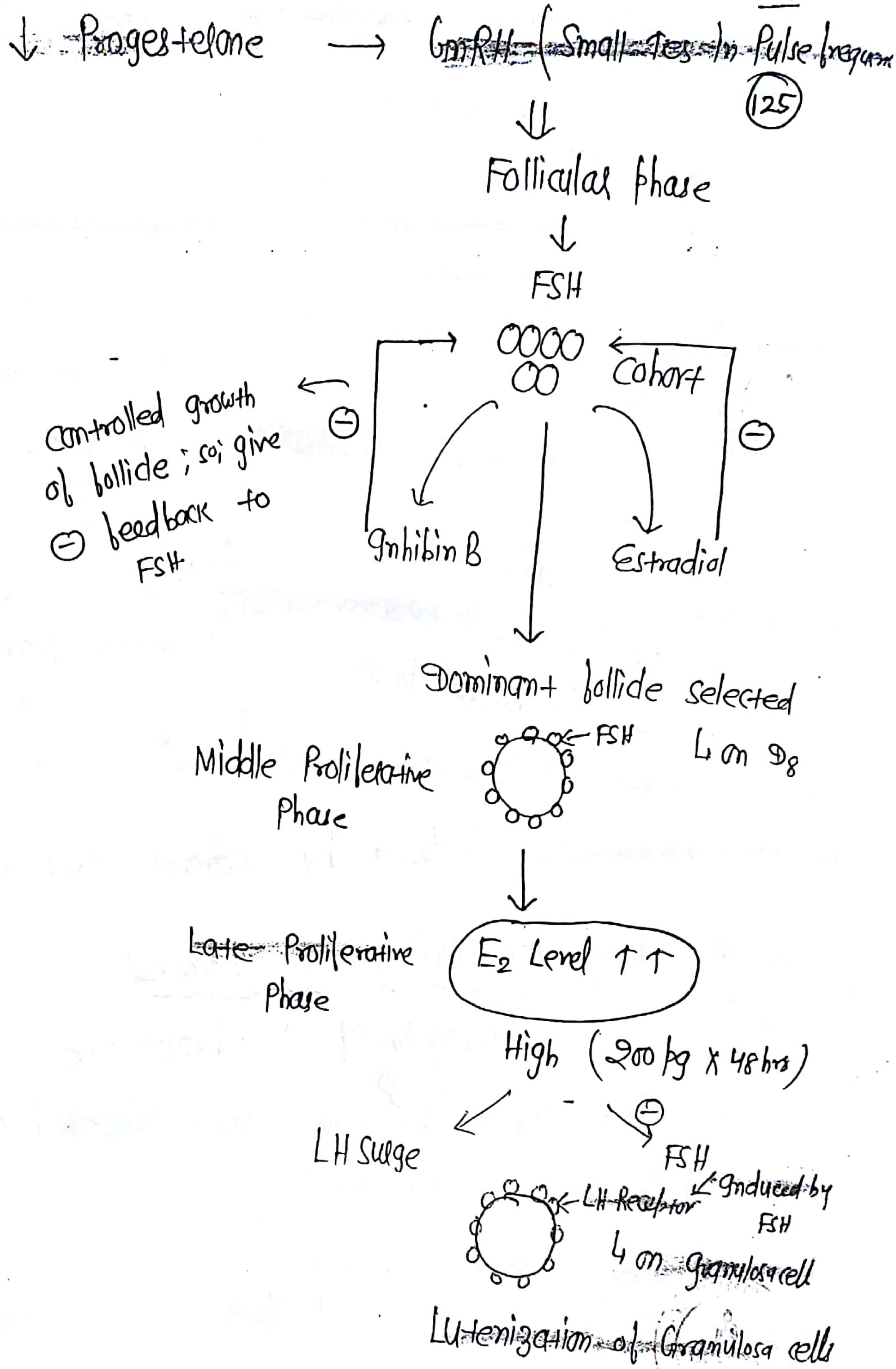
Progesterone withdrawal → Release PG $F_{2\alpha}$ (vasoconstrictor)

Release → Endometrium
- Spiral Arterioles ← vasoconstriction ← Menstrual blood is Mainly Arterial
- Avascular → Necrosis → Sheds off (Menses)
- Myometrium

Myometrium ⇓

1° dysmenorrhoea (Physiological) → if present then ovulatory cycle ⊕

Anovulatory bleeding ⇒ Painless



↓ Progesterone → GnRH (Small ↓ in Pulse frequency
125
Follicular phase
FSH
Cohort
controlled growth of follicle ; so; give ⊖ feedback to FSH
⊖
⊖
Inhibin B
Estradiol
Dominant follicle selected
Middle Proliferative Phase
FSH
↳ on D8
Late Proliferative Phase
E2 Level ↑↑
High (200 pg x 48 hrs)
LH Surge
⊖
FSH
LH Receptor
Induced by FSH
↳ on granulosa cell
Lutenization of Granulosa cells

Testosterone → Sex steroids

↓

Intracytoplasmic (R) (In the absense of Ligand) C19

↳ Major Source of testosterone in ♀ ⇒ i) Peripheral Conversion of (50%) Androstenedione

ii) 25% adrenal gland

iii) 25% ovary – theca cells (theca interna)

↓

Androgen

↳ Which androgen is in Max^m amount

↓

Androstenedione > DHEA > Testosterone

- Ovary doesn't produce DHT (Dihydro testosterone)
- ovary also doesn't produce DHEAS ↳ sulphate

- Produced by Adrenal gland only.

* Gene for Androgen (R) Located

↳ Long Arm of X-Chromosome

* Testosterone in ♀ ⇒ i) Pubarche / Adrenarche (depend Androgen on)

→ Estrogen

ii) Control of Libido

iii) ↓ Intraovarian Testosterone Level ↓

↓

Arrest follicular growth (Estrogen Rich environment)

* Testosterone in ♂ ⇒ Spermatogenesis (126)

⇓

Intra-testicular Level of testosterone is high

⇓

Sertoli cells produces TBP (Testosterone Binding Protein)

* ~~Initiation of Spermatogenesis~~

↳ by FSH

* ~~Spermatogenesis Require~~ ⇒ ~~FSH + Testosterone~~

* Sertoli cells produce ⇒ Mullerian Inhibiting substance

~~TBP (Testosterone binding protein)~~

Relaxin

Inhibin

Estradiol

* Most of Testosterone is in Bound form: Binds to SHBG / Albumin

↳ 1% Testosterone free (Male: 2% free).

* Testosterone —⊖ve→ SHBG Synthesis

↳ takes place in Liver

Qo. Which has higher affinity to bind to SHBG ?

~~Testosterone > Estrogen~~.

* End product of Testosterone ⇒ ~~Oxosteroid~~ (Ketosteroids).

Q. Which cells form Blood-testis barrier

↳ Junction of Sertoli - Sertoli cells

↳ Physical barrier b/w blood vessels & seminiferous tubules.

2 compartments : ADLUMINAL COMPARTMENT : 1° Spermatocyte 2° Spermatocyte

↙

Inner side of tubules; isolated from blood & Lymph

Basal compartment : Spermatogonia

↳ Outer side of tubules; in contact ~~of~~ blood & Lymph.

* Normal Menstrual cycle

↳ Length = 21–35 days

acc-to FIGO; Length = 24–38 days

Avg. Length ⇒ 28 days

Amount of blood loss ⇒ 80 ml

Average of blood loss (amount) ⇒ 35–50 cc

No. of days = 2–8 days

average No. of days = 4 1/2 – 5 days

* Abnormal Uterine bleeding (AUB) :

Menorrhagia ⇒ More Amount (>80ml) or More Menstrual day (≥8 day)

Length of cycle = (N)

HypoMenorrhoea ⇒ <2 day or <20ml

Polymenorrhoea ⇒ <21 day (<24) Length of Menstrual cycle

Oligomenorrhoea ⇒ >35 day (>38) Length of Menstrual cycle

Metrorrhagia ⇒ Irregular bleeding / Intermenstrual

- classification of AUB acc. to FIGO :- (127)

PALM – COEIN System :-

AUB P – d/t Polyp
AUB A – d/t Adenomyosis
AUB L – d/t Leiomyoma
AUB M – d/t Malignancy

AUB C – d/t coagulation defect
AUB O – d/t ovulatory dysfunction
AUB E – d/t endometrial causes
AUB I – d/t Iatrogenic
AUB N – Not yet classified

M_x ⇒ acc. to its cause

AUB ≥ 45 yr → evaluated for Endometrial carcinoma (do Endometrial biopsy to Rule out Endometrial carcinoma)

PUBERTY

- development of Secondry Sexual Chalactel.

	Girls	Boys
(N) Age of Puberty ⇒	$10\frac{1}{2}$ yr	$11\frac{1}{2}$ yr
Precocious Puberty ⇒ (↑ More common in girls)	< 8yr	< 9yr
Delayed Puberty ⇒ (↳ More common in boys)	13yr	14yr

	Girls	Boys
1st sign of Puberty	Growth spurt	Testicular enlargement
1st visible sign of Puberty	Thelarche (Appearance of Breast bud) (Tanner stage - 2)	Testicular enlargement

Q. Growth spurt → Thelarche → Pubarche (Adrenarche) → Peak height velocity → Breast → Tanner stage 3

Time gap = 6 months ← Peak height velocity → Menarche

Testicular enlargement → Penile enlargement → Pubarche → Peak height velocity

* M/c Cause of Precocious Puberty in girls ⇒ Idiopathic (90%)

So; girls comes ☹ Precocious Puberty ← Brain tumor (10%)

evaluate ☹ MRI Brain

M/c Brain tumor ⇓ Hamartoma

Central Precocious Puberty

- Premature activation of HPO axis
- LH/FSH ↑
- Isosexual

Peripheral Precocious Puberty (128)

↓

Peripheral source of sex steroid hormones

⇓

Estrogen / ~~Progesterone~~ Androgen

↳ secreting tumors

⇓

M/c a/w ⇒ McCune Albright Syndrom (Precocious Puberty + Cafe-au Lait + Polyostotic fibrous dysplasia)

↓

♂ May be isosexual or May be heterosexual.

* M/c cause of delayed Puberty in Males ⇒ Constitutional delay

⇓

Other Relatives have Same history of delayed Puberty

* Other problems in adolescent / Pubertal age group

↳ Irregular bleeding – M/c cause Anovulatory bleeding

2nd M/c ⇒ Coagulation defects

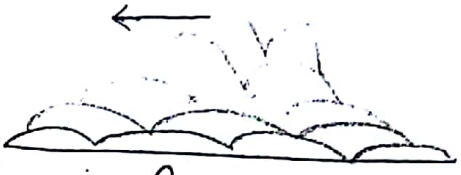
* In Anovulatory cycle → Unopposed estrogen

Superifical Layes ←

⇓

Outgrow the vascular supply

↳ Necrosis → Shed's off (More than (N) bleed)



Break through bleeding (estrogen)

↳ b/c endometrial is thick

* DOC ⇒ OCP

for Adolescent Irregular bleeding

↳ It Regularise the cycle

It also ves blood loss.

Protects from Unwanted Pregnancy

also ves Pelvic Inflammatory disease

also gives - only Progesterone Pills

QQ: 20 days bleeding → Unstable Vitals

↳ So; endometrium is thinned at time of Presentation

⇓

firstly give high dose i/v estrogen

↳ do endometrium Proliferation quickly and stops bleeding by Sealing the breaks

⇓

finally give Progesterone only Pills / combined ocp

* High dose estrogen only given in unstable vitals; bic in all other cases estrogen also cause closure of epiphyseal plate (stop Growth spurt). (129)

Least effective ⇒ Mefenemic Acid (NSAIDs)

⇓

When hormonal therapy is Not taken by girls.

Tranexamic acid (antifibrinolytic drug)

↳ Stop bleeding

MENOPAUSE

- Cessation of Menses for 12 consecutive Months.
- Avg. Age ⇒ 51yr

  Avg. Age in India ⇒ 47yr
- It doesn't Need any investigation; it is history based diagnosis

* Pre Mature MenoPause (Premature ovarian failure, 1° ovarian insufficiency) - ⇒ <40yr

↳ Confirmed by SFSH Level: if it is ≥ 40IU on 2 occasion done 1 month apart – diagnosed Premature Menopause

* Delayed Menopause ⇒ doesn't happen by 55yr of age

⇓

Endometrial Evaluation (Endometrial biopsy)

FSH ↑

LH ↑

Estradiol → ↓es (<20pg)

Testosterone production from the ovary continues just like before

Gradual Process (Cliametric phase)

↳ Hormonal changes start.

Perimenopausal Phase / early Menopause

M/c Symptom ⇒ Vaso Motor Symptom

↳ Hot flushes

↳ d/t Estrogen withdrawl

↳ coincides ¯c LH Surge

Hot Flushes ⇒ Sudden feeling of warmth followed by Diaphresis } Last for 1-5 min.

↳ More @ Night. (so; disturb sleep wake cycle)

↳ Moderate - Severe hot flushes (disturbs daily Routine)

↳ to start HRT (Hormone Replacement Therapy)

Q. If patient has intact uterus ~~Best by estrogen~~

↳ give (E) +P → No Role in Hot flushes

↳ Systemic therapy (transdermal > oral)

Q: Gn Post-hysterectomy patient

↳ only (E) (1st Line) (130)

↓ if (E) is CI

give SSRI (2nd Line)

3rd Line drugs :- clonidine → Gn pre-Menstrual Syndrome it is 1st Line of drug
Gabapentin
Pregablin

* if patient is Not tolerating oral Progesterone

↳ give Mirena (LNG-IUD)

(E) + Bazedoxifene (SERM+SERD)

↓ protects the Endometrium

→ Good effect on Bones

Other SERMs ⇒ Tamoxifene, Raloxifene, Clomiphene, Ormeloxifene

Mlc side effect ↳ Hot flush ←

Not used in Rx of hot flush

Tamoxifene ⇒ given in breast cancer patient
↑ Risk of Endometrial cancer

Raloxifene ⇒ doesn't ↑ Risk of endometrial ca
↳ can be used for Post-Menopausal osteoporosis

* DOC for Post-Menopausal osteoporosis ⇒ Bisphosphonates

ORMELOXIFENE ⇒ Centchroman (Saheli)

- Indian government ⇒ Chhaya
- Non-~~contraceptive~~ steroidal contraceptive

It Makes endometrium out of phase & prevents implantation.

DUB (Dysfunctional Uterine bleeding)

PERIMENOPAUSAL WOMEN ⇒ Cycle became Anovulatory; So; ⇑

Irregular bleeding starts

(Estrogen break through)

- during the phase of active bleeding
  - 43yr ♀ ; ∈ 3 Month Amenorrhoea
  - Bleeding × 20 days
    - Unstable vitals ⇓ do D&C quickly stop bleeding / In place of high dose estrogen
      - ↳ In Adolescent: NO D&C bc it alters the fertility
    - Stable vitals ⇓ High dose oral Estrogen ⇒ stop the bleeding in 24 hrs ↳ after that give (P)/OCP
- doesn't bleed from 2½ A
  - During phase of Amenorrhoea ⇓ gives OCP/(P) alone

* Any Reproductive age women; comes ☹ H/o Amenorrhoea
Firstly Rule out Pregnancy.

V.V.g. ***

AMENORRHOEA

Primary

- Absense of Menses by 13yr of age in the absense of 2° sexual character
OR
Absense of Menses by 15yr of age in the presence of 2° sexual character

M/c cause ⇒ Gonadal dysgenesis
2nd M/c cause ⇒ Mullerian agenesis

Secondry

- Absense of Menses for 90 days in a previously Menstruating female
(In Irregular cycles ♀ ⇒ 6 Months Absense of Menses)
- M/c cause ⇒ Pregnancy
- M/c Pathological cause ⇒ PCOS

PRIMARY AMENORRHOEA

- Look about Thelarche

Absent
⇓
d/t Gonadal dysgenesis ♀ ⇒ Gonads Abnormal
Kallman's Syndrome } ⇒ Gonads Normal
Constitutional delay }

Present

Gonadal dysgenesis (Raised LH; FSH)

- Turner
- Pure gonadal dysgenesis
- Mixed gonadal dysgenesis

	TURNER	PURE GONADAL DYSGENESIS	MIXED GONADAL DYSGENESIS
Karyotype ⇒	XO	46 XY / 46 XX ↳ Swyer's Sx (Mutation in SRY gene) Non-functional	MOSAICS 45 XO / 46 XY
Gonads —	ovary	d/t absense of Y chromosome Functional (SRY gene)	
Internal Genitalia —	Female	absense of MIS / testosterone Estrogen ↓ → Absense Growth Puberty ↳ Hypoplastic	
External genitalia —	Female	absense of DHT (active form of testosterone)	
Gonads ⇒ abnormal	Ovary ⇓ Accelerated Atresia fibrosis (Fibrotic Streaks)	Fibrotic gonads ⇓ fibrotic ovary	Fibrotic Streaks / Malfunctioning testes

	TURNER	PURE GONADAL DYSGENESIS	(32) MIXED GONADAL DYSGENESIS
Uterus ⇒	present (Hypoplastic)	present	Mullerian / wolffian both ducts present; b/c MIS acts on i/L Mullerian duct
external genitalia ⇒	Female Like	Female Like	Ambiguous genitali (Like of both Male & Female
Pubic / Axillary hair ⇒	present (Sparse Scanty)	present	Present
Breast development ⇒	Absent	Absent	Absent

QQ. Most characteristic feature of Turner Syndrome :→
Short Stature

Stature ⇒	Short Stature	N/Tall	N/Tall

45XO
↓
Absent (X)
↓
Absence of (Shox) gene
↓
Responsible for growth of long bone

TURNER SYNDROME

- Short Stature
- Short Webbed Neck
- Low Posterior hair line
- M/c congenital heart disease ⇒ Bicuspid Aortic valve
- Short 4th Metacarpel
- Cubitus Valgus (elbow deformity)
- Rudimentry ovaries
- No Menstruation

True about Turner's :-

(a) ~~Uterus~~ ⊕ Breast ⊖

(b) Both ⊕

(c) Uterus ⊖ Breast ⊕

(d) Both ⊖

* I.Q. ⇒ (N) in Turner Syndrome

I.Q. ⇒ ~~Ab~~ Sub Normal ⇒ when extra "X" chromosome ⊕

↳ Gn "Klinefilter Sx" (47 XXY)

↳ M/c sex chromosome Abnormality.

* Life-Span ⇒ Slightly ↓es

* LH/FSH ⇒ ↑es (So; Turner Sx is Klas II Hypergonadotropic hypogonadism")

TURNER's (45X0)	KALLMAN's (46XX)
FSH ↑	FSH ↓ (Hypogonadotropic hypogonadism)
Short Stature	(N) / tall
Streak ovaries	(N) ovaries
Anosmia ⊖	Anosmia ⊕
Uterus ⊕	⊕
Breast development ⊖	⊖
External genitalia Female Like	Female Like
Pubic/Axillary Sparse	Sparse

* Constitutional delay
  - ↳ Diagnosis of exclusion
  - Short (a) Presentation
  - (N) Karyotype

* goc for Primary Amenorrhoea ⇒ Karyotype

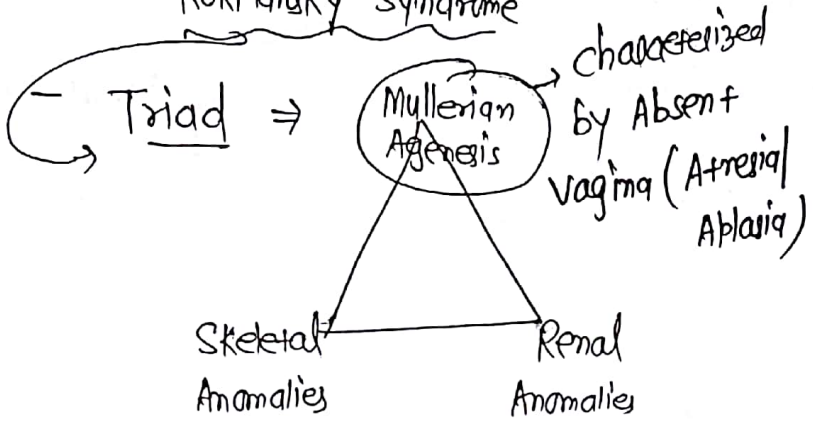
* Rx for Gonadal dysgenesis ⇒ give (E)/(P)
  - ↳ She doesn't Needs Surrogate mother. Needs ovum donor

* Primary Amenorrhoea & Secondry sexual characters;

i) Mullerian Agenesis;
ii) AIS (Androgen Insensitivity Syndrome);
iii) Imperforate hymen;
iv) Transverse vaginal septum

Mullerian Agenesis

K/as "MRKH Syndrome"
Rokitansky syndrome



Absent vagina
Absent Uterus
Fallopian tube are absent – Proximally
Present – Distally

- Gonads – ovary (N)
Karyotype – 46XX

AIS

- K/as "Testicular Feminization Syndrome"
- Testis is producing Androgen; but Receptor is completly insensitive

- Blind ending vagina (Small vaginal pouch)
- Uterus Absent (b/c testis produce MIS)

- Testis (+) (functional)
Karotype ⇒ 46XY

Mullerian Agenesis		AIS
Breast development	→ Present	Present @ Puberty
external Genitalia	→ Female Like	Female Like

Pt: May have Inguinal hernia & carrying Undescended testis

↳ May cause Malignancy

⇓

do gonadectomy ⇒ after Puberty

⇓

ib done before Puberty:

AIS patient Neither have female Nor Male; so: done after Puberty

Male Pseudohermaphrodite

(M/c cause ⇒ AIS)

↳ genotype Male; Phenotype Female

Female Pseudohermaphrodite

M/c cause ⇒ CAH

↳ deficiency of enzyme 21-alpha

Female phenotype → Y chromosome

↓

Should undergo gonadectomy ← as Soon as diagnosis is Made

	Mullerian Agenesis	AIS
Pubic / Axillary hair	(N)	Absent (Sparse) / Scanty
Pregnancy	Needs Surrogate Mother ∵ Generally – the child is of Mullerian Agenesis patient. (by GVF technique) – also vaginoplasty do	physically Absolutely (N); but they have worst Reproductive outcome ⇓ do vaginoplasty
Best to differentiate ⇒	Karotyping	
S. testosterone Level ⇒	(N) (N female Level)	Elevated (Like of Male Level)

Q: After doing Karyotype in ♀ Amenorrhoea; Nor + testis
USG (=)
USG + FSH (=)

* TRUE HERMAPHRODITE ⇒ Tissue of both ovary & testes (ovo testes)
  - also have Ambiguous Genitalia
  - Mosaic Karyotype
  - ♂ of Mixed gonadal dysgenesis ⇒ differentiate by HPE of ovary & testis

IMPERFORATE HYMEN

(135)

- Outflow tract obstruction
- everything else — Karyotype – (N)
  Internal genitalia – (N)
  External genitalia – (N)
  development of Puberty – (N)

- H/o ⇒ Primary Amenorrhoea ; cyclical abdominal Pain
  On Local examn ⇒ bluish distended Membrane
- Sometimes prt. c Emergency :- Acute Urinary obstruction
  Hematometra, Hematocolpos } ⇒ Bladder outflow obstruction

TRANSVERSE VAGINAL SEPTUM

M/c site ⇒ Upper 1/3rd of vagina

- H/t = cruciate Incision — Imperforate hymen
  Excision — vaginal Septum (Transverse)

* Refeinstein Syndrome ⇒ Partial Androgen Insensitivity Syndrome

Complete AIS → Clitoris – hypoplastic
Labia Majora – ″

Partial AIS → Clitomegaly seen
↳ Both girl looking or Boy looking Person May have Partial AIS (depend on how Much Receptors are Active

* Precocious Menarche ⇒ Menarche starts without 2° Sexual character
↳ < 10yr Menarche starts

SECONDRY AMENORRHOEA

- Rule out ♀

Goc! Hormone assessment
- TSH → both hypo & hyper thyroidism
- Prolactin – Hyperprolactinemia
- FSH (±LH / ±E_2)

always together ⇐ done ⇓ bcz TRH is stimulatory to Prolactin.

Hyperprolactinemia
↳ M/C Cause ⇒ Pituitary Microadenoma (<1cm)
↳ M/c presentation ↳ Infertility & Amenorrhoea

* Prolactin — ⊖ve feedback → GnRH

↳ if < 50 ⇒ Repeat test

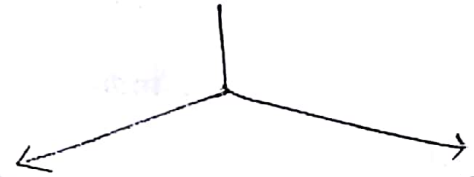
> 50 ⇒ MRI

DOC for Prolactin ⇒ Cabergoline > Bromocriptine

(dopamine Agonists)

↳ Longer t1/2; so give twice a week only.

QQ if TSH & Prolactin ⇒ (N)



FSH ↑

Ovary Problem

⇓

"Premature ovarian failure"

- S. Estradiol ↓es
- PCT (Progesterone challange test)

↳ MPA (Medroxy Progesterone Acetate)

10–20mg X 5 day

⇓

Nor withdrawal bleeding; b/c uterus is Not estrogen Primed

do Karyotype also

FSH Low/Normal

⇓

PCT | SE_2

⇓

PCT ⊕ve (withdrawl)

Serum Estradiol (N)

⇓

Anovulation

↳ "PCOS"

↳ LH ↑

Testosterone ↑

If PCT ⊖ve

⇓

Give E+P challange test (by OCP & withdrawal ft)

↳ $S.E_2$ = (N) Not bleed

⇓

Endometrium Problem

Asherman Syndrome

Bleed

$S.E_2$ ⇒ Low

⇓

Central causes

↳ do MRI brain

Possibility of trauma; infection & infarction

MRI brain

↓

Normal

↳ (Functional hypothalamic Amenorrhoea)

⇓

Diagnosis of exclusion

↳ Seen ⊂ Anorexia Nervosa

Stress Induced Amenorrhea

Exercise Induced Amenorrhea

Chronic Malnutrition

Tt of PreMature ovarian failure

↳ HRT

(till the age of Menopause)

ASHERMAN'S SYNDROME

- Intrauterine Adhesions
- M/c Cause ⇒ vigorous curettage
- Highest Risk ⇒ PPH (vigrous curettage)
- M/c presentation ⇒ Menstrual Irregularities

↳ Amenorrhea > Hypomenorrhea

* Single M/c Symptom/ Presentation
  ↳ Infertility.

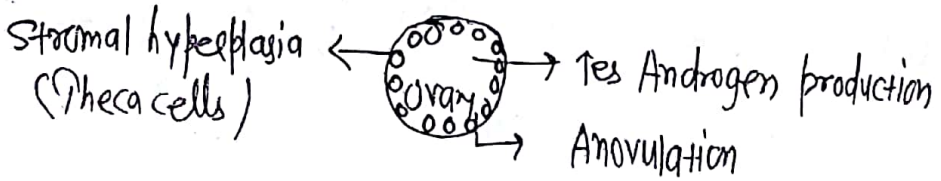
* Screening test ⇒ HSG (Not confirmatory test)
  ⇓
  Adhesion seen as filling defect
  ⇓
  In HSG
  ⇓
  Multiple; Smooth; Irregular Margin; Sma in look.

IOC - Hysteroscopy (confirmatory test)
  ↳ both diagnostic & therapeutic

T/t :→ Hysteroscopic Adhesiolysis
  + CU-T insertion + High dose Estrogen for 1 cycle
  ⇓ ⇓
  to Make distance b/w Uterine wall for quickly Proliferation

PCOS (Polycystic ovarian Syndrome)

- K/as " Stein Levinthal Syndrome " ✱
- Primary Pathology lies in the ovary.



- ↑es Androgen production ; Not only inside ovary ; but also in Periphery
  - ↳ symptoms (Hirsutism)
  - ↳ also cause dyslipidemia

- 50% of girls have obesity (also produces excess Unopposed Estrogen)
  - ↳ blc in Periphery
  - Androgen $\xrightarrow[\text{cell}]{\text{Adipose}}$ Estrogen

- 75% of girls have Insulin Resistance
  - ↳ causes hyperinsulinemia ⇊
    - ↑es Androgen production further
    - dyslipidemia

Syndrome X
(Metabolic syndrome)
- ↳ Hyperinsulinemia
  - ↑ Androgen production
  - dyslipidemia

* These patient have Resistance ↑es in LH
  - ↳ ↑es Androgen production

* HAIR AN → Acanthosis Nigricans ⇒ Cutaneous Marker of Insulin Resistance
  - ↙ Hyper Androgenism
  - ↳ Insulin Resistance
  - ↳ Seen @ Nape of Neck, Axilla, Groin

Rotterdam's criteria for diagnosis ⇒ (138)

if 2 or more of the following criteria are Met provision diagnosis of PCOS;

i) Amenorrhoea and/or oligomenorrhoea
↳ d/t Anovulation

* Menorrhagia ⇒ can be presentation (Mainly in obese pati
↳ Not a criteria of Rotterdam's.

ii) Hyperandrogenemia and/or Hyperandrogenism

Hyperandrogenemia ⇓ High blood Level ↳ Total S. testosterone ↑ (Mildy elevated)
(N) < 70 ng/dl
∴ PCOS = 70–150 ng/dl
definitely < 200 ng/dl
if > 200 ng/dl (Severe) = Testosterone Secreting Tumor

Hyperandrogenism ⇓ Clinical feature ↓
i) Hirsutism → on chin; chest Axilla; thick hair growth
Tes terminal hair growth in Male pattern distribution
ii) Acne – Resistant to usual f/t and Scarring in Nature
iii) Alopecia

* Scoring System to confirm the Hirsutism
↳ Ferriman Gallway score ≥ 8

i) Virilization (Hyperandrogenism) ← Not in PCOS
↳ Severe testosterone – Seen in Androgen tumor

Virilization presents ā :-

i) clitoromegaly

ii) ↑ Muscle Mass

iii) Hoarseness of voice

iv) Male pattern balding
(Temporal Recession)

iii) USG criteria of Rotterdam's

a) ≥ 12 follicles in the ovary & each follicle <10 mm in size

And/or

b) Ovary volume ≥ 10 cc

* (N) Female ~~also~~ May have USG pictures of PCOS ;
(20-25+)

PCOS Female may have Normal USG pictures

* if Follicles seem large in USG ⇒ Hyperstimulatory ovary.
(>1cm)

* On USG of PCOS ⇒ Necklace Pattern
of ovary ↓
Characteristics to PCOS

Not Rotterdams criteria

↳ also Stromal hyperplasia
Thick theca

* If 2 criteria are Met ; then Provisional diagnosis of ⇒

2 P.C.O.S. >> Non-classical CAH (Adult onset CAH) (39)

⇓ ⇓

Very common Rare

to differentiate do ⇒ S. 17 OHP (→ Hydroxy Progesterone) test (Screening test)

ACTH Stimulation test (diagnostic test)

Other dd of PCOS ⇒ Androgen tumor

↳ In it Rapid onset

Rapid progression

Testosterone >200

Virilization

Cushing syndrome

* Lab Investigation ↳ i) S. testosterone

(DHEAS - May be slightly elevated <700 Mgm)

ii) USG

iii) LH↑ / FSH(N)

↳ LH/FSH Ration ⇒ Yes (>2:1)

iv) T. Estrogen ↑

Total E_1 ↑ / FE_2 = (N) { $\frac{E_2}{E_1}$ Ratio Reverse

Free E_2 ↑

v) SHBG ↓ (So; Free E_2 ↑)

↳ ↓ b/c testasterone inhibits SHBG Synthesis

↳ ↓↑ Hyperinsulinemia.

vi) Lipid Profile

vii) OGTT (to look for Insulin Resistance)

- Do $\frac{\text{Fasting Glucose}}{\text{Fasting Insulin}} < 4.5$

viii) TSH
ix) Prolactin } (N)

x) 17 Hydroxy progesterone test.

PCOS patients

Short term Problem
- Menstrual irregularities
- Hirsutism
- Infertility
} + co exist

Long term Problem
- Type 2 DM
- Hypertension
- CAD
- Endometrial cancer
- ovarian cancer
- Non-alcoholic steatohepatitis
- Sleep Apnea syndrome
- Psychiatric disturbances
  - Anxiety
  - depression

- Pregnancy Complication
  - Abortion
  - Gestational DM
  - Pre-eclampsia
  - Preterm-Labour
  - Still-birth.

* Management :- Menstrual Irregularities + Hirsutism

Obese PCOS Patient ⟶ Advice weight loss (by 5-10%)

↳ Drug Treatment ⇒ ① OCP (Low dose) → DOC
4th/3rd generation Progesterone

- Correct the Menstrual Irregularity
- Improve hirsutism
- Endometrial Protection.

DOC for PCOS ⇒ OCP

* Only Hirsutism patient ⇒ give Spironolactone derivative
  ↳ Advice Not to conceive b/c it is Teratogenic drug

* Cyproterone Acetate
* Flutamide
* Finasteride
* Ketoconazole
* GnRH Agonist → Insulin sensitizes → weight loss (obese)
* Metformin → Can cause Lactic Acidosis
  do LFT / KFT

Eflornithine (Topical)

all drugs are given in Hirsutism except → Danazol
(Androgenics S/E)

T/t for Infertility → d/t Anovulatory

Obese pcos → weight loss
(weight gain is also advice in less weight patient)

Ovulation Induction ⇒ Clomiphene citrate (SERM) does antigonistic activity

It has. Zu component
En component

MoA ⇒ Central

Estrogen Receptor on pituitary prevents feedback inhibition

↓

FSH ↑ (FSH/LH)

Starting dose 50mg D_2-D_6 / D_5-D_9 of Menstrual cycle

Maxm (Approved) drug ⇒ 100mg.

↳ by FDA

Maxm approved time ⇒ 12 Months.

% women ovulate after clomiphene ⇒ 80% (141)
% women conceive " ⇒ 40%

Antagonistic effect
- Cx Mucus — Thick (Impermeable)
- Endometrium — growth is affected

* Poor Response (Not ovulating)

Obese patient (Insulin Resistance) — clomiphene citrate + Metformin > clomiphene citrate (CC) alone

ACOG obese PCOS patient ⇒ DOC for Infertility

↳ Letrozole (Not given for everyone; b/c Not FDA approved)

2.5 mg ⟶ 7.5 mg (Aromatase Inhibitor)

* Clomiphene citrate ⟶ Not teratogenic

M/c side effect of clomiphene citrate ⇒ Hot flushes

2nd M/c " ⇒ ovarian cyst formation

Other side effect " ⇒ Multifetal Pregnancy
↳ (6-8%)
↳ only twins
(Not higher order gestations)

Other " ⇒ OHSS (ovarian hyperstimulation syndrome)
↓↓
2-1% (Negligible)

2nd Line drug for ovulation induction ⇒

- Injection Gonadotropin (preferred) (FSH/LH)

- Laparoscopic ovarian drilling ⇒ S/E
  - Premature ovarian failure

- Inj. HMG (Human Menopausal Gonadotropin)
  - taken from Urine of Post-Menopausal women.

- Recombinent Purified preparation → Potent Inj. FSH
  - Highly expensive
  - More S/E as well
    - Multifetal - 30% higher Pregnancy order Gestation
    - OHSS - 15%

* Step up Protocol

Start ē Low dose
↓
Monitor Response
- Tering the dose.

(142)

3rd Line drug for ovulation Induction :-

DOC of ovulation Induction in hypothalamic cause/ Kallmann's Syndrome ⇒ Inj. GnRH ↓ Pulsatile

* Multifetal ♀ Risk ⇒ Gonadotropin > clomiphene citrate > GnRH Agonist

* OHSS Risk ⇒ Gonadotropin > GnRH Agonist > clomiphene citrate > GnRH Antagonist ↓ Prevention of OHSS.

In general :-

Bromocriptine → Anovulation
↳ d/t hyperprolactinemia

Aromatase Inhibitors → Letrozole

* OVARIAN HYPERSTIMULATION SYNDROME (OHSS)

R|F ⇒
i) Younger Age;
ii) PCOS;
iii) High Serum E_2 Levels (>3500 pg)
iv) Large size of follicle & Large No. of Follicle (>20 Follicles & >10 mm in size)
v) Pregnancy
vi) Gonadotropin

Causes ⇒ Injection hCG (Used as ovulation Trigger);

- Mediator ⇒ VEGF ⇒ Cause Endothelial injury → Hypercoagulable state
  ↳ Leakage of fluid in 3rd space

Early – within 9 days of inj. hCG
Late – >9 days of inj. hCG
↳ d/t Pregnancy Late OHSS seen

Prevention ⇒ Delay the hCG injection.; (called as "coasting")
Cancel the cycle & do cryopreservation of embryo;

GnRH Antagonists
Volume expanders
Bromocriptine

INFERTILITY

- Inability to conceive with one year of Unprotected intercourse
- But; if the patient is >35yr ⇒ Inability to conceive c/in 6 Months of Unprotected intercourse

- Female factor contributes 40-55%
  Male factor → 40%
  Unexplained → 10%.

- Female Factor ⇒ ovulatory Factor – 30-40%
  Tubal Factor – 20-30%
  Uterine Factor – 15%
  cervical Factor – 5%
  Unexplained – 10%.

  ovulatory Factor ⇒ Most Reversible
  ↳ dlt Anovulation do → ovulation Induction
  Premature ovarian failure do → Donor ovum

- Test of ovulation ⇒ i) cervical Mucus
  ii) vaginal cytology → Lateral vaginal fornix (upper 1/3rd of Lateral wall)
  iii) Basal body temp. (BBT) (Progesterone
  ↳ Tes BBT by 0.5-0.8°F

  if we plot Biphasic graph – cycle is ovulatory

iv) easiest test ⇒ S. Progesterone

⇓

on D_{21} → ≥ 3ng ⇒ ovulatory cycle

v) Best test — Endometrial Biopsy

⇓

do in Premenstrual phase-

2 days before the expected date of Menstruation.

if endometrium Report ⇒ Secretory Endometrium

↳ ovulatory cycle

Proliferative Endometrium

↳ Anovulatory cycle → Telescopic gland

↳ See Long tubular glands & Pseudostratification

↳ d/t estrogen hormone

While Subnucleal vacuolation → is the evidence of Progesterone secretion on D_{16} on HPE

Cork-screw glands → Seen on D_{20} on HPE (Late secretory Phase)

Maxm stromal edema → Seen on D_{22} on HPE

Leucocytic Infiltration of Endometrium → (Premenstrual Phase) on D_{26} on HPE

* Endometrial biopsy at least once in evaluation of women Infertility to Rule out Genital TB; (144)

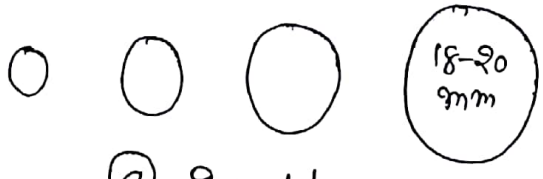
Endometrial biopsy

Saline → For TB

Formalin → For HPE

vi) M/c used test of ovulation in Infertile Patients TVS for follicular Monitoring ⇒

Starts on D_{10}



@ 2 mm/day

Mature follicle

tells the Infertile patient to Intercourse.

→ ① Sudden ↓ in size and free fluid in Pouch of Douglas

↓↓

Suggestive of ovulation.

- also in endometrium on USG ⇒ Trilaminar Endometrium (Tripple Layer Endometrium)

↳ Three hyperechoic Lines seen in Endometrium

↳ Seen in "Periovulatory Phase".

* Single hyperechoic Line ≅ Posterior Enhancement

↳ d/t Secretion from Endometrium

↳ Suggestive of Secretory phase

vii) Urinary LH kits :→

Urinary* LH Surge ⟶ After 24hrs

↳ ovulation takes place

OVARIAN RESERVE

M/c used test for it ⇒ i) S. FSH ⇒ D_2-D_4

↳ on D_3 (Best)

↳ (N) value of S. FSH on D_3

↳ <10 IU

10-15 gu ⇒ Borderline Reserve

>15 gu = Poor Reserve

>20 gu = Suggestive of Premature ovarian failure

≥40 gu = diagnosis of Premature ovarian failure

ii) S. Inhibin B ⇒ on D_3 – <45 pg – Poor Reserve

iii) AFC (Antral Follicle count) – on D_2-D_4

<10 follicle ⇒ Poor Reserve

iv) Best test ⇒ S. AMH (Anti Mullerian hormone; equivalent to MIS)

Very small amount – Small prenatal follicle

<0.5 ng – Poor Reserve

↳ b/c No fluctation in menstrual cycle

(False test - Less)

VI CCCT (clomiphene citrate challange test)

D_3 - S. FSH.

D_5-D_9 - Clomiphene citrate 100mg

D_{10} → S. FSH

high basal level which Rise further on D_{10} – Poor Reserve

TUBAL FACTOR

Fallopian tube should be patent.

Goc for Patency ⇒ HSG (Screening test)

↓ if abnormal

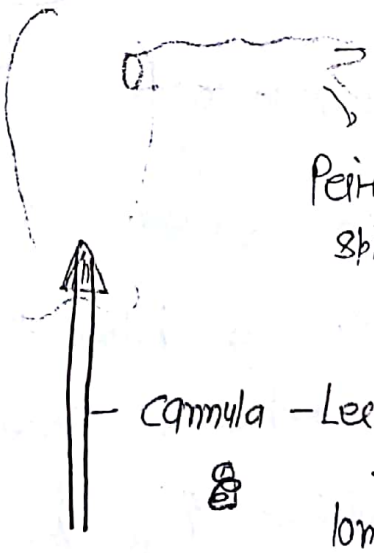
Best → Laparoscopy + Chromopertubation (Diagnostic)

Post-Menstrual Phase ⇒ D_5 - D_{11} day (M/c on D_{10})

↳ dlt Cervix dilation

⊕nt @ this time

and also Pregnancy Ruled out @ this time



* C|I of HSG ⇒ ① Suspected ♀ (UPT → ⊖ve);
② Known case of Genital TB;
(Endometrial biopsy for Aeid fast bacilli ⇒ ⊖ve)
③ Actively bleeding;
④ Current Pelvic Infection;
⑤ K|c|o dye allergy

. HSG as Screening for Uteline Pathologies
- Adhesion
- Polyp
- Submucosal fibroid
- Mullerian Anomalies

. Other Screening Modality ⇒ Sono hysterography
↳ Uses USG & Normal saline

. B|L cornual block (Proximal block)

. B|L Hydrosalpinx ⇒ happen d/t distal block
↳ Represents severe injury

. B|L Proximal block
Mid segment block
Distal block
⇒ Best Prognosis
↳ B|L Proximal block
↳ very less pathologically

B/L Proximal block ⇒ Physiological (In Maxm case) — Cornual spasm (146) / Mucus plug

↓

Next Step ??

Diagnostic Laparoscopy + Chromopertubation + Hysteroscopy

↓ OR K/as "Laparohysteroscopy"

↓ if it fails

On Same sittings; it works as therapeutic by the process of "Hysteroscopic cannulation"

TUBAL PATHOLOGY

Operate ⟵ B/L cornual block Next / Best ↑/t ⇒ Laparohysteroscopy

IVF (preferred over operation; to; avoid ectopic ♀) — Last Resort

* if on HSG ; B/L distal block seen

↓

do Diagnostic Laparoscopy

Mild ↓ ↑/t by Fibroplasty Adhesiolysis

Severe (B/L hydrosalpinx) ↓ do IVF

↓ Fluid ⇒ embryotoxi

· So; before IVF; do ⇒ B/L Salpingectomy & Cornual clipping.

* if on HSG; Proximal & distal block both seen on both of tubes separately (severe)

⇓

do gvf.

* if on HSG ; Mid segment-block seen

⇓

Tubal Ligation ⟶ Tubal Recanalization.

Good Prognostic Marker of conception after Tubal Recanalization ⇒ i) Type of Ligation

Clips > Falope Rings.

⇓

Can be Reversed

Can't be Reversed ; Cautery > Modified Pomeray

ii) Type of Reanastomosis

Best ⇒ Isthmo-isthmic > Isthmo-Ampullary

iii) Total Length after Reanastomosis > 4cm

iv) No other Cause of Infertility

Test done before Anastomosis ⇒ Semen Analysis of husband

GENITAL TUBERCULOSIS

(147)

- Secondry Infection;
- M/c Primary - Lungs > Lymph Node
- M/c Route - Hematogenous
  Direct
  Lymphatics
  Ascending Infections
- M/c site ⇒ Fallopian tube > 90%
  Endometrium 50-60%
- M/c Route ⇒ Direct Spread
- L/c Site ⇒ Vagina & vulva - <2%
- Fallopian tube - Acute - Red Inflammed edematous
  Chronic - Thick walled/ Adhesions
- Cobble Stone appearance on HSG
  Tobacco Pouch appearance on HSG
  Lead pipe OR pipe stem appearance on HSG
  Beads on string appearance on HSG
  Golf club appearance on HSG
  B/L Hydrosalpinx on HSG
  ⇒ Genital TB

* M/c site affected ⇒ Ampulla (1st site to be affected on Genital TB)

L/c site affected ⇒ Intramural

Endometrium → acute – Normal
↳ affects only superficial part
Myometrium – spared
Chronic – Adhesion / Ulcers
(Asherman's Syndrome)

* M/c Presentation ⇒ · Infertility (world over = 10%
India = 17%)
· Pain
· Menstrual Irregularity
↙ ↘
First Menstrual Irregularity → Menorrhagia
More common Menstrual Irregularity → Amenorrhoea > oligo

* M/c Finding In Reproductive Age
↳ (N) Pelvic exam
↳ Tenderness sometime

L/c Finding In Reproductive Age
↳ B/L Adnexal Mass

B/L Adnexal Mass ⇒ M/c finding in adolescent girls ∈ Genital TB

(148)

Diagnostic ⇒ → Endometrial Biopsy (Best)

→ Menstrual blood PCR Analysis
(1st day sample taken to check superficial layer of endometrium)

Rx ⇒ ATT (Anti-tubercular therapy) X 6 Months

↳ Improve fertility status – Yes.

* In case there is Severe Tubal Pathology (distort Normal Anatomy)

↳ ATT doesn't improve fertility status; go for IVF; but ATT is given for Genital TB

UTERINE FACTORS

Infertility caused by ⇒ i) Fibroid – SubMucosal;
ii) Polyp
iii) Endometritis;
iv) DES (Preg. women)
↳ Fetus Female fetus → Uterus (Hypoplasia) Most characteristic T-Shaped uterine cavity

DES — In female fetus

↳ @ Vagina → Adenosis (Sq. epithelium Replaced by columnar epithelium)

→ clear cell cancer

@ Fallopian tubes — Para-tubal cyst

No Renal Anomalies

In Male fetus → Hypospadias | Testicular hypoplasia/ cryptorchidism

↳ Renal Anomalies ⊕

V) acutely Retroverted Uterus

Cochleate Uterus ⇒ Acutely Anteverted Uterus

VI) Mullerian Anomalies

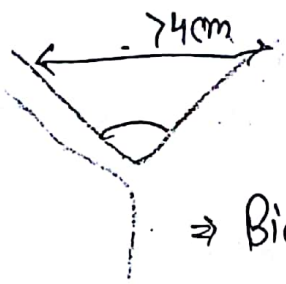
↳ M/c cause of Infertility — Septate Uterus

M/c caused Abortion ↙ ↓

M/c Mullerian Anomaly — Worst Reproductive outcome

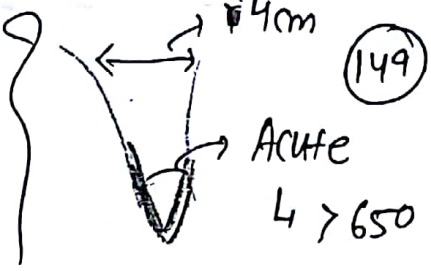
Best outcome ⇒ Arcuate > Didelphys > Bicornuate

Screening test ⇒ HSG (Non-diagnostic)



⇒ Bicornuate

Septate Uterus ⇐



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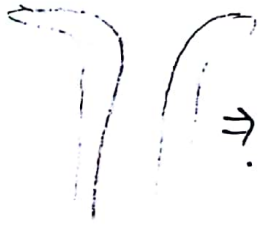


⇒ Didelphius

D/d of septate Uterus on HSG

↳ Bicornuate Uterus

IOC ⇒ MRI *** ⇒ if showing fundal dip >1cm

⇓

Bicornuate.

Sonohysterography

3D/4D USG (Not 2D USG)

↳ usually do

Gold Standard Investigation ⇒ Laparoscopy + hysteroscopy

↓

alone is Not a good Modality.

* All patients of Mullerian Anomalies Undergo evaluation for → Urinary tract anomalies (Renal USG / IVP)

⇓

High Risk

* ectopic ovary ⇒ ↳ Unicornuate Uterus → U/L dysmenorrhea
↳ highest association c
Urinary tract anomalies

* TOC for septate Uterus

↳ Hysteroscopic Resection
(Tompkins / Jones)

CERVICAL FACTORS

- Mucous affects fertility
↳ Characteristics — Impermeable to sperms
↳ Anti Sperm Antibodies — Post coital test
↳ Post coital Cx Mucus — observed under Microscope
Normal → Forward Motility
ASA (+) — Abn Motility
circulatory
Shaky
done @ 12-14th day of cycle

r' Kl as ^ Sims Huhner test

* Newer test ⇒ Immuno bead Assay
Sperm Agglutination
Sperm Immobilization
} Not doing in current clinical Practice.

* Tx of ASA ⇒ i) Intrauterine Insemination (IUI)
↳ Put Sperm directly into Uterus ; bypass the Cx Mucus
IOC for Immunological Infertility.

ii) CC + IUI
↳ 6 Month — 3 month CC alone
\ 3 month CC + IUI

iii) Mild Male factor Infertility
Semen Sample — Processing
↓
Sperm Swim up technique ↳ use Membrane Filter
Sample (highly fertile)

iv) Disorders of Sexual Intercourse
↳ Vaginismus
Failure of erection
} Sexual dysfunction

v) Absense of Male partner (Popular qn developed world).

GUG :- Semen Sample Inserted

O.P.D. Procedure ⇐
- ↳ 0.5 ml (Maxm)
- ↳ Mixed c Liquid Media
- ⇓
- Put it in Uterus
- Preferably on the day of ovulation.

Pell's patient to be in Injected Position in Minimum of 10min. ⇐ — to Reach the site of fertilization c/in 10 minute

Male Infertility Factors

MIC ⇒ defect in Spermatogenesis

Semen Analysis ⇒ Best ⇒ Masturbation

Abstinence ⇒ 2d - 7day

Reach the Lab c/in 60 min

done after Liquefaction

avg. time ⇒ 20-30min

* WHO Parameters for Semen analysis ↳ (151)

↳ Lowest Most value → for fertile

Volume > 1.5mL

pH > 7.2

Total sperm count → > 39 million / ejaculate

(N > 100 million / ejaculate)

Sperm conc^{n} → > 15 million / mL

Total Motility → > 40%

Progressive (Forward) → > 32%

Morphology → > 4%

Vitality → > 58%

WBC count → < 1 million / mL

* Aspermia ⇒ Absense of ejaculate

Azoospermia ⇒ Absense of sperms in ejaculate

Oligospermia ⇒ < 15 million / mL

Asthenospermia ⇒ (Abn) Motility

Teratospermia ⇒ (Abn) Morphology

Necrospermia ⇒ Dead Sperms

Globospermia – Sperms – Rounded head
↓
Lack Acrosomal cap

* Azoospermia
↓ then 1st ly do
- Confirmation on a 2nd sample
(1–4 week gap interval)
↓
if azoospermia confirm
↓
Do LH | FSH | Testosterone

if comes (N)
↓
Klas" obstructive } ⇒ obstruction in
Azoospermia" } Semen Pathway
→ if site of ejaculation block vas deferens ⇒ Scrotal USG
→ if site of ejaculation block on ED (volume ↓es) ⇒ Trans-Rectal USG
↓
dilated seminal vesicle
→ absent seminal vesicle
↓
Cystic fibrosis (∈ CFTR-gene Analysis)

defective ⇒ Spermatogenesis

if Non-obstructive case
. (Testes) – M/c
↓
↑ LH | ↑ FSH | ↓ testosterone
↑ FSH | LH (N) | Testes (N)
↓
Sertoli cells affected
(Leydig cells (N)
. LH ↑ | Testosterone (N) | FSH (N)
↓
Partial AIS
↳ Testosterone (N)
↳ LH ↑es
FSH (Sertoli cell– Inhibin

* if Testes involve ⇒ 1° Hypogonadism (152)
(Hypergonadotropic)

↑LH, ↑FSH, ↓ testosterone

* Non-obstructive Azoospermia

↳ Micro surgical TESE (Testicular sperm extraction)

do for Non-obstructive Azospermia cases ← ↓

ICSI (Intracytoplasmic sperm injection)

* if Sperm count (15 million/mL) → do IUI

(5-15 million/mL) → do IVF

(<5 million/mL) → do ICSI

* Sperm conc^n + Motility > Morphology (Most imp. Parameter in N Sperm)

* ART ⇒ Simplest form ⇒ IUI

All are ART except ⇒ ~~IUI~~

ZIFT

GIFT

ICSI

IVF

gVF

- do for – i) Tubal factor infertility
  ii) Male factor infertility
  iii) Unexplained infertility

⇓

give 1st clomiphene citrate + gug X 3 cycles

↙ for superovulation; Not for ovulation induction

↓ if don't conceive do gVF

iv) PIGD (Pre-implantation genetic diagnosis)

⇓

Site of Genetic Material taken

Blastomere → Polar bodies

⇓ Blastomeres — M/c site biopsy

Usually Blastocyst trophoectoderm (Best)

pierce the zona pellucida — take one cell (Max^m 2 cell) — done on D_5

Blastomere biopsy done on D_3

v) Premature ovarian failure

- Parts of gVF :→ 1st ovulation induction

↳ by inj. Gonadotropins

↓

Follicular grow (Monitor growth by Number, size; E_2)

↓

(153)

↓

Ovulation triggered by Inj. HCG

↓ 34-36 hr after

Ovum pick-up (Under USG guidance)

↓ on same day

IVF (test-tube Embryo formation)

↓

do Embryo transfer (M/c on D3).

↳ Never Put one embryo ; Min^m - 2 Embryo Puts at 2 cm below fundus Under USG guidance

ENDOMETRIOSIS

- Presense of Endometrial glands & stroma outside the Uterus.
- M/c site ⇒ Ovary > Pouch of douglas > Posterior leaf of broad Ligament > Utelosacral Ligament > Fallopian tube

Occur at all sites except ⇒ Spleen.

- dependent on Estrogen for growth (ovarian steroids)

↳ so; disease of Reproductive age g/p (25-35yr)

- It is Rare in adolescent & Perimenopausal / Post Menopausal women

- In Pregnancy — Maxm time endometrium Regress
  ↳ blc of continous - Progesterone Rich cond^n
  ⇓
  decidualization

PGI

Theory of endometriosis

↳ Most accepted theory
  ↳ Retrograde Menstruation (Sampson's theory)

2nd Most accepted theory
  ↳ Coelomic Metaplasia

3rd ⇒ Immune Mediated theory
  ⇓
  Women c endometriosis have deficient cell Mediated / humoral immunity

4th ⇒ Genetic theory ⇒ K-ray
if one First degree Relative affected
  ↳ chance of endometriosis is 7 times more

5th ⇒ Lymphatic / hematogenous (154)

⇓

Umbilical Endometriosis

↳ Lymphatic explains it very well

IOC ⇒ Diagnostic Laparoscopy

↙ ↘

Confirm the diagnosis — Stage

↓

Biopsy (HPE)

↳ if altered coloured blood ⊕

↳ Choclate cyst ⇒ prt. in ovary

↳ Red flame lesion (New lesion of endometriosis)

↳ Powder burnt lesion (chronic lesion of endometriosis)

↙

Minimal → Superficial isolated Implants

Mild → Superficial + Multiple aggregates diameter < 5cm

Moderate → Superficial + deep lesion ↳ (7 5mm deep)

Severe → if endometriosis distorts Pelvic Anatomy

↳ dense adhesion

↳ choclate cyst

On USG ⇒ Choclate cyst can be pickup

↳ Homogenous Ground glass appearance

On MRI ⇒ Only pick up the choclate cyst

↳ do In Adolescent girl comes ☹ Endometriosis.

↳ "MushRoom gap sign" seen.

* CA-125 ⇒ Raised in Endometriosis

⇓ ⇓

Normal <35 In Endometrioma ⇒ CA125 7/100 (Rupture)

*** 24/5/18 Presentation ⇒ Pain + Adnexal Mass + Infertility. (M/c)

↳ Menstrual complain — Menorrhagia

↳ Bowel/Bladder Symptoms ⊕

↳ Catamenial Hemothorax / Pneumothorax

↳ @ the time of Menses (May be endometriosis goes to Lung)

PAIN :- M/c ⇒ Dysmenorrhoea > Chronic Pelvic Pain > Dyspareunia > Low Back Ache

↳ 2° dysmenorrhoea

[1° dysmenorrhoea

d/t Progesterone withdrawl

2° dysmenorrhoea

d/t Underlying disease process (Endometriosis PID)

1° dysmenorrhoea	2° dysmenorrhoea
Spasmodic	congestive (SS)
center (suprapubic)	Localised (on one side)
begins Mostly on the 1st day of Menses	PreMenstrual (week before Menses)
Improves ↓ blood flow ↓ in 72 hrs — Relief	doesn't improve ↓ flow; persist even Post Menstrual
Rx ⇒ Very Responsive to NSAIDs	Less Responsive to NSAIDs
	* also has Dyspareunia; ↓ seen in Rectovaginal septum; deep endometriosis

Why Pain in endometriosis ⇒

Implants ⟶ [Bleed] ⟶ Inflammatory cells

↓ Release

Inflammatory Mediators

Sign of chronic Inflammation

↓ healed by Fibrosis

↓ cause Adhesion

↓ also cause Pain

cause of Pain

* Pain in — Implants

⇓

Neuromodulation (↑ Nerve Endings — Pain sensation)

↓ cause by Estrogen,

* Implants → Estrogen is in Permanent Excess state

⇓

$PGIE_2$ —Upregulation of Aromatase→ E_2

COX_2

(N) Endometrium doesn't have excess Aromatase for Upregulation of Aromatase

⇓

Eutopic

(N) Endometrium has 17-β OH dehydrogenase; which Metabolizes E_2.

* What we do for Pain in Endometriosis :⇒

Pain (Suggestive of endometriosis)

Nature of Pain ??

Minimal – Moderate

⇓

OCP's + NSAIDs → Reduce the Mediators

⇓

It Supress the ovary

If she wants to conceive then only NSAIDs given

⇓

If No improvement

↳ Give Progesterone (do decidualization)

Dienogest (Latest Progesterone)

↳ oral

oral MPA

DMPA (im drug; works for 3 Months)

Mirena (LNG-IUD)

Severe Pain

⇓

Give GnRH Agonist

(given after diagnostic Laproscopy)

(156)

If After Progesterone female is Not Responsible

⇓

Give GnRH Agonist. (given after confirmation of endometriosis)

⇓

by Laproscopy

↳ given in continous Manner

can also Give GnRH Antagonist.

↓ if Not Responsive

Give Danazol ⟶ higher Androgen S/E

Aromatase Inhibitor ⟶ it can produce hypoestrogenic state

↳ if given for More than six Months ⇒ Result in Bone Loss;

So; given "ADD-BACK THERAPY" ⇒ Given NORETHINDRONE

⇓

to protect bone loss.

* Surgical Management of Pain ⇒ i) Adhesiolysis;

ii) Fulguration of Implant;

iii) LUNA (Laproscopic UteroSacral Nerve Ablation);

iv) Presacral Neurectomy

↳ Not effective; Not done Routinely.

v) Adrenal Mass

↳ Endometrioma ⇒ Not Responsive to Medical Mx at all

* Tx of Endometrioma

↳ Cystectomy

I & D of the cyst (destroy the cyst wall) ⟶ Recurrence Rate (80%)

if cyst is < 5cm ⟶ wait & watch

if cyst is > 5cm ⟶ do cystectomy.

vi) Hysterectomy (Last Resort)

↳ only in case of family is complete

ADNEXAL MASS

P/v examination :- findings who tells about endometriosis ⇒

i) Tenderness in Pouch of Douglas;

ii) tender Nodules on Uterosacral Ligament;

iii) Fixed Retroverted Uterus

iv) Adnexal tenderness.

v) Adnexal Mass

⇊

Ground glass appearance on USG

Infertility in Endometriosis ⇒ Main Reason ⇒ Ovarian (157)
(Not Anovulatory)

- folliculogenesis ⇒ defective
- Genetic Material ⇒ Not good of ovum

Gn Moderate - Severe endometriosis ⇒ Main Reason ⇒ Ovarian + Tubal

Gn Minimal - Mild Endometriosis ⇒ Rx Clomiphene Citrate + Intrauterine insemination X3cycle (3 Months)

↓

Superovulation

↓

don't conceive

↳ do IVF

Gn Moderate - Severe Endometriosis ⇒ Rx IVF + Sx

↳ do Mainly; Surgery is Not Necessary to do.

* GnRH Agonists has No Role in improvement of Infertility in endometriosis

* Endometrioma ⇒ If during the IVF; we find the Choclate Cyst

⇓

don't operate: b/c if operate, blc of Follicle damage, Infertility may occur.

Wait & watch ←

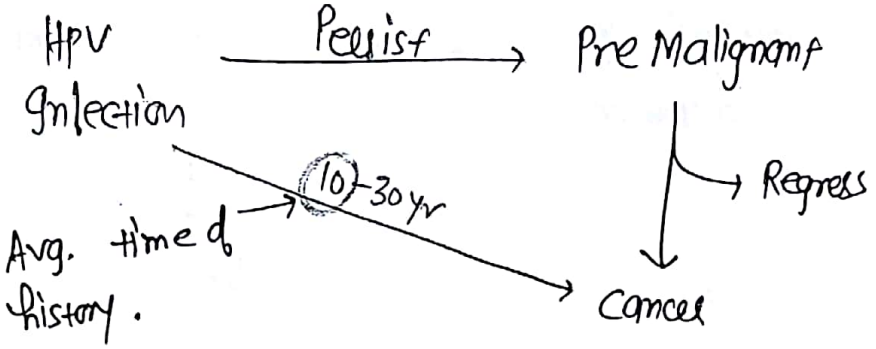
* MALIGNANCIES

* M/c Cancer among Indian women ⇒ Breast Cancer
2nd " " " ⇒ Cervical cancer

M/c cause of Mortality d/t Cancer in Indian women ⇒ "

CERVICAL CANCER

- Very commonly a/w HPV infection (Most women clear this infection)



if all History is given do "Universal Screening"

- Acc. to ACS/FIGO

Starts screening ⇒ 21 yrs (irrespective of Sexual activity)
In

How ?? ⇒ PAPs → 3 yearly in 21-25 yr; everyone will turn out +ve; so: Not do.

PAPs + HPV → 5 yearly (Co-test) → Higher Sensitivity (Ideal ≥ 30 yr, can do in ≥ 25 yr)

Higher specificity ←

Stop ⇒ @ 65 yr (provided the PAPs in Last decade (N))
if Not Normal Stop @ 75 yr.

WHO Programme

Start of Screening ⇒ begins @ ≥ 30yr

3rd - 4th decade (30-49 yr) } More targeted Population Age group.

↓

WHO says " SEE & TREAT ".

⇊

do single test

⇊

How ?? ⇒ via HPV > VIA > PAPs

≡ (visual inspection c Acetic acid) ↳ ideal ↳ for confirmation

Best Method ⇒ HPV + VIA

if HPV alone done ⇒ 5 yearly do

if VIA & PAPs done ⇒ 3-5 yearly do

Treatment Protocol a/c to WHO ⇒ do cryotherapy ? LEEP > Conization

if Not eligible goes for LEEP

* Screening Methods ⇒ HPV testing (DNA testing)

⇊

· For high-Risk viruses

↳ do via Hybrid capture Technique

↳ expensive

· if HPV + PAPs → Cotest

· if do PAPs 1st then follow up by HPV ⇒ Reflex testing

* High Risk virwes

↳ HPV 16, 18, 31, 33, 35, 45, 52, 56, 58

↓ 70% of cervical cancer

↓ 30% of cervical cancer

* Routinely in India we do ⇒ VIA (visual inspection c Acetic acid 5%)

↓

Abnormal → White area (dysplastic cells ⊕)

↓

Aceto white area (Stained Tes)

Unstained Area ⇒ Normal

VILI test — Lugol's Iodine - 4-5%.

Also "Schiller's test"

↳ Brown → Ⓝ test — Normal cells c Glycogen

↳ ⊕ in mature cells

↳ Unstained (Abnormal test)

↳ blc of ⊖ve of dysplastic cells (immature cells)

• PAPs Smear — Screening test (highly specific+y)

↳ Taken by "Ayer's spatula & cytobrush".

↳ taken secretion from endocervix secretion

↓

Pap Smear is alway taken from Bifid end of it & turn it by 360°.

Taken from Transformation Zone > Squamo columnar Junction > Ectocervix of cervix,

(159)

* Smear taken on ONE SLIDE

No Air drying do

↓

Fixative — ?! AIIMS Nov'17 ~~95% Ethyl alcohol~~ + 5% ether

* No Absolute contraindication for PAP Smear; but if actively bleeding patient comes then tell her to come after bleeding stops.

* PAP Smear is also klas " Secretion Cytology ":

* BETHESDA CLASSIFICATION ⇒ ↳ tells about Report comes on PAP Smear.

① Normal Report

② Reactive & Reparative changes (Healing Inflammatory changes);

③ Infection — Specify the organism

* Organism lies inside endocx ; tough to catch in PAP Smear ⇒ Chalamydia Gonorrhoea

④ ASCUS — Atypical Squamous cells of Undetermined significance

ASC — US (Modified Bethesda classification)
H → high Risk

⑤ LSIL — Low grade Squamous Intraepithelial Lesion

⑥ HSIL — High " "

⑧ Cancer

*	LSIL	HSIL
Nucleus	↑	↑↑
Cytoplasm		
No. of cells	Less	More
Granules	evenly distributed (Granular chromatin)	clumps
Membrane	Shrivelled Membrane	Double

Ideally → PAPs done ⟶ For Confirmation

⇓

Biopsy done

(For looking Abn Area

⇓

Use Colpo Scope → Focal Length = 30
Maxm Magnification = 30

⇓

if PAPs comes abnormal ⇒ Colposcopic directed Biopsy

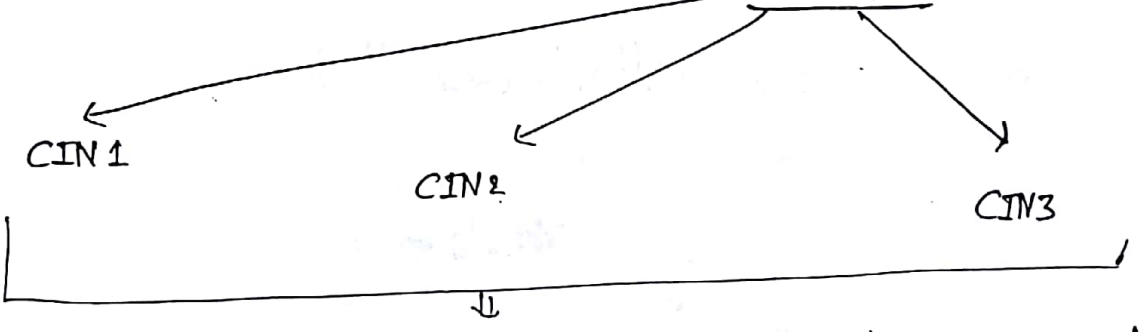
We can see Ectocx
Vaginal wall
vulva;

but we can't see Endocx

* Abnormal Area from where Biopsy should be taken ⇒ (160)
  i) Irregular Surface contour
  ii) Mucosa – Pale in colour
  iii) On Acetic acid → White area seen
  iv) On vascular pattern of
    - Reticular
    - Mosaic
    - Punctate

  ⇓ to visualise vascular pattern clearly; we add Green filter to colposcope

* Since it is Biopsy; so; Colposcope Report called as "HPE Report"



all are Pre Malignant cond^{n} i.e all have basement Membrane Intact.

* HPV cells affects basal & Parabasal cells; so; Cancer starts from Lower part of epithelium
* Dysplastic cells – all Seen in Lower 1/3 of the epithelium
  - ↳ CIN1 ⇒ Mild dysplasia
  - ↳ LSIL = CIN1 = Mild dysplasia

CIN2, CIN3 = HSIL

- Moderate dysplastic ⇓ Lower 2/3 of the epithelium → Dysplastic
- Severe dysplastic ⇓ ? Lower 2/3rd of the epithelium – dysplastic

LSIL ⇒ if the case is of LSIL

Age

- <25yr ⇓ Repeat PAP's
- ≥25yr ⇓ Preferred HPV test
  - if ⊖ve → do Screening.
  - if ⊕ve → Can also do Colpo Biopsy

HSIL ⇒ do colpodirected Biopsy

+

ECC (Mandatory) ⇓ Endocervical curretage

HPV testing has No value; once the Report is HSIL.

Direct Treatment done if the patient will not follow up.

- Cryotherapy ⊗
- LEEP

ASCUS ⇒

- Asc-US
  - if Age
    - <25yr ↓ Repeat PAPs
    - ≥25yr ↓ ⊖ve HPV testing ⊖ve → Repeat
    - ⊕ve → do colpo directed biopsy
- Asc-H ⇓ do colpodirected biopsy;

(161)

* if colpo Reports — confirming the Lesion

CIN-1 ⟶ Ca 1-1.

↓

Follow up

↓

Co-test 1Yearly for 2 years

↳ Usual time of CIN1 to Regress

↓

if Persistant for 2yrs

↓

Treat

CIN-2 → 5-1. (cancer)] Treat.
CIN-3 → 12-40-1.

* How to Treat ⇒

Cryotherapy > LEEP > conization

↓

Who is eligible — 2 criteria

all are known by visual inspection by acetic acid

i) Entire Squamo columnal junction visible
ii) entire lesion should be on Ectocervix;
iii) if lesion should occupy < 75% of Ectocervix

↓

do CRYO ABLATION → apply cold gases (CO_2 / Nitrous oxide)

↳ OPD Procedure

↳ destroy the cells & in tissue

Mech^n of cryoablation

↳ Freeze – Thaw ⇒ Freeze)

↓

do crystallization of intracellular water

⇓

Causes Dessication

Pain Managed by Analgesics

Long term complication ⇒ Persistant watery discharge

↳ bleeding is Not a complication of cryoablation.

* Laser Ablation do → i) If Depth of Lesion is More;

→ ii) Lesion extends on the vaginal wall

* LEEP = LLETZ →

⇓ ⇓

Loop electro-surgical excisional procedure — Large loop excision of Transformation Zone

→ electric current

do cutting + Coagulation

* Bleeding is Not the S/E of LEEP. ***

- No training Required;
- OPD Procedure;
- takes < 4min in completion of Procedure

* Cryotherapy doesn't give us any specimen; while LEEP give us specimen after procedure. (Specimen of Transformation zone)

(162)

* **CONIZATION** :→ Invasive ;
O.T. procedure ;
Remove Tissue ;

* **Indication of cone / CI for LEEP** :⇒

○→ Apex towards inside
→ Cut from Transformation zone

Shallow cone — Deep cone

- ectocx
- endocx
- Junctional zone
- (Mucosa & Stroma

} given by cone

i) Unsatisfactory colposcopy
↳ entire Transformation zone is Not visible ;

ii) When there is discrepency b/w cytology & HPE

iii) if PAP's Smear is HSIL → do colpo. + ECC
↳ ⊕ve

iv) if there is Suspicion of Microinvasion

v) if Biopsy Report says ⇒ Adenoca (Suspicion of endocx involvement).

Q: 38yr old Lady P_3L_3 CIN3 ??

a) ~~cryo~~

b) LEEP
c) Conization
} → we need for follow up.

d) Hysterectomy.

↳ only indication to pre-invasive lesion

4. In Recurrent CIN :
- if Patient will not follow up;
- if Suspicion of Adeno histology & family complete ⇓

May be case of endometrial Ca.; so; do hysterectomy

- Other Pelvic pathologies which justify a hysterectomy.

CANCER

R|F for Cx cancer :-
i) early Age of 1st intercourse
ii) " " " 1st child birth;
iii) Multiparity
iv) Multiple sexual partner
v) Low Socioeconomic status
vi) STD
vii) Smoking → ↑ Sq. cell ca
→ ⊛ Adeno ca.

viii) Pre Invasive Lesion ⊕

ix) OCP → Res Risk if use beyond or equal to 5yr
↳ Nullify Risk if Leave for ≥10yr
↳ ↑ Related to Adenoca

x) family history
Early Menarche
Late Menopause
} ⊗ Not a R/F for Cx Cancer

Etiology of Cx cancer ⇒ HPV
↳ also a/w cervix; vaginal; vulval cancer; Penile; Anal; oral

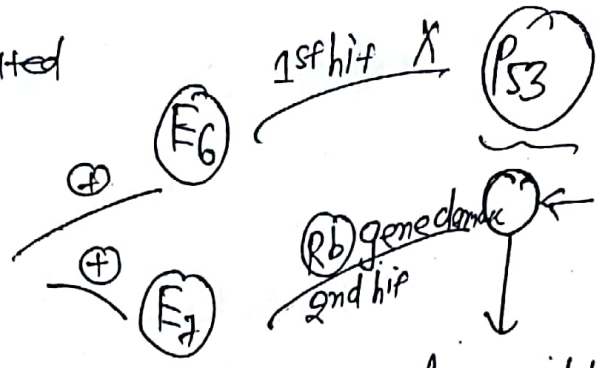
High Risk HPV ⇒ Cause Cancer

Low Risk HPV ⇒ 6, 11 → Cause genital warts
↓
condylomata Accuminata
↳ Laryngeal Papillomatosis

* On HPE of HPV infected cell
↳ Koilocytes
↳ Perinuclear halo.

Cancer ⇒ E_1 E_2 E_6 E_7 viral proteins
⊕ function ⊖

* When virus integrated
c̄ host genome
⇓
E_1 E_2 altered



after 2nd hit; immortal cells complete the cell cycle
⇓
Malignant transformation
↳ E_7 E_6

* HPV vaccines

	Gardasil	CERVARIX
	Quadrivalent	Bivalent
–	Made from inactivated capsid protein	
	16, 18, 6, 11	16, 18
–	Latest FDA approved Gardasil-9 (Nonvalent) 16; 18; 6, 11, 31, 33, 45, 52, 58	
–	given 0.5ml i/m	given 0.5 ml i/m
–	0, 2, 6 Months	0, 1, 6 Months
–	Ideal age to give the vaccine ⇒ 11-12yr can be given ⇒ 9yr - 21yr	
–	Girls/Boys both taken	Girls taken

S/E of vaccine ⇒ Syncopal attack (164)

⇓

So; there has to be observation time of 15 min; then send her to home

* Protection Rate – Quadrivalent Cardasil ⇒ 70%
  Cardasil 9 ⇒ 95%

* M/c virus a/w Cancer Cx ⇒ HPV16 = Squamous
  Most Specific virus a/w cancer Cx ⇒ HPV18 = Adeno

* For Cervical cancer ⇒

  M/c Age ⇒ 3rd–4th decade
  (Shows Bimodal Peak → 1st ⇒ 3rd–4th decade.
  → 2nd ⇒ 5–6th decade)

  M/c histology ⇒ Squamous cell Ca = 69%
  Adeno Ca = 25%
  Large cell Non-Keratinizing squamous cell Ca

  M/c Route ⇒ Direct; Lymphatic

  M/c Presentation ⇒ Irregular vaginal bleeding

  1st Presentation ⇒

  Most Specific presentation ⇒ Post coital bleeding

  ↓ Next
  Clinical examination

clinical examination

↓ ⊕

do PAPs Smear*

* Persistent Post coital bleeding ≥ 6 Months

↓↓

even with (N) PAPs

↓↓

do colpo Biopsy

QQ 35yr P_2L_2 C Post coital bleeding ; O/E 2×2 cm growth on the Anterior lip of cervix ⇒ do PUNCH BIOPSY.

QQ M/c site of distant Metastasis In Cx cancer ⇒ Lungs

M/c cause of death ⇒ Uremia (Renal failure) In Cx cancer

Risk of ovarian involvement ⇒ <1% In Cx cancer (Ovaries - Spared)

Most imp. Prognostic Marker ⇒ Stage > Lymph Node status In Cx cancer

* Staging for cervical cancer ⇒ (165)

FIGO – clinical staging

Investigation should not be used to change stage of cancer :-

USG, CT, MRI, PET ⊗ Not used.

- Cystoscopy (to look bladder cavity);
  - ↳ Part of staging
- EUA (Examination Under Anesthesia);
  - ↳ Part of staging

Stage 1

- A_1 – Micro invasion – depth < 3mm ; Horizontal Limit – < 7mm
- A_2 – Micro invasion – depth 3–5mm ; " – < 7mm
- B_1 → Macro – depth ≤ 4cm
- B_2 → Macro – depth > 4cm

} & all Microscopic cond^n above than A_2.

Stage 2 – Upper 2/3rd of vagina

do MRI; but we can't ↓ change the stage

A – Without invasion of Parametrium (connective tissue)

B – With invasion of Parametrium ↳ clinically seen as Obliteration of Fornices

Stage 3

A → Lower 1/3rd of vagina is involved

B → Spread to Lateral Pelvic wall (Ureter → hydroureter)

↳ Seen by gyn/CT → approved to change stage to look for hydroureter.

Stage 4 :- A → Spread to bladder and/or Rectum

B → distant spread ↓

Inguinal L.N.

* Early Stage Cancer ⇒ Upto Stage IB_1.
  ↳ Primary T/t ⇒ Surgery

Locally Advanced Cancer ⇒ $\geq IB_2$
  ↳ Primary T/t ⇒ Chemo Radiation

T/t of Cancer Cervix ⇒

IA_1 → if Family is complete
  ↳ Hysterectomy
  (Type-I Hysterectomy / simple Extrafascial hysterectomy)

if Family is Not complete

⇓

Fertility preserving conization.
(Therapeutic conization)

⇓

→ Cut Uterus; Cx & Overlying fascia And Remove

IA_2 → if Family is complete
  ↳ Type 2 Hysterectomy + Pelvic LN
  (Wertheims / Modified Radical) dissection

Cut midway b/w Utero Sacral Ligament and/or cardinal Ligament

Remove Uterus; Cx & half of Parametrium ←

+ Lateral Pelvic wall

→ Parametrium

(166)

IA_2 – if Family is Not complete

⇓

do Radical Trachelectomy

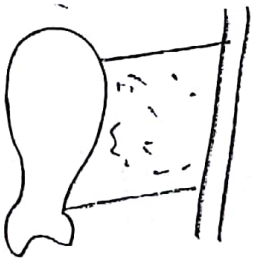
⇓

Remove Cx + Palametrium + Pelvic LN

Spares Uterus

IB_1 – if Family is complete

⇓



Type-3 Hysterectomy (Meigs/ Radical hysterectomy).

+

Pelvic L.N. dissection

↳ When we Remove all the Lymph Node

+

Para-aortic LN Sampling.

↳ Few L.N. Remove

⇓

Insertion on the

Lateral Pelvic wall we

cut the cardinal/ Uterosacral

Ligament

Type 1, 2, 3 Hysterectomy

↳ only for Malignancy

(Piver Rutledge classification)

QQ. Cancer 1cm ; 4mm deep and 9mm Hz Limit 11 Stage ⇒ 1B1

9n case if tumor is ≤ 2cm ⇒ type 2 Hysterectomy (Wertheim's)

M/c Surgery in the Cx cancer ↵

* 1B1 → Family is Not complete

⇊

if ≤ 2cm ⇒ do Radical Trachelectomy.

CHEMORADIATION

9g| stage ≥ 1B2

⇊

Chemo-therapy + Radio-therapy

(give concurrently)

Radiation sensitizers

Chemo Agent ⇒ cis-platin > 5FU

9n 2A1 (< 4cm)

↳ type 3 hysterectomy

⇊

Upper 2/3rd of vagina Removed (or half of vagina Removed)

Not Recommendation; but we do.

* Radio-therapy → Distant → External beam RTH (EBRT) - K/as "Tele-therapy"

↓ Close

Brachy-therapy (9ntra cavitary)

M/c used = Iridium 192

* 1st|y EBRT gives then follow up by Brachy-therapy.

⇊

M/c used = Cesium

(167)

* EBRT gives to Pelvis

↳ Dose ⇒ 50 Gy in 5 weeks
(5 fraction every weeks)

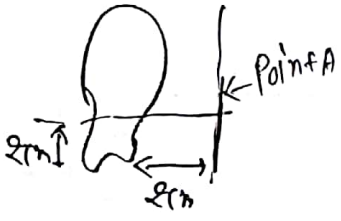
* EBRT gives to Pelvis + Abdomen (Extended field RTH)

↳ Dose ⇒ 30 Gy

* Brachy-therapy gives to Pelvis

Point A

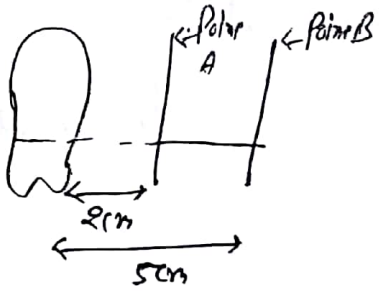
- 2cm above external os
- 2cm Lateral to cervix



- Corresponds to Paracervial Lymph Nodes ; Ureters
- Dose ⇒ 8000 cGy

Point B

- 3cm Lateral to Point A at the same Level



- Corresponds to Uterus

6000 cGy

↳ can tolerate 7000 cGy

Radiosensitive order ⇒ Ovary > Rectum > Bladder > Vagina

↳ can tolerate 7500 cGy

↳ Most Radiosensitive (can't tolerate Radiotherapy)
↳ for tolerant Mobilize it.

* Adjuvant chemoRadiation

↳ give Post-operatively

Reports says ⇒ i) Lymph Node ⊕
ii) Parametrium Invasion ⊕
iii) Tumor Margins are ⊕ve

QQ. What to do in Recurrence of Cx cancer ⇒

Primary ✗ if Sx → do → chemoradiation

if Primary ✗ chemoradiation

Inoperable ↓ ⇐ { Reached Lateral Pelvic wall ⇓ Palliative ✗ ⇓ chemotherapy

Seen by Looks for hydroureter; ULV Limb edema; Pain Radiating on one Leg.

operable ⇓ Central Recurrence ⇓ do Pelvic Exenteration Surgery

QQ Known case of Cancer cervix 3 cm growth upper vagina is involved ⊂ Parametrium ; CT - hydroureter , ; cysto scopy (168) bullosa edema of bladder Mucosa

Stage 3B.

doesn't Mean Invasion of bladder ; i.e Lymphatics obstruction ; so ; Not change the stage

OVARIAN CANCER

- Not very common like of cervical Ca
- No specific sign & Symptom
- Routinely Not Screening for ovarian Cancer

⇓

Pt. comes ⊂ Adnexal Mass

(More Commonly in benign & Malignant ; Not a Rule)

Benign	Malignant
⇓	⇓
In Reproductive Age	In extremes of Age — Pubertal, Post Menopausal
Pain ⊕	⊖
U/L	B/L
Cystic consistency	Variable consistency

Benign
tender

Malignant
Non-tender

IOC for Adnaxal Mass ⇒ TVS

U/L; Unilocular ; Anechoic ⇒ Benign cyst

Most commonly

* M/C cyst of the ovary ⇒ Follicular cyst *

B/L; Solid component ; Septae ; Neovascularity ; Ascites; Enlarged LN/ Matted Bowel Loop
(thick > 2-3 mm)

Ground Mass | Septae

⇓

Malignant cyst. (Highly Risk of Malignancy)

Sx ⇒ Malignancy – Laparotomy

Benign – Laparoscopy

Indication

i) High Risk condition on USG

ii) ovarian Mass > 7cm

Adnexal Mass > 10 cm

iii) Raised CA125 (N value < 35)

↳ only in Post Menopausal age group.

iv Mass present as acute Abdomen → d/t Rupture
d/t Torsion (169)

* Benign looking Mass
(U/L; Unilocular; Anechoic Mass)

→ In Reproductive Age Group patient
⇓ check size
if 3-5cm ⇒ Wait & watch (Maybe follicular cyst)
if 5-7cm ⇒ Follow up 6wks; 12weeks
* Give OCPs → Pain
→ Menstrual Irregularity
→ contraception
⇓
It prevents occurrence of New adnexal cyst;
but Nothing do c currently exist cyst

→ In extremes of Age patient
⇓
Tumor Marker
- Pubertal (Adolescent)
⇓
AFP + Hcg
- Post Menopausal
⇓
CA-125

* Adnexal Mass in a pregnant women ⇒
In 1st Trimester ⇒ Wait & watch;
In 2nd Trimester ⇒ i) High Risk features
ii) >10cm (size)
iii) Acute Abdomen
⇓
Safest time for elective Surgery.

Cyst seen common in ♀ ⇒ i) Theca Leutin cyst → Hcg (Pregnancy Marker)
(Adnexal Mass) ↳ also in Clomiphene citrate therapy

iii) Luteoma — Gn Pregnancy
↓
virilizing ovarian tumor
↳ Gn mother
Less common — Gn fetus
- Spontaneously Regress after ♀.

More the ovarian cycle
⇊
More the Risk of ovarian tumor
More the estrogen
⇊
More the Risk of ovarian tumor

* RIF for ovarian tumor ⇒
i) Early Menarche;
ii) Late Menopause;
iii) Gn fertility;
iv) obesity;
v) BRCA 1 & 2
HNPCC
vi) Smoking (only in Mucinous variety of ovarian tumor)
vii) PCOS

Protective for ovarian tumor ⇒
i) O.C.P
ii) Breast feeding;
iii) only Anovulation (Not a/c Any disease)
iv) Salpingectomy, Tubal Ligation, Hysterectomy } Ascending Mitogens don't Reach ovary

* Fallopian tube ca ; ovarian ca & Peritoneal carcinomatosis
↳ all have common origin ⇒ Fallopian tube

* Types of ovarian tumor ⇒ i) Epithelial ; ii) Germ cells ; iii) Sex cord Stromal

Epithelial ⇓ 90%

Germ cells, Sex cord Stromal ⇓ 10%

(A) Epithelial ovarian TUMOR (Features) -

- Serous — 75%
- Mucinous
- Endometroid } 10% each
- Brenners
- clear cells

Presentation Peak age - 60 yr. (6th - 7th decade)

- B/L
- Non-specific sign & symptom
  - ↳ Irritable bowel Sx
- Late Stage
- High Mortality Rate
- Sporadic - 90%

⇓

So; only 10% tumor are familial.

⇓

⇐ { Gene involved ⇒ BRCA1 *** 5-15%
BRCA 2 - 25
HNPCC - 15%

Can tend to occur a decade earlier (50yr)

* if First degree Relatives affected → Risk ↑es by 3 times.

QQ if patient is K/c/o Genetic Mutation →

Go for Prophylactically Sx

⇓

Go for BSO (Beyond 35yr Risk ↑es every year)

↓

BSO (B/L Salphingo-oophrectomy)

↓

done @ 35yr or as soon as family complete

↓

This surgery protects → got from ovarian cancer

also protects from Breast cancer by 50%..

2nd Line approach ⇒ if Patient doesn't want to go for BSO

⇓

give OCP's + Screening – High Risk

⇓

High Risk { i) Strong family Breast/ovarian Ca
ii) K/c/o Genetic Mutation

Screening ⇒ TVS + CA125

Start @ 35yr 6 Monthly / 12 Monthly

Ovarian Tumor

⇒ M/c ovarian Tumor = Serous cyst Adenoma

M/c ovarian Ca = Serous cyst Adenocarcinoma

* Mucinous ovarian tumor ⇒ i) Decade earlier
ii) Grow to Large Size (20 cm)
iii) Diagnosed early
iv) Better Prognosis
v) UL (B/L in 10% cases)
vi) CEA (Tumor Marker)

* CA125 ↓Tumor Marker for Serous tumor

(171)

vii) Pseudomyxoma Peritonei

(Loculated Mucinous collections in Abdomen)

↳ M/C Seen ē tumor of Appendix; Not ovary.

* Endometroid ovarian Ca – high Risk for co existant ē "Endometrial Ca".

↳ 10% of total Epithelial

↳ U/L in Nature

* Clear cell ovarian Ca – higher association ē Endometriosis

⇓

also a/w Endometroid ovarian Ca.

↳ Hob Nail cells ⊕ (O)

↳ HPE findings.

* Brenners – U/L; Benign; solid lesion

↳ on HPE – Bladder Like epithelium – Transitional epithelium.

(B) GERM CELL TUMOR ≒ 5-8% of all ovarian tumor

. Teratoma → Mature cystic Teratoma (Dermoid)

↳ Immature.

. Dysgerminoma

- Embryonal cell Ca
- EST (Endodermal Sinus tumor) / Yolk sac tumor
- Choriocarcinoma
- Mixed tumor

M/c Germ cell tumor of ovary ⇒ Dermoid

M/c Germ cell cancer of ovary ⇒ Immature Teratoma > Dysgerminoma

* Feature ⇒ i> U/L (Unilateral);

of GCT Which GCT has higher Risk of Bilaterality ⇒

Dysgerminoma > Dermoid
(15%) (10%)

ii> Seen in Younger girls (10-30yr)

⇓

What % of ovarian tumor in this Age gp. are Germ cell tumor ⇒ 70%.

iii> Non-Specific sign & Symptom + (A) Precocious Puberty
(B) Acute abdomen

iv> Pick up in early stage:

v> Good Prognosis

vi> Conservative Sx.

b/c GCT Release hCG
⇓
& Submit similar to LH / FSH
EST / Yolk sac tumor
↳ Most Rapid growth of tumor

TUMOR	TUMOR MARKER
* Dysgerminoma	⇒ LDH (HCG + PLAP) (Tumor Marker)

(172)

Fleshy; Lobulated & Tan in colour.

↳ Not Secrete AFP.

* Endodermal Sinus tumor ⇒ AFP (LDH)

↳ Tumor Marker

↳ Not Secrete HCG.

* Choriocarcinoma ⇒ HCG

* Embryonal ⇒ HCG + AFP

* Dermoid ⇒ No Tumor Marker

↳ Rarely HCG Secrete

↳ Roki-tansky Protrubance / Tip of Iceberg sign

⇓

White Area Inside cyst (black) in USG.

* M/c ovarian tumor in Reproductive Age ⇒ Dermoid.

" " In ♀ ⇒ Dermoid

" Cancer ⇒ dysgerminoma

* Dermoid ⇒ Benign

↳ Risk of Malignancy (0.2-2%)

type: Sq cell Ca

site: Rokitansky protrubance

↳ M/c ovarian tumor to goes in torsion.

* Germ cell cancer ~ Best Prognosis ⇒ Dysgerminoma

" " " Worst Prognosis ⇒ EST / Yolk sac tumor

* only ovarian tumor ~ is Radiosensitive

↓↓

Dysgerminoma (Moderately Radiosensitive)

② Sex cord Stromal tumor (3+)

- Granulosa cell tumor
- Sertoli- Leyding cell tumor
- Leydig cell tumor
- Thecoma
- Fibroma (Stromal tumor of ovary)

Features ⇒ , U/L ; occur in all age gp / Peak Incidence in Peri Menopausal women;

- Non specific sign/symptom,
- AUB ⟶ Estrogen
  or
  virilization ⟶ Testosterone
- early stage pick up
- don't show any Lymph Node Metastasis.
- Best prognosis:
- Granulosa cells tumor ⟶ Inhibin
  ↳ Secrete estrogen → Risk of endometrial ca ††.

- On HPE ⇒ · Call exner bodies (follicle) (173)
  · Rokitansky Protuberance (also in dermoid)
  · Walthard cell Nest
  Coleb-bean cells (also seen in Brenner tumor)
  · Reinke's crystal — Leydig cell tumor
  · Schiller-duval bodies — EST tumor
  · Psammoma bodies — Serous cystadenoma of ovary

- Krukenberg's tumor ⇒ Not a Primary tumor; Secondary tumor.
  - M/c Primary tumor ⇒ Gastric cancer
  - Spreads via Retrograde Lymphatics
  - B/L in 80% cases
  - Shape of the ovary Maintained;
    Capsule of the ovary Intact
  - On HPE ⇒ Signet Ring cells*

* STAGING OF OVARIAN CANCER ↳ by FIGO; Surgical staging.

Stage 1
- A → U/L ovary
- B → B/L ovary
- C_1 → Intra operative capsule Rupture
- C_2 → Pre operative capsule Rupture
- C_3 → Malignant Ascites

Stage 2
- A → Cancer Spread to Uterus / Fallopian tube
- B → " Pelvic structures

Stage 3

A — 1 ⇒ ⊕ve Retroperitoneal Lymph Node
A — 2 ⇒ Microscopic extrapelvic peritoneal spread

B — Macroscopic ≤ 2cm extra pelvic peritoneal spread

C — Macroscopic > 2cm extrapelvic peritoneal spread
↳ if there is involvement of capsule of Liver/ spleen

Stage 4

A → Malignant pleural effusion

B → Parenchyma of the abdominal organ
distant spread
Inguinal Lymph Node

Stage 1/2 ⇒ early stage Ca

Stage 3/4 ⇒ Advanced stage Carcinoma

* For early diagnosis of ovarian Ca ⇒ TVS
or
K/C/O ovarian Ca ⇒ Best ⇒ CT-scan
↳ can't do staging by CT-Scan

* On Follow up; if CA 125 ↑es
↳ it Means Recurrence happen
↓
do PET scan

Staging Laparotomy ⇒ Steps

(174)

i) Midline vertical Incision
   - Never give Pfannenstiel Incision or transverse Incision; Rarely Paramedian Incision given

ii) Ascites → Sample taken → Cytology for Malignant cells

OR

Saline wash → 50–100ml → Cytology for Malignant cells

iii) Inspection & Palpation of all abdominal organs

iv) Random Peritoneal biopsies
   - Paracollic gutters
   - Pouch of douglas
   - Surface of diaphragm → Scrapping (acceptable)

v) TAH ± BSO (Pan hysterectomy)
   - type 1 hysterectomy

vi) Infracolic Omentectomy.

vii) Pelvic & Palaaortic LN Sampling

viii) closure

* In Stage 3/4 ⇒ Primary T/t ⇒ Surgery
↓
Debulking Sx

* Post-operative ⇒ Chemotherapy.

* Conservative Sx for ovarian cancer ⇒ U/L Salphingo-oopherectomy

↳ eg ⇒ Germ cell tumor
(U/L; Younger age patient)

- Stage 1A (if fertility is desired).
- Borderline epithelial ovarian tumor
↳ epithelial ovarian potential ≈ Low Malignant potential
(Stromal Invasion - Absent)
Very good prognosis
U/L
decade earlier

Post-operative chemotherapy

(175)

↳ epithelial ⇒ all stages except ≠ 1A & 1B graded cell ca Need Post-op. chemotherapy,

Chemotherapic Agent ⇒ Carboplatin + Paclitaxel } 6 cyc.
↓
Cisplatin + Paclitaxel }

given i/v + Peritoneal.

Germ cell ca, Sex cord ca ⇒ all Stages Need chemo. except ⇒ Dysgerminoma stages II No Need of chemotherapy

Only Advanced stages Need chemotherapy.

Chemo. Agent ⇒ BEP (Bleomycin, Etoposide, cisplatin).

ENDOMETRIAL CANCER

Etiopathogenesis ⇒ ↑ Estrogen (unopposed)
↑ Menstrual cycles

· RF ⇒ Early Menarche;
Late Menopause;
PCOS;

v) Infertility

vi) obesity
vii) HTN
viii) Diabetes
→ Endo ca (corpus cancer Syndrome)

viii) Tamoxifen → highest - 70%.

ix) BRCA1, 2, HNPCC → Lynch syndrome
↳ a/w ovarian ca; Not of Breast cancer

x) HRT (only Estrogen)

Protective of Endometrial ca :
- Smoking
- OCP (↓ Risk by 60%)
  (↓ Risk of ovarian ca by 50%)
- Exercise
- Green tea

Histology ⇒

Type 1	Type 2
Endometroid	Papillary; serous; clear cell
Most common in 80% cases	In 20% cases
Estrogen Responsive	Non Responsive
Pre Invasive	⊗
Good Prognosis	Poor prognosis (Worst Prognosis clear cells)

(176)

Type I		Type II
Gene association ⇒ PTEN ← Gatekeeper Gene KRAS		p53
Microsatellite deletions		High grade serous show p53 Mutation Low grade serous show KRAS Mutation
Peri Menopause early Menopause		Late More Age More type II
Obese Lady		thin Lady.

* Pre Invasive Lesion ⇒ Endometrial hyperplasia

which changes into the endometrial Ca

⇓

on HPE by taking endometrial Biopsy.

Kla "cystic glandulas hyperplasia": { Glands & Stroma both proliferate

- Simple hyperplasia — c/out Atypia → 1%
- Complex " → 3%
- Simple c Atypia → 8%
- Complex c Atypia → 29%

Glandular Proliferation is Much more than ~~Stromal~~ Stromal proliferation

⇓

Back to Back arrangement of gland.

- Hyperplasia c/out Atypia

↳ given Progesterone 1st ly

M/c ⇒ MPA X 6 Months
(daily) ⇓
Repeat Biopsy

also we DMPA
Mirena

- Hyperplasia c Atypia

Reconfirm ← ↳ do Hysterectomy (TOC)
(Frozen section)
↳ Intraoperatively Send & get a
Immediate Report & Reconfirm
⇓ if Not possible
do Endometrial sampling (Optional)
(FC + Hysteroscopy)
↳ Functional Curettage

2nd Line ⇒ if wants Preserving the Uterus
⇓
Reconfirm on Repeat Endometrial sampling
(Ec + hysteroscopy)
⇓
2ndly Progesterone (Prefer – Megestrol Acetate x 6 Months
Other MPA
Mirena)

(177)

* Simple hyperplasia
  Cystic glandular hyperplasia → Metrophthica Hemorrhagica

↓

Age ⇒ 40–45yr

8 weeks of Amenorrhoea ⇒ (Anovulatory cycles b/c Unopposed Estrogen)

History of bleeding ⇓ Painless

Endometrium on HPE ⇒ Absense of Secretory Pattern

Swiss cheese appearance

Ovary ⇒ Cyst

Ca ⇒ 1°

TOC ⇒ Progesterone

* Peak age for endometrial cancer ⇒ 60yr (5–7th decade)

M/c presentation / 1st presentation = Irregular vaginal bleeding

Most specific presentation = Post Menopausal bleeding (PMB)

% of PMB have endometrial Ca = 10%

↓

M/c cause ⇒ Senile endometrial Atrophy (Atrophic endometritis)

M/c cause of PMB in India ⇒ Ca cervix

* M/c Cause of Pyometra ⇒ Endometrial Ca
  In India ⇒ Cervical Ca

* M/c Route for endometrial Ca ⇒ Direct spread
  " " ovarian Ca ⇒ Tumor Exfoliation

* No Routine Screening done for endometrial Ca
  ↓
  if Pt. is K/C/O "HNPCC" – do Routine Screening
  ↳ age 35yr
  do fractional curettage (FC)
  6 monthly / 12 monthly.

* Any women comes ☹ Post Menopausal bleeding
  ↳ Rule out Endometrial Ca

* if women ≥ 45yr ☹ AUB
  ↳ Rule out Endometrial Ca

Next Step → do TVS (see endometrial thickness)
⇓
acc. to ACOG if thickness ≥ 4mm / AIIMS May 18 " American Radiological " ≥ 5mm } → high Risk for cancer

If endometrial thickness < 4mm (Acog) / < 5mm (American Radiology) (178)
↳ No Tes In Risk of Cancer

* IOC ⇒ **Endometrial Biopsy**

* TVS do to Rule out other pathologies like fibroid; Polyp

O·P·D Procedure; Aspiration do
(Endometrial Aspiration cytology)
⇓
We use "KARMAN'S CANNULA"
Other device "PIPELLE DEVICE"
"VATIRA ASPIRATOR".

* Gold Standard technique to Rule out endometrial Ca
⇓
Most Invasive
⇒ Functional curettage + Hysteroscopy
May (D&C) → use synonym ≈ Functional curettage
O·T· + Anesthesia Needed
→ 1st ly do cervical curettage – (Endocervical curettage)
⇓ then
dilate Internalos
⇓ then
Endometrial curettage
← if 1st ly do endometrial cells comes In cervix.

Condition where Functional curettage done

i) Endometrial biopsy – Benign ; while Symptom Persistant

ii) Endometrial biopsy – No Endometrial cells seen

iii) Hyperplasia c Atypia (preserve the Uterus)

iv) Cervix Stenosed

* Should we do PAP Smears in Post Menopausal bleeding ⇒ Yes.

Staging → FIGO → Surgical staging

Stage 1 { A – only Endometrium or < 50% of Myometrium
B – > 50% of Myometrium
(Intraoperatively Cut open the Uterus)

Stage 2 – cervical spread
⇓
only if cervical stroma is involved

Stage 3 A → Cancer spread to Serosa / Adnexa
B → " Vagina / Parametrium
C1 → ⊕ve Pelvic LN
C2 → ⊕ve Para-aortic LN

Stage 4 A ⇒ Spread to Bladder and/or Rectum (179)

B ⇒ Distant spread / Inguinal L.N

Staging Laparotomy

↳ Omentectomy is Not done Routinely

↳ for type 2 Endometrial Ca

- do TAH & BSO

↳ type 1 — Stage 2 — Type 3 hysterectomy

⇓

cervical spread

- Pelvic & Paraaortic LN sampling ⇒ Type 2 cancers L.N dissection

- Stage 3/4 ⇒ Advance stage Ca

↳ Primary ↑x ⇒ Debulking surgery

Post-operatively

⇓

Low Risk

- all three
a) Endometrioid
b) Grade 1
c) only endometrium

Intermediate Risk

In b/w Low & high Risk

High Risk

a) Stage 3/4 disease
OR
b) type 2 cancer

Tt of Low Risk ⇒ Need No Post-operative Tt; do Follow up

Tt of Intermediate Risk → Pelvic Radiotherapy

Tt of high Risk → Chemotherapy + Radiotherapy
↓
(Cisplatin + Paclitaxel)

PROLAPSE → Recent classification
↳ POP-Q classification
↳ Pelvic organ prolapse quantification
↓
Reference ⇒ Hymen.

* DeLancey Level of Support

Level I – Uterosacral Ligament + Cardinal Ligament
↓ if
weak ⇒ Uterocervical descent

[earlier classified as
1st degree → descent above vaginal opening
2nd degree → Uterus descent @ the Level of vaginal opening
3rd degree → Uterus descent outside the vagina
Procidentia → Uterus completely outside the vagina
↳ Fundus is also outside

→ Apical Prolapse → Enterocele → Prolapse of GUT into Pouch of Douglas.
→ vault Prolapse (apex of vagina)
(Post hysterectomy)
→ Uterocervical descent

Level 2 ⇒ Paravaginal tissue & their attachment (180)
fascia coveling Levator Ani
↳ weak causes ⟹ Cystocele (upper 2/3rd Anterior wall)
↳ M/c type of Prolapse

Level 3 ⇒ Perineal body & Muscle attach to it
↳ B ⇒ BULBOSPONGIOSUS;
L ⇒ LEVATOR ANI MUSCLE;
E ⇒ EXTERNAL ANAL SPHINCTER
S ⇒ SUPERFICIAL TRANSVERSE PERINEAL MUSCLE
S ⇒ SPHINCTER URETHRAE
D ⇒ DEEP TRANSVERSE PERINEAL MUSCLE
↳ Weakness causes ⟹ Rectocele (Post. vaginal wall)

* Prolapse is disease of older Age.

- R/F of Prolapse ⇒ i) No. of deliveries & process deliveries
(Prolonged Labour
Instrument delivery
episiotomy "
Perineal tear
obstructed Labour

ii) Teg Age (d/t loss of estrogen)

* Younger age women also have Prolapse of uterus by → May
i) Connective tissue d/o.
ii) Congenital elongation of Cx
iii) Spinal cord Injury

* Smoking ↑es Risk of Prolapse

* Intra abdominal Pressure ↑ ⇒ ↑es Risk of Prolapse

↳ Chronic cough ; Ascites.

Case I :- Old woman P_3L_3 ; 3rd degree Utero cervical descent + cystocele + Rectocele

Utero cervical descent → do Vaginal hysterectomy

Sequence of cutting & clumping the structure in TAH

↓

Reverse the sequence of vaginal hysterectomy

Sequence of cutting & clumping of sequence

Firstly Utero sacral Ligament

↓

Cardinal Ligament

↓

Uterine Artery

↓

Utero ovarian Pedicle

* Sequence of cutting & clumping the structure in TAH & BSO ⇒

Utero sacral Ligament → Cardinal Ligament → Uterine Artery → Infundibulo pelvic Ligament

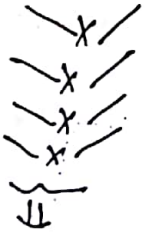
↓

Utero ovarian Pedicle

* Usually we prefer vaginal hysterectomy ; but it is difficult in — Uterine size > 12wk (181)
  Obese
  Pelvic Adhesions.

* Urinary Tract Injuries
  ↳ Laparoscopic Sx > Abdominal hysterectomy > Vaginal hysterectomy
  ↳ highest Risk for Urinary tract injuries in Benign cond^n
  ↳ Seen c hysterectomy for Malignancies
  (Wertheim's hysterectomy)

* Rx of Cystocele → Anterior colporrhaphy
  ⇊
  (Vagina)



Rx of Rectocele → Posterior colpoperineorrhaphy
⇊
Strengthen the Levator Ani Muscle

VH + Ant. colpo + Posterior colpoperineorrhaphy

⇓

VH + Pelvic Floor Repair

⇓

Ward Mayo Sx **

+ Enterocele Sx

⇓

do prophylaxis; also do for vault Prolapse

⇓

McCalls culdoplasty

↳ vaginal Repair

Other Surgeries for Enterocele ⇒ Moschcowitz Repair, Halbains Repair

Both are Abdominal Repair; Not used Now a day

Support the vaginal vault ∈ Utelosacral Ligament in McCalls culdoplasty.

2nd case — Younger Age group Reproductive + Prolapse (Uterocervical descent).

↳ can't do hysterectomy

TOC ⇒ ** Sling's Surgery

↳ Modified Shriodkers abdominal Surgeries

Anterior sling (if tape tie's at anterior aspect of isthamus)

* Pyrandale Sx (↳ Autologus (tendon fascia lata) and — Aponeurosis external oblique muscle

Posterior sling (if tape tied at Posterior aspect of isthamus)

* khanna's Sling.

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Khanna's sling

↳ one end at ~~Posterior aspect of~~ Isthamus ;
Other end ~~Anterior Superior~~ Iliac spine.

Shriodkar sling ⇒ Posterior sling

↳ Meselene tape used
↳ on the left hand side first pass through Psoas Muscle (Form Psoas hook) then goes to sacrum

⇓

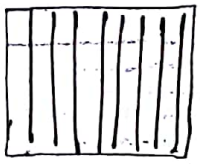
to prevent compression & obstruction of sigmoid colon / Rectum.

Vikrud's sling ⇒ Composite sling

(Anterior + Posterior sling)

Abdomino cervicopexy ⇒ For putting Mesh we have to clear Pre-Sacral Area ; technically difficult ; but Results are better.

Mesh



↳ higher complication

* Non sling surgery ⇒ Manchester Repair

(Kas " Fothergill's Surgery)

↳ *done in Reproductive age women who completed child bearing..

- also done in congenital Cx elongation

UCL (Uterocervical Length) estimation

- Process ⇒ of Manchester Repair

↓ D & C (to prevent the complication of cervical stenosis)

↓ Cervical Amputation

↓ Reattach cardinal Ligament anteriorly

↓ Cover the Cervix → ⊂ Vaginal Mucosa

Cystocele done

Rectocele Repair done

if the UCL Yes ; don't do sling operation ; do Manchester Repair

UCL = Uterocervical Length

(N) UCL Length ⇒ 6 to 8 cm.

* Shriodkar Modification of Manchester

↳ Can be done even if woment want to conceive.

↳ All steps are same in it except there is No cervical Amputation in it.

3rd case — Old woman + Co-morbidities (183)

↓

PAC (Pre-Anesthetic Check-up) — fit for short Sx.*

Latzko colpocleisis ⇓ done for Vesico-vaginal Fistula.

Rx ⇒ LeFort's colpocleisis

- DeNude Mucosa – Anterior Vaginal wall
- DeNude Mucosa – Posterior vaginal wall

Means Scrape Mucosa from Anterior & Posterior vaginal wall

1st ly we Rule out Cx Cancer & Endometrial Cancer

& Patient can't be Sexually active

- Done Under Local Anesthesia.

{colpocleisis ⇒ closure of vagina}

4th case — Co-Morbidities + old woman

↳ PAC ⇒ Unfit for short Sx.

Rx ⇒ Pessary → Space occupying device
- Insert into vagina

Gellhorn Pessary 

Doughnut Pessary 

* Early ♀ ∈ Prolapse – also Indication of Pessary
↳ Remove – 16–18 weeks.

* Other Indication of Pessary – Puerperium

* Ulcer on Prolapse part

↳ Decubitus Ulcer

Relative c/I for Pessary

Seen d/t venous congestion

↑/t ⇒ Reposit

How to Reposit ??

Use Tampon (Hygroscopic) → Like Pads; used to absorb Menstrual Flow

↳ Use Glycerine Acridine (Tampon Soaked in it) → Antiseptic in Nature

healing Requires ⇐ b/c Surgeon Never Operate on Nuded area.

also use Local Estrogen Creams for faster healings.

5th case

Women who have Vault Prolapse

Abdominal Surgeries

- Abdl. Sacrocolpopexy (Best) → Technically difficult Suture the vault to Sacrospinous Ligament
- Uterosacral Suspension
  ↳ M/c done*

Vaginal Surgeries

- Sacrospinous fixation
- Uterosacral Suspension

* Leborte Colpocleisis can also done in vault prolapse (184)
  ↳ in short time Sx.

* all are Sx of vault Prolapse except ⇒ Colposuspension:
  ⇓
  done in Stress Urinary Incontinence (SUI)

Burch colposuspension
⇓
Gold Standard Surgery for SUI

TOC for colposuspension ⇒ TVT | TOT
↙ Transvaginal tape
↳ Trans obturator tape

MMK colposuspension (Marshall-Marchetti-Kranz surgery)
⇓
Not done
Support the urethera by Periosteum of Symphysis Pubis

Transvaginal tape
⇓
Mid urethral Sling

Kind of Abdominal Surgery
- Support the proximal urethera by Cooper's Ligament.

i) They are as good as Burch colposuspension
ii) Day-care Sx;
iii) Lesser complication;
iv) vaginal Surgeries;

* Trans vaginal tape ⇒ Retropubic Surgery

Trans obturator tape ⇒ Not Retropubic Surgery

↳ In it we enter the Space of Retzius

⇊

So; More complication than TOT; so,

We prefer TOT Now a days.

* Pt c Vault prolapse + SUI??

⇊

Abdominal Sacrocolpopexy

Rx ⇒ Burch colposuspension.

* 1st Line Mx of SUI ⇒ Kegel's exercise i.e Pelvic floor exercise
* Drug Rx of SUI ⇒ DULOXITENE (only drug Rx of SUI).

FIBROID

- Smooth Muscle tumor of Uterus ??
- M/c benign Pelvic tumor in females. ??
- a/w Estrogen; so, Seen in Reproductive Age

  in >35yr women; it is More common
- In PostMenopausal women → Regression seen.
- In Pregnancy — Most of the fibroid don't enlarge

→ grow within Myometrial wall.

Types :→ Intramural (M/c)** ⇒ 75% (185)

↳ Most fibroids to begin as Intramural & Later converted into different types

Subserosal

grow outward toward the peritoneal surface

Sub Mucosal

↳ grow toward the uterine cavity,

Hysteroscopic appearance (Wamstekers classification).

↳ Type 0 → Completely Intracavitary

Type 1 → >50% Intracavitary i.e <50% in Myometrium

Type 2 → <50% Intracavitary i.e >50% in Myometrium

↳ can't be Removed hysteroscopically

M/c presentation ⇒ ASymptomatic

M/c Symptom ⇒ ① Bleeding → Menorrhagia

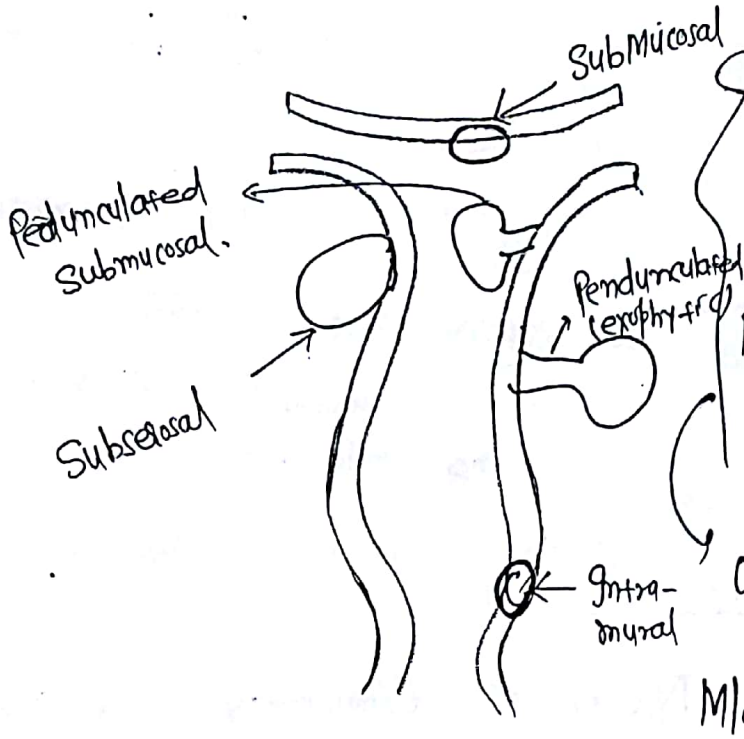
⇓

Cycles — Regular

Flow — ↑↑↑

M/c cause by which fibroid ⇓ Submucosal

While Subserosal fibroid Not a/w bleeding



Fibroid Polyp
↳ cause Menorrhagia

Fundal Fibroid Polyp
↳ cause Inversion of Fundus.

Uncommon.

M/c presentation of fundal fibroid (Submucosal)
⇓
Menorrhagia **

② Pain → if it Undergoes - degenerations

Torsion - Pedunculated Subserosa

M/c degeneration ⇒ Hyaline ***

Least common !! ⇒ Sarcomatous **

↓

Rare Malignant change
↳ < 0.5%
↳ Post Menopausal fibroid enlarge & Pain.

* Womb Stone – Subserosal fibroid stone ; (186)
  ↳ Old bladder stone ⇓ Calcification
  ↳ It is eccentric → Differential diagnosis

* Red degeneration ⇒ Seen in ♀
  - M/c in 2nd Trimester.
  - presenting as acute Abdomen (Pain + Nausea; vomiting ± Fever)
  - Mx – Conservative
    N.P.O + i/v fluids + analgesic
  - Stained Salmon Pink & or Red
  - Fishy odor. &
  - Histologically : evidence of thrombosis in some vessels. &
  ↳ aseptic cond'n ⇒ No Role of Antibiotic **
    ↳ Fever is Reactionary only

* In Fibroid ⇒ dysmenorrhoea ⊕ ; but Not a primary complaint.

* Fibroid doesn't cause dyspareunia
  Fibroid May show Pressure symptom
  ↳ Ant wall Fibroid ⇒ Urinary Symptom
  Post wall Fibroid ⇒ Bowel symptom **

* Ant. wall fibroid cause ⇒ ↑ Frequency of Micturation

Post. " " " ⇒ Urinary Retention

* BROAD LIGAMENT FIBROID

False

↓

Subserosal uterine fibroid outgrown into the Layers of Broad Ligament

True

↓

denovo b/w the Layer of broad Ligament

Lateral to the Fibroid ← Uterus → Medial to the Fibroid.

* Fibroid also prone Infertility } Submucosal Fibroid only **

Recurrent ⊙ Loss }

* Pregnancy complication of Fibroid

apart from RPL & Red degeneration

↳ Abruption
Pre-term Labour
Malpresentation
dysfunctional Labour
PPH

IOC ⇒ USG (Hypoechoic)

↳ Well-circumscribed Masses; Pseudocapsule

Small SubMucosal fibroid May Miss In USG

⇓

Best Ix ⇒ Hysteroscopy

2nd Best ⇒ SIS (Saline Infusion Sonography)

* Don't do MRI ⇒ Routinely

↓

do in pre-op. condⁿ to know — No.
— size
— Location

* DD

Fibroid	Adenomyosis
• Smooth Muscle tumor	Endometrial glands & stroma Inside Myometrium
• > 35yr age	40-45yr age
• Menorrhagia	Menorrhagia + dysmenorrhea
• Non tender	Tender (Half/Ben size)
• Irregular growth (Lumpy Bumpy growth)*	Symmetrical growth (Globular)*
• Grows upto uterus sized 20 week	10-12 week

Fibroid

goc ⇒ USG

Adenomyosis

MRI

On USG we see ⇒

Salt pepper appearance

Venetian blind ⇒ alternate dark & light band

Myometrial cyst

Subendometrial cyst

Poorly defined Junctional zone ⇒ don't tell about where endometrium starts & Myometrium ends

* Degenerations/ Secondry changes in Fibroid

↳ Mnemonic

↳ Avoid → Atrophy;
Red → Red degeneration;
Hot → Hyaline degeneration (Mlc)
Fatty → Fatty degeneration or calcification
Meat of → Myxomatous degeneration
Chicken → Cystic degeneration.

On MRI ⇒ Junctional zone thickness

> 12mm ⇒ Likely adenomyosis

< 8mm ⇒ Unlikely ⇒

· For confirming Adenomyosis ⇒ (HPE) - Postoperatively

↓

See depth of these endometrial glands in Myometrium

↓

Atleast 1 HPF deep / 2.5mm deep } to the Junctional zone

TOC ⇒ Hysterectomy *

T/t for Fibroid ⇒

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Medical ⟶ Surgical

Minimally Invasive (Not Responsive to Medical Rx; Not willing for surgical)

Bleeding

(don't Reduce the size)

DOC → OCP
Mirena
Tranexa

Tranexa ← Yes blood Loss only.

↓ size
↓ bleeding

↳ GnRH Analogue (continuous)

conceive if stop ↳ Regrow fibroid

we don't use GnRH Anlogue for Long time

Used in pre-operatively to Yes Intraoperative blood loss

↓ before 6 month - GnRH starts

Fibroid → Regress

Intraoperative bleed Yes

(Sx → Surgeon Not prefer to give 6 Month back to Pre-Op.)

GnRH agonist ⟶

Surgical planes are easily find

planes are lost

Drugs that ↓ size of Fibroid :-

U → Ulipristal
Are → Aromatase Inhibitor
Gynae → GnRH Agonist/Antagonist
M → Milepristone
D → Danazol.

ii) GnRH Antagonist

iii) Milepristone } Progesterone (R) Modulator

iv) Ulipristal

(Wants to conceive
↳ don't give)

v) Aromatase Inhibitor - Anastrozole

(S/E - Severe Hypoestrogenic)

UAE → Uterine artery embolization
→ Embolization
→ do if family is complete

- Minimally Invasive

MRg HIFU

MRI Magnetic Resonance Guided High Intensity Focused USG

USG

- Rapid Symptom Improvement
- Fibroid Keep shrinkage

do if only family is complete; expensive

* Surgical M/t

Radical

- Hysterectomy

M/C Indication for TAH → Fibroid ***

Conservative

Myolysis
↓
Cryo
Laser

Submucosal (Type 0, 1)
↓
Hysteroscopic

Myomectomy
↓
Laparoscopic } others

* Gn Laparoscopic hysterectomy (189)
  ↳ Slightly higher Recurrence Rate
    ↳ Not Statistically significant.
* Laparoscopy is better than Abdominal in all except ⇒ Recurrence
* M/c Side effect of Hysteroscopy ⇒ Uterine Perforation
  fluid overload
* Myomectomy ⇒ It is enucleation of Myomata from the Uterus leaving behind a potentially functioning organ capable of Future Reproduction

INFECTIONS

Bacterial vaginosis	Candida	Trichomonas
- all causing Vaginal Discharge/Vaginitis		
- M/c - Bacterial vaginosis >	Candida >	Trichomonas
- Gardenella vaginalis (Mycoplasma Ureaplasma Mobilincus)	Candida albicans	T. vaginalis
Doderline Replaced by Gardenella.		
	After passing urine; Pain left bic of excoriation of skin	
- Foul Smelling discharge Itching ⊗ Dyspareunia ⊗ Urinary symptoms ⊗	- Pruritis - Discharge may present - Urinary Symptom ⊗ (SPLASH DYSURIA)	- Discharge ± Dyspareunia ± Urinary symptom ± Itching

Discharge →	Foul Smelling	Curdy	Green
	Oil white/ Greyish	White	(Yellow)
pH	>4.5	<4.5	>4.5

- IOC – Saline Microscopy

Clue cells (+)	Pseudohyphae	organism see itself ↓↓ dlt flagella

- Ratio of Polymorphonuclear cells / epithelial cells → <1

- Gold standard - Gram Staining

Nugent Score ⇒ 7-10

Culture has No Role in Bacterial vaginosis	Culture in SDA Media	Culture in Stuart's medium

- Amsel's Criteria

if 3 out of 4 – Bacterial vaginosis	Splash dysuria ↓ Painful Urination due to exfoliation of vulva	Strawberry cervix (Punctate Hemorrhage)
i) Foul Smelling (off/white) discharge		
ii) pH>4.5	Whiff test – (-)	Whiff test – (+)
iii) Clue cells (atleast 20% of the epithelial cells)		
iv) whiff test (addition of 10% KOH to D/S → Fishy Amine odour		

Not a STD	Usually Not STD	STD
Partner Not treated	Usually Not (done if partner is symptomatic)	Yes
Dx ⇒ Metronidazole ↓ Clindamycin	Single dose Fluconazole	Metronidazole
• Can cause Pre-term Labor in ♀	• Recurrent Vulvovaginal candidiasis ⇓ ≥ 4 episodes / year	

PID (Pelvic Inflammatory Disease)

- Infection of Upper Genital Tract (Uterus / Fallopian tube / ovaries)

M/c organism ⇒ Chlamydia + Gonorrhea

age group ⇒ 15-25yr

higher R/F ⇒ Multiple sexual partners.

PID in virgin girl ⇒ dlf Tuberculosis

PID in guy uses ⇒ dlf Actinomyces

* Clinical diagnosis :⇒

↳ Pain Lower abdomen & Any of the following

a) Uterine tenderness

b) Cx Motion //

c) Adnexal //

Ix ⇒ * USG ⇒ Cog wheel sign; Beads on string sign; Waist sign

Endometrial Bx → Plasma cell endometritis

↓

Chronic endometritis

↓

TH of chlamydia

Laparoscopy → Best (Gold standard)

↳ F-H-S - Fitz-Hugh-Curtis Sy.

F-13 Fitz-Hugh Curtis Syndrome (191)

↳ Perihepatitis

violin string Adhesions b/w Liver & Anterior Abdominal wall

→ Rt. upper Quadrant Pain

Liver enzyme (N)

→ M/c caused by ⇒ Chlamydia > Gonorrhoea

* Long term complication of PID ⇒

i) Infertility;

ii) Ectopic ♀;

iii) Chronic Pelvic Pain;

iv) Recurrent PID;

v) Hydrosalpinx.

CONTRACEPTION

* Methods of contraception

TEMPORARY METHODS
(Used to postpone pregnancy or space birth)

- BARRIER METHOD :
- NATURAL CONTRACEPTION ;
- OCPs ;
- Injectables
- Implants
- IUCDs

PERMANANT METHODS
(Aim is to Purposefully & Permanently destroy the Reproductive capacity of an individual).

- Female → Tubectomy
- Male → Vasectomy

* OCPs

* On the basis of Amount of estrogen ; they can be classified as →
  - i) Low dose Pills : < 50 mcgm (Avg : 35 mcg) Ethinyl estradiol
  - ii) High dose Pills : ≥ 50 mcg (Ethinyl Estradiol)
  - iii) Very Low dose Pills : ≤ 20 mcg (Ethinyl Estradiol)
  - iv) Lowest Possible Pills : 10 mcg (Ethinyl Estradiol)
    (Lo Lo Estrogen)

* Mala D & Mala N
  - both have 30 mcg ethinyl Estradiol + 0.15 mg Levonorgestrel (LNG)
  - Both have 21 hormonal tablets & 7 lemon fumarate tablets;
  - Mala D available @ a cost of 2 Rupees ; while Mala N free of cost by Govt of India

M.O.A of OCP :→ Mainly : Inhibition of ovulation. (192)

* M/c side effect of OCP : Breakthrough bleeding

↓

Progesterone breakthrough bleeding.

* In Anovulatory DUB

↓

Estrogen breakthrough bleeding.

* If a Lady misses 1 pill ; take 2 pills the following doses ;
  If she misses 2 pills ⟶ Backup Method of contraception

* In the event of Missing a pill :→

Take the Most Recent Missed pill Immediately ; Use condoms for 7 days & continue the packet

↓

Now if

≥ 7 pills are Remaining in packet

Finish the Remaining tablet & Start the New packet after 7 days gap.

< 7 pills are Remaining in packet

Finish the Remaining pills & Start the New packet Next day without a 7 days gap.

Q: A women who is taking combined OCPs misses 2 consecutive Pills. There are 10 Pills Remaining in the Packet. Next ?

a) Take both pills immediately continue the packet & Use condom for 7 da

b) Take the Most Recent Missed pill Immediately ; continue the packet & Use condom for 7 days.

c) Take the Most Recent Missed pill Immediately ; continue the Packet ; Use condom for 7 days & commence the Next packet after a 7 days gap

* Fertility Return ⇒ ∈ in 3 Months of withdrawal of the drugs in 90% cases
  ⇓
  (Ovulation Return)

* Which contraception have Least chance of Ectopic ♀ ∴ OCP
* OCP also ↓es Risk of PID.

  But ↑ Risk of candida & chlamydia are seen by Combined oral contraceptives

* Other M.O.A. of OCPs ⇒ Prevention of Fertilization;
  Interference ∈ Implantation;

* OCP & Cancers ⇒

  - OCP & Cervical cancer → ↑es;
  - ovarian cancer ↓es by 50%;
  - Endometrial cancer ↓es by 60%;
  - Colon cancer ↓risk;
  - Breast cancer : No ↑es Risk
    ↳ OCPs are protective against benign breast disease.
    but Role of OCPs are controversial in Ca of Breast,
  - Using HRT (Hormone Replacement Therapy) ↑es chance of breast cancer.
  - Hepatic Adenoma : ↑es Risk;
  - HCC : No ↑es Risk (Not decrease Risk also);
  - Gallbladder Cancer : No ↑es Risk.

* Absolute C/I of OCP (WHO Category 4) :⇒ (K93)

Mnemonics ↳

Banks → K/c/o Breast Cancer

Have → Severe Hypertriglyceridemia / Hypercholesterolemia

Various → Undiagnosed Vaginal bleeding

Scheme → Stroke ; Smoker over age of 35 years.

To → Thrombophlebitis | Thromboembolic disorde

Provide → Pregnancy

Home → Uncontrolled Hypertension (≥ 160/110 mm of Hg)

Looms → Acute Liver disease (Hepatitis ; ~~cirrhosis~~) ↳ Not C/I of OCP.

During → Diabetes c Vasculopathy

May → Migraine c Aura (i.e Focal Neurological deficit).

also; Coronary Artery Disease is absolute C/I of OCP.

* Newly Married couple : choice of contraception : OCP

Living far apart ; Meeting occasionally

↳ Barrier Method

* Safety : Which contraception is safest : "Barrier"

⇓

S/E ⇒ very high failure Rate

∴ Pregnancy is S/E

PROGESTERIN ONLY PILLS (POP)

aka " Minipills " (75 mcg Progesterone)

M.O.A. : Thickening Cervical Mucus

* Should be taken on Same time Everyday
  ⇓
  (Sale Margin < 3hrs)
  ⇓
  If delay was for > 3hrs - Back Method should be used.

- POP's are contraception of choice in Lactating Female
  ↳ can be started Immediately after delivery, POP > IUD

* Contraception of choice in Lactating's Female : POP > IUCD
  ↳ but Not Lactating Amenorrhea
  ↳ b/c high failure Rate

* Minipill available in India ⇒ "CERAZETTE"
  ⇓
  M.O.A. ⇒ Mainly Again
  ↳ Inhibition of ovulation
  Sale Margin : 12hrs
  (A delay of ~ 12hrs can be accepted)

* M/c side effect of POP : Irregular vaginal bleeding.

* Absolute C/I : i) Pregnancy;
  ii) Undiagnosed vaginal bleeding;
  iii) K/c/o Breast Cancer
  } Same for all

PROGESTERONE INJECTION

(194)

DMPA (Depot Medroxyprogesterone Acetate)

Dose ⇒ 150 mg i/m

To be Repeated every 3 Months

Pt. can wait upto 4 weeks late for Next injection

Net En (Norethisterone enanthate)

200 mg i/m

Repeated every 2 Months

Pt can wait upto 2 weeks Late

* DMPA :- 2 Good things ⇒ i) Useful in Female ⊂ Epilepsy ↑ Seizure threshold;

ii) Reducing Sickling crisis : Useful in Sickle cell Anemia;

2 Bad things ⇒ i) Significant Bone loss;

ii) Delay in Return of Fertility;

Avg. delay : 12 Months

Maxm. delay : 18 Months.

* M/c side effect of DMPA : Irregular Vaginal Bleeding.

* Absolute C/I : Same three S/E

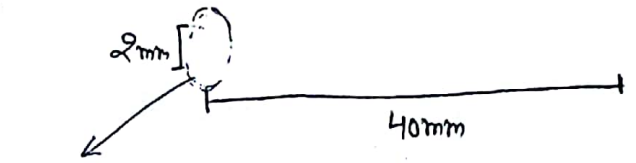
↳ Undiagnosed vaginal bleeding

Pregnancy

K/c/o Breast cancer

PROGESTIN ONLY IMPLANTS ⇒ Among all contraceptives; Least failure Rate = 0.05%

IMPLANON :→



core (40% ethylene vinyl acetate + 60% etonorgestrel) 68mg

Rate controlling Membrane

↳ Rate of Release 67 Mg/day x 3 years.

↳ Single Rod ≅ Keto-desogestrel

OPD Procedures (Most Popular Implant Now a days);

M.O.A. ⇒ Inhibition of ovulation.

Site of Implantation ⇒ Non-dominant Arm (Medial aspect of Upper Arm).

- It is Not Radio opaque.

∴ Next Generation of IMPLANON : NEXPLANON
↳ Radio opaque

M/c side effect : Irregular vaginal bleeding.

Absolute C/I : Same 3
↳ i) Pregnancy
ii) Undiagnosed vaginal bleeding
iii) K/C/o Breast cancer

NUVA

- It is Vaginal Ring (Blue or white);
- It is E+P Compound (E = Ethinyl Estradiol : 15 Mg/day
P = Etonogestrel : 120 Mg/day)

M.O.A : Inhibition of ovulation.

How to Use : Insert in vagina on 1st day of her Menstrual cycle & keep it for 3weeks; after 3 week ; Last week is "Ring free" (195)

↓↓

then : Insert New Ring.

Safe period of Ring : 3 hours before sex.

it Means if the expelled Nuva Ring has been out of vagina for more than 3 continuous hours; during weeks 1 & 2; you may n4 protected from ♀.

INTRA UTERINE DEVICES

1st Generation IUD's

Inert OR Non-Medicated Devices

eg ⇒ Lippe's Loop

↳ Inserted by "Push out technique".

- CUT 380A
- Release Rate : 50 Mg/day
- Radio opaque : coated ē Barey
- Free of cost by govt of India

2nd Generation IUD's

It consists of copper or silver containing IUDs

eg ⇒ CUT-220C; CUT-380A

NovaT; MuHiload Cu 250/375

→ Klas "PARAGUARD".***

CUT 380A → Arms (i.e *** copper wire is also found on Arms)

copper wire, Shape, Surface Area

3rd Generation IUD's

It consists of hormone Releasing IUDs.

eg ⇒ Progestasert; Mirena

MIRENA (aka) LNG-20

↳ LNG = 52mg

20 Mg/day

Radio opaque

- Not free (7000/-)

CUT 380A

- Effective for span of 10 years;
- presense of beak : to Les Risk of Perforation & for Identification and Removal.
- Can be used as Emergency contraceptives
- Tes Menstrual blood Loss

M/reng

- Effective for span of 5 years.
- Drug presents on Lower Limb only. (drugs Release for a span of 7 years).
- Not an Emergency contraceptives
- Les Menstrual blood loss (amenorrhic for atleast 6 Months).

* M/c Side effect of IUD ⇒ ↑ Bleeding;
  M/c cause for Removal ⇒ Pain of IUD
* I.U.D. : Mech^m of Action ⇒ Mainly "Spermicidal"
  ∴ Acts ⇒ Inhibition of Fertilization
  Inhibition of Implantation
  M/c Infection of IUD : Actinomyces;
* IUD insitu c ♀ : Remove IUD
  ↓ why
  b/c Tes Risk of Abortion
* ** DO USG b/c failure of IUD (or) ♀ c I.U.D. Mostly : Ectopic *
* Max^m Infection c IUD : c/in 20 days of Insertion *
* Multifilamentous : Olden days → ↑ Risk of Infection;
* Monofilamentous : Now a days → ↓ Risk of Infection → that too by design

Misplaced GUD (Missing thread) ⇢ G.O.C ⇒ USG
↓ If Not found
X-Ray (196)

. GUD Missing ∈ Perforation ⊕nt in Abdomen* : Mx : Laparoscopy**

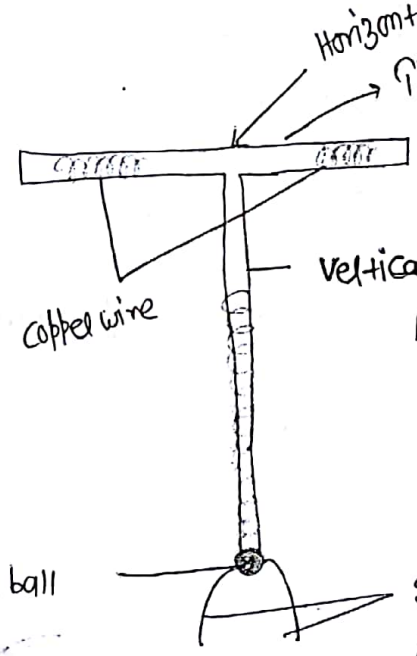
. if GUD Embedded in Myometrium : Mx : Hysteroscopy & Remove it.

* Contraception in HIV⊕ Patient ⇒ GUD + Barrier
D.M. ⇒ GUD
Heart disease ⇒ GUD

* M/c Mode of contraception used in India : Barrier Method*

* Best contraception; if Family is complete : Vasectomy > Sterilization > GUD, OCP*
Best Non-permanent contraception; if Family is complete : GUD > OCP. *

* No Risk of Teratogenecity ; if a ♀ Female continue ♀ ∈ GUD



CU-T 380A

Silver Line CU 380Ag ⇢ M/c CU T used worldwide
↳ have flexible Arms : Silver core(A) & Rest Same as CUT380A

* Absolute c/I of IUCD - Category 4 of WHO :-

Mnemonic →

Please → Peurperal Sepsis or Postabortal sepsis

Don't → DUB / Unexplained vaginal bleeding;

Try to → Gestational Trophoblastic Disease;

Put → Current PID / STD or c/in Past 3 Months

Condom → Puerperal sepsis; know Pelvic TB
Ca cervix
Ca endometrium.

STERILIZATION (Permanent Method).

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* No. of Children Required for sterilization ??

Ans ⇒ At least 1 child of 1yr old.

* It is a Legal procedure → concent is Mandatory; but only of client.

* concent of spouse is Not Mandatory.

- 22yr - 45yr can Undergo Sterilization;

QQ. UnMarried women can Undergo sterilization ?? ⇒ NO

Married or evel married ⇒ Yes

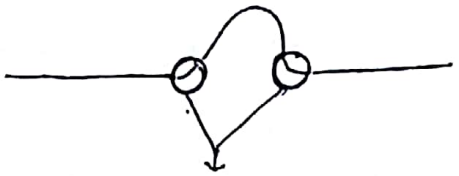
- Most cost effective Mode of contraception : Vasectomy
- Most effective contraception : Implant
- How Many days after vasectomy should avoid coitus or use another contraception : > 3 Months till azoospermia
- Post-partum Sterilization :- within 7 days of delivery (or) after 42 days of Post-partum (can't do @ 8th or 9th ___ days)
  - This is Klas " Interval Sterilization."
- M/c Method used for Post-partum Sterilization : MiniLaprotomy (3 cm Long)
  - by Pomeroy technique
    - Babcock forceps used
- We don't use Laparotomy / LaproScopic Sterilization in Post-partum Sterilization.

* Post- placental IUD ⇒ if we put IUD C/in 10 min of delivery;
* Post- partum IUD ⇒ if we put IUD C/in 48 hr of delivery.

* M/c part of Fallopian tube that we Ligate in sterilization
↳ Isthmus.

Modified Pomeroy

aka "Parkland Method"



double Ligation of tube is done

Failure Rate = 0.2

Pomeroy

Middle part of tube (3-4 cm from fundus) is formed into loop using babcock forceps; which is tied & excised.

0.4

* Interval sterilization :- Non-pregnant state

Whenever we do sterilization in Non-♀ Female is k/as "Interval"

M/c. Method used : Laproscopy

* M/c Method of Female sterilisation ⇒ Laparoscopic sterilisation.
  - ↓ Intraabdominal Pressure b/w 8-12 mm ; Max^m 15 mm of Hg
    - Not More than 15 mm of Hg b/c it ↓es venous Return
  - ← CO_2 gas used
* M/c Method for Laparoscopic Ligation ⇒ Yoon falope Ring / Sialistic band
* Site of Ligation ⇒ Isthamus

* Among sterilization technique ⇒

Least failure Rate : Unipolar cautery > Modified Pomeroy
(Never Used)
↳ b/c of Intestinal burn

Highest Failure Rate : Clips > Bipolar cautery
↓
HULKA CLIPS

Reversal Methods : ~~Clips~~ > Falope Ring > Modified Pomeroy > Cautery

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Laparoscopic Ligation : Pt in Lithotomy position

⇓

With help of ~~Verses Needle~~ (Introduced at an Angle of 45°) Pneumoperitoneum is created

↳ CO_2 gas used

⇓

Procedure is done under Sedation & Local Anesthesia

* M/c used Method in Minilaparotomy : Modified Pomeroy.
* Highest Risk of ectopic ♀ : Cautery > Madlenal > Modified Pomeroy.