Yourwish

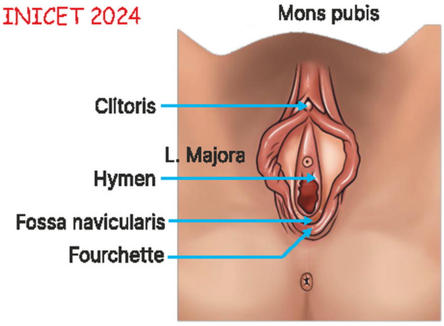
1. RELEVANT CLINICAL ANATOMY

EXTERNAL FEMALE GENITALIA/ VULVA

FMGE 2025
NEET 2024
INICET 2024

00:01:00

VESTIBULE



- Vestibule is bounded by labia minora on both the sides
- Folds of labia minora meet posteriorly forming fourchette
- Structures opening in vestibule
  - Vaginal introitus posteriorly
    - → It is covered by a membrane- hymen
    - → Hymen is lined by non keratinised stratified squamous epithelium on both sides
  - Urethra anteriorly
  - Para-urethrine glands of skene (Around urethra)
  - Bartholin's gland duct(greater vestibular gland)
    - → Opens just outside hymen
    - → At junction anterior 2/3rd and posterior 1/3rd
- Fossa navicularis
  - Depression between vaginal opening and fourchette

STRUCTURE	HOMOLOGOUS TO
Labia majora	Scrotum
Labia minora	Ventral shaft of penis
Para-urethral glands	Prostate
Bartholin's gland	Cowpers gland
Clitoris	Glans penis

IMPORTANT POINTS

00:04:10

- Labia majora contains
  - Termination of round ligament of uterus
  - Obliterated vaginal process (canal of nuck)
- Course of round ligament
  - Starts at the cornu of uterus
  - Enters inguinal canal vis deep inguinal ring
  - Exits inguinal canal via superficial inguinal ring
  - Terminates by attaching to labia majora
- Hydradenoma vulva- benign tumor of apocrine sweat glands in labia majora (apocrine sweat glands absent in labia minora)
- Carunculae myriteformis→Remnants of hymen after childbirth

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BARTHOLIN GLAND CYST

00.06.25

- Bartholin gland secretes alkaline mucus at the time of coitus
- Block in the ductal opening →Accumulation of secretions → vulval swelling MC type of vulval cyst in reproductive age
- Clinical features
  - Swelling in vulval area, located posterolaterally on the vulva
  - Interfere with coitus due to large size
  - Might get infected and pus collects inside forming bartholin gland abscess

→ Red,warm,tender and fluctuating sw
→ M/C organism is E.Coli

- Treatment
  - Surgery for Bartholin's gland cyst - marsupialisation
  - Bartholin's abscess-Incision and drainage under antibiotics cover
  - Solid swelling in women over 40 years (Risk of malignancy)-Complete excision of cyst

Blood Supply Of Vulva

- Mainly by internal pudendal artery
- Region of mons pubis by external pudendal artery

Lymphatic Drainage Of Vulva

- Inguinofemoral group of lymph nodes
- Involved in vulval cancer
- Drainage pattern
  - Superficial inguinal lymph nodes →deep inguinal lymph nodes →pelvic group of lymph nodes
  - Sometimes lymphatics from clitoris directly →deep inguinal group of lymph nodes
  - All midline structure (Clitoris/ fourchette/anterior labia minora) → B/L drainage
  - Cancer involving the lateral structures I/L → drainage

Nerve Supply Of Vulva

- Sensory innervation
  - Mainly by pudendal nerve
  - Anterosuperior
    → Branches of lumbar plexus
      – Ilioinguinal nerve
      – Genital branch of genitofemoral nerve
  - Posteroinferior
    → Branches of sacral plexus
      – Posterior cutaneous nerve of thigh

Q. A woman undergoes a cesarean section and on POD-7 (Post-Operative Day 7) complains of tingling and numbness over the mons pubis & upper labia majora. Which nerve is most likely injured?

a. Pudendal N.
b. Genitofemoral N.
c. Ilioinguinal N.
d. Iliohypogastric N.

Ans. c

- Pudendal nerve is not encountered during C-section
- Genitofemoral nerve
- Pfannenstiel incision
  - 10-12 cm long low transverse abdominal incision
  - One finger breadth above the pubic symphysis

- If incision is extended more laterally iliohypogastric or ilioinguinal nerves are injured
  - → Iliohypogastric supplies skin over suprapubic area
  - → Ilioinguinal supplies skin over mon pubis amd labia majora
- Genitofemoral nerve is more deeply situated hence not injured

INTERNAL FEMALE GENITALIA

00:19:20

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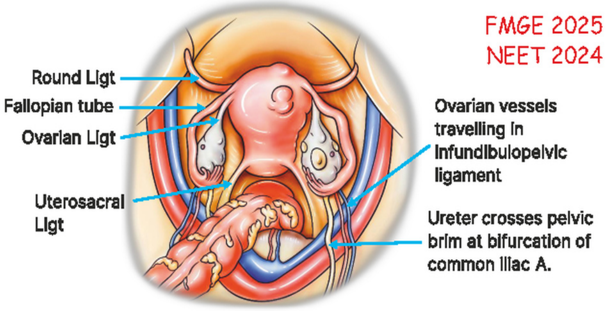
NEET 2024

Structures At Uterine Cornu

- Anterior to posterior
  - Round ligament
  - Fallopian tube
  - Ovarian ligament
- Clinically important in identifying the fallopian tube during surgical procedures especially when fimbrial end is not visible



Suspensory Ligament Of Ovary

- Attaches ovary to lateral pelvic wall
- Aka infundibulopelvic ligament
- Ovarian vessels reaches ovary via this ligament
- Clinical importance:
  - Just behind this ligament,ureter crosses the pelvic brim at the bifurcation of common iliac artery
  - 2nd M/C site of ureter injury during gynecological surgeries

Uterosacral Ligaments

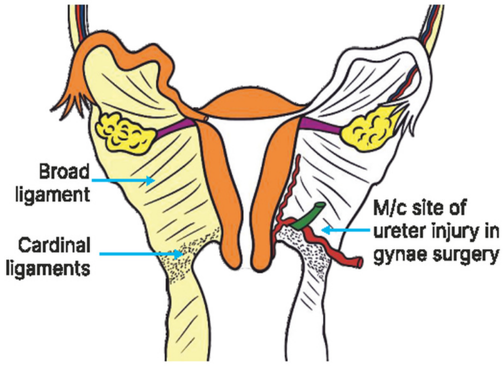
- From the posterior aspect of the cervix towards the sacrum.
- Deep down and between the two ligaments is pouch of douglas (cul de sac)

Important Information

- Normal uterocervical length is 6-8cm
- Corpus to cervix ratio
  - Before puberty→1:2
  - During puberty→3:1
  - Menopause→1:1

Broad Ligament

- Sheet of peritoneum double layered from lateral pelvic wall to lateral part of uterus
- Does not provide support to uterus
- Provides transport to
  - Ureter
  - Uterine artery and branches



Round Ligament

- False support/pseudo support

Cardinal Ligament

- Aka transverse cervical ligament/Mackenrodt ligament
- Attach cervix to the lateral pelvic wall
- Forms the main support of uterus

Important Information

Main support to the uterus is by :

- Cardinal uterosacral complex > Cardinal ligament > pubocervical ligament
- Cardinal uterosacral complex suspends external os at level of ischial spine

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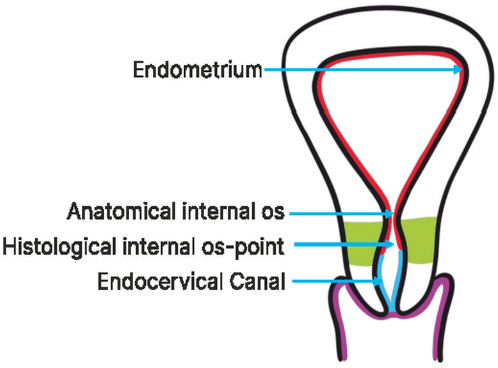
- Clinical importance
  - Ureter crosses under the uterine artery (water under the bridge) about 1.5cm lateral to cervix
  - M/C site of ureter injury in gynecological surgeries
  - This is called Danger area

Isthmus

00:28:50

- Region between anatomical internal os and histological internal os
  - histological internal os - transition from endometrial lining to endocervical lining
  - Endometrial lining- specialized columnar epithelium with stroma and glands
  - Endocervical lining- columnar epithelium
- It forms the lower uterine segment
- Measures
  - 5cm at term
  - 10cm during labor



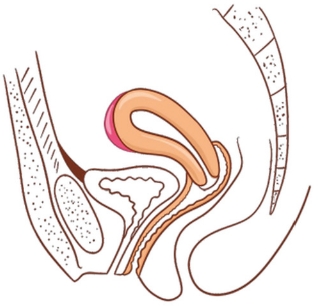
Peritoneal Reflections

Anterior Peritoneal Reflection

- Is at the level of isthmus that forms lower uterine segment
- Identified by loose fold of peritoneum during cesarean section

Posterior Peritoneal Reflection

- Extends up to upper vaginal
- Forms pouch of douglas which is the most dependent part in upright women
  - Blood/ascites/pus/fluid gets collected in this part first

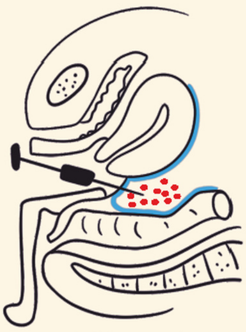

Sagittal view of pelvis

Normal Position Of The Uterus

- Body of uterus sits on top of the bladder
  - Anteversion
    - → Vaginal axis and cervical axis is 90*
  - Anteflexion
    - → Cervix axis and body of uterus is 120*
- Retroversion of uterus is prevented by uterosacral ligament

Important Information

- Deepest fornix is posterior fornix
- Procedure to reach POD via the posterior vaginal wall using needle→ culdocentesis


Culdocentesis

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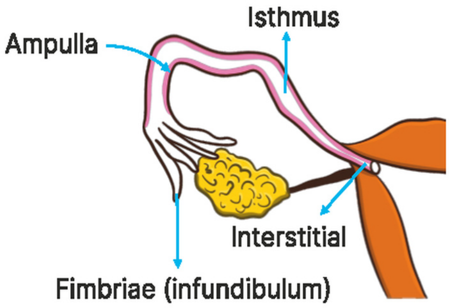
FALLOPIAN TUBE

00:37:10

- Function-
  - Transport egg from the ovary
  - Site of fertilisation
- Lined by ciliated columnar epithelium , Secretory cells and Peg cells/supporting cells/intercalary cells
- Tubal peristalsis>movement of cilia reason for transport of conceptus towards the uterine cavity
- Anatomically narrowest apart - interstitial part
- Physiological sphincter / 2nd most narrow part → isthmus
- Widest and longest part of fallopian tube→ ampulla
- Site of fertilization→ampulla
- M/C site of tubal ectopic →ampulla
- Site of tubal ligation→isthmus because
  - Narrow
  - Circular muscle fibres there
  - Uniform thickness present
- Fimbrial end/infundibulum
  - Finger like projection part of fallopian tube



VAGINA

- Lined by stratified squamous epithelium non keratinized
- Devoid of glands
- Secretions come from
  - Endocervical glandular secretions
  - Transudation of fluid across the epithelium
- Normal pH 3.5 to 4.5 in reproductive age
  - Act as natural defense mechanism of vagina
  - Due to the commensal Lactobacilli/Dorderlein bacilli and Estrogen
    - → Estrogen stimulates the glycogen rich superficial cells proliferation
    - → Lactobacillus consumes glycogen and forms lactic acid in process
- Vaginal pH becomes alkaline (6to 8) in
  - Prone to infections
  - Menses
  - Childhood
  - Postmenopausal women

FMGE 2018 & 2021, 2022, 2023, 2024, 2025
INICET 2018, 2019, 2020, 2021, 2023, 2024, 2025
NEET PG 2020, 2023, 2024

CERVIX

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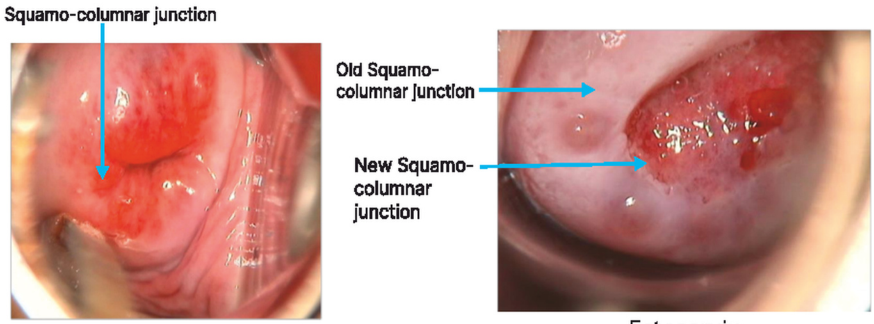
Transformation Zone



Ectocervix

- Area between new and old squamocolumnar junction
- M/C site for cervical cancer and CIN
- Light pink is stratified squamous epithelium of ectocervix
- Dark red is single layered columnar epithelium of endocervix
- In between is the SCJ
- Due to the effect of estrogen in OCP use, childbirth ,puberty
  - The endocervical epithelium puts out because of which squamous metaplasia takes place forming → new SCJ
  - The old SCJ is also visible in periphery and contain multiple cystic follicles which are physiological and are called nabothian follicles

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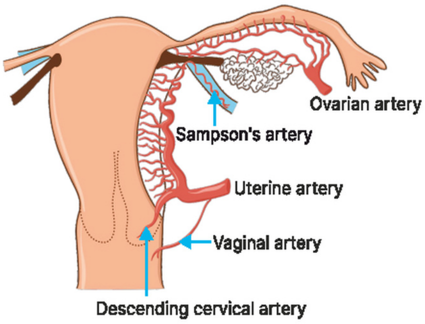
BLOOD SUPPLY OF FEMALE GENITAL TRACT

00:44:40

- Main blood supply of ovary
  - Ovarian artery : direct branch of aorta
- Main blood supply of uterus
  - Uterine artery : branch of anterior division of internal iliac artery
  - Sampson artery : special branch of uterine artery for round ligament
- Lower 1/3rd of vagina and vulva
  - Internal pudendal artery: branch of anterior division of internal iliac artery



Stepwise Devascularisation Procedure

B/L uterine arteries (Close to the uterus)

↓

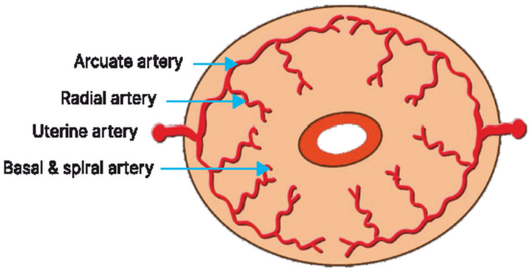
Ovarian arteries (at the sight of anastomoses with uterine artery)

↓

Anterior division of internal iliac artery

Branches Of Uterine Artery For Uterus

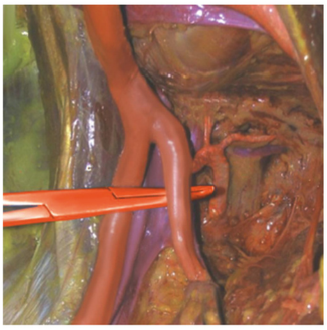
- Arcuate
  - Forms arc around the uterus
- Radial
  - Supplies myometrium
  - 2 branches
    - → Basal artery -Deeper 1/3rd basalis layer of endometrium
    - → Spiral artery- superficial 2/3rd ,functional layer of the endometrium
- Middle layer of the myometrium is called living ligatures because the radial artery in between the muscles are compressed by the uterine contraction



CS of Uterus

Internal Iliac Artery Ligation

- Anterior division is ligated 5cm distal to bifurcation of common iliac artery to spare the posterior division
- Posterior division is spared to spare blood supply to superior gluteal artery supplying buttocks
  - Prevents ischemic pain to buttocks



- Confirming that the anterior division of internal iliac artery and not the external iliac or common iliac artery is ligated is done by palpating
  - Femoral pulse that is present but slowed down
  - Dorsalis pedis that is present but slowed down
- Principle behind the arterial ligation in PPH

Pulse pressure decreases by 85%
↓
Arterial circulation mimics the venous circulation
↓
Promotes coagulation and thrombus formation

- For the ligation to work in PPH coagulation process should be normal,hence DIC should be corrected prior to ligation

HYSTERECTOMY

00:52:40

Supracervical Hysterectomy

- Only body of uterus is removed
- Cervix is left behind
- Done in PPH management, usually in peripartum

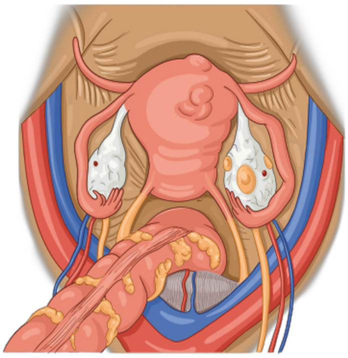
Total Hysterectomy

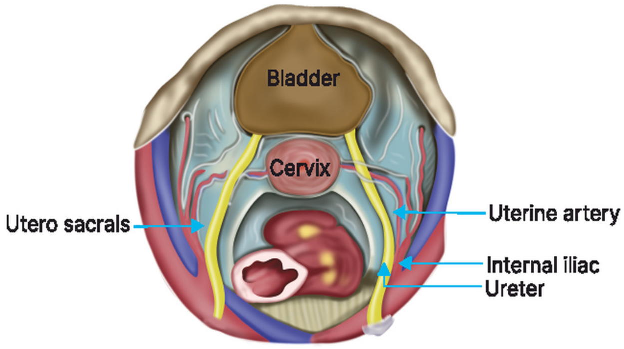
- Uterus and cervix removed
- When tubes and ovaries are removed -salphingo-oopherectomy

Type-I/simple Hysterectomy/extrafascial Hysterectomy

- Uterus,cervix and the covering fascia are removed

Type II/modified Radical /wertheim''s Hysterectomy





- More lateral dissection
- 1-2 cm of vaginal cuff and medial half of parametrium is removed
- Uterine artery ligated near the ureter
- Ureter dissected in the ureteric tunnel near the cardinal ligament(Ureter can be injured)
- Uterosacral is cut midway to rectum

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Type III/meigs Hysterectomy

- More lateral dissection than type 2
- Upper 1/4th -1/3rd of vagina and lateral parametrium removed
- Uterine artery ligated at its origin
- Uterosacral resected near rectum
- With more lateral dissection:
  - Chances of ureter injury is more
  - Obturator vessels and nerve can be injured
- Advanced ovarian cancer pain is referred to I/L knee via obturator nerve

Sequence Of Clamps In Abdominal Hysterectomy

Tuboovarian pedicle
↓
Uterine artery
↓
Cardino uterosacral complex

- The order reversed in vagival hysterectomy
- If ovaries are to be preserved ovarian ligament segment is cut
- If ovaries are to be removed infundibulopelvic ligament is clamped and cut

Points to remember-

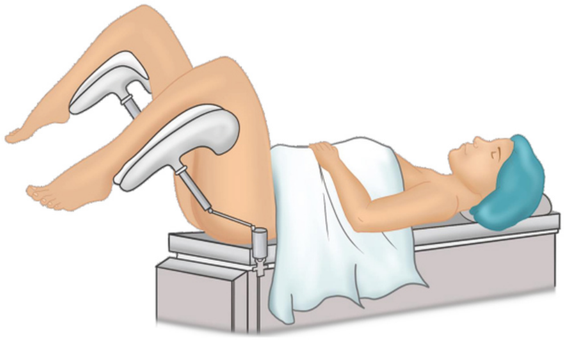
- MC gynecological surgery associated with ureter injury: simple hysterectomy
- Maximum risk of ureteric injury : radical hysterectomy
- MC injury to ureter is crushing injury
- Least risk for ureter damage → vaginal hysterectomy (least invasive)
- More risk of ureter injury of laparoscopic hysterectomy because of dissipation of heat

Q. A 65-year-old woman underwent vaginal hysterectomy for prolapse uterus. The surgery took much longer than anticipated. Post-operatively she developed paresthesia of the lateral aspect of her left leg, foot and foot drop. Compression of which nerve is the most likely cause?

a. Pudendal N.
b. Common Peroneal N.
c. Femoral N.
d. Obturator N.

Ans. b. Common peroneal nerve

LITHOTOMY POSITION AND ITS PROBLEMS



- Too much hip flexion
  - Stretches obturator nerve or sciatic nerve
  - Compress the lateral cutaneous nerve of thigh or femoral nerve behind the inguinal ligament
- Too much knee flexion or external rotation
  - compress the common peroneal nerve around the fibular head

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- M/C obstetric neuropathy in postpartum women when there is too much hip flexion causing compression of lateral cutaneous nerve of thigh: Meralgia paresthetica
- M/C neuropathy after abdominal hysterectomy because of abdominal wall retractors compressing: Femoral nerve

NERVE SUPPLY OF FEMALE GENITAL TRACT

01:08:20

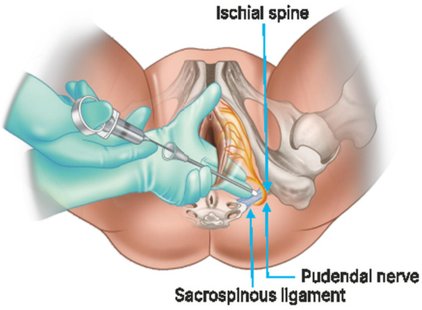
Structure	Type of nerve supply	Via	Clinical importance
Ovaries and outer 2/3rd of fallopian tube	Sympathetic to T9-T10	Renal and aortic plexus	
Uterus, proximal fallopian tube	Sympathetic from T11-12 to L1 segments	The inferior hypogastric plexus (Frankenhauser ganglia)	Pain due to uterine contractions referred all over the abdomen
Upper vagina, cervix and LUS	Parasympathetic S2/S3/S4	pelvic splanchnic nerves	Pain due to cervical dilatations during labour is referred to the back
Perineum, vulva and lower vagina	S2/S3/S4	Pudendal nerve	

- Best labour analgesia
  - Epidural
- Level of block in epidural analgesia is T10
- Level of block cesarean section is T4

NEET PG 2020, 2023, 2024, 2025
FMGE 2020, 2021, 2023, 2024, 2025
INICET 2020, 2021, 2024

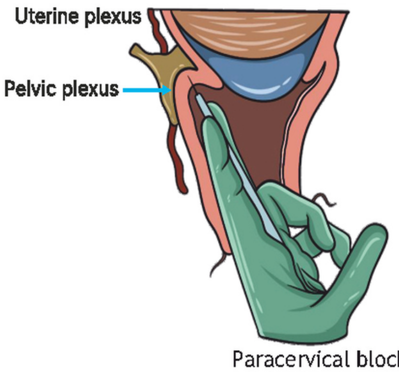
Pudendal Nerve Block

- We use diluted lignocaine
- Pain relief during the second stage of labor
- Not effective for exploration for cervix, upper vagina and uterine cavity
- Sacrospinous ligament is pierced
- Stay medial to ischial spine
  - As lateral to this there is pudendal vessels

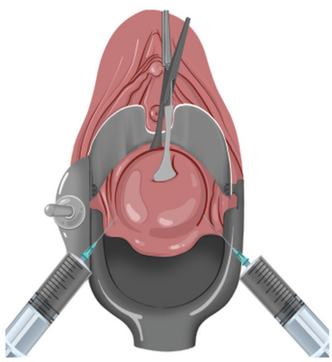


Paracervial Block

- Pain relief during cervical dilatation as in
  - 1st stage of labor
  - surgical MTP procedure
- Do not give block at 9 0 clock and 3 o clock as it contains descending cervical artery



Paracervical block



2. REPRODUCTIVE PHYSIOLOGY AND CLINICAL CONDITIONS

HPO AXIS

00:01:33

FMGE 2019, 2020
NEET PG 2023, 2024, 2025
INICET 2022, 2024

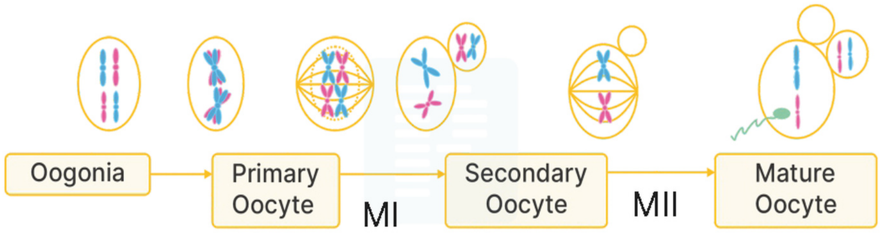
Hypothalamus
GnRH
↓
Pituitary gonadotrophins
(FSH, LH)
↓
Ovarian follicles
↓
Oocyte maturation and hormone production
↓
Menstrual cycle

OOGENESIS

00:03:24

NEET PG 2019

Primordial germ cells (2n)
↓
Oogonia (2n)
↓
Primary oocyte (2n)
↓meiosis 1
Secondary oocyte (n)
↓Meiosis II
Mature oocyte (n)
(ready for fertilization)



- Oogenesis begins in the intrauterine life of the fetus
  - Primordial germ cell till primary oocyte → Intrauterine life
  - Secondary oocyte till mature oocyte → Reproductive phase
- Primary oocyte arrest in meiosis 1
  - Diplotene phase of Prophase
  - Because the oocyte maturation inhibitor is produced by the granulosa cells
- Reduction division completed/1st polar body released/formation of secondary oocyte→ Just prior to ovulation
- Secondary oocyte arrest → Meiosis II, metaphase
- The 2nd polar body is released during fertilization
- Primordial germ cells are diploid and originate from primitive ectoderm
  - 1st identified in the endoderm of yolksac by the end of the 3rd week of fertilization
  - They reach developing ovaries by 6 weeks of gestation
- Oogonia first appear at 9 weeks of gestation

- Primary oocyte first appears/ meiosis I begins → 11-12weeks
- Follicle formation in intrauterine life begins 18-20weeks
- Max number of oogonia → At 20week of gestation (7 million)
  - At birth→~2 million primary oocytes
  - At puberty→~ 4 lacs primary oocytes
  - Reproductive life→~ 400 primary oocytes
- The HPO axis is functional during the intrauterine life of females, and it reactivates during puberty

IMPORTANT HORMONES

00:09:40

Gnrh

- GnRH→ Gonadotropin-releasing hormone
  - Neurohormone synthesized in the arcuate nucleus of the hypothalamus
  - Decapeptide
  - t1/2→2 to 4 min
- Pulsatile secretion:
  - Stimulate the pituitary
  - Nature of pulsatile secretion varies during each phase of the menstrual cycle
- Continuous secretion of GnRH downregulates the pituitary
  - Synthetic GnRH analogues cause receptor desensitization→ Decreased production of Gonadotropin → Ovarian production of hormones is decreased
- Congenital deficiency of GnRH neurons → Kallmann syndrome
  - X-linked inheritance - M/c
  - Mutation in the KAL-1 gene - Encoding for anosmin protein
    → Transports GnRH neurons and olfactory neurons from the olfactory placode to the hypothalamus location
  - Patients present with:
    → Delayed puberty
    → Primary amenorrhea
    → Anosmia

Gonadotrophins

00:13:34

NEET PG 2019, 2024, 2025
AIIMS 2018
FMGE 2019, 2020, 2021, 2023, 2024, 2025

- FSH → Follicular-stimulating hormone
- LH → Lutenizing hormone
- Synthesized from gonadotrophs in the anterior pituitary
- Both are glycopeptide hormones
  - Have alpha unit(non-specific)
  - Have beta unit(specific)
- t1/2 of FSH: 3 TO 4 hours
- t1/2 of LH: 20 mins
- LH is structurally similar to hCG hormone

Steroid hormone

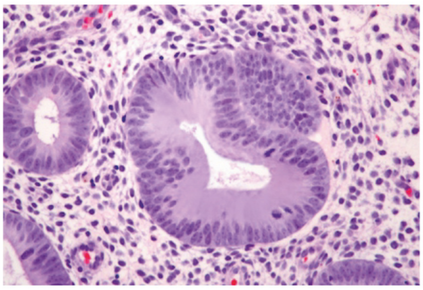
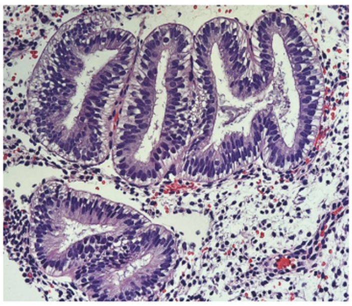
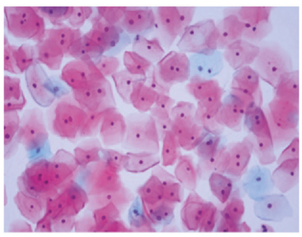
00:15:20

- Main androgen synthesized by the ovary → Androstenedione
- Most potent/ predominant estrogen in reproductive age:
  - Estradiol (E2) > Estrone (E1) > Estriol (E3)
- Predominant form of estrogen in post menopausal women - Estrone (E1)

- From the peripheral aromatization of androgens (fat cells)
- Estrogen forms specific to pregnancy: Estetrol (E4)> Estriol(E3)

Estrogen v/s progesterone action

00:17:25

ESTROGEN	ACTION	PROGESTERONE
Proliferative changes: • Narrow tubular glands • Loose syncytial stroma • Pseudostratification 	**ENDOMETRIUM**	Secretory changes: • Subnuclear vacuolation(1st secretory changes) • Cork screw-shaped glands • Stromal edema • Leucocytic infiltration 
Growth of the uterus	**PREGNANT UTERUS**	Decidualization
Spinn Barkeit • ↑ NaCl, ↑ H_2O, Low protein • Cervical mucus becomes thin and elastic → On drying, fern-like pattern on a glass slide (Ferning)	**CERVICAL MUCUS**	Thick and breaks apart (Tack)
↑ Motility ↓ Secretions	**FALLOPIAN TUBE**	↓ Motility ↑ Secretions
Ductular development	**BREAST**	Alveolar development (after estrogen priming)
Growth spurt initiation at puberty Mineralization of bones Closure of epiphysis	**GROWTH**	
Hypercoagulability (in pregnancy)	**COAGULABILITY**	

VAGINAL CYTOLOGY

- Stratified squamous cells of the epithelial lining of the vagina
  - Cells predominate with estrogen - Superficial cells
  - Cells predominate with progesterone- Intermediate cells

- Cells predominate with no hormone exposure - Basal and parabasal cells

KARYOPYKNOTIC INDEX

- AKA: Cornification index
    - Ratio of superficial cells to all the cells combined in a cytology specimen
- Maximum index → On the day of ovulation (Periovulatory period)

MENSTRUAL CYCLE

00:24:20

AIIMS 2018
NEET 2019, 2024, 2025
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- In a regular 28-day cycle

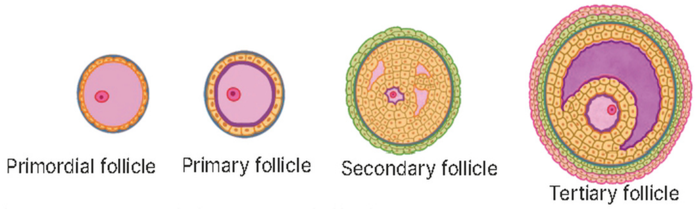
Bleeding starts on Day 1
↓
Follicular phase (follicles grow and secrete estrogen)
↓
Proliferative changes of the endometrial lining
↓
Ovulation on Day 14 & One follicle becomes the dominant follicle
↓
The remnant of the follicles becomes the corpus luteum
↓
Corpus luteum secretes progesterone
↓
Secretory changes to the endometrial lining
↓
The corpus luteum dies, and the withdrawal of hormones
↓
Bleeding starts (cycle repeats)

FOLLICULOGENESIS

00:28:25

- Both FSH and LH are required for this process

Primordial follicle
↓
Primary follicle
↓
Secondary follicle
↓
Tertiary follicle
↓
Dominant ovulatory Graafian follicle (20mm-25mm)



- LH is required for the final maturation of dominant follicle
- FSH → Stimulates granulosa cells → Estrogen

- LH→ Stimulates theca cells→ Androgens
  - Can be converted to estrogen using aromatase activity
- Preantral follicles: Primordial, primary, and secondary follicles
- Antral follicles: Tertiary and Dominant follicles
- Growth of the antral and preovulatory follicle → Gonadotropin dependent
- Follicular growth until secondary follicle (late preantral stage)→ Gonadotropin independent
- Time taken for primordial follicle to become preovulatory follicle: 85 days

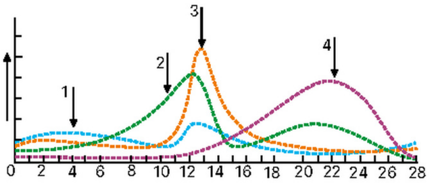
LH FUNCTIONS

- Responsible for Ovulation (local release of PGE2, Proteases)
- Resumption of meiosis I
- Corpus luteum support in non pregnancy state
  - Hormone supporting CL in pregnancy: hCG

CORPUS LUTEUM

- Lifespan:
  - Non pregnant→10-12 days
  - Pregnant→10 weeks
- In the absence of pregnancy, → Luteolysis occurs → Progesterone withdrawal → Enzymatic autolysis of endometrium
  - Superficial 2/3rd layer→ Shed in menses
  - Basal layer → For regeneration

Q. Which of the following peak is responsible for ovulation?



A. Peak 1
B. Peak 2
C. Peak 3
D. Peak 4

Answer: **C**

- Peak 1: FSH
- Peak 2: Estradiol peak
- Peak 3: LH surge → Ovulation
- Peak 4: Progesterone

FSH stimulates follicular growth
↓
Estradiol ↑ in low amounts and Inhibin B (from granulosa cells)
↓
Negative feedback on pituitary → FSH ↓
↓
Dominant follicle continues to grow despite FSH ↓ (maximum FSH receptors)
↓

Estradiol peak
↓
Positive feedback to pituitary
↓
LH surge occurs
↓
LH peak occurs
↓
Triggers ovulation
↓
Corpus luteum secretes progesterone and inhibin A
↓
Negative feedback on pituitary
↓
Decreases gonadotropin levels

LH SURGE

- Due to Estradiol (E2) peak
  - More than200pg/ml
  - Lasts for 48 to 50 hours
  - Maintenance by both estrogen and progesterone

TGF BETA FAMILY POLYPEPTIDES

- Local paracrine and autocrine regulation of menstrual cycle
- Inhibin - Inhibits FSH
  - Inhibin A - from CL
  - Inhibin B - from granulosa cells
- Activin - Stimulates FSH
- AMH - From preantral and smaller antral follicles
  - Marker for ovarian reserve
  - Inhibits the growth of the lesser follicles and allows the dominant follicle to emerge
  - Inhibit oocyte meiosis till the right time

Q. The corpus luteum secretes?

A. Progesterone
B. Inhibin
C. Estrogen
D. All of the above

Answer: D

Q. In a 28-day cycle, ovulation occurs about 14 days prior to the expected menses. In a woman with regular cycles of 32 days length, when is ovulation expected to occur?

Yourwish

A. Day 14 of cycle
B. Day 18 of cycle
C. Day 12 of cycle
D. Day 16 of cycle

Answer: B

- Duration of luteal phase is fixed
- Cycle length - 14 = Approximate Day of ovulation
- If irregular cycles → Anovulatory

Important Information
- LH surge approximately 36 hours prior to ovulation
- LH peak approximately 10-12 hours prior to ovulation
- Peak LH approximately 75ng/ml (for at least 24 hrs)
- Peak secretory activity/ Peak CL activity/ Peak progesterone levels → Day21-22 of cycle
  - 7 to 8 days after ovulation
- Peak proliferative changes → Day8-10 of cycle

MENSTRUAL CYCLE PATTERN

00:50:45

- Normal cycle length /frequency of menses: 21 to 35 days/ 24 to 38 days
- Cycle length is prolonged/infrequent: Oligomenorrhoea
- Cycle length is shortened/frequent: Polymenorrhoea
- Normal duration of flow: 2 to 8 days
- Volume of monthly blood loss: 35ml to 50ml
- Menorrhagia- old terminology
  - Prolonged duration > 8 days
  - Heavy bleeding > 80ml
- Excessive bleeding interfering with life quality -Heavy Menstrual Bleeding (new terminology)
- Scanty flow/light flow: Hypomenorrhoea
- Cycle-to-cycle variation >10 days- Irregular cycles (metrorrhagia-old terminology)
- Acyclic bleeding episodes superimposed on normal cycle: Intermenstrual bleeding

DYSMENORRHEA

00:52:50

Q. Which of the following is a feature of primary dysmenorrhea?
A. Pain persists for 1st 48 hours and then subsides
B. Begins a week or two before menses
C. Dyspareunia
D. Non-cyclical pain

Answer: A

- Miltleschmerz → midcycle pain /ovulation pain

PRIMARY V/S SECONDARY DYSMENORRHEA

FMGE 2019, 2020
NEET PG 2023, 2024, 2025
INICET 2022, 2024

PRIMARY DYSMENORRHEA (Spasmodic)- PGF2α		SECONDARY DYSMENORRHEA (Congestive)
Younger women within a few years of menarche	AGE	Older women, can occur in anovulatory cycles
Start on the same day, 48hrs-72hrs	MENSTRUAL CRAMPS	Starts 1-2weeks prior to menses, persists throughout
Normal	PELVIC EXAMINATION	Pathology present
Hot fomentation, NSAIDS OCPS	TREATMENT	Treat the pathological cause

PUBERTY

00:56:40
FMGE 2019, 2020
NEET PG 2023, 2024, 2025
INICET 2022, 2024

Q. Which of the following pubertal events in girls is not mediated by estrogen?

A. Menses
B. Vaginal cornification
C. Pubic hair growth
D. Reaching an adult height

Answer: C

- Average age: 9 to 13 yrs
  - Secondary sexual characters develop
  - Reproductive capacity achieved
- Gatekeepers of puberty onset:
  - Kisspeptin (Kiss-1 gene) & Neurokinin → HPO axis gets activated
- Permissive role of leptin
- 1st hormone to increase is FSH
- Initially, only nighttime secretion of LH
- Initial cycles are anovulatory (HPO axis is immature)
- M/c cause puberty menorrhagia → Anovulatory cycle

Sequence Of Pubertal Development

- Growth spurt
  - Estrogen is responsible for the initiation
  - Depends on growth factor, IGF-1
  - Estrogen causes closure of the epiphysis
  - 1st sign of puberty
- Thelarche
  - 1st visible sign of puberty
- Pubarche
  - Androgen-dependent changes
  - Adrenarche - at 6 years (DHEA-S ↑)

- Peak height velocity
- Menarche
- Staging and grading of pubertal changes → Tanner Staging

PRECOCIUS PUBERTY

01:00:48

- Development of any secondary sexual characters before 8 years & onset of menarche before 10 years of age
- M/c cause: Constitutional/ Idiopathic
- Management →DOC: GnRH analogs
  - Treat the specific cause

TYPES OF PRECOCIOUS PUBERTY

CENTRAL/TRUE	PERIPHERAL/PSEUDO
Gn dependent (Gn is high)	Gn independent (Gn is low)
Always isosexual	Isosexual/ heterosexual
Cyclic ovulation and menses occur	No cyclic ovulation Vaginal bleeding +/_(estrogen)
CAUSES • Idiopathic • CNS tumors(M/c hamartoma) • CNS infections/trauma	**CAUSES** • Autonomous functional ovarian cyst (M/c) • Hormone-secreting ovarian tumor • Non-classical CAH (M/c cause of heterosexual precocious puberty development) • McCune-Albright syndrome (isosexual) • Severe primary hypothyroidism (isosexual)

MENOPAUSE

01:07:53

FMGE 2019, 2020
NEET PG 2023, 2024, 2025
INICET 2022, 2024

ETIOLOGY

- Ovarian follicles depleted → estrogen deficiency→no endometrial proliferation
  - Average age: 51 yrs
  - Indian female: 47yrs
  - Late menopause: 51 yrs
  - Premature menopause: 40 yrs

DIAGNOSIS

- Women of expected age: Retrospective diagnosis after 1 year of amenorrhea
- Women not in the expected age:
  - Serum FSH >40 IU/L on 2 occasions at least 1 month apart

HORMONAL CHANGES IN MENOPAUSE TRANSITION

Q. All of the following hormonal changes are seen during menopausal transition except?

A. Increase FSH

B. Decrease estrogen
C. Decrease AMH
D. Increase Inhibin
Answer: D

- Decreased E2, decreased inhibin B → Increase FSH
- Decreased Estrogen
  - Postmenopausal levels of E2 in serum: <20pg/mL
- Decreased AMH
- Androgen levels decrease (but estrogen falls more than androgen levels)
- Most constant feature of menopausal transition (climacteric): Anovulatory/irregular cycles during the perimenopausal period
- Most bothersome complaint: Hot flashes
  - Vasomotor symptoms→ Due to estrogen withdrawal
  - Last couple of years
  - Worse at night
  - Coincides with increased LH pulses
  - M/c reason for starting HR
- Genitourinary atrophy → Vaginitis, dyspareunia, UTI
- Bone loss after menopause is approximately 1-1.5% bone mass/year
  - M/c osteoporosis fracture → Vertebral compression fracture

Q. HRT in postmenopausal women is used to prevent all except?
A. Hot flashes
B. Vaginal dryness
C. Coronary artery disease
D. Osteoporosis

Answer: C

ADVANTAGES AND DISADVANTAGES HRT

01:18:10

HRT ADVANTAGES	HRT DISADVANTAGES

• Relief from hot flashes
• Relief of genitourinary atrophic symptoms
• Prevents osteoporosis
• Decrease risk of colon cancer
	• Risk of breast cancer
	• Increased risk of Coronary artery disease in females
	  ○ Not cardioprotective
	  ○ No risk of CAD in otherwise healthy <60yrs females within 10 years of menopause
	• Increased risk of venous thromboembolism
	• Increase risk of endometrial cancer
	• Risk of gallstones
	• Risk of ovarian cancer

Yourwish

HRT DRUGS

01:20:00
INICET 2018, 2020, 2019, 2022, 2024, 2025
FMGE 2018, 2019, 2020, 2022, 2024, 2025
NEET PG 2018, 2019, 2020, 2021, 2022, 2024

- If uterus present: Estrogen + Progesterone (endometrial protection)
- If uterus is absent: Estrogen alone
  - Except in the history of:
    - → Supracervical hysterectomy
    - → Endometrial cancer
    - → Endometriosis
    - → Endometrioid tumor of the ovary
- If estrogen C/I → SSRI used(Paroxetine)
- Female complaints only of vaginal dryness→ Local estrogen creams
- Ospemifene:
  - SERM for dyspareunia due to vaginal dryness
- Tamoxifene and raloxifene → Estrogen agonist action
  - Not used for the treatment of hot flashes
- DOC for osteoporosis already present: Bisphosphonates

FUTURE HRT

- Tissue-selective estrogen complex
- Conjugates equine estrogen + Bazodoxifene (SERM)
  - Conjugates equine estrogen
    - → Relief of vasomotor symptoms
    - → Bone protection
  - SERM
    - → Antagonist effects on the breast and endometrial tissues

Yourwish

3. RELEVANT CLINICAL EMBRYOLOGY AND ASSOCIATED DISORDERS

RELEVANT EMBRYOLOGY

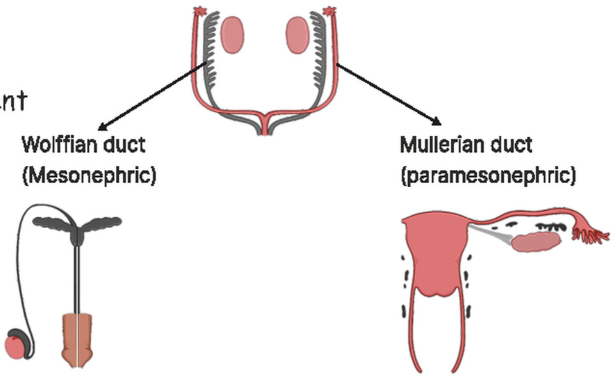
00:00:40

Gonads

- Develop from the gonadal ridge
- In the posterior abdominal wall (medial to mesonephros)
- Bipotential until 5 weeks of gestation i.e both ducts are present
  - Wolffian duct/mesonephric duct
  - Mullerian duct/paramesonephric duct
- Once the germ cells from the yolk sac migrate to region of developing gonads at 6weeks

↓

Gonads develop either into testis or ovaries



Male Gonadal Development

Genetic male with 46XY SRY on shortarm of Y chromosome

↓SOX9/FGF9

Testis develop 6-9wks of gestation

↓

Sertoli cells secretes AMH(antimullerian hormone)

↓

Mullerian duct regression completes by 8weeks of gestation

- Leydig cells secrete testosterone

↓

Wolffian duct develops

↓

Male internal genitalia develops 9-12weeks of gestation

- Testosterone secretion by leydig cell
  - Starts at 8 weeks
  - Peaks by 15-18 weeks
  - Initial stimulus is from hCG

- Testosterone

↓ 5 alpha reductase

5Dihydroxy Testosterone

↓

Masculinization of male external genitalia (Begins at 10week , Completes by 12-14weeks)

Female Gonad Development

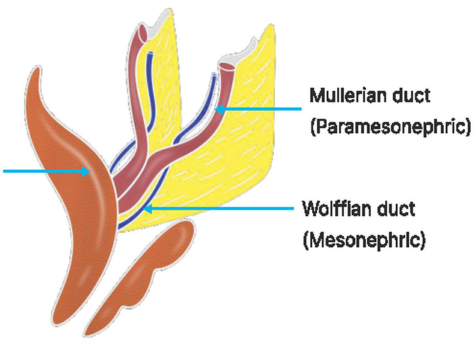
Genetic female with 46 XX

↓WNT-4/RSpondin-1

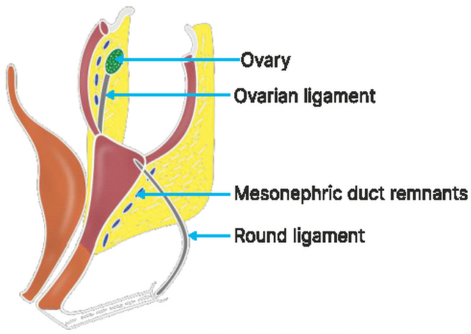
Ovaries develop at 8-10weeks

- Both XX chromosomes are required for ovaries to develop
  - Turner's syndrome with 45XO present with streak ovaries
- Genital development in a female fetus is by default, because
  - Mullerian duct develops because of absence of AMH
  - Wolffian duct regresses and female external genitalia develops because there is no androgens

Mullerian Duct



- Mullerian duct developes to form fallopian tubes, uterus, cervix and upper ⅓ vagina
  - Unfused part forms fallopian tube
  - Fused part forms uterus, cervix, upper 1/3rd of vagina
- Complete fusion of mullerian duct occurs by 10weeks
- Uterine cavity formed after dissolution of septa by 18-20weeks
- Endometrium differentiates by 20weeks
- Vagina develops from lower fused part of mullerian ducts and urogenital sinus
- Fibromuscular wall of vagina is mesodermal in origin
- Epithelium of vagina is endodermal in origin
- Canalisation of vagina completes by 20weeks of gestation
  - Failure of canalization of vagina/failure of fusion of mullerian duct with urogenital sinus : Transverse vaginal septum



- Ovarian and round ligaments are remnants of gubernaculum
- Remnants of mesonephric duct are located in sheets of broad ligament
  - Paraoophoron and epoophoron are cranial remnants
    - Cysts in para and epoophoron are called paraovarian cyst
  - Gartner's duct is caudal remnant
    - Gartner's duct cyst present as swelling from the antero- lateral aspect of vagina

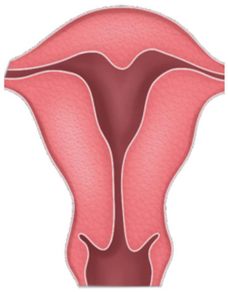
Garners duct cyst	Cystocele
Tense cystic	Non tense
Non compressible	Reducible
Vaginal rugosities lost	Vaginal rugosities present
Cough impulse absent	Cough impulse present

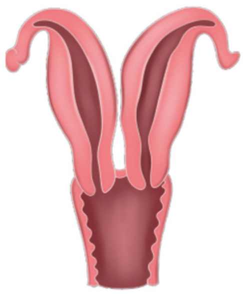
Mullerian Duct Abnormalities

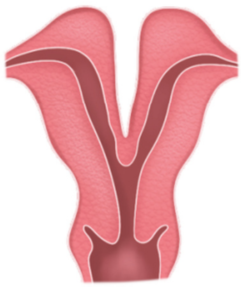
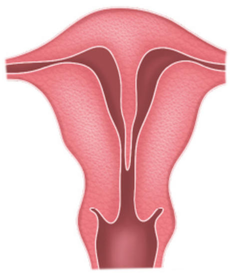
FMGE 2020, 2025
Neet PG 2022, 2024 00.15.05

UNICORNUATE UTERUS

	• Only one side mullerian duct developed	• Rudimentary horn maybe connected to main cavity
		• May have functional endometrium
		• In case of rudimentary horn is functional
		  ○ U/L dysmenorrhea
		  ○ Chances of ectopic pregnancy in rudimentary horn called cornual pregnancy

ARCUATE UTERUS 	• Cavity normal but slight bulge present	

DIDELPHYS UTERUS

	• Complete failure of fusion of mullerian ducts	• External dip at fundus is present
		• 2 separate uterine cavities
		• 2 separate cervices
		• Can be associated with
		  ○ Longitudinal and horizontal vaginal septum
		  ○ OHVIRA(Obstructed hemivagina and I/L renal agenesis are present)

BICORNUATE UTERUS 	• Incomplete fusion of mullerian duct	• Fusion of mullerian duct start centrally • Later proceed upwards and downwards • Externally dip in the fundus is seen • 2 separate uterine cavities • Single cervix
SEPTATE UTERUS 	• Failure of dissolution of septum	• No dip at the fundus • 2 uterine cavities • Single fused cervix

- Defects of lateral fusion
  - MC anomaly : septate>bicornuate uterus
  - M/C clinical presentation 2nd trimester abortions
    - Anomaly that cause 1st trimester abortion is septate uterus
  - Best reproductive outcome seen in arcuate>didelphys
  - Maximum incidence of urinary tract abnormalities(MC I/L renal agenesis) in unicornuate uterus
- DES (diethylstilbisterol) related anomalies
  - Not associated with renal urinary tract abnormalities
  - Vaginal adenosis (overall M/C)
  - Cervical hood and collars
  - Hypoplastic uterus (m/c finding in uterus)
  - T shaped uterus(most specific in uterus)
  - Clear cell adenocarcinoma of vagina

Q. A woman is seen with a history of recurrent transverse lies in her three pregnancies. Which uterine anomaly is most likely?

a. Unicornuate uterus

b. Uterus didelphys

c. Bicornuate uterus

d. Arcuate uterus

Handwritten Notes

- Malpresentation more likely with distorted cavity

Q.Which of the following is the most important indication of surgical correction of bicornuate uterus?

a. Infertility

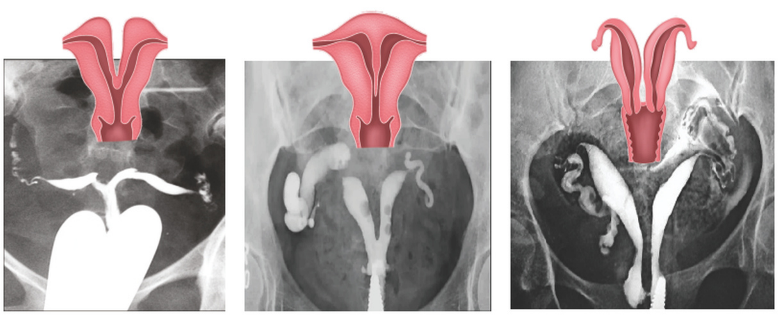
b. Dysmenorrhea

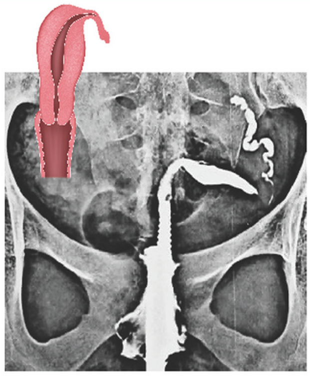
c. Menorrhagia

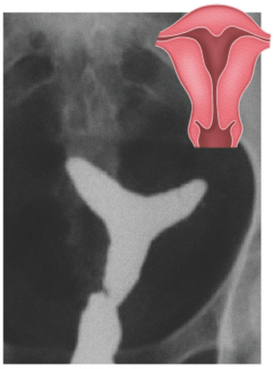
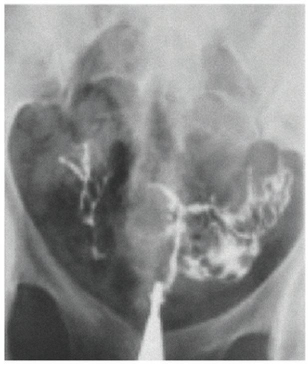
d. Habitual abortion

- IOC for mullerian anomalies is 3D USG>MRI
- Gold standard investigation is laprohysteroscopy
- In incidental diagnosis no surgical treatment
- Septate uterus with infertility or recurrent abortion,treatment of choice is hysteroscopic septum resection,preferably under laparoscopic guidance
- Uterus unification surgeries(Metroplasty)
  - Jones metroplasty
  - Stassman metroplasty
  - Tomkins metroplasty
- M/C indication of surgery is recurrent pregnancy loss

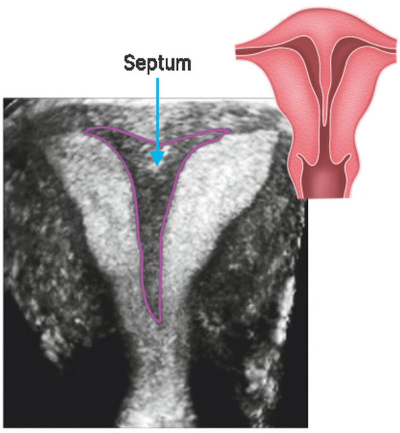
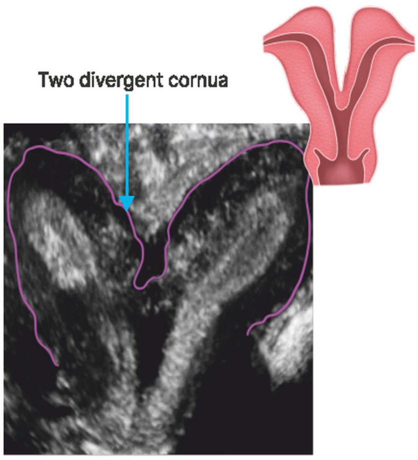
HSG IMAGES



			
• Angle is obtuse • Most likely bicornuate	• Angle between 2 horns is acute • Most likely septate	• 2 cannulas and 2 cervix seen • Most likely didelphys	• Dye seen only in one side • Unicornuate

		
• Normal uterus	• Arcuate uterus • Cavity is normal • Difficult to differentiate from normal uterus based on HSG alone	• DES exposed uterus • T shaped uterus with endometrial stripe

3D USG IMAGES

 Septate uterus	 Bicornuate uterus	 Arcuate uterus

SEPTATE UTERUS	BICORNUATE UTERUS	ARCUATE UTERUS
• 2 separate uterine cavity • Single cervix • Septum length >1cm • Septal angle<90 degree	• Separate uterine cavities • Serosal indentation on uterus	• Cavity is almost normal • Fundus is intact • Septal bulging into the cavity • Septal length <1cm • Septal angle >90 degree

Mullerian Agenesis

00:41:30

INICET 2021, 2024

- Uterus,tubes and vagina -all absent
- Blind vaginal pouch may be present(developing from urogenital sinus)
- Sometimes Lateral 2/3rd tube,primordial uterus may be present
- Gonads/ovaries normal
- Karyotype 46XX
- Androgen production normal
- Normal breast and pubic hair development
- Normal hormones
- Absence of menses (primary amenorrhea) due to absent uterus
- If difficulty in sexual intercourse is anticipated ,then
  - Franks vaginal dilators
  - Vaginoplasty surgeries
    - Mc indoe's vaginoplasty
  - Pregnancy is possible by IVF with surrogacy
- Mayer Rokitansky Kuster Hauser Syndrome
  - Mullerian agenesis
  - Renal agenesis> horse shoe kidney
  - hemiverterbrae/scoliosis

DISORDERS OF SEXUAL DEVELOPMENT

00:46:00

- Intersexuality includes pseudohermaphroditism and true hermaphroditism

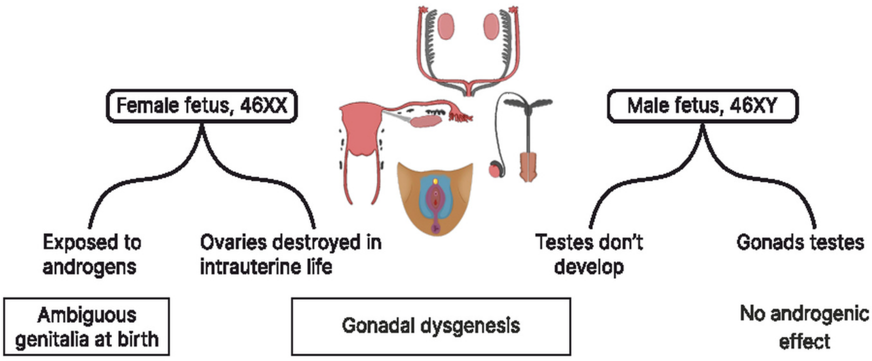
PSEUDO-HERMAPHRODITISM	TRUE HERMAPHRODITISM
• Gonads are of one sex • Phenotype of another sex **FEMALE PSEUDOHERMAPHRODITISM** • Gonads are ovaries • Karyotype is 46 XX • External phenotype is male • MC cause is congenital adrenal hyperplasia **MALE PSEUDOHERMAPHRODITISM** • Gonads are testes • 46 XY karyotype • Female phenotype • MC cause is Androgen in sensitivity syndrome	• B/L ovotestes • Majority karyotype 46 XX • Could be 46XY/mosaic • Mostly ambiguous genitalia at birth

Q.Exposure of female fetus to androgens during early embryonic development may interfere with development of?
A.Mullerinan duct
B.Ovary
C.Urogenital sinus
D.Mesonephric ducts

- Androgens will interfere with the development of urogenital sinus leading to masculinisation of external genitalia or ambiguous genitalia in the new born
- Androgens will not interfere with the development of wolffian duct because
  - Development of wolffian duct require high local concentration of testosterone which is maintained by the androgen binding protein(ABP)produced by sertoli cells in a male fetus
  - ABP is not available in female fetus and exogenous androgens are in less concentration

CONCEPT

Neet PG 2024
INICET 2021, 2023



- Female ambiguous genitalia at birth
  - MC cause is CAH
  - MC enzyme deficient is 21 alpha hydroxylase
  - Other causes-
    - Maternal androgenic drugs during pregnancy
    - Mother suffering from androgen secreting tumor
    - Placental aromatase deficiency
- Germ cells fail to migrate to gonads→ Gonadal dysgenesis →Female genitalia /default genitalia
- Male fetus 46XY +gonads are testes, but no androgenic effect→Male fetus not able to masculinize → 46XY, with female phenotype
- MC cause of ambiguous genitalia in 46XY- partial androgen insensitivity syndrome.

Gonadal Dysgenesis

00:57:32

- MC type of gonadal dysgenesis is Turner syndrome
  - MC genotype is 45 XO
  - Can be mosaic 45X/46XX,45XO/46XY
    - Turner mosaic could menstruate
  - Increased maternal age does not increase risk
  - Incidence is 1 in 2000 live born females
  - 98% fetuses carrying aneuploidy abort
- Pure gonadal dysgenesis-
  - 46 XX gonadal dysgenesis
  - 46 XY gonadal dysgenesis is swyer syndrome

Yourwish

- Mixed gonadal dysgenesis (45XO/46XY)
- Born and bought up as females
- Identified in late puberty
- Absence of menses
- Primary amenorrhea
- Delayed puberty development

Turner's Syndrome

01:00:05

INICET 2022, 2025
FMGE 2020

Clinical Features

- Short stature
  - Estrogen is responsible for the closure of epiphyses and hence halting the height of a person
  - Though turners is deficient in estrogen does not present with tall stature because
    - Haploinsufficiency of SHOX gene (Xp22)
- Wide spaced nipples/shield chest
- Webbed neck and low posterior hairline
- Cubitus valgus
- Hypothyroidism
- CVS anomalies(bicuspid aortic valve (MC) COA,HTN)
- Renal anomalies m/c horse shoe kidney>renal agenesis
- Infantile uterus and external genitalia
- Streak ovaries
  - Estrogen deficiency hence LH and FSH increased
- Osteoporosis

Diagnosis

- Diagnosis of turners syndrome is based on clinical profile and confirmed by karyotype
- Evaluation of cardiac ,renal ,thyroid status
- Regular screening for SNHL ,DM(increased risk of type 1 DM)

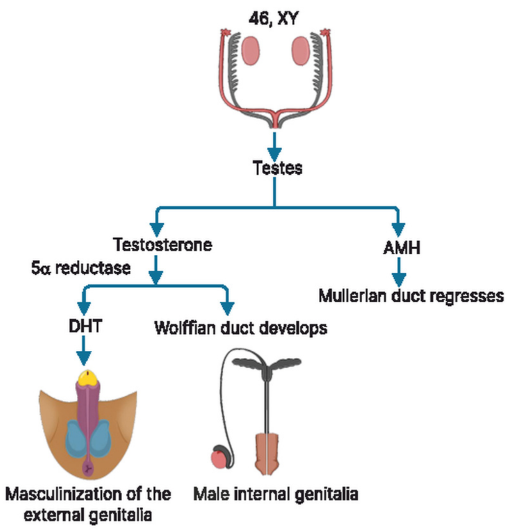
Treatment

- Need lifelong HRT(estrogen followed by both estrogen and progesterone)
- Early childhood diagnosis→ growth hormone for treatment of height
- Pregnancy is contraindicated (because of increased risk for cardiac status)

Disorders of 46xy Development

01:05:00

Neet PG 2024
FMGE 2025
INICET 2021, 2023



Yourwish

1.Genetic male XY + absence of SRY gene and other genes that involved in testicular development may be defective

↓

No development of testis,hence, no AMH,no testosterone

↓

Mullerian duct does not regresses

↓

Phenotypically develops into female with uterus

↓

Swyers syndrome

2.Gonads are testis+46XY development problem happens

↓

AMH secreted by sertoli cells is normal

↓

Mullerian duct regresses

↓

Uterus absent

3.Testis present +not synthesizing testosterone

↓

No wolffian duct development/no masculinization

↓

Androgen synthesis deficiency

4.Androgen /testosterone is present but not acting on tissues because of androgen receptors deficiency

↓

Androgen insensitivity syndrome

5.Gonads are testis,testosterone produced,wolffian duct develops,5 alpha reductase deficiency

↓

Masculinization did not take place in fetal life

↓

5 alpha reductase deficiency

Summary

	SWYERs MC cause is Point mutation in SRY genes	**COMPLETE AIS** Deficiency of androgen receptors	**ANDROGEN SYNTHESIS DEFICIENCY 17a hydroxylase**	**5a REDUCTASE DEFICIENCY**
GONADS	Dysgenetic testes	Undescended testes	Undescended Testes	Undescended Testes

INTERNAL GENITILA	Uterus is present	Uterus is absent	Uterus is absent Wolffian duct structures+/-	Uterus is absent Wolffian duct +/-
EXTERNAL GENITILIA	Female	Female	Female/ ambiguous	Female ambiguous
Born and brought up as females,present as primary amenorrhea and inguinal or labial mass				
BREAST DEVELOPMENT	Absent	Present (High levels of testosterone are converted to estrogen by aromatase)	Absent	Absent Virilize at puberty
PUBIC HAIR	Present	Absent	Absent	Present

Important Information

- Partial AIS : Female with mild virilization,labioscrotal fusion,clitoromegaly
- Reifenstein syndrome: Undervirilized male with hypospadias, gynecomastia, infertility

Q. All of the following statements regarding Androgen Insensitivity Syndrome are true except?

a. The phenotype is always female

b. Can present as ambiguous genitalia in newborn

c. X linked recessive inheritance

d. Androgen receptors are deficient

- While Complete Androgen Insensitivity Syndrome (CAIS) presents with a completely female phenotype, Partial Androgen Insensitivity Syndrome (PAIS) can present with varying degrees of ambiguous genitalia, and mild forms can present with a male phenotype. Therefore, it is not "always" female.
- The other options (b, c, and d) are generally considered characteristic or true features of the spectrum of androgen insensitivity.

Q. Which anomaly is associated with the poorest reproductive outcome?

a. Mullerian agenesis

b. Androgen Insensitivity Syndrome

c. Pure gonadal dysgenesis

d. Swyer Syndrome

- IVF And surrogacy is possible in mullerian agenesis
- Pure gonadal dysgenesis and sweaters syndrome have uterus , hence they can borrow eggs from someone else.
- Androgen insensitivity syndrome have undescended testis, therefore spermatogenic potential is almost nil.

TREATMENT

DIAGNOSED WITH PUBERTAL DELAY	SWYERS	COMPLETE AIS
Gonadectomy needed **At increased risk of gonadoblastoma/malignancies**	Done as soon as diagnosis is made	Done after the pubertal development is complete /by age of 18 years
HRT	Estrogen+progesterone	Estrogen
Reproductive option	IVF + donor oocytes	Adoption

Yourwish

4. ANOVULATION, HORMONAL DISORDERS, AMENORRHEAS

OVULATORY DYSFUNCTION

00:01:44

Common Causes

- PCOS: M/c cause
- Obesity
  - Peripheral fat aromatizes androgens to estrogen → chronically elevated estrogen prevents LH surge → anovulation.
  - Decreased Sex Hormone Binding Globulin (SHBG) → increased free (active) hormones.
    → Insulin resistance
    → Excess androgens
    → Excess corticoids
    → Hypothyroidism
- Thyroid disorders (especially hypothyroidism)
- Hyperprolactinemia
- Functional hypothalamic dysfunction (stress, chronic illness, excessive exercise)
  - Inhibition of pulsatile GnRH secretions

Functional Hypothalamic Dysfunction

- Suppressed HPO axis (inhibition of pulsatile GnRH).
- Mild Suppression:
  - Inhibition of follicular growth
  - Anovulation
  - Irregular cycles
- Severe Suppression:
  - Estrogen deficiency symptoms (Hypogonadism)

Features Of Anovulatory Bleeding

Q. All of the following are features of anovulatory bleeding except?

a. The only symptom may be failure of conception.

b. Usually associated with painless periods.

c. Associated with premenstrual symptoms.

d. Associated with irregular & heavy menstrual bleeding.

Ans. c

Features Include

- Failure of conception
- Associated with painless periods
- Associated with irregular and heavy menstrual bleeding

- No premenstrual periods/premenstrual molimina
  - Bloating
  - Breast discomfort
  - Mood swings
- Major risk factor for endometrial hyperplasia and cancer

Mechanism:

- No ovulation → No corpus luteum → No progesterone
- Unopposed estrogen → Continuous endometrial proliferation
- Follicular atresia → Estrogen withdrawal Bleeding
- **Estrogen Withdrawal Bleeding:** Typically heavy, prolonged, and painless

Important Information

- Progesterone down regulates estrogen receptor on endometrium and stabilize the growth
- Important concept
  - Prolonged h/o chronic anovulation is a risk factor for Endometrial Hyperplasia & Cancer
    → D/t Prolonged unopposed estrogen action on endometrium
  - Role of progesterone in management of AUD & endometrial hyperplasia

PCOS

00:15:08

Q. 23-year-old girl presents with c/o infrequent menses since menarche. Her cycles are irregular, often delayed by 2-3 months & bleeding lasts for 10-15 days. She is not sexually active. She has mild hair growth over her chin & upper lip. A dark velvety pigmentation is seen at the nape of her neck. What is the likely diagnosis?

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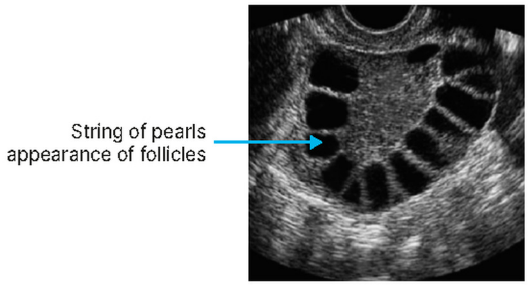
a. PCOS
b. Cushing Syndrome
c. Androgen secreting tumor
d. Congenital adrenal hyperplasia

Ans. a



Rottedam Criteria

- Criteria used for diagnosis
- 2/3 should be present
  - Menstrual cycle abnormalities
    → Amenorrhea
    → Oligomenorrhea
    → Irregular cycles
  - Clinical/biochemical evidence of hyperandrogenism
    → Serum testosterone levels
  - USG appearance of polycystic ovaries
    → 2-9mm follicles are being measured
    → ≥20 follicles in either ovary and / or ovary volume more than 10ml
    → String of pearls appearance /necklace appearance

Important Information

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- Underlying insulin resistance, hyperinsulinemia & hyperandrogenism
- Increased risk of metabolic syndrome, DM, endometrial hyperplasia
- LH levels are increased & FSH levels are low
- LH:FSH is >2:1 (D2/D3)
- SHBG levels decreased
- Serum AMH levels increased (>5ngm/ml)
- E2:E1 ratio is reversed i.e E1>E2, total Estrogen levels increased
    - Total E2 levels are in normal range
    - Free E2 levels are increased

Treatment Of Pcos

- 1st line treatment: Lifestyle modification and weight reduction
- Women not wanting to conceive → DOC is OCP
- 1st line drug for hirsutism in PCOS → OCPs
    - OCPs ↓LH and FSH level, causes anovulation
    - Estrogen component in pill increases SHBG → ↓ free level of hormone
- DOC for ovulation induction letrozole>clomiphene
- Role of metformin → insulin sensitizer (metabolic benefit)

MCQ

Q. 26-year-old with BMI of 40, is seen in the infertility clinic. She has irregular cycles. On physical examination, hirsutism is noted and USG shows polycystic ovaries. What is the next best step in management?

a. Weight reduction, metformin, ovulation induction with gonadotropin

b. Weight reduction, metformin, ovulation induction with clomiphene

c. Metformin, finasteride, ovulation induction

d. Metformin & laparoscopic ovarian drilling

Ans. b

Explanation

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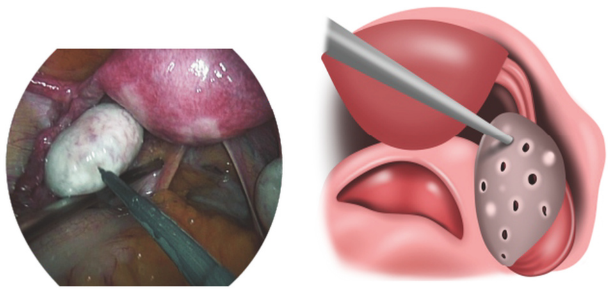
- Management:
    - Weight reduction & lifestyle modification is key
    - Ovulation induction needed for pregnancy
    - Best Step: Clomiphene (or Letrozole) + Metformin + Weight reduction
    - Avoid: Finasteride (anti-androgen) in women trying to conceive (teratogenic/feminization of male fetus).
- Laparoscopic ovarian drilling



Laparoscopic ovarian drilling

- Procedure: Puncturing ovarian stroma to reduce androgen production.
- Indication: Refractory cases not responding to medical ovulation induction
- Current Status: Utility limited due to success of modern ART (IUI/IVF)
- Note: Laparoscopy is NOT for diagnosis of PCOS.

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HIRSUTISM

00:32:50

- Excessive growth of terminal (coarse and dark)hair in male pattern distribution
- Grading of hirsutism → FERRIMAN GALLWEY SCORING
  - 9 sites are checked
  - Score of ≥ 8 is hirsutism is present
  - Score of ≥15 is severe hirsutism is present
- Virilization
  - Refers to features of severe androgen excess like deepening of voice, temporal balding, breast atrophy, clitoromegaly
- Androgens in circulation in descending order of concentration
  - DHEA-S>DHEA>Androstenedione>testosterone
  - DHEA-S secreted exclusively from adrenal glands
- Testosterone in females
  - 25% each from adrenal and ovaries
  - 50% from peripheral conversion of androstenedione

With Hirsutism

- Acute onset, severe, rapidly progressive hirsutism/ virilization &/ or S, Test >150 ng/dl
  - → R/o androgen secreting ivarian tumors & Adrenal gland tumors (DHEA-S↑>= 700 μg/dl)
- Mild, chronic, slow progressive S. Test < 150 ng/dl
  - → Most likely DX PCOS
- r/o Hypothyroidism Hyperprolactinemia
- In pubertal girls, also consider CAH Non-classical. Dx↑serum 17-OH pragesterone

Important Information

HAIR -AN SYNDROME

- Hyperandrogenism
- Insulin resistance
- Acanthosis Nigricans

IDIOPATHIC HIRSUTISM

- Regular cycles
- Ovulation is documented
- Normal serum androgens are present
- Normal ovaries seen on scan

Yourwish

Treatment Of Hirsutism

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- Always treat the underlying cause
  - Surgical removal of tumor
  - For CAH →corticosteroids
- Drugs used
  - Combined OCPS
    - → Containing cyproterone acetate,drospirenone are preferred
  - Anti androgens
    - → Spironolactone (Preferred)
    - → Flutamide(androgen Rc antagonist)
    - → Finasteride(5 alpha reductase inhibitor)
  - GnRH analogs
    - → Last resort
    - → Suppress the ovarian production of hormones
    - → Effective if source of androgen is ovaries

Important Information

- Always give anti-androgens along with OCPs (contraception)as there is potential to feminize a male fetus

HYPERPROLACTINEMIA

00:41:35

- Prolactin is a polypeptide hormone synthesized from anterior pituitary lactotrophs
- Physiological causes
  - Pregnancy
  - Lactation
  - Nipple stimulation
  - Chest wall stimulation(burn/herpes)
  - Sleep
  - Stress
  - Exercise
  - Orgasm

- Hyperprolactinemia can present with
  - Menstrual disturbances
  - Infertility
  - Galactorrhea
  - Hirsutism
  - Frank hypogonadism

Important Information

- Prolactin inhibitory factor dopamine
- Prolactin causes HPO axis dysfunction by inhibition of GnRH
- If a woman presents with amenorrhea and galactorrhea
  - 2/3rd have high prolactin levels
  - 1/3rd of them will have pituitary adenoma
    - → M1/C Visual field defects bitemporal hemianopia

Pathological Causes of Hyperprolactinemia

- Drugs like dopamine antagonists
- Primary hypothyroidism → increase TRH → Stimulates prolactin release
- Prolactinomas → prolactin secreting pituitary adenomas
- Hypothalamic and pituitary tumors
- Decrease in prolactin clearance
  - Chronic renal failure
  - Chronic liver disease

Treatment

- Treatment of underlying cause
- DOC → Dopamine agonist
  - Cabergoline> bromocriptine
    → Better side effect profile
  - Used in woman wanting to conceive
  - Used for Treatment of galactorrhea

Prolactinomas During Pregnancy

- Risk of increase in size
- Periodic checking of prolactin is not beneficial
- If needed, drug treatment during pregnancy →bromocriptine

AMENORRHEA

00:50:50
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INICET 2022, 2024

Primary Amenorrhea

- Primary amenorrhea defined as absence of menses by
  - 13 years of age (I/C/O) → No secondary sexual characters present
  - 15 years of age (I/C/O) → secondary sexual characters present
- M/C cause worldwide → gonadal dysgenesis (turners)
- M/C cause in india is → mullerian agenesis

Secondary Amenorrhea

- Secondary amenorrhea defined as absence of menses for 3 consecutive cycles for or 6 months
- M/C physiological cause is pregnancy
- M/C pathological cause is PCOS

Concept

- The causes of amenorrhea can be
  - Pituitary or hypothalamic cause
    → GnRH levels are decreased → Estrogen deficiency
    → Breast development is absent
    → Called as hypogonadotropic hypogonadism
  - Ovarian cause
    → Gonadal dysgenesis
    - Estrogen deficiency occurs
    - Increased FSH and LH levels due to feedback
    - Breast development is absent
    - Called as Hypergonadotropic hypogonadism
  - Uterine cause
    → Outflow tract abnormalities
    - Hormone levels normals
    - Breast development is normal
    - Called as Eugonadotropic Eugonadism

    → Absent uterus

CLINICAL APPROACH-PRIMARY AMENORRHEA

- Breast devp present
  - H/o cryptomenorrhea uterus present
    - Bluish bulge at introitus imperforate hymen
    - L/E normal Transverse vaginal septum
  - Uterus is absent blind vaginal pouch
    - Pubic hair present- Mullerian agenesis
    - Pubic hair absent Complete androgen insensitivity syndrome
- Breast devp absent

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Primary Amenorrhea, Absent Breast Development, Uterus Present

- Check Hormonal profile: E2/FSH//LH/TSH/Prolactin
  - FSH is the best

FSH HIGH	FSH LOW
• Diagnosis-hypergonadotropic hypogonadism • Next steps karyotype	• Diagnosis hypogonadotropic hypogonadism • M/C cause functional GnRH deficiency ○ M/c cause of Functional GnRH deficiency is constitutional
• Short ,height,streak ovaries hypoplastic uterus- Turner syndrome	• Tall +anosmia → kallman's • M/C CNS tumor ○ R/o by MRI brain ○ M/c CNS tumor: Craniopharyngioma
• Tall streak gonads uterus present → Other types of gonadal dysgenesis	• Short,other causes r/o, FSH low/normal range

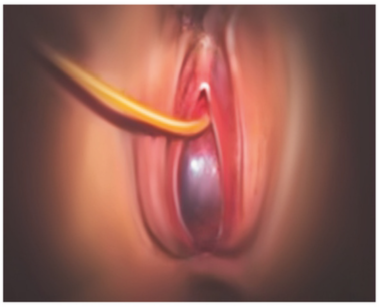
OUTFLOW TRACT DISORDERS

01:08:12

Imperforate Hymen

MCQ

Q.A 15-year-old is brought in by her mother in emergency with acute urinary retention. On abdominal examination, there is a suprapubic bulge, and a lump abdomen is palpable arising from the pelvis. On local exam, the following findings are seen. On further questioning, mother says that the girl has not yet attained menarche. What is the most likely diagnosis?



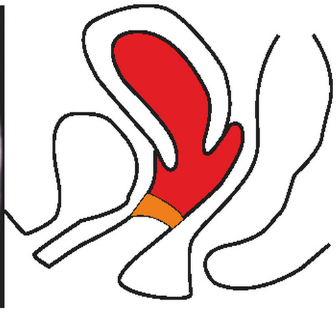
a. Fibroid uterus
b. Imperforate hymen
c. Transverse vaginal septum
d. Mullerian Agenesis

Ans. b

Imperforate Hymen

- PR Exam: Bulge felt anterior to rectum along entire length
- Symptoms: Cyclical pain, primary amenorrhea, acute urinary retention (large mass effect)
- Next investigation: Usg pelvis
- Treatment: Cruciate Incision over the hymen

Transverse Vaginal Septum



- M/C location is the upper part
- Local examination mostly normal
- On PR → bulge anterior to rectum felt higher up
- MRI >USG
  - Surgical planning
  - Exact location of septum
  - Other genitourinary pathologies

Treatment

- Septum resection with or without graft placement

MCQ

Q. A 19 years old girl with primary amenorrhea with normal secondary sexual characteristics. What is the next investigation to be done?

a. USG

b. LH and FSH

c. Estradiol estimation

d. Karyotyping

- Normal breast = normal estrogen/axis
- Rule out uterine/outflow cause first
- Next best investigation: Ultrasound Pelvis (to check if uterus is present)

Ans. a

Q. 18-year-old girl presents with c/o primary amenorrhea. She has well developed breast & pubic hair. Vaginal introitus looks normal on local examination & the cervix is not felt on per-rectal exam. What is the likely diagnosis?

a. Androgen Insensitivity Syndrome

b. Turner Syndrome

c. Transverse vaginal septum

d. Mullerian Agenesis

Ans. d

- Dx: Mullerian Agenesis (Blind vaginal pouch, absent uterus)
- Why not AIS? Pubic hair is present in Mullerian Agenesis, absent in AIS.

Q. In the above patient USG confirms the absence of uterus & intrabdominal gonads are seen. Which of the following tests can help with the diagnosis?

a. Serum FSH

b. Serum Estradiol

c. Serum Testosterone

d. Gonadal Biopsy

Ans. c

- Test: Serum Testosterone.
- Result: Male range in AIS (Testes), Female range in Mullerian Agenesis (Ovaries).

Mullerian Agenesis Vs. Complete Androgen Insensitivity Syndrome

- Primary amenorrhea, breast development present, uterus absent, blind vagina → 2 possibilities
- Mullerian agenesis
- Complete androgen insensitivity syndrome

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MULLERIAN AGENESIS		COMPLETE ANDROGEN INSENSITIVITY SYNDROME
Ovaries	**GONADS**	Testes(undescended)
Normal female range (20-80ngm/dl)	TESTOSTERONE SERUM	Male range (200-800ng/dl)
46 XX	KARYOTYPE	46XY
No HRT,pregnancy possible by IVF and surrogacy	MANAGEMENT	Gonadectomy after pubertal development complete, will need estrogen HRT later, adoption
Evaluation for other genitourinary anomalies	ADDITIONAL CONCERN	X linked recessive disorder Other family members may be affected

Q. 16-year-old girl presents with c/o primary amenorrhea. Her height is 140 cm, breast development is Tanner stage 1, with pubic hair & uterus present. LH & FSH levels are raised & USG shows streak ovaries. What is the likely diagnosis?

a. Kallmann Syndrome

b. Turner Syndrome

c. Swyer Syndrome

d. Androgen Insensitivity Syndrome

Ans. b

- Dx: Turner Syndrome
- Why not Swyer?
  - Swyer patients are tall, dysgenetic testes
- Why not Kallmann?
  - Kallmann has low FSH

Important Pointers

- Hypogonadotropic hypogonadism
  - Treatment directed towards treating the cause
- Gonadal dysgenesis
  - Lifelong HRT(estrogen f/b estrogen + progesterone)
  - Patients with Y chromosome (e.g., swyers syndrome) need gonadectomy due to risk of Gonadoblastoma and germ cell malignancies
    → Done as soon as diagnosis is made
- I/C/O normal uterus present
  - IVF with donor oocyte for future pregnancy
- Kallman syndrome Treatment
  - Lifelong HRT
  - Ovulation induction for pregnancy with Gonadotropin & Pulsatile Luprolide (GnRH agonist)

Extra Pointers

01:24:10

17-alpha-hydroxylase Deficiency:

- AR disorder
- Clinical Presentation:
  - Primary Amenorrhea.
  - Breast development absent (Estrogen deficiency).
  - Uterus present (46,XX, no AMH).
  - High FSH (Hypergonadotropic Hypogonadism) but normal karyotype (not gonadal dysgenesis)
  - Clue: Hypertension (Excess mineralocorticoids due to shunting of precursors)
- Pathophysiology: Defective androgen synthesis (androgens are precursors to estrogens)

Constitutional Delay Of Puberty:

- Clinical Picture:
  - Primary amenorrhea
  - Breast/uterus present
  - Normal hormonal profile and USG
- Progesterone Challenge: Withdrawal bleeding occurs
  - Interpretation: Estrogen is present and acting on the endometrium (Endometrium is functional). The axis just hasn't fully matured to start regular cycles.
- Contrast with Genital Tuberculosis: In TB, despite normal estrogen, progesterone withdrawal bleeding does NOT occur because the endometrium is scarred/damaged

MCQ

01:29:12

Q.17-year-old girl presented with primary amenorrhea. She is tall, has no pubic & axillary hair & breast development is absent with B/L inguinal masses. Investigations reveal absence of uterus & ovaries. Which of the following is the most likely cause?

a. Complete AIS

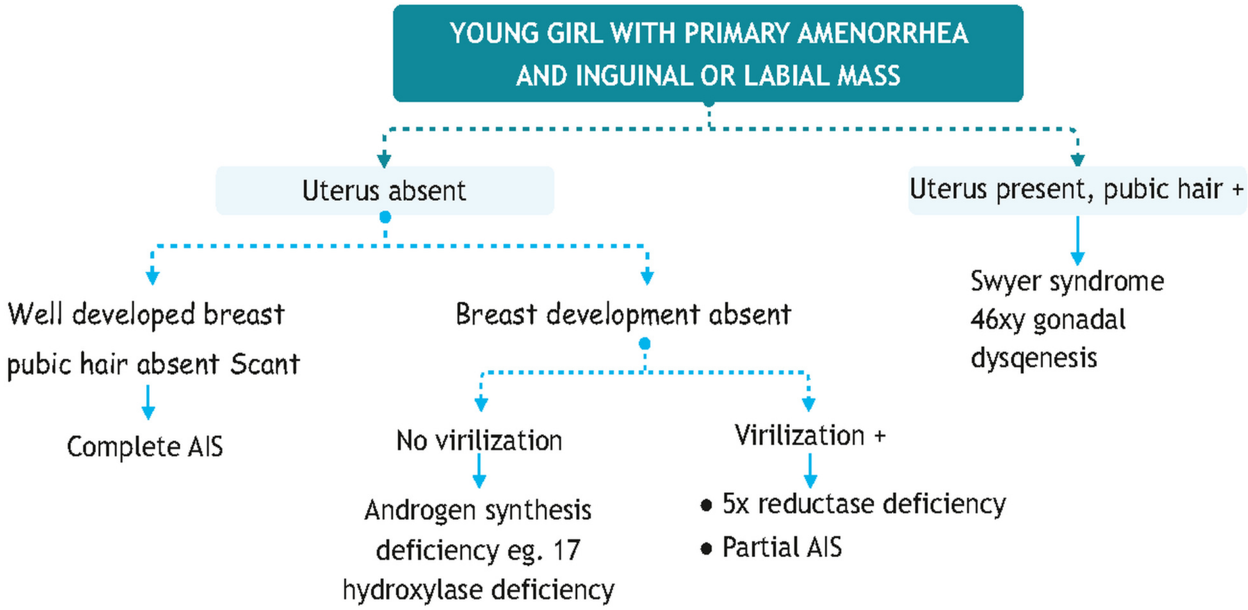
b. Swyer Syndrome

c. Turner Syndrome

d. Hypergonadotropic hypogonadism

Ans. d

- Swyer Syndrome (46,XY Gonadal Dysgenesis):
  - Ruled Out: Uterus is present in Swyer syndrome (streak gonads don't make AMH). Here, the uterus is absent.
- Turner Syndrome (45,XO):
  - Ruled Out: Uterus is present (though hypoplastic), streak ovaries present. No inguinal masses (testes).
- Complete Androgen Insensitivity Syndrome (CAIS):
  - Features: 46,XY, Testes present (inguinal masses), Uterus absent (AMH present).
  - Key Distinction: In CAIS, breast development is present (Testosterone aromatizes to Estrogen)
  - Ruled Out: Patient has absent breast development.
- Hypergonadotropic Hypogonadism (Androgen Synthesis Defect):
  - Diagnosis: Most Likely Cause
  - Mechanism: Genetically male (XY) fetus with defective androgen synthesis (e.g., 17α-hydroxylase deficiency)
  - Clinical Correlation:
    - → No Androgens: No virilization, no pubic/axillary hair
    - → No Estrogen: Androgens are precursors to estrogen → No breast development
    - → Hormonal Profile: Steroid hormone deficiency → Lack of negative feedback → High FSH (Hypergonadotropic)



- To differentiate b/w 5 alpha reductase deficiency and partial AIS
  - S. testosterone to DHT ratio
    - → Increased in 5 alpha reductase deficiency
    - → Normal in partial AIS

SECONDARY AMENORRHEA

01:38:32

Q. Which among the following does NOT cause secondary amenorrhea?

a. Kallman Syndrome

b. Fragile X permutations

c. Sheehan Syndrome

d. Turner Syndrome

Ans. a

- Kallmann Syndrome: Congenital GnRH deficiency → Primary Amenorrhea
- Fragile X Pre-mutation: Carriers suffer from Premature Ovarian Failure (Secondary Amenorrhea).
- Sheehan Syndrome: Postpartum pituitary necrosis → Acquired gonadotropin deficiency.
- Turner Mosaic: May have some follicles initially → Menstruate for a while → Premature failure (Secondary Amenorrhea)

Q. 32 years old unmarried woman came with secondary amenorrhea. She was having regular normal flow periods until now. Nothing was found on pelvic examination. No other associated complaints. What will you do next?

a. LH/FSH testing

b. Estrogen level

c. USG

d. Urine HCG

Ans. d

Clinical Approach To Secondary Amenorrhea

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INICET 2022, 2024

- Rule out Pregnancy
  - Test: Urine HCG (UPT)
- Rule out Common causes
  - Serum TSH: To rule out Hypothyroidism.
  - Serum Prolactin: To rule out Hyperprolactinemia.
- Progesterone Challenge Test
  - Medroxyprogesterone Acetate (10 mg OD for 5 days) → Stop
  - Interpretation:
    - → Withdrawal Bleeding Occurs (+):
      - Endometrium is responsive/intact
      - Estrogen is present (no deficiency)
      - HPO Axis is functional (not suppressed)
      - Diagnosis: Anovulation (e.g., PCOS)
    - → No Withdrawal Bleeding (-):
      - Next Steps: Estrogen + Progesterone Challenge OR Hormonal Profile

Hormonal Profile & Interpretation

- Scenario A: Normal FSH + Normal Estradiol, No Withdrawal Bleeding on E+P test
  - Diagnosis: Asherman Syndrome.
- Scenario B: High FSH + Low Estradiol, withdrawal bleed on E+P test
  - Diagnosis: Premature Ovarian Insufficiency
- Scenario C: Low/Normal FSH + Low Estradiol, Withdrawal bleed on E+P test
  - Diagnosis: Hypogonadotropic Hypogonadism
  - R/o CNS tumors by MRI Brain
  - M/c CNS tumor: Prolactinoma
  - Functional HPO axis suppression → Diagnosis of exclusion

Yourwish

Premature Ovarian Insufficiency (poi)

Q. 32-year-old athlete presents with amenorrhea for 1 year. Her BMI is 20 kg/m^2. She is not using any contraception. She reports dryness during sexual intercourse & episodes of excessive sweating & flushing anytime during the day. Her pelvic exam is normal. Her serum FSH is 30 IU/L, Serum E2 is 50 pg/ml. What is the likely diagnosis?

a. Excessive exercise

b. Premature ovarian insufficiency

c. Anorexia nervosa

d. Primary hypothyroidism

Ans. b

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Important Pointers

- Diagnosis of premature ovarian insufficiency is made with serum FSH level>40IU/L on at least 2 occasions ,at least 1 month apart
- M/C cause of premature ovarian insufficiency idiopathic > autoimmunity (testing for anti-adrenal antibodies and anti-thyroid antibodies)
- Other causes: radiotherapy or post surgical, Fragile X permutations
- If POI diagnosed in < 30-year-old, think of chromosomal anomalies involving X chromosome (e.g., Turner Mosaic)

Management

- HRT therapy
- Option for pregnancy →IVF with donor oocyte

Asherman Syndrome

01:50:48

FMGE 2024, 2025

Q. 25-year-old woman came to gyne OPD with absence of menses for 6 months, since she last underwent a D & C for missed abortion. Her pelvic exam is normal. There is no withdrawal bleeding on progesterone challenge test. Serum FSH levels is 6 IU/L. What is the likely diagnosis?

a. Uterine synechiae

b. Premature menopause

c. Pituitary tumor

d. PCOS

Ans. a

- Premature Menopause → FSH high
- Pituitary tumor → FSH low
- PCOS → Withdrawal bleeding should occur on PCT
- Diagnosis: Uterine synechia / Asherman syndrome

Clinical Presentation:

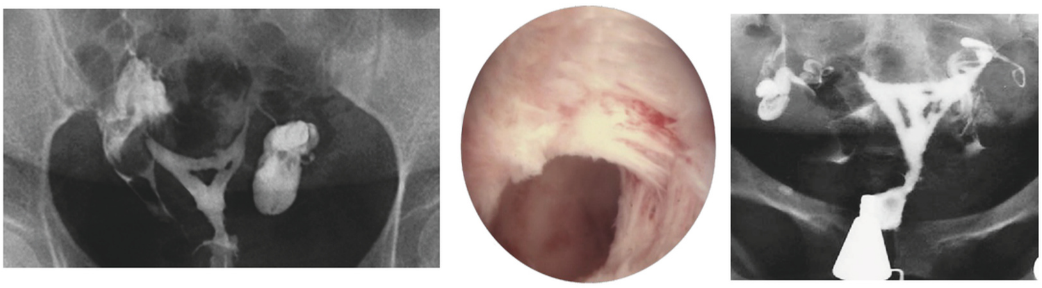
- Secondary amenorrhea following a history of curettage
  - Especially postpartum → damage to basalis layer of endometrium
- H/O genital tuberculosis

Clinical Presentation
- Hypomenorrhea
- Amenorrhea
- Infertility

Diagnosis
- Confirmed by hysteroscopy
  - Situational clue: inability to pass the uterine sound

Treatment
- Hysteroscopic adhesiolysis f/b High dose estrogen therapy
- Insert IUD/copper-T, remove the copper wire to prevent future adhesions

HSG



- HSG (Hysterosalpingography):
  - May show filling defects, but findings are non-specific (could mimic polyps or fibroids)
  - Ultrasound is often insufficient

Sheehan Syndrome

01:55:11

Q. 30-year-old woman has come with c/o amenorrhea for past 1 year since her last delivery during which she had received 4 units of BT for PPH. She also recalls having failure of lactation. Now she also experiences vaginal dryness & cold intolerance. On examination there is loss of pubic & axillary hair, pelvic exam is normal. What is the likely diagnosis?

a. Asherman Syndrome

b. Sheehan Syndrome

c. Savage Syndrome

d. Prolactinoma

Ans. b

Symptoms:
- Failure of lactation (First sign due to Prolactin deficiency).
- Features of pan-hypopituitarism: Cold intolerance (TSH def), loss of pubic/axillary hair (ACTH/Androgen def), and vaginal dryness (Gonadotropin def)

Important Information
- **Savage Syndrome (Resistant Ovary Syndrome)**
- Ovarian follicles are resistant to gonadotropins due to receptor defects.
- **Presentation:** Mimics ovarian failure (High FSH, estrogen deficiency, amenorrhea), but follicles are present.
- **Management:** Treated similarly to ovarian failure

INICET 2022
FMGE 2019, 2020, 2023
NEET PG 2019, 2021, 2022

Sheehan Syndrome - important Pointers

- Acute infarction and ischemic necrosis of anterior pituitary
    - Posterior pituitary spared
- Radiology shows empty sella

Diagnosis

- Based on clinical and hormonal profile

Management

- Correction of hormonal deficiencies HRT
- Pregnancy option
    - The ovaries and uterus are functional, but the signal is missing
    - Pregnancy requires Ovulation Induction with Gonadotropins (injectable FSH/LH)
    - Ovulation trigger → hcg Injection/ LH injections

5. CLINICAL CONDITIONS OF REPRODUCTIVE AGE GROUP

CLINICAL APPROACH AUB

00:01:59

NEET 2024, FMGE 2024

PALM-COEIN SYSTEM

Structural causes
P-Polyps
A-adenomyosis
L-leiomyomas
M-malignancy

Non-Structural causes
C-Coagulopathy
O-ovulatory dysfunction
I-Iatrogenic
E-endometrial causes
N-no otherwise specified

- Differentiation: Structural vs. Non-Structural
  - Structural Causes: Evidence present on Ultrasound or Histopathology.
  - Non-Structural Causes: No findings on Ultrasound or Endometrial Histopathology
- Diagnostic Strategy
  - Rule out Pregnancy: First step to exclude pregnancy-related complications causing bleeding.
- Clinical Assessment:
  - Initial IOC: Transvaginal Sonography (TVS)

General Management Principles

- Structural Causes: Management based on treating the specific cause.
- Non-Structural Causes: Primarily medical management.

Important Information

- 20% women in reproductive age group in AUB can have coagulation disorders
  - In older women M/C immune thrombocytopenic purpura
  - In pubertal girls von willibrindt disease

Indication For Endometrial Aspiration

- Age >40 years
- Endometrial thickness >12mm
- Younger women with high-risk factors
  - Multiple risk factors for endometrial cancer, failed medical treatment
  - Prolonged H/o for anovulatory cycles
- Pipelle cannula
  - Used for OPD endometrial aspiration

Yourwish

Indication Of Hysteroscopy

- Nature of Procedure
  - Invasive/Daycare procedure permitting visualization of the uterine cavity.
- Indications
  - Performed when there is strong clinical suspicion of an intracavitary lesion
  - Persistent intermenstrual bleeding
  - Persistent symptoms despite normal initial endometrial aspiration/curettage report.
- Utility
  - Endometrial sampling is possible during the same sitting
  - Certain identified clinical conditions can be treated simultaneously

Medical Management Of Abnormal Uterine Bleeding (Aub)

- Drug Categories
  - Non-hormonal: NSAIDs, Tranexamic acid
  - Hormonal: Combined Oral Contraceptive Pills (COCs), Progesterone, Ormiloxifene, GnRH analogues
- Management of Coagulopathy (AUB-C)
  - Contraindication: NSAIDs are NOT used.
  - First Line: Tranexamic acid
  - Second Line: Hormonal therapy
- Tranexamic Acid:
  - Antifibrinolytic drug
    → Note: Ethamsylate is another antifibrinolytic but is NOT recommended/used
  - Combined Oral Contraceptive Pills (COCs)
    → First-line preference for AUB-O (Ovulatory dysfunction/Anovulatory cycles)
  - Progesterone Therapy:
    → Forms: Mirena (Intrauterine System), Oral, Injectable.
    → Mirena: Most preferable option
    → Indications: Patients where Estrogen is contraindicated or daily pills are unwanted
  - Ormiloxifene
    → Selective Estrogen Receptor Modulator (SERM)
    → Estrogen antagonistic activity on endometrium
    → Mechanism: Thins endometrial lining.
  - GnRH Analogues:
    → Status: Last resort.
    → Mechanism: Stops ovarian estrogen production → Suppresses HPO axis → Induces Amenorrhea
    → Limitations: Cannot use > 6 months
    → Side Effects: Estrogen deficiency symptoms (Bone pains, longer duration use predispose to ↑ risk of osteoporosis)

MCQ

Q. 40-year-old obese, multiparous woman c/o heavy menstrual bleeding over the past 2 years. She has delayed cycles coming every 3-4 months, followed by 10-14 days of heavy bleeding. Her physical exam is normal. Pelvic USG is normal. What should be done next?

a. Endometrial aspiration

b. Hysterectomy

c. Hormonal treatment
d. Endometrial ablation

Ans: a

Explanation

- Management Approach
  - Immediate Step: Endometrial Aspiration.
    → Must rule out endometrial pathology (Hyperplasia) given age (>40), obesity, and prolonged history
  - Hysterectomy/Hormonal treatment is incorrect before diagnosis
- Endometrial Ablation
  - Limited clinical utility due to availability of Mirena
  - Mirena vs. Ablation: Mirena acts as a "medical ablation" (thins lining) + provides contraception + reversible
  - Historical Use of Ablation:
    → Conservative surgical option for women unfit for major surgery
    → Only if fertility was NOT a concern (procedure prevents future childbearing)

ENDOMETRIAL HYPERPLASIA

00:17:14

FMGE 2019, 2020, 2022, 2023, 2025
NEET PG 2020, 2025

- Risk Factors
  - Most important RF: Chronic unopposed estrogen exposure
  - Increasing age.
- Important Drug Associated: Tamoxifen (SERM)
- Risk of Progression to Endometrial Cancer
  - Simple Hyperplasia: 1%.
  - Complex Hyperplasia: 3%.
  - Simple Hyperplasia with Atypia: 8%.
  - Complex Hyperplasia with Atypia: 29%.
- General Rule:
  - Hyperplasia without Atypia: 1-3%.
  - Hyperplasia with Atypia: 10-30% (Risk increases ~10x).

Treatment

- Hyperplasia Without Atypia: Progesterone therapy (Preferably Mirena).
  - Note: COCs are not used.
- Hyperplasia With Atypia: Simple Total Hysterectomy.
  - Exception: If patient has strong desire for future fertility → Counsel regarding high malignancy risk → Consider Progesterone therapy only if surgery is refused

MCQ

Q: 35-year-old, multiparous woman c/o heavy bleeding for the past 20 days. She has h/o delayed cycles followed by episodes of heavy bleeding over the past 1 year. Her vitals are stable. Pelvic exam is normal. What should be done next?

a. Transvaginal sonography
b. Dilatation & curettage
c. Urine pregnancy test
d. OCPs

Ans: c

Explanation

- First, rule out pregnancy-related complications in the reproductive age group
- Urgent Transvaginal Sonography (TVS): Assess structural lesions and endometrial thickness.
- Role of Dilatation and Curettage (D&C)
  - Type: Therapeutic Curettage
  - Utility:
    - → Acute control of bleeding
    - → Provides histopathology sample
  - Indication: Useful in perimenopausal women or thick endometrium

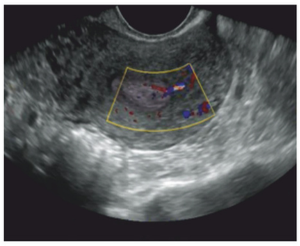
Hormonal Control Of Acute Aub Episode

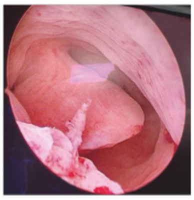
- Thick Endometrial Lining (Estrogen Influence)
  - Progesterone therapy OR High-dose Combined Oral Contraceptive Pills to Stabilize lining
  - Note: COCs have a net progestational action on the endometrium.
- Thin/Denuded Endometrial Lining
  - Estrogen therapy followed by Progesterone therapy for Re-epithelialize/build up the lining
- Acute control followed by long-term regular hormonal maintenance

POLYPS

00:25:56

- Typically cause intermenstrual bleeding
- USG doppler
  - Hyperechoic lesion inside the uterine cavity
  - Feeding vessel sign
- TVS irregular endometrial stripe
- Best diagnosis made by Hysteroscopy (visualizes friable/reddish polyp)
- Treatment of symptomatic polyps: Hysteroscopic Polypectomy
  - Confirmation: Histopathology.





FIBROID VS ADENOMYOSIS

Q. A 40-year-old, multiparous woman with the complaint of dysmenorrhea, menorrhagia and chronic pelvic pain undergoes hysterectomy. From the cut specimen given below, identify the diagnosis.

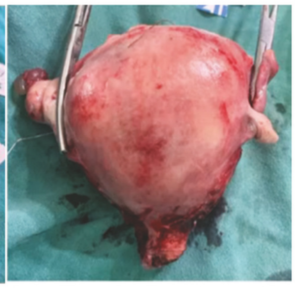
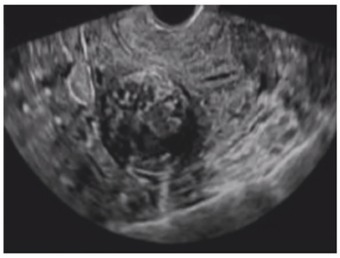
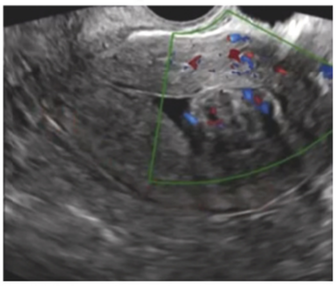
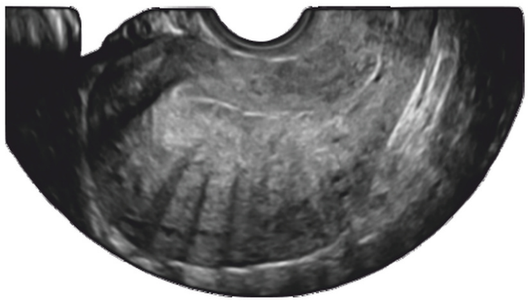
a. Fibroid uterus

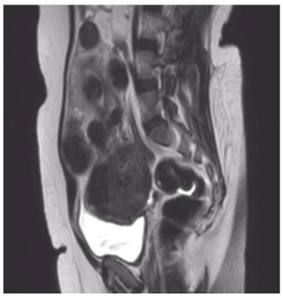
b. Adenomyosis

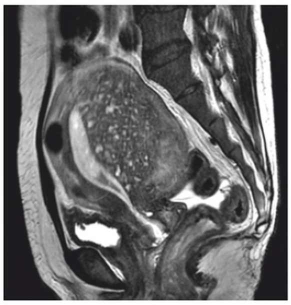
c. Endometriosis

d. Endometrial cancer

Ans: b

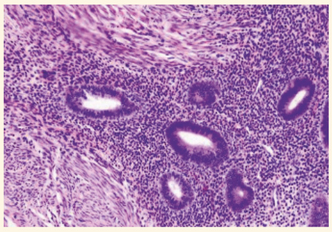
	Fibroid (Leiomyoma)	Adenomyosis
Pathology	• Benign monoclonal smooth muscle tumor. • Well-circumscribed with a vascular pseudocapsule. • Vascularity: Periphery (most vascular) → Center (least vascular/prone to necrosis). • Cut Section: Whorled appearance. • Firmness: Due to smooth muscle + extracellular matrix  	• Endometrial glands and stroma within myometrium. • Myometrial hyperplasia and hypertrophy (usually diffuse)  
Clinical Differentiation	• More common in Nulliparous women • Uterus: Enlarged, Irregular outline, firm, non-tender. • Bleeding: Menorrhagia (most common)	• More common in Multiparous women • Bleeding: Severe Congestive Dysmenorrhea • Uterus: Uniformly enlarged (globular), soft, tender.
Ultrasound Findings	• Well-defined hypoechoic heterogeneous mass. • Peripheral vascularity (Ring of Fire) on Doppler  Well defined, hypoechoic, heterogenous mass 	• Diffuse uterine enlargement. • Myometrial Cysts: Hypoechoic black dots/lacunae in myometrium (Specific) • "Venetian Blind" appearance (Rain shower appearance) • Loss of endo-myometrial junction. • Asymmetrical thickening (Posterior wall > Anterior). 
MRI Findings	• Used for mapping (number/location) prior to surgery (e.g., Myomectomy) • Note: MRI is not routine; USG is first-line	• Junctional Zone (JZ) thickness > 12 mm • Hyperintense myometrial cysts • Note: JZ < 8 mm rules out Dx





Important Information

- Confirmed diagnosis of adenomyosis is after hysterectomy on HPE
- Presence of endometrial glands and stroma >1hpf deep to the junctional zone on hysterectomy specimen



Management Of Adenomyosis

Management

- Definitive Treatment: Simple Total Hysterectomy (esp. in older women/completed family).
- Medical Management:
  - Mirena/Progestins (for younger women/fertility desire), though response is poor compared to other conditions

MCQ

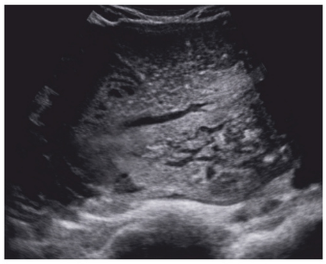
Q: 45-year-old, multiparous woman has been troubled with heavy menstrual bleeding & severe congestive dysmenorrhea for the past 2 years. On pelvic exam, the uterus is enlarged to 14 week size & feels soft & globular. USG shows myometrial cysts & loss of endo-myometrial junction. What would be the next step?

a. Perform MRI pelvis

b. Perform Endometrial aspiration

c. Simple Hysterectomy

d. MIRENA Insertion



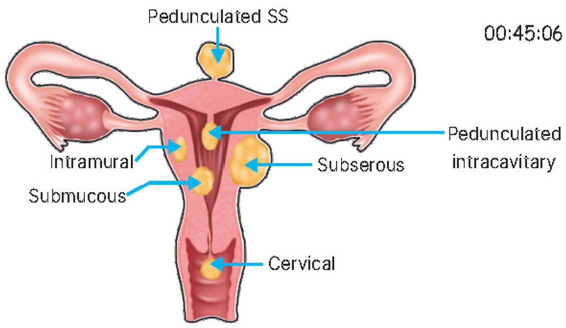
Ans: b

Explanation

- Next Step: Endometrial Aspiration
- Reasoning: Age > 40 + HMB → Must rule out concomitant Endometrial Hyperplasia/Cancer before Hysterectomy
- MRI is unnecessary if USG is diagnostic

NEET PG 2018, 2020, 2023, 2024, FMGE 2020, 2021, 2025
AIIMS 2018, 2019, 2020, 2023

Important Pointers Fibroids



00:45:06

- M/C clinical presentation: asymptomatic
- M/C complaint menorrhagia: Heavy menstrual bleeding
  - Submucosal>intramural>subserous
- Fibroid causes intermenstrual bleeding: Intracavitary pedunculated (aka fibroid polyp)
- Fibroid a/w infertility: submucosal>intramural>subserosal

- Fibroid to undergo torsion: intracavitary pedunculated/ pedunculated subserous
- Both estrogen and progesterone growth of fibroids
- Can be associated with tumor specific chromosomal rearrangements t(12:14) and del chr-7
- Smoking exercise multiparity are protective
- OCPs do not increase fibroid risk
- Broad Ligament Fibroid
    - Rare location
    - True broad ligament fibroid can arise in the broad ligament, Ureter and uterine artery are medial to it
    - Pseudo broad ligament fibre arises from body of uterus, grows into sheets of broad ligament
      → Ureter and uterine artery laterally displaced
- Pain with fibroids: Torsion, Infected myoma, Sarcomatous degeneration & Re degeneration or d/t associated diseases
- M/c degeneration in a fibroid: hyaline degeneration
- Sarcomatous degeneration is very rare & squamous metaplasia never occurs
- Calcareous degeneration mostly seen in subserous
- Red (Carneous) Degeneration:
    - Aseptic infarction (not an infection)
    - Most common in 2nd trimester of pregnancy
    - Risk: Can trigger preterm labor
    - Management: Conservative (Admission, IV fluids, Analgesics). No antibiotics needed.
- Asymptomatic fibroids → expectant management
- Fibroids leading to infertility → myomectomy
- Fibroids causing AUB
    - Medical treatment
    - If Medical mx fails → surgical management

Role Of Hysterectomy In Fibroids

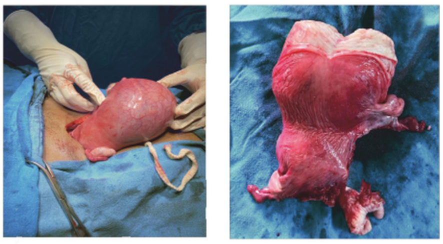
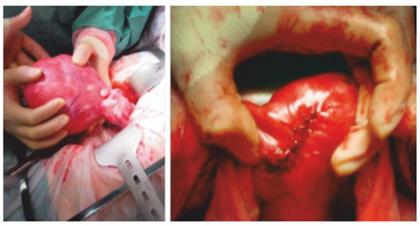
- Postmenopausal Women with symptomatic or rapidly growing fibroid (Risk of Leiomyosarcoma).
    - Leiomyosarcoma:
      → Diagnosis: Histopathology (>10 mitotic figures/10 HPF)
      → Diagnosis of hysterectomy specimen
      → Cannot be definitively diagnosed by radiology (MRI is inconclusive).
- Completed Family, >40 years & wants definite management of symptoms

Medical Management For Fibroid

- Drugs that shrink size of Fibroids
    - Mechanism: Cut off hormonal support (Estrogen/Progesterone)
    - Drugs Used:
      → Mifepristone: Antiprogestin.
      → Ulipristal Acetate: Selective Progesterone Receptor Modulator (SPRM).
      → GnRH Analogues: Suppress HPO axis (induce amenorrhea).
      → Aromatase Inhibitors
      → Danazol & Gestrinone
- Clinical Utility
    - Pre-operative: Shrink size to facilitate minimally invasive surgery (e.g., Laparoscopy)

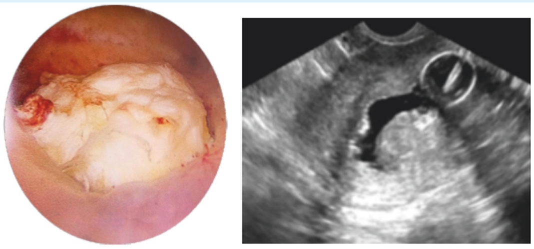
- Alternative to Surgery: Perimenopausal women unfit/unwilling for surgery (bridge to menopause)
- Limitations:
  - → Temporary effect (regrowth within 6 months post-cessation)
  - → Side effects (Bone loss, menopausal symptoms)

Fibroid Types And Imaging

SUBSEROUS FIBROID	 Hysterectomy specimen of a 50-year-old postmenopausal woman with lump abdomen
CERVICAL FIBROID	 Hysterectomy specimen of a 47 year old multiparous woman with irregular heavy bleeding & repeated episodes of urinary retention & hydronephrosis. • Presentation: Urinary retention, hydronephrosis (ureteric compression). • Sign: "Dome on St. Paul's" appearance
INTRACAVITORY FIBROID POLYP	 Hysterectomy specimen of a 47 year old multiparous woman with irregular heavy bleeding and postcoital bleeding. • Presentation: Irregular heavy bleeding, post-coital bleeding. • Exam: Pedicle felt high up (cannot reach).
SUBSEROUS FIBROID	 Myomectomy done for a 40-year-old woman with a large subserosal fibroid causing pelvic discomfort and pressure symptoms

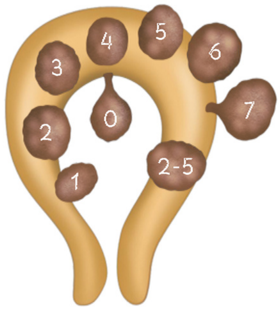
Yourwish

SUBMUCOUS FIBROID



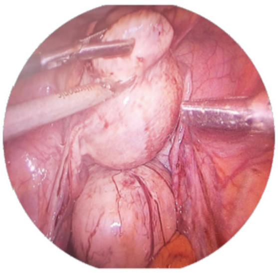
Hysteroscopic image of a 32 year old woman with infertility and h/o heavy menstrual bleeding.

- Presentation: Heavy Menstrual Bleeding (HMB), Infertility.
- Diagnosis:
  - Best: Hysteroscopy
  - USG: Saline Infusion Sonography (SIS) enhances visibility
- FIGO Classification:
  - Type 0: Completely intracavitary
  - Type 1: <50% inside myometrium
  - Type 2: ≥50% inside myometrium
- Note: Type 0 & 1 are eligible for Hysteroscopic Myomectomy
- Figo 0,1,2 → submucus
- Figo 4 → Intramural
- Figo 5,6,7 → Sub serous



MYOMECTOMY

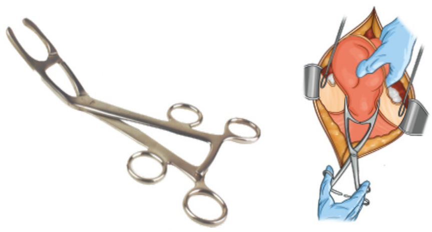
LAPROSCOPIC MYOMECTOMY



ABDOMINAL MYOMECTOMY

MYOMA SCREW

BONNEY'S MYOMECTOMY CLAMP



PRE REQUISITES OF MYOMECTOMY

- Correction of anemia
- R/o endometrial hyperplasia
- R/o other causes of infertility
- Consent for potential hysterectomy

Yourwish

MCQ

Q. 32-year-old woman on workup for primary infertility is found to have two intramural fibroids of size 4 cm & 7 cm, blocking the tubal ostia. What is the preferred course of management?

a. Assisted reproductive techniques

b. GnRH analogs

c. Uterine Artery Embolization

d. Laparoscopic myomectomy

Ans: d

Explanation

- Management: Laparoscopic Myomectomy
- Reasoning:
  - GnRH analogues are temporary and prevent conception
  - UAE compromises ovarian blood supply

Uterine Artery Embolization (Uae)

- Procedure
  - Interventional radiology: Occlusion of uterine arteries using gelatin microspheres/PVA
  - Principle: Ischemic necrosis of fibroid.
- Indications: Symptomatic women needing surgery but unfit/unwilling
- Contraindications/Not Preferred
  - Calcified fibroids
  - Submucous/Intracavitary fibroids
  - Subserous pedunculated fibroids (Risk of detachment into peritoneum)

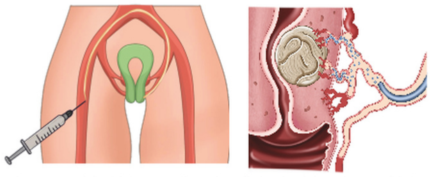


Image guided interventional radiological (angiographic) procedure. Percutaneous single femoral A. cannulation, through which B/L uterine A. catheterised & occluded using gelatin microspheres or polyvinyl alcohol particles.

FMGE 2025

01:16:48

VAGINITIS

Q. 26-year-old woman, married for 2 years, is anxious for conception. She complains of profuse watery vaginal discharge, there is no itching & no foul smell. It has been 12 days since her LMP. What is the diagnosis?

a. Physiological

b. Bacterial vaginosis

c. Candidiasis

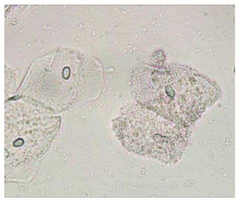
d. Trichomoniasis

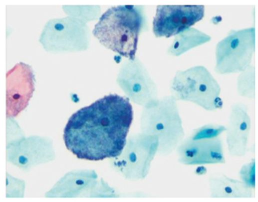
Ans: a

FEATURE	BACTERIAL VAGINOSIS	CANDIDIASIS	TRICHOMONIASIS
PATHOLOGY	• Lactobacillus replaced by gram negative roads especially gardnerella vaginalis • Not a STI	• Usually not STI • R/F: DM,antibiotics, pregnancy, immunocompromised	• STI

VAGINAL DISCHARGE ON P/S EXAM	• Tin grey white and foul smelling • Itching absent	• Curdy white /cottage cheese appearance • Itching ++ • Dysuria present (splash dysuria)	• Greenish yellow frothy discharge • Itching ++ • Dysuria ++ • Foul smell
VAGINAL PH	• >4.5	• <4.5	• >4.5
WET SMEAR (SALINE M/E)	• Clue cells • No WBCs	• KOH prep-fungal pseudohyphae, WBCs present	• Motile flagellated organism • WBCs present
WHIFF (KOH) TEST	• Positive	• Negative	• Positive
GOLD STANDARD	• Nugent score ○ Done on Gram stain	• Culture	• Culture

Bacterial vaginosis





Identify image

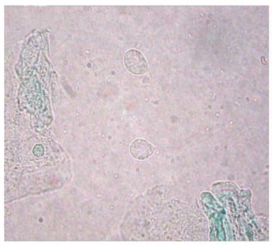
- Clue cells on wet smear
  - Vaginal epithelial cells studded with bacteria

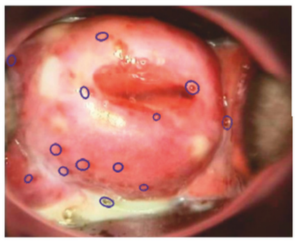
Important Points

- Clinical criteria for diagnosis: Amsel's criteria
- DOC-metronidazole
  - 500mg BD X 7days
- DOC in pregnancy metronidazole
  - 1st trimester → vaginal route
  - 2nd/3rd trimester → oral metronidazole
  - Partner treatment not required

"NEET PG 2019, 2020
AIIMS 2019, 2023, 2024
FMGE 2025"

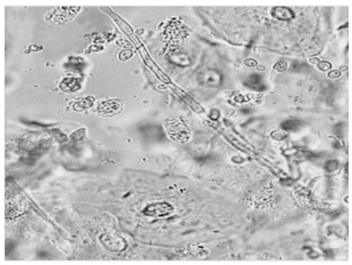
Trichomoniasis





- Strawberry cervix
- Wet smear image
  - Tennis racket appearance of Trichomonas vaginalis
- DOC: Metronidazole
- Partner treatment is mandatory

Candidiasis



- Fungal pseudohyphae
- DOC-fluconazole
- In pregnancy
  - Fluconazole is C/I
  - DOC: clotrimazole vaginal pessary
- Partner treatment not necessary

CERVICITS

01:24:33

Q: You are posted in a PHC. A woman comes with the complaint of yellowish white discharge from the vagina, not associated with soreness or itching. She also has burning micturition. On P/S exam, the vagina is healthy, there is cervical erosion with mucopurulent discharge coating the cervical os. An endocervical swab is taken & the cervix bleeds on touch. What can be done as the next step to make a diagnosis?

a. Saline microscopy of discharge
b. Perform culture
c. Perform gram stain
d. Perform NAATs

Ans: c

Explanation

- Diagnostic Approach (Peripheral Setting)
  - Suspected Condition: Cervicitis (Organisms: Chlamydia, Gonorrhea)
  - Saline Microscopy: Not useful (detects vaginitis, not endocervical organisms)
  - NAAT/Culture: Unavailable or expensive in PHC
  - Best Step: Perform Gram Stain.
    → Simple investigation available at peripheral level

Diagnosis Of Cervicitis

- Clinical Differentiation
  - Vaginal Discharge + Healthy Cervix: Vaginitis
  - Cervical Discharge + Unhealthy Cervix: Cervicitis.
  - Tenderness (Adnexal/Uterine/Cervical Motion): Pelvic Inflammatory Disease (PID)
- Gram Stain Findings (Cervicitis)
  - WBCs + No Organism: Presumptive diagnosis of Chlamydia.
  - WBCs + Gram-negative intracellular diplococci: Presumptive diagnosis of Gonorrhea
- Investigation Standards
  - Investigation of Choice: Nucleic Acid Amplification Test (NAAT).
  - Gold Standard: Culture (Chlamydia requires McCoy cell lines)

Treatment

Antibiotics	Chlamydia	Gonorrhea
Preferred	Doxycycline 100 mg BD 7 days	Ceftriaxone 500 mg IM + Doxycycline 100 mg 7 days
Alternative	Azithromycin 1 g single dose	Ceftriaxone 500 mg IM / Azithromycin 2 g single dose
Pregnancy	• Doxycycline is contraindicated • Alternatives: Azithromycin, Erythromycin, Amoxicillin	• Fluoroquinolones are also Contraindicated • Use Ceftriaxone + Azithromycin.

- Note: Partner treatment is required for both (STIs)

Naco Kits For Syndromic Treatment

"NEET PG 2019, 2020
AIIMS 2019, 2023, 2024, FMGE 2025"

PELVIC INFLAMMATORY DISEASE

01:30:05

"NEET PG 2019, 2020
AIIMS 2019, 2023, 2024
FMGE 2025"

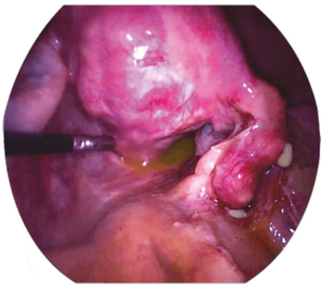
- M/C route of infection is ascending infection from vagina
- Most infections are polymicrobial in nature
- Most infective organism: Chlamydia trachomatis > Neisseria gonorrhoeae
- PID in virgin females → genital tuberculosis
- PID in postmenopausal women → E. coli
- Actinomycetes infection typical in IUD users

Important Information

- With ascending infection, endosalpingitis occurs 1st
- Tubal damage more with chlamydia >gonorrhea
- In clinical setting of septic abortion, puerperal sepsis, pelvic cellulitis occurs and exo salpingitis occurs first
- Clinical staging of PID: gainesville staging

Diagnosis Of Pid

- Minimum criteria for diagnosis: Uterine/adnexal/cervical motion tenderness
- Additional criteria
  - Fever
  - Mucopurulent cervicitis
  - Leukocytosis
  - Cervical Dx positive for chlamydia/gonorrhea
- Definitive criteria
  - Ultrasound showing tubo-ovarian abscess.
  - Endometrial Biopsy: Evidence of Endometritis
  - Laparoscopic evidence of Salpingitis



Management

Indications for hospitalization with acute pid

- Suspected pelvic abscess
- Clinically severe disease
- Pregnant
- Unable to tolerate oral Tx

- No clinical clinical response to oral Tx

Surgical Treatment Indications

- Drainage of pelvic abscess
- Ruptured ovarian abscess.
- Peritonitis unresponsive to antibiotics.
- Evacuation of products of conception in the setting of retained products & septic abortion

Important Information

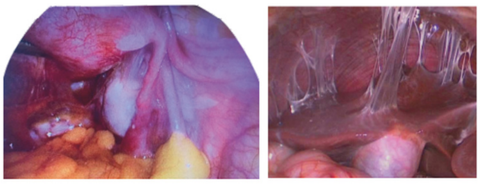
OPD based Tx of PID

- Ceftriaxone 500mg IM single dose +
- Doxycycline 100mg BD for 14 days +
- Metronidazole 500mg BD for 14 days

Inpatient Tx of PID

- Ceftriaxone 1g IV every 12hours+
- Doxycycline 100mg IV/oral every 12 hrs+
- Metronidazole 500mg IV/oral every 12hr

Chronic Pid Laparoscopy

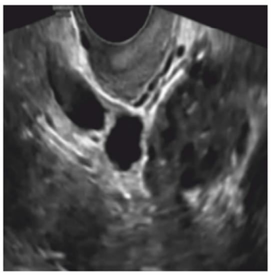


Laparoscopic images of a woman undergoing diagnostic laparoscopy during evaluation for infertility.

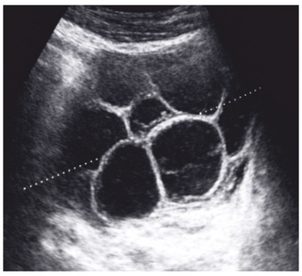
- Chronic PID Imaging
  - Thickened tubes.
  - Pelvic adhesions.
- Fitz-Hugh-Curtis Syndrome
  - Image Finding: "Violin string" adhesions on the undersurface of the diaphragm
  - Clinical: Right Upper Quadrant (RUQ) pain in a patient with PID history
  - Note: Can also occur with Genital Tuberculosis
- Boer-Meisel System
  - Scoring system for tubal status/adhesions seen on laparoscopy
  - Utility: Prognosticates pregnancy outcome.

HYDROSALPINX

Cogwheel sign



Waist sign

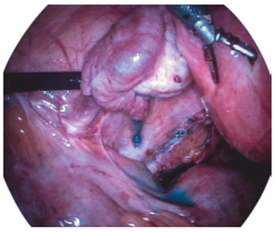


Incomplete Septa Sign

- TVS images of women undergoing evaluation for infertility
- Clinical findings showed B/L non tender cystic adnexal masses, h/o multiple episodes of PID in the past
- Ultrasound Findings (TVS)
  - Dilated tubes filled with fluid.

Yourwish

- Cogwheel Sign: Cross-section appearance of thickened folds.
- Waist Sign: Indentation on opposite sides of the tube.
- Incomplete Septa Sign: Scar tissue/flimsy adhesions within the dilated tube
- Laparoscopic image of Hydrosalpinx



GENITAL TUBERCULOSIS

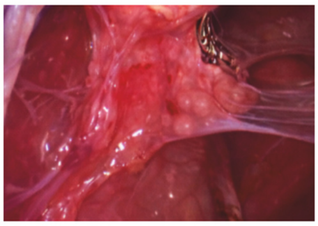
01:42:40

"NEET PG 2019, 2020
AIIMS 2019, 2023, 2024
FMGE 2025 "

- Almost always secondary with M/C primary site pulmonary TB
- MC route of spread hematogenous route
- MC site of infection fallopian tube>endometrium
- After tubal involvement, spread to endometrium by direct spread
- MC clinical presentation: Infertility > menstrual complaints
  - Asymptomatic 10%-15%
- Earliest menstrual complaints: mennorrhagia(HMB)
- M/c menstrual complaints: amenorrhea/hypomenorrhea
- MC pelvic exam finding normal
- Diagnosis of TB: AFB, Culture, PCR, HPE, granuloma
- Treatment of genital TB: Category 1 ATT

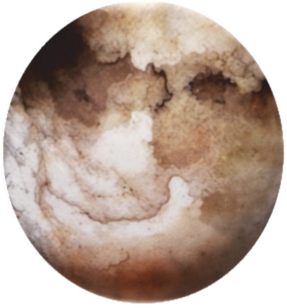
Genital tb-images

Laproscopic image



- Beaded tubes present
- White tubercles
- Pelvic adhesions
- Dried tree branch sign

Hysteroscopy Image



ENDOMETRIOSIS

01:48:28

"NEET PG 2019, 2021, 2024, 2025
FMGE 2018, 2019, 2020, 2022
INICET 2018, 2021, 2023"

- Presence of endometrial glands and stroma outside the uterus
- Estrogen dependent condition with genetic predisposition: KRAS mutation
- MC site is ovary
- Other sites

  - Pouch of douglas
  - Uterosacrals
- MC extragenital site sigmoid colon
- MC theory sampson's theory of Retrograde menstruation and implantation
- MC in women with mullerian anomalies
- Scar site endometriosis
  - Episiotomy site
  - Abdominal incision site
  - Direct implantation theory
- Rare site: Pleura, Lungs, GIT, Urinary tract, Nose
- Ivanoff's Coelomic Metaplasia Theory:
  - Explains rare sites derived from coelomic tissue (e.g., Pleura, Lungs).
- Lymphatic/Hematogenous Dissemination:
  - Explains distant rare sites (e.g., Brain, Nose, GIT, Urinary tract)
- Catamenial Symptoms (Vicarious Menses)
  - Symptoms occurring only during menstruation due to bleeding from ectopic endometrial tissue
  - Examples: Catamenial hemoptysis/pleuritic pain (Lung/Pleura), Epistaxis (Nose), Rectal bleeding (GIT)

Endometriosis: Clinical Presentation

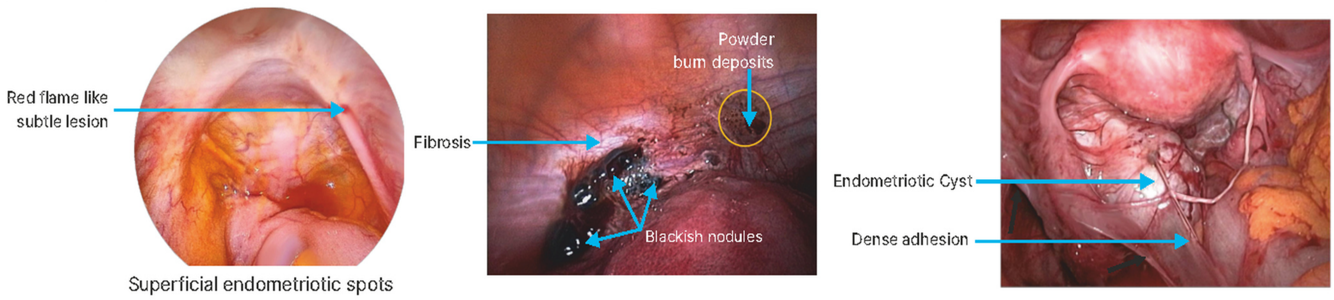
01:52:38

- Most Common Presentation: Pelvic pain
  - More common in nulliparous female
- Classic Triad: Dysmenorrhea + Dyspareunia + Infertility
- P/v examination findings
  - Can be completely normal.
  - Advanced Cases:
    - → Fixed retroverted uterus
    - → Adnexal mass
    - → Tender nodularity in POD (Cobblestone feel of the uterosacral ligaments)

Endometriosis: Imaging & Diagnosis

- Ultrasound (Endometrioma)
  - Finding: Ovarian mass with a typical "Ground Glass" appearance
- Gold Standard Diagnosis
  - Laparoscopy (Preferably with histopathology confirmation)

Laparoscopic Images



Superficial endometriotic spots

- Fresh Deposits: Red, flame-like subtle lesions, blackish/brownish/bluish nodules.
- Old Deposits: "Powder burn" or gunshot wound-like appearance with surrounding white peritoneal fibrosis

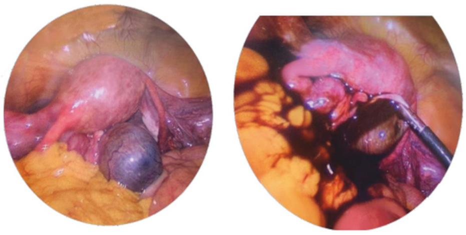
- Severe Adhesions: both ovaries stuck together in the POD, buried under adhesions
- Note: There is no septic seeding of implants

Reason For Infertility

- Distorted tuboovarian anatomy
- Defective follicular development
- Interference with fertilization
- Impaired endometrial receptivity
- Anovulation can be associated

Endometrioma

- A/K/A Chocolate cyst
- Cystectomy TOC
  - Least risk of recurrence
  - Symptomatic patient, large size>4cm it is preferred



Management

Q. A 29 year old nulliparous lady presented with endometriosis and infertility. On laparoscopy there were severe pelvic adhesions and the uterus had bowel stuck to its fundus with dense adhesions. The ovaries were cystic, each around 8cm in size, and were stuck to each other (Kissing ovaries). What is the next line of management?

a. GnRH analogues

b. OCPs

c. Hysterectomy with oophorectomy

d. B/L Cystectomy, Adhesiolysis, Prepare for IVF

Ans: d

Explanation

- Management: Bilateral Cystectomy, Adhesiolysis, Prepare for IVF
- Reasoning:
  - Hysterectomy is a last resort (especially in young/nulliparous).
  - Medical management (GnRH analogues/OCPs) suppresses ovulation → interferes with conception desire.

Management Of Endometriosis Associated Infertility

- Prevalence of endometriosis in unexplained infertility 40%-50%

Min/Mild Disease	Moderate/Severe Disease
Ovulation induction + IUI ↓ Fails → IVF	Surgical adhesiolysis tried 1st ↓ Fails → IVF

Drugs Used For Medical Mx Of Pain

- NSAIDS,
- OCPs → 1st line
- Progesterone → 1st line

- Dienogest 2 mg / daily
- GnRH Analogues: Injectables (SC).
- GnRH Antagonists (Oral): Elagolix, Relugolix (Newer approved options)
- Not Used: Mifepristone is NOT approved

"FMGE 2018, 2019, 2023, 2025
INICET 2018, 2021, 2024
NEET PG 2019, 2023, 2024"

INFERTILITY

02:03:20

- Inability to conceive after 1 year of regular unprotected intercourse
- Earlier evaluation if obvious risk factors of woman's age >35 years
- Fecundability refers to the probability of achieving pregnancy within one menstrual cycle (~20% on average)

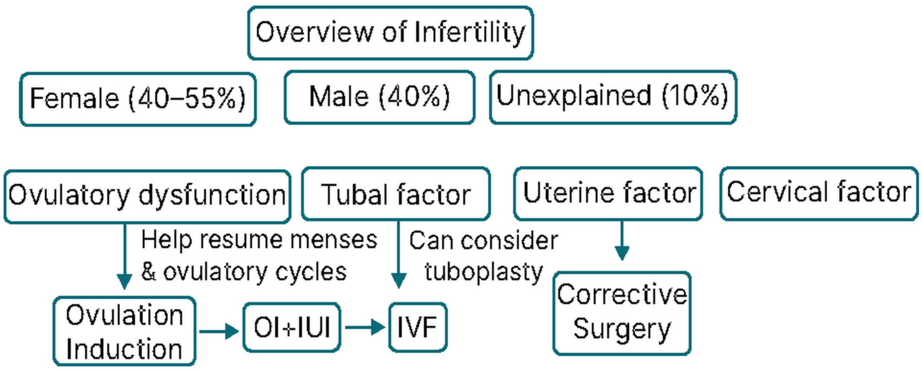
Basic Evaluation For Infertile Couple Includes

- Tests for ovulation
  - If anovulation documented / H/o irregular cycles → Evaluate the cause
- Tubal patency tests
- TVS
- Husband semen analysis

Important Information

- Any invasive test on female done after husband semen analysis

Overview Of Infertility



- Unexplained infertility:
  - HSA normal
  - Ovulation documented
  - TVS normal
  - At least 1 tube is patent

Points to Remember

- Best Tx for tubal factor infertility → IVF
- Best Tx for unexplained infertility → IVF
- Initial treatment: Ovulation Induction + IUI

Tests For Documenting Ovulation Done In Clinical Practice

- Serum Progesterone
  - Done on day 21 (1 week prior to expected menses)

  - Levels >3 ng/ml suggest ovulation
- Endometrial Sampling
  - Timing same
  - Secretory changes on HPE
- Urinary LH Testing
  - Utility is in timed interval
  - Greatest fertility on day of surge & next 2 days
- Follicular Monitoring on TVS
  - Usually done along with ovulation induction

Other Ways Of Documenting Ovulation

- Basal body temperature → Biphasic temperature
- Cervical mucus changes
- Vaginal cytology

MCQ

Q. Which of the following findings is suggestive that recent ovulation has taken place?

a. Pseudo-stratification of endometrium on HPE.

b. Spinnbarkeit phenomenon in cervical mucus.

c. Shrinkage of dominant follicle & free fluid in POD.

d. Trilaminar endometrium on TVS

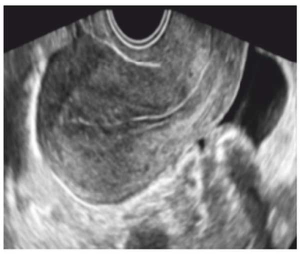
Ans: c

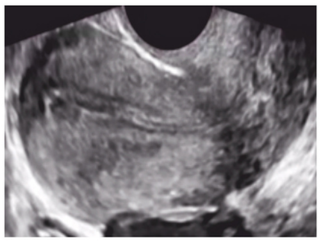
Explanation

- Pseudostratification: Indicates proliferative phase (Pre-ovulation).
- Spinnbarkeit: Indicates estrogen effect (Pre-ovulation).
- Best Indicator on TVS: Shrinkage of dominant follicle + Free fluid in Pouch of Douglas

Images

- Grows @ 2 mm/day
- Likely to ovulate when it reaches 18-20mm





Important Information

- After ovulation:
  - Dominant follicle shrinks in size & fluid in POD is seen
- Trigger for ovulation during ovulation induction:
  - Usually HCG injection

Drugs For Ovulation Induction
- First line drugs: Clomiphine citrate, letrozole

Clomiphene Citrate
- Centrally acting anti-estrogen.
- Dose: 50-100 mg OD
- Start Day 2-5
- Side Effects: Vasomotor symptoms (Hot flushes), Ovarian cysts, Thin endometrium
- In case of Visual disturbances → Stop immediately
- Multiple Pregnancy Rate: 7-10%.

Letrozole
- Mechanism: Aromatase Inhibitor (blocks estrogen synthesis)
- Half-life: ~45 hours.
- Dose: 2.5-7.5 mg OD
- Start Day 2-5
- Benefit: Mono-follicular development

Secondline Drugs
- Gonadotropins (FSH/LH)
- Dopamine agonists are only used in hyperprolactinemia
- GnRh analogues
  - Pulsatile leuprolide
- Risk of Multiple pregnancy with Gn is 15-30%

Important Information
- Both clomiphene and letrozole stimulate FSH release from pituitary
  - Not effective in: Hypogonadotropic hypogonadism
- First line in Hypogonadotropic hypogonadism
  - Gonadotropins
  - Pulsatile GnRH agonist
  - With anterior pituitary necrosis / pituitary ablation → Give gonadotropins

Ovarian Reserve Tests
- Day 3 Serum inhibin ↓ → poor reserve
- Day 3 Serum FSH >10 IU/L → poor reserve
- Day 3 Serum Estradiol >60 - 80 pg/ml → poor
- Day 3 Antral follicle count <4 → poor reserve (TVS)
- Best test: Serum AMH <0.5 - 1 ng/ml → poor reserve

Serum Amh Testing
- AMH secreted from granulosa cells of preantral and smaller antral follicles
- Levels are Gn independent
- Timing: anytime

Indications For Testing Ovarian Reserve

- Female >35 years
- H/o smoking
- H/o POI in family
- H/o pelvic radiotherapy, chemotherapy, ovarian surgery

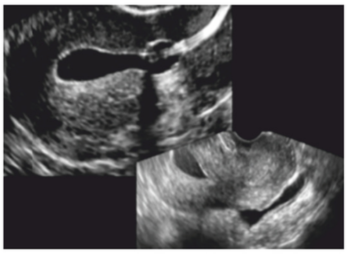
Tubal Patency Tests

02:29:03

Hysterosalpingography (Hsg)

- Method: Fluoroscopy with radio-opaque dye
- Finding: Dye fills uterus → tubes → Free spill into peritoneum (Normal)
- Status: Most commonly used initial test

Sonosalpingography



- Method: Saline infusion via catheter observed on TVS.
- Finding: Fluid accumulation in Pouch of Douglas indicates patency.
- Advantage
  - Simultaneous assessment of adnexa and uterus
- Disadvantage
  - No information on tubal anatomy
  - Difficult to tell which tube is blocked
- Can be used as screening test

Timing Tubal Patency Tests

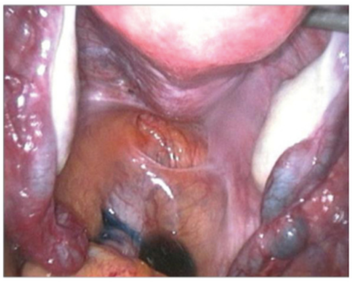
- Postmenstrual (Day 6 - Day 11)
  - Most common Day 10
- Cannula used: Leech Wilkinson's cannula

Contraindications Of Hsg

- Genital tuberculosis
- Active genital infections
- Bleeding
- Dye allergy

Laparoscopic Chromopertubation

- Gold standard for tubal evaluation
- Dye used: Methylene blue dye
- Dye comes out of fimbrial end of fallopian tube
- Uses:
  - Confirms tubal blockage
  - Evaluates pelvis and tube condition



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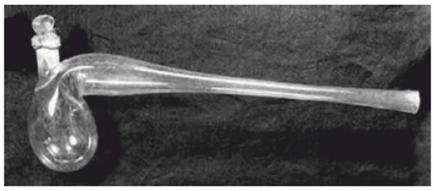
Identify Images

B/L CORNUAL BLOCK

- Differentials:
  - False block
  - Cornual spasm
  - Faulty catheter placement → U/L cornual block
  - True block → Genital tuberculosis

B/L DISTAL TUBAL BLOCK

- Most likely Hydrosalpinx



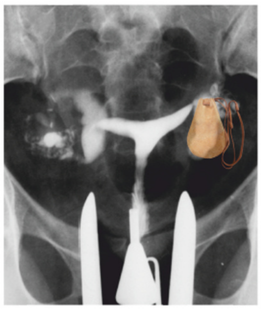
- Retort Shaped Tubes

Next Step
- Laparoscopy with hysteroscopy
- Hysteroscopic cannulation can be done

Identify Images

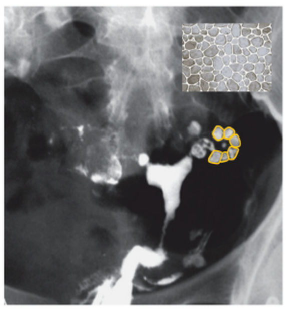
- Genital Tb can be associated with pseudo unicornuate uterus

- **Lead Pipe Tubes:** Thickened, rigid tubes.



- Tobacco Pouch Appearance of fallopian tube

Beaded Tubes.

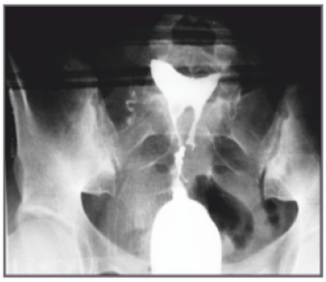


Cobblestone Appearance.

Golf Club Appearance.

MCQ

Q. 28-year-old woman being evaluated for infertility has come with her HSG report as shown. She has regular cycles with scanty flow over the past 1 year. Her pelvic exam is normal & husband semen analysis is normal. What would be the preferred next step in management?



a. Refer for IVF

b. Laparoscopy & Hysteroscopy

c. Laparoscopic chromopertubation

d. Proceed with OI + IUI

Ans: b

Explanation

- Diagnosis: Suspect Asherman's Syndrome/Synechiae or GTB
- Preferred Step: Laparoscopy + Hysteroscopy.
- Why not IUI?
  - IUI requires open tubes for fertilization
- Why not IVF ?
  - Need to evaluate the uterine cavity and confirm tubal status first.

Male Infertility

02:41:56

- Evaluation have to be done after 3 days abstinence & sample examined within 60 minutes of collection (collected in sterile container)
- Lower limit of reference values, WHO 2021
  - Sperm volume > 1.4ml
  - pH > 7.2
  - Count > 39million per ejaculate
  - Sperm concentration >16 million/ml
  - Total motility >42%
  - Progressive morphology >4%
  - Progressive motility >30%
  - Vitality >54%
  - WBC <1 million/ml
- Most Important Criteria: Morphology > Motility > Concentration
- Criteria for Morphology
  - STRICT criteria (Kruger Tygerberg criteria)
- Rough ER absent in sperm

Abnormal Semen Parameters

- Absence of semen → Aspermia
- Absence of sperm in semen → Azoospermia
- Low sperm concentration → Oligospermia (severe if concentration <5 million/ml)
- Low motility → Asthenospermia
- Abnormal morphology → Teratospermia
- Dead sperms → Necrospermia
- Round sperms → Globospermia

Important Information

- Most common overall cause of male infertility: Idiopathic
- Sperms gain motility in epididymis
- Ion responsible for motility → Calcium
- Gene responsible → CATSPER gene
- Capacitation
    - Sperms gain hypermotility and fertilizing capacity
    - Occurs in female genital tract, mainly in the Fallopian tube (starts in cervix), takes ~ 7hours
- Fertilizable lifespan:
    - Sperm → 72 hours
    - Egg → 12 - 24 hours

MCQ

Q. A 25 yr old married man came to an infertility clinic, having azoospermia. Normal sized testis, FSH and testosterone levels are also normal. What could be the reason?

a. Obstructed vas

b. Kallman syndrome

c. Klinefelter syndrome

d. Kartagener Syndrome

Ans: **a**

Azoospermia

02:51:02

- Test to differentiate between obstructive v/s non obstructive azoospermia
    - Best: S. FSH (ideally full hormonal profile done)
- High FSH + Low Testosterone: Primary gonadal failure
    - R/o Klinefelter syndrome 47XXY: Undervirilized male, Gynecomastia with Small atrophic testes
    - Y chromosome microdeletions (Yq11-AZF microdeletions): transmitted to male offsprings
    - Trauma, Radiation, Mumps orchitis, Cryptorchidism
- Low FSH + Low Testosterone: Pituitary / hypothalamic cause
    - Least common cause
    - Secondary gonadal failure
- Normal FSH + Normal Testosterone: Obstructive azoospermia
    - Acquired causes: TB, Gonorrhea, Chlamydia
    - Postsurgical causes
    - Congenital: B/L absence of vas

- Azoospermia + Low volume ejaculate + Absence fructose + Acidic pH + Normal hormones
  - Possibility 1: Congenital absence of vas deferens
    → Inability to palpate the vas on L/E, Seminal vesicles absent: Check for CFTR gene mutation and renal imaging
  - Possibility 2: Ejaculatory duct obstruction
    → Epididymal fullness, Seminal vesicles dilated (could be felt on PR examination)
  - If Both Possibility 1 and 2 is ruled out
    → Retrograde ejaculation: Check post ejaculatory urinalysis
- I/C/O obstructive azoospermia and Obstruction of vas deferens / epididymis suspected → Scrotal USG done

MCQ

Q. Artificial insemination with husband's semen is indicated in all of the following situations except:

a. Oligospermia

b. Impotency

c. Antisperm antibodies in the cervical mucus

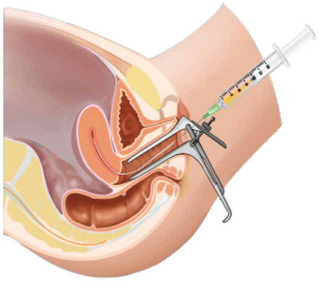
d. Azoospermia

Ans: d

Management

- Mx of mild semen abnormalities → IUI
  - Also option for impotency and ejaculatory disorders
- Mx of severe oligospermia / azoospermia
  - Surgically extract sperms → IVF with ICSI
- Option of donor sperm IUI
  - With primary testicular failure
  - Chances of retrieving sperms low

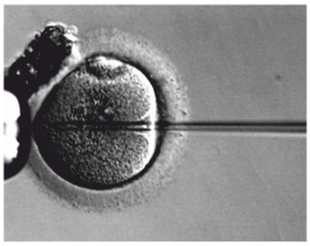
Intrauterine Insemination



- Not an ART procedure
- 0.5 ml of prepped semen sample and introduced in uterine cavity
- Methods For Semen Preparation
  - Swim up method
  - Density gradient method
  - Glass wool filtration
  - Preparation done ideally same day as IUI
- Cryopreservation of semen
  - Liquid nitrogen used
- Timing of IUI
  - On the day of ovulation
  - 36 hours after ovulation trigger
  - Day after LH surge detected in urine

Yourwish

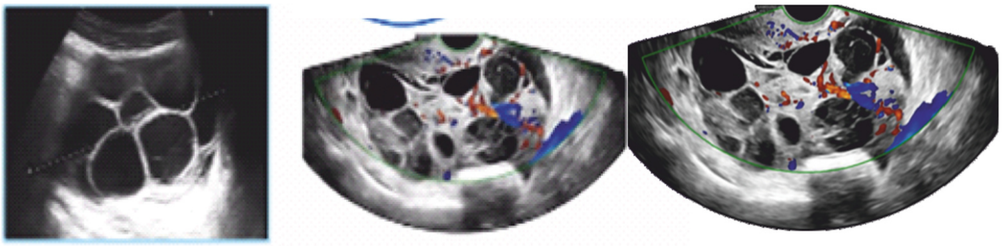
ICSI



- Intracytoplasmic sperm injection
- Single sperm injected in oocyte
- Indications
  - Conventional IVF fails
  - Severe male factor infertility
  - Surgically retrieved sperms used mostly

Ovarian Hyperstimulation Syndrome

03:06:00



- Clinical Profile
  - Woman on IVF/Gonadotropins (HMG/FSH)
  - Symptoms: Abdominal pain, Distension, Ascites, Nausea/Vomiting
  - Enlarged, bulky ovaries with multiple large cysts ("Kissing ovaries" appearance)
- Pathophysiology: Increased vascular permeability → VEGF
- Risk of
  - More with gonadotrophins (15%)
  - Hypovolemia
  - Hypotension
  - Ascites
  - Pulmonary edema
  - ARF & VTE
- Timing
  - 3-4 days after giving HCG trigger
  - 12-17 days after trigger when she gets pregnant
- Low risk with Clomiphene/Letrozole (~1%)

MCQ

Q. 26-year-old woman, during work-up for primary infertility found to have B/L ovarian masses. She has regular cycles with normal flow but reports severe congestive dysmenorrhea & dyspareunia. Her CA 125 levels are 90 IU/L. What is the most likely diagnosis?

a. Endometriosis

b. Genital tuberculosis

c. Dysgerminoma

d. Fibroid uterus

Ans: a

Explanation

- Endometriomas can be bilateral
- Clinical profile fits classic triad.
- PID is bilateral but profile differs.
- Genital Tuberculosis: Adnexal mass is not a common presentation.
- Dysgerminoma: Would have different tumor markers.
- Fibroids: Causes uterine enlargement, not ovarian masses
- CA-125 in Reproductive Age
  - Marker for epithelial ovarian cancer (more useful in postmenopausal women).
  - Limitation: Non-specific in reproductive age group.
  - Causes of Elevation: due to peritoneal irritation/inflammation (Endometriosis, Genital tuberculosis, Fibroids, PID / Adenomyosis)

Adnexal Mass

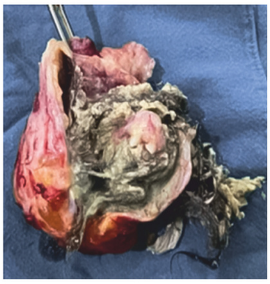
03:12:42

D/D In Reproductive Age Group

- Functional ovarian cyst
  - Follicular cyst (MC overall)
  - Corpus luteal cyst: Most likely to have hemorrhage inside cyst and rupture
  - Theca lutein cyst
    - → GTN, Molar pregnancy
    - → Diabetic pregnancy
    - → Rh isoimmunized pregnancy
- Endometriosis cysts
- Inflammatory tubo ovarian masses
- Ovarian tumors
  - MC ovarian tumor: Dermoid cyst

Dermoid CYST

03:15:47

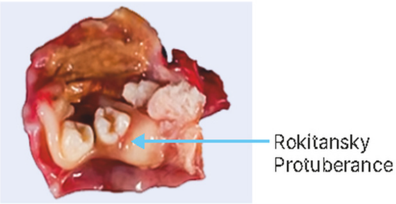


- Mature cystic teratoma
- MC ovarian tumor in 2nd and 3rd decades of life
- MC ovarian tumor identified during pregnancy
- Bilateral in up to 10% cases
- MC ovarian tumor to undergo torsion (15%) risk
- Cyst lined by stratified squamous epithelium
- Malignant change: <2% (very rare)
- If malignant change occurs → Squamous cell carcinoma

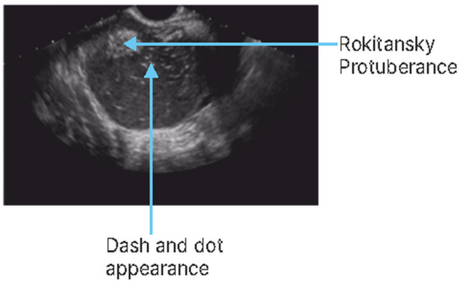
Treatment

- Cystectomy, preferably laparoscopic
- Caution → not to rupture the cyst inside the abdomen
  - In case of rupture → chemical peritonitis

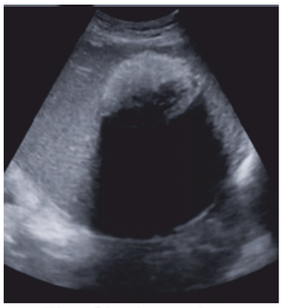
Usg Findings Of Dermoid Cyst



- Rokitansky protuberance



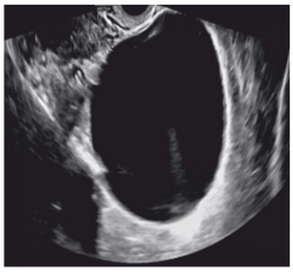
- Dash and dot appearance


Tip of iceberg sign

- Tip of the iceberg sign
  - Characteristic of dermoid cyst

MCQ

Q. 20-year-old girl presents with a USG report showing a right sided, simple ovarian cyst, thin walled, unilocular, hypoechoic, measuring 5 cm. She has regular periods. There is no h/o congestive dysmenorrhea. She is not sexually active. What is the most appropriate step in management?



a. Laparoscopic cystectomy
b. Measure serum CA 125 levels
c. Start her on OCPs
d. Follow up after 3 months

Ans: d

Explanation

- Likely diagnosis: Follicular cyst (incidental finding)
- Management
  - Best step: Follow-up after 3 months
  - Reason:
    → No suspicion of malignancy
    → Functional cysts usually resolve spontaneously
- Role of OCPs
  - Action: Suppress follicular growth → prevent new cyst formation
  - Limitation: Do not shrink existing cyst
  - Indication: Use if symptomatic or contraception desired

Indication Of Surgery With Ovarian Mass In Reproductive Age Group

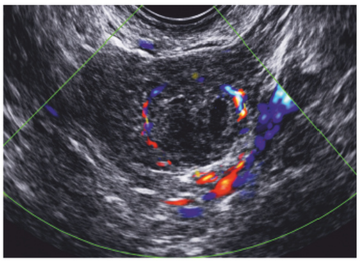
- Size ≥ 8 cm
- USG features suggestive of malignancy
  - Bilaterality
  - Multilocularity and septations
  - Solid areas, Papillary excrescences
  - Increased blood flow inside masses
  - Ascites, Evidence of metastasis, Enlarged lymph nodes
- Acute abdomen / torsion → Operate irrespective of size

Ovarian Mass In Pregnancy
- Indications to operate same
- Timing: 14-16 weeks (Not to touch in 1st trimester)
- Preferably laparoscopy
- If torsion occurs
  - Surgical emergency irrespective of period of gestation

Ovarian Cyst In Postmenopausal Women
- Criteria for Observation (all must be present)
  - Asymptomatic
  - Unilateral simple cyst
  - Size < 5 cm
  - Normal CA-125
- Indication for Surgery
  - If any feature is abnormal → suspicion of malignancy

MCQ
Q. 23-year-old girl, presents to the emergency with sudden onset of sided lower abdominal pain. Her vitals are stable. It has been 17 days since her last menstrual period, she otherwise has regular cycles. USG shows a 4 cm cystic structure in left adnexa with internal echoes & reticular pattern. There is small amount of free fluid in POD. What is the most likely diagnosis?

a. Dermoid cyst
b. Ectopic pregnancy
c. Corpus luteal cyst
d. Follicular cyst

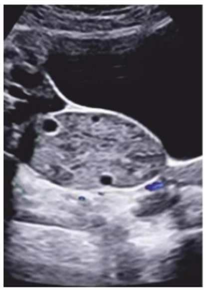


Ans: c

Management Of Hemorrhagic Corpus Luteal Cyst
- Depends on hemodynamic status
  - Stable / uncomplicated → Observation
- Unstable / significant hemoperitoneum
  - Surgery to control bleeding

Q. 26-year-old nulliparous woman presents to the emergency with acute severe lower abdominal pain, nausea & vomiting. There is h/o waxing & waning pain over the past 1 week. Her LMP was 10 days ago. Her PR is 100/min, BP is 110/70 mm Hg, temp 100.2°F. P/A exam - tenderness in lower abdomen, no guarding or rigidity. USG shows a 6 cm right-sided complex adnexal mass with whirlpool sign. What is the most likely diagnosis?

a. Ectopic pregnancy
b. Hemorrhagic corpus luteum
c. Acute PID
d. Adnexal torsion



Ans: d

Management Of Ovarian Torsion

- Immediate Action: Resuscitation + urgent surgery
- Surgical Approach
  - Preferred: Laparoscopy (if stable)
  - Laparotomy: If patient is unstable
- Contraindications to laparoscopy
  - Hemodynamic instability
  - Clinical peritonitis
- Surgical Procedures
  - Detorsion (untwisting) → restore blood flow
  - Cystectomy if cyst caused torsion
  - Salpingo-oophorectomy only if ovary is non-viable (necrosis)

Yourwish

6. GYNECOLOGICAL CANCERS

POSTMENOPAUSAL BLEEDING

00:00:56

FMGE 2019, 2020
NEET PG 2023, 2024, 2025
INICET 2022, 2024

- Bleeding from or into the genital tract, > 12 months after the final menstrual period
- M/c cause → Cervical cancer
- M/c uterine cause → Senile atrophic endometritis
- M/c worldwide cause→ Senile atrophic endometritis
- Other causes:
  - Endometrial hyperplasia
  - Endometrial cancer (seen only in 10% of cases)
  - Tamoxifen estrogen-containing HRT
  - Estrogen-producing ovarian tumors

Clinical approach to post menopausal bleeding

FMGE 2019, 2020
NEET PG 2022, 2023, 2024, 2025
INICET 2022, 2024

- History and clinical exam, including P/S and P/V
  - Growth on cervix→ Punch biopsy
- Screen for cervical cancer
- TVS
  - If ET>4mm
    - → Endometrial aspiration
  - ET<4mm
    - → Low risk → observe
    - → Persistent PMB → endometrial aspiration
    - → Normal endometrial aspiration → Hysteroscopy and endometrial biopsy (Gold standard)

Q. A 50-year-old, obese, postmenopausal woman has come with the complaint of irregular and heavy vaginal bleeding. Her pelvic examination is normal. What is the investigation of choice for further evaluation?

a. TVS
b. Endometrial biopsy
c. Pap smear
d. Hysteroscopy

Ans. b

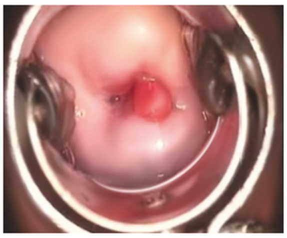
Important Information

- Endometrial biopsy: IOC for postmenopausal bleeding

POST COITAL BLEEDING

00:06:35

Q. A 35-year-old woman presents with the complaint of postcoital bleeding. Her cycles are regular with normal flow; there is no history of abnormal vaginal discharge or pelvic pain. Per speculum findings are shown. Pelvic examination findings are normal. What is the diagnosis?



a. Cervical fibroid
b. Endocervical polyp
c. Cervical erosion
d. Cervical cancer

Ans. b

Clinical approach to post coital bleeding

00:08:04

- 1st history and clinical exam, including PS and PV
  - Growth on cervix→punch biopsy
- Cervical cancer screening status
  - Abnormal cervix screening or suspicious-looking cervix → Colposcopy
  - Normal cervix but persistent postcoital bleeding→ Colposcopy
- Associated heavy menstrual bleeding/ Inter-menstrual bleeding → Perform TVS
- If findings of cervicitis present→ Testing for STIs

CERVICAL CANCER

00:10:15

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2025

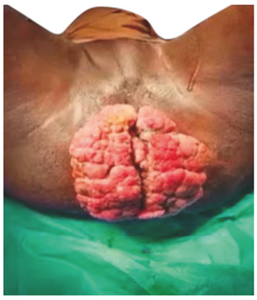
- M/c gyne cancer in indian women
- M/c HPV type a/w with CIN and Cervix cancer: HPV 16 AND HPV 18
  - Most specific HPV 18

Risk factors

- Early intercourse and childbirth
- High parity, low socioeconomic status
- Multiple sex partners
- Concomitant STIs, HIV
- Immune suppression
- Smoking → Squamous cell carcinoma
- OCPs

Important pointers

- Oncoproteins required for viral replication: E1 and E2
- Oncoproteins for malignant transformation
  - E6 targets P53 gene
  - E7 targets RB gene
- M/c histological type: Squamous cell cancer (large cell non-keratinizing type)
- Adenocarcinoma is associated with OCP use
  - Younger women
  - Specifically associated with HPV 18
- Low risk type: HPV 6 & HPV 11
  - Condyloma acuminata
  - Anogenital warts
- Women in labour with active warts→ Caesarean section is preferred
  - Transmission to newborn during vaginal delivery →laryngeal papillomatosis

Condyloma acuminata	Anogenital warts
	

Hpv vaccination

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024

- WHO strategy to prevent cx cancer, targets by 2030
  - 90% girls fully vaccinated by 15 years of age
  - 70% women screened by 35 years of age &again by age 45
  - 90% of those with cervical disease get appropriate treatment
- Quadrivalent vaccine (Gardasil/ Cervavac): HPV 16& 18, 6 & 11
- 9-valent vaccine (GARDASIL 9)- HPV 6,11,16,18,31,33,45,52,58
- Inactivated vaccine made up of viral-like particle → Composed of L1 capsid protein
- Recommended age:
  - Girls 9-26 years
  - Primary target: 9-14 years
- Dosage schedule: 0.5ml IM
  - 9-14 years →2 doses, 6 months apart
  - >15 years→ 3 doses (0,1-2months,6 months)
- Vaccinated women need screening
- Sexually active women can get vaccinated
- HPV testing is not required before vaccination.
- Not recommended for pregnant women

CERVICAL CANCER SCREENING

00:19:30

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- Age group screened (in India): 25-65 years of age
- Priority age group for screening (WHO): 30-49years of age
- Primary HPV DNA testing is recommended
- If HPV DNA testing or co-testing, repeat every 5 years
- If pap(cytology) alone, repeat every 5 years
- If VIA, repeat every 3 years
- Stop screening at age 65 (if regular screening in the last 10 yrs)

Screening in low resource setting

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- Visual inspection with acetic acid (VIA)
- Affordable HPV DNA testing where available - WHO
- Screen the priority age group

AYRE'S SPATULA	CYTOBRUSH/ ENDOCERVICAL BRUSH	LIQUID-BASED CYTOLOGY KIT/LBC
		 • Fixative used→ methanol • Advantage ○ Lesser number of unsatisfactory smears ○ Same sample can be used for HPV -DNA testing

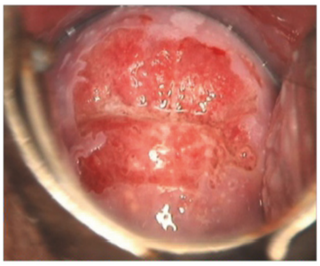
Yourwish

STEPS FOR PAP SMEAR

- Introduce the speculum → Take the sample using Ayre's spatula → Rotate it 360 degrees → Ectocervical sample → Endocervical sample
- Immediately prepare the slides
  - Not allowed to air dry
  - Fixative used → 95% ethanol

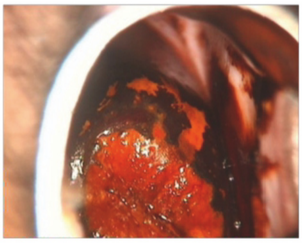
VIA/VISUAL INSPECTION WITH ACETIC ACID

- 5% diluted acetic acid is used
- The abnormal area turns white



VILI/VISUAL INSPECTION WITH LUGOL'S IODINE

- The abnormal area remains yellow
- Does not take up iodine stain



Important Information

- If primary HPV DNA testing is positive, VIA-guided treatment is usually used
- Screen and treat approach:
  - Uses VIA
  - Limited to low resource setting

Screen, Triage, & Treat Approach

- Used in high resource setting
- HPV DNA testing results are positive
  - Triaging is done using
    → HPV genotyping
    → Cytology
    → VIA
  - If triage is positive → Colposcopy
- After cytology → Do colposcopy if:
  - LSIL - Low-grade Squamous Intraepithelial Lesion
  - HSIL - High-grade Squamous Intraepithelial Lesion
  - ASC-H - Atypical Squamous Cells, cannot exclude HSI
- After cytology → Do HPV triage if:
  - ASCUS - Atypical Squamous Cells of Undetermined Significance
  - ASCUS + HPV positive → Colposcopy

Colposcopy

- Provides a magnified view of the ectocervix, vagina, and vulva
- Abnormal area to biopsy → Acetowhite
- If green filter is used → vascular patterns are seen clearly
  - Abnormal vascular patterns: Mosaic, Punctations

- Examine the complete transformation zone
- Endocervical curettage is done at the end of endoscopy in case of:
  - PAP smear report→ Atypical glandular cells
  - HSIL/ASC-H if colposcopy is unsatisfactory
    - → The transformation zone is not completely seen
    - → No ectocervical lesion

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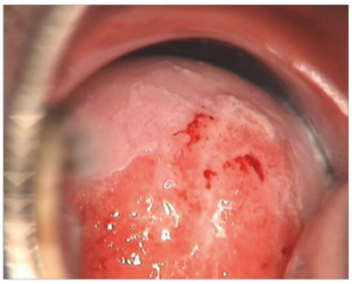
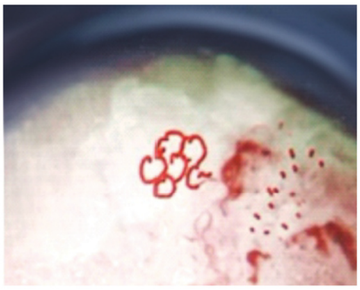
FMGE 2018, 2021, 2022, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2025

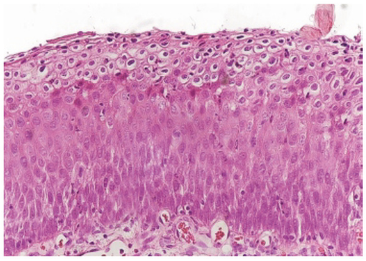



CERVICAL INTRAEPITHELIAL NEOPLASIA

00:36:50

Q. A 30-year-old, P1L1 woman with Pap smear report of HSIL is subjected to colposcopy. An abnormal area was identified on the ectocervix, and the biopsy showed dysplastic cells involving the full thickness of epithelium with the basement membrane intact. What is the next step?

a. Cryotherapy
b. LEEP
c. Hysterectomy
d. Conization



Ans. b

Diagnosis: CIN-3 (Cervical Intraepithelial Neoplasia Grade 3)

CYTOLOGY	LSIL (low-grade squamous intraepithelial system)	HSIL (high-grade intraepithelial system)
CIN SYSTEM /HPE	CIN1	CIN II, CIN III

- Dysplasia in the lower 3rd epithelium-CIN I
- dysplasia>1/3rd to 2/3rd thickness - CIN 2
- Dysplasia >2/3rd to full thickness -CIN 3
- In CIN, the basement membrane is not breached

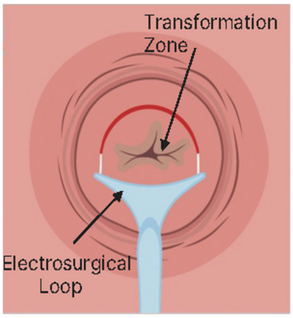
Important Information

- P16 immunostaining is a surrogate marker for transforming HPV infection with overexpression of E7
  - If positive →high grade

Risk of progression to cancer

- CIN1: 1%
  - Observation initially
  - If it persists at the end of 2 years→ Start treatment
- CIN 2: Risk is 5%
- CIN 3: Risk is 20%
- TOC for high-grade CIN →LEEP(loop electrosurgical excision procedure)

Leep/ lletz (Large loop excision of transformational zone)



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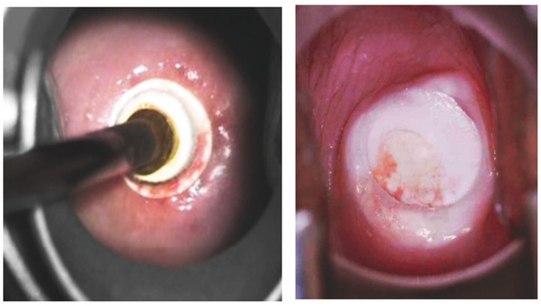
- TOC high-grade CIN
  - OPD procedure
  - Less bleeding
  - Less chance of cervical incompetence /stenosis
- Can be diagnostic and therapeutic

Cryotherapy



- MOA: Crystallization of intracellular water
- Cryogun is kept at the ectocervix connected to a cylinder with gas
  - Gas used is N_2O, CO_2 (-20 TO -30°C)
- Freeze-thaw-freeze technique
- Depth of destruction: 5mm
- M/c complication → Copious watery vaginal discharge

Cryotherapy is acceptable when

- Small lesion (<75% of transformation zone)
- Lesion fully covered by cryotip
- Lesion completely on ectocervix
- No endocervical involvement
- No suspicion of cancer

Indications of conization

- Discrepancy between cytology, colposcopy, and HPE
- Suspicion of microinvasive cancer on biopsy/LEEP
- HSIL/ASC-H with unsatisfactory colposcopy
- ECC positive for CIN2/3
- If adenocarcinoma suspected
  - PAP smear shows adenocarcinoma in situ

CERVICAL CANCER

00:47:15

Clinical presentation of cervical cancer

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- Bimodal peak of incidence, typical age is 44-55 years
- M/c complaint: irregular vaginal bleeding
- 1st complaint is blood-stained vaginal discharge
- M/c route of spread: Lymphatics
- Most specific complaint post coital bleeding

- M/C site of distant metastases: Lungs
- Pain is not common
  - Unless in locally advanced disease
- Can present as pyometra (pus collection in the cervix)
  - Cervical cancer is the M/C cause of pyometra in indian women

Primary lymph node involved

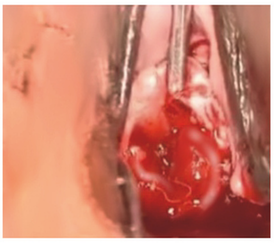
- Hypogastric (internal iliac group)
- Obturator→M/c involved LN
- Paracervical/parametrial/uterine→ Sentinel lymph nodes
- External iliac group
- Sacral

Important Information

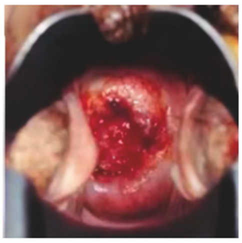
- Inguinal nodes are never involved

Cervical growth

- Exophytic, friable growth bleeds on touch → Punch biopsy
- Ulcerative growth → Punch biopsy
- Infiltrative type of growth
  - The cervix is hard and nodular
- Conization is required for the evaluation of endocervical growth



Exophytic, friable, growth bleeds on touch



Ulcerative growth

Figo staging of cervical cancer

NEET PG 2020, 2023, 2024, FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020, INICET 2020, 2021, 2023, 2024, 2025

STAGE	DESCRIPTION
STAGE I	• Limited to the cervix • 1a→microinvasive ○ Diagnosed on leep /conization ○ 1a 1→<3mm depth of invasion ○ 1a 2→3-5mm depth of invasion • 1b→invasive visible growth ○ 1b1→<=2cm ○ 1b2→>2- <=4cm ○ 1b3→>4cm
STAGE IIA	• Upper 2/3rd vagina • IIa1:size of growth <4cm • IIa2:>4cm
STAGE IIB	• Parametrium, but not up to the lateral pelvic wall
STAGE III	• IIIa→lower 1/3rd vagina • IIIb→parametrium upto lateral pelvic wall • IIIc→pelvic/para-aortic LN
STAGE IVA	• Bladder & rectum
STAGE IVB	• Distant metastasis

Yourwish

Important Information

- The upward spread to the uterus is disregarded
- Hydronephrosis, irrespective of size of growth, on Cx → Stage III
- M/c causes of death in cervical cancer → Renal failure
- Bullous edema of the bladder is not stage IV
- Staging → Physical exam + all investigations allowed

Q. A 37-year-old woman with irregular vaginal bleeding is diagnosed with invasive cervical cancer. She has a growth of 4 cm on her cervix. Pelvic and rectal examination shows bilateral parametrium thickened and shortened. She also complains of left-sided flank pain and lymphedema of the left leg. What would be the most appropriate treatment strategy?

a. Neoadjuvant chemotherapy followed by surgery
b. Wertheim's hysterectomy
c. Chemoradiation
d. Radiotherapy

Ans. c

Diagnosis: Stage III (lateral pelvic wall involvement)

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Stagewise tx of cervical cancer

Family not complete	Stage	Family complete
CONIZATION (Margins should be free)	1a1 & No LVSI	Extrafascial (type 1) hysterectomy
RADICAL TRACHELECTOMY + PELVIC LYMPHADENECTOMY	1a1+LVSI & 1a2	Modified radical hysterectomy(type II), (wertheims)+pelvic lymphadenectomy
	Ib1	Type III radical (meig's) hysterectomy+pelvic lymphadenectomy
	Ib2, IIA1	
	IIB & beyond IB3 &IIA2, bulky growth>4cm	Chemoradiation Chemo agent of choice: Cisplatin (acts as radiation sensitizer)

- Ovaries are not removed in younger women
- Radiotherapy can be used in all stages, but is mainly done if unfit for surgery or has advanced cancers
- Fertility-preserving surgery is only possible till stage IB1
- Radical trachelectomy:
  - Cervix, upper 1-2cm vagina & parametrium removed + pelvic lymphadenectomy + permanent cervix cerclage

Post -OP adjuvant therapy

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- High-risk → chemoradiation
  - Mets to lymph nodes
  - Parametrium is positive
  - Margins of vagina positive

- Intermediate risk → Post-operative radiotherapy
  - Tumor size >4cm
  - LVSI
  - Deep stromal invasion
- Low risk → Surveillance
- Prognostic factors
  - Overall stage of diagnosis
  - LN status
  - Tumor volume
  - Depth of cervical involvement
  - Presence of LVSI (Lymphovascular Space Invasion)
- Most recurrences are seen within 3 yrs
- M/c site of recurrence is the pelvis (central recurrence)
- M/c presentation is vaginal bleeding
- If distant mets, palliative chemotherapy is done
- With local pelvic recurrence, treatment depends on the primary mode of therapy

Radiotherapy for cervical cancer

NEET PG 2020, 2023
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- Vagina is the most tolerant tissue to radiation
  - Vagina > bladder>rectum>colon>small bowel
- Chronic complications of radiation therapy are due to obliterative endarteritis in the tissue
- The effect of radiation is inversely proportional to distance^2
- External beam radiotherapy/teletherapy uses cobalt -60 linear accelerator
  - If para-aortic LN included in the radiation field → Extended field radiotherapy
- Intracavitary brachytherapy uses Cs-137 in low-dose radiotherapy & Ir-192 in high-dose radiotherapy
  - Point A→2cm lateral to the midline of the cervical canal
    → Parametrial LN, dose: 80 grey
  - Point B→3cm lateral to point A
    → Obturator LN, dose: 60 grey
  - Both points are 2cm above the lateral vaginal fornix

Q. 35-year-old, sexually active woman, visits Gyne OPD for routine checkup. She is concerned because her mother died of cervical cancer at the age of 45 years. What would you advise her?

a. HPV vaccination
b. Cervical cancer screening
c. BRCA testing
d. HNPCC testing

Ans. b

HEREDITARY GYNE CANCERS

01:18:44

HNPCC mutation

NEET PG 2020, 2023, 2024
FMGE 2018, 2021, 2022, 2023, 2024, 2025
AIIMS 2018, 2019, 2020
INICET 2020, 2021, 2023, 2024, 2025

- Associated with lynch II syndrome
- Mutation in MSH-1,MSH-2,MSH-6
- Lifetime risk:

- Endometrial cancer is 40-60%
- Ovarian cancer is 10-12%

- Mutation carriers offered regular TVS/EA screening from age 35 onwards and risk-reducing total hysterectomy + Bilateral Salpingo-Oophorectomy at age 40 or earlier if family complete

BRCA mutation

- Lifetime risk:
  - BRCA 1 mutation is 45%
  - BRCA 2 mutation IS 25%
- Carriers are offered regular TVSCA-125 screening from age 35 onwards and Risk-Reducing Salpingo-Oophorectomy at age 40 or earlier if the family is complete
- The average lifetime risk for ovarian cancer is approximately 1.4%

ENDOMETRIAL CANCER

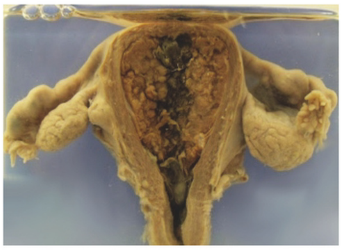
01:20:58

NEET PG 2020, 2025
FMGE 2019, 2020, 2022, 2023, 2025

- Risk factors:
  - Early menarche
  - late menopause
  - Nulliparity
  - Obesity
  - Tamoxifen
  - Increasing age
- Corpus cancer triad:
  - Diabetic
  - Obese
  - HTN- HTN is not a risk factor individually
- Protective factors
  - Multiparity
  - OCPs
  - Smoking
- Average age at presentation is 55 -70 years
- M/c presentation→irregular vaginal bleeding
- Most specific complaint→post menopausal bleeding
- Pain is a late feature
  - Referred in hypogastrium: Simpson's pain
  - Physical exam is often normal except when cancer has spread
- M/c route of spread: Direct extension
- Diagnosis is made by HPE from the endometrial sampling

Q. A 54-year-old woman, obese, diabetic, hypertensive woman with postmenopausal bleeding underwent hysterectomy. The cut specimen is shown below. What is the most likely diagnosis?

a. Endometrial cancer
b. Adenomyosis
c. Cervical cancer
d. Endometriosis



Ans. a

Q.62-year-old, lean & thin woman, presented with postmenopausal bleeding. The pelvic exam is unremarkable. She underwent endometrial biopsy & has been diagnosed with endometrial cancer. Even though the cancer is confined to the body of uterus, she has been told that the prognosis is poor. What is the most likely histology?

a. Endometrioid adenocarcinoma
b. Uterine papillary serous
c. Mucinous carcinoma
d. Leiomyosarcoma

Ans. b

Endometrial cancer pathology

NEET PG 2020, 2025
FMGE 2019, 2020, 2022, 2023, 2025

M/c HISTOLOGY- 80% (ENDOMETRIOD ADENOCARCINOMA)	TYPE II HISTOLOGY (SEROUS, CLEAR CELL)
Good prognosis	Poor prognosis
Obese, pre- and perimenopausal women	Older, postmenopausal women, lean thin
Estrogen responsive &a/w atypical endometrial hyperplasia	Estrogen unresponsive Arises in atrophic endometrium
M/c a/w PTEN mutation - good prognosis Kras mutation - a/w unfavourable prognosis	M/c a/w P53 mutation Also a/w HER2neu and P16 overexpression

- Non-aggressive histology: Endometrioid grade 1 and 2
- Aggressive histology: Non-endometrioid and grade 3 endometrioid

Molecular analysis of endometrial tumor

- Good prognosis → POLE mutations
- Intermediate prognosis
  - Microsatellite instability-high or mismatch repair-deficient
  - No specific molecular profile
- Poor prognosis
  - P53 abnormal
- Utility: Immunohistochemistry is done for HPE from the initial sample/ hysterectomy specimen → To stratify risk and tailor adjuvant therapy

Figo staging of endometrial cancer

- Histology, LVSI, grade of lesion are also used for staging

STAGE I	• Confined to the body of uterus
	• Non-aggressive histology, grade $\frac{1}{2}$ EEcs, no/ focal LVSI
	  ○ 1A → confined to the myometrium or < 50% myometrium
	  ○ 1B→involves ≥ 50% of myometrium
	  ○ 1C→aggressive histology confined to the endometrium

STAGE II	• Cervical stromal involvement ○ Non-aggressive histology with substantial LVSI ○ Aggressive histology with any myometrial involvement
STAGE III	• Breach of uterine serosa/adnexa→3A • vagina/parametrium below/pelvic peritoneum→3B • Pelvic or para aortic LN→3C
STAGE IV	• Bladder /bowel distant mets • Inguinal LNs

Management of endometrial cancer

NEET PG 2020, 2025
FMGE 2019, 2020, 2022, 2023, 2025

- Clinically confined to the uterus:
  - Surgical staging
    → Type 1 extraficial hysterectomy+ BSO
    → Pelvic & para-aortic lymphadectomy
    → If aggressive histology add omentectomy
- If the cervix is involved:
  - Radical hysterectomy
  - Achieve tumor-free margins
- Advanced stage:
  - Debulking surgery
  - Post op chemoradiation
- Role of additional imaging
  - MRI → Evaluates myometrial, cervix, and parametrium involvement
  - CT Scan → Peritoneal and LN metastases
- Can omit LN dissection if:
  - Endometrioid grade 1 or 2
  - Tumor size < 2cm
  - <50% myometrium involved
  - No cervical stromal involvement
  - No extrauterine disease
  - No enlarged or suspicious nodes
- Post-op chemoradiation given in:
  - Type 2 histology
  - Stage III/IV
  - Grade 3 EEC & >50% myometrial invasion

- No postop Tx
  - Stage IA
  - Endometrioid Grade 1 or 2

OVARIAN CANCER

01:40:16
NEET PG 2024
FMGE 2019, 2020
INICET 2021, 2025

- M/c histological subtype → Epithelial
- M/c ovarian tumor → serous cystadenoma

- M/c ovarian cancer → serous cystadenocarcinoma
- Epithelial ovarian tumour identified in post menopausal women:
  - 30% malignancy risk
  - Premenopausal women have only 7% risk of malignancy

Risk factors

- Nulliparity
- Caucasian
- Increasing age
- Early menarche
- Delayed child-bearing
- Hereditary, family history
- Smoking is a risk factor for mucinous histology

Protective factors

- Multiparity
- Breastfeeding
- OCPs
- Salpingectomy
- Hysterectomy

Q. A 60-year-old woman presents with long-standing complaints of dyspepsia, bloating & progressive abdominal distention for the past 6 months. There is no c/o abdominal pain. Imaging reveals ascites with omental caking and a B/L adnexal masses measuring 6 cm each, with multiple septations & papillary excrescences. CA 125 levels are 450 IU/L. What is the most likely diagnosis?

a. Serous cystadenocarcinoma

b. Mucinous cystadenocarcinoma

c. Granulosa cell tumor

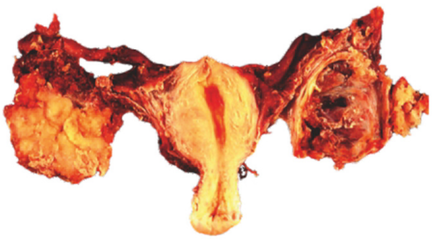
d. Endometroid tumor

Ans. a

FMGE 2019, 2020
INICET 2021, 2025, NEET 2024

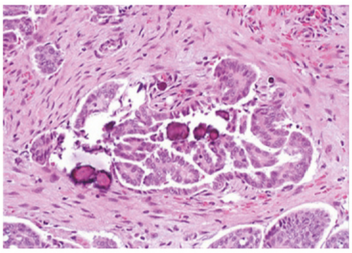
Epithelial ovarian cancer

- Peak age: 56-60 years
  - Often bilateral at presentation
  - Diagnosed at a late stage
- M/c symptoms are nonspecific GI symptoms
- M/c route of spread: Tumor exfoliation
  - Spread across the peritoneal surfaces
- Pain in advanced ovarian cancers can be referred to the I/L knee joint
- CA-125 - Marker for epithelial ovarian cancer



Histology

- Serous histology:
  - Tumor cells resemble tubal epithelial cells

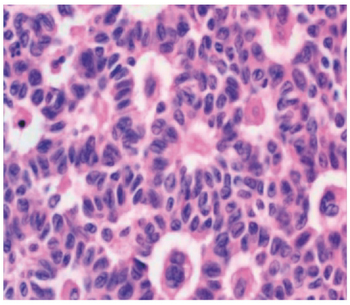


- Psammoma bodies are seen
- Type 1: Low-grade, mutation in KRAS & BRAF
- Type 2: High-grade, mutation in P53

- Mucinous:
  - Multiple loculi filled with mucin
  - Often huge and U/l
  - Better prognosis
  - Tumor marker is CEA, CA 19-9
  - A/w pseudomyxoma peritoni
- M/C histology a/w endometrial cancer: Endrometrioid
- M/c histology a/w endometriosis: Clear cell>endometrioid
- A/w hobnail cells and high-grade malignancy: Clear cell
- BRENNER'S:
  - Transitional cell, solid tumors, mostly benign
  - U/L walthard cell nests on HPE
- Borderline tumor:
  - Low malignant potential
  - Epithelial hyperplasia and atypia
  - Destructive stromal invasion absent

NEET PG 2024
FMGE 2019, 2020
INICET 2021, 2025

Sex chord stromal tumor



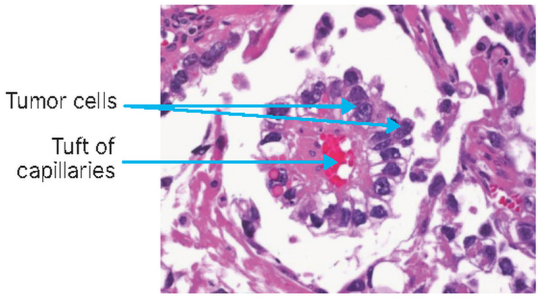
- Granulosa cell tumor
  - Secretes estrogen
  - A/w AUB, PMB, precocious puberty
  - Tumor marker→ Inhibin B
  - HPE→ Call exner bodies, coffee bean nuclei
  - Rarely B/L
  - A/w FOXL2 gene mutation
- Sertoli-Leydig cell tumor
  - Hirsutism
  - Virilization
  - Secrete androgens
- Fibroma
  - Solid, benign
  - A/w meig's syndrome: Fibroma+ascites+pleural effusion
    → Reactive because it releases VEGF

Germ cell cancers

01:52:08

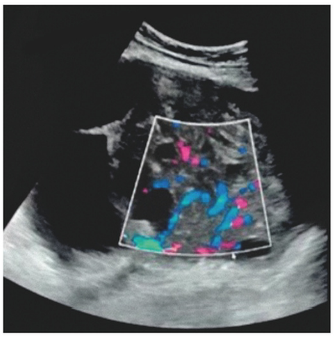
- M/c type: Dysgerminoma
- M/c ovarian cancer identified during pregnancy
- Tumor markers
  - LDH
  - Placental ALP
  - hCG
  - Never secrets AFP

- Usually U/L
- B/L in 15% cases, can arise in dysgenetic gonads, lymphocytic infiltration, very radiosensitive
- Immature teratoma - Grading by immature neural elements
- Endodermal sinus (yolk sac) tumor on HPE
  - Schiller Duval bodies
  - Tumor marker AFP
- Embryonal Cell CA - Secretes AFP & hCG
- Choriocarcinoma - Secretes hCG
- Peak age
  - 10-30yrs
  - Often U/L
  - Diagnosed at early stages
- Grow to large sizes
  - A/w pain
  - A/w precocious puberty
- Very chemosensitive & conservative surgery possible



Q. An 18-year-old girl presents with an abdominopelvic lump which feels firm, ill-defined margins, non-tender with restricted mobility. USG shows a U/L solid cystic ovarian mass measuring 12 cm with raised blood flow inside the mass on Doppler. What is the most appropriate next step?

a. Send CA-125, AFP, HCG, CEA
b. Send CA-125, AFP, HCG, LDH
c. Diagnostic Laparoscopy
d. USG guided FNAC



Ans. b

- Tumor markers are not diagnostic for cancer
  - If elevated → Ideally operate under gynecologic oncology & work up
  - If elevated baseline → Post-op follow-up
- FNAC is not routine for making a diagnosis
  - Done in clinically advanced ovarian malignancy, surgically unfit, or before chemo needs HPE

Management of ovarian cancers

- Surgical staging
  - Includes ascitic fluid/peritoneal cytology, removal of tumor deposits, and representative biopsies
- TAH+BSO+pelvic area and para-aortic lymphadenectomy +infracolic omentectomy +appendectomy (if mucinous)
- Advanced stage: Debulking Sx + post-op chemo
- Optimal debulking with <1cm residual tumor left behind
- Neoadjuvant chemo f/b interval debulking:
  - Option for high-risk surgical candidates or low likelihood of optimal debulking
- Fertility-preserving option:
  - Surgical staging + U/L Salpingo-oophorectomy
  - Germ cell cancers
  - Borderline tumors
  - Stage 1a epithelial ovarian
  - Granulosa cell tumor in young girls

Yourwish

Figo staging - Ovarian cancers

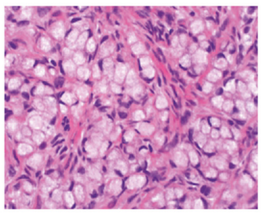
Stage I	• Limited to the ovaries • 1a→one ovary • 1b→both ovaries • 1c→ capsule rupture, malignant ascites
Stage II	• Uterus/tubes/pelvic intraperitoneal structures
Stage III	• Intrabdominal deposits • Liver and spleen capsule • Retroperitoneal lymph nodes
Stage IV	• Malignant pleural effusion • Inguinal LN • Distant mets present

FMGE 2019, 2020
INICET 2021, 2025
NEET 2024

- Chemotherapy for epithelial: DOC→ Carboplatin+ Paclitaxel
- Post-op chemo given to all except stage 1a, 1b, grade1/2
- If clear cell histology→ always give post-op chemotherapy
- Chemotherapy for germ cell cancers
  - BEP regime
  - Given to all except stage 1 dysgerminoma, immature teratoma stage 1, grade 1

Metastatic tumors of the ovary

- Overall, M/c cancer metastasizing to the ovary: Endometrial cancer
- M/c extragenital malignancy: Adenoma carcinoma colon
- M/c primary site for Krukenberg tumor:
  - Stomach>breast
  - Spread to the ovaries via the retrograde lymphatics
  - On HPE: Signet ring cells
  - Usually B/L, capsule intact



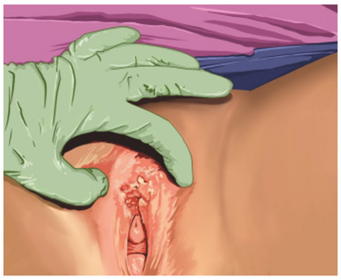
VULVAL CANCER

02:10:33

Pathology

- M/c histological type is squamous cell cancer
- Keratinizing type
  - Most common
  - Older women
  - Associated with lichen sclerosis
  - Associated with differentiated VIN
- Warty/basaloid type
  - HPV infection: M/c HPV 16>33>18
  - Associated with younger woman
  - Associated with usual type VIN (HSIL/high-grade VIN)
  - Risk factors→HIV/smoking
- Not related to parity, gravidity, or lichen simplex

- Paget's disease of vulva: A/w adenocarcinoma vulva
- Bartholin gland CA: Squamous, adeno, or transitional cell cancers
- Differentiated VIN / high-grade VIN → Risk of malignancy
  - Long-standing h/o pruritis
  - Biopsy diagnosis
  - Excision - TOC



Clinical presentation

- Peak age: 65-75 years of age
- M/c presentation: Pruritus vulva
- M/c site: Labia majora
- If growth is seen → Diagnosis by biopsy
  - Keyes punch biopsy forceps are used
- If no gross lesion, only dystrophic changes → Vulvoscopy is one with toluidine blue dye
- M/c route of spread: Direct >lymphatic (inguinofemoral nodes)

Q. A 55-year-old postmenopausal woman is diagnosed with squamous cell cancer of the vulva. There is a 4 cm growth on the clitoris, and there are no clinically enlarged inguinofemoral lymph nodes. What is the most appropriate treatment for this patient?

a. Radical vulvectomy + Sentinel lymph node sampling

b. Radical vulvectomy + B/L inguinofemoral lymphadenectomy.

c. Chemoradiation

d. Radiotherapy

Ans. b

MANAGEMENT OF VULVAL CANCER

• **STAGE I: CONFINED TO VULVA** ○ **IA:** Size <= 2cm and depth of stromal invasion<= 1mm	• Wide local excision if margins are free & no lymphovascular space invasion • Tx is enough
• **STAGE IB:** Size>2cm and/or depth of stromal invasion >1mm • **STAGE II:** Growth of any size, Lower 1/3rd urethra, vagina, or anus	• For primary tumor: Radical wide local excision ○ 2cm tumor-free margin • Management of LNs ○ Small lateral lesion<4cm in size and >= 2cm from midline → I/L inguinofemoral LN dissection → If positive → C/L inguinofemoral LN dissection ○ Midline lesion 2cm in midline → B/l inguinofemoral LN • If inguinofemoral LN positive→ Postoperative radiotherapy to groin region
• **Advanced stage:** ○ Upper 2/3rd vagina/bladder/rectum positive IFLM - Stage III ○ Fixed, ulcerated IFLN tumor, fixed to bone, pelvic LNs, distant metastasis- Stage IV	• Chemoradiation

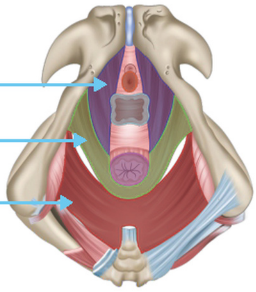
7. PROLAPSE & CONTRACEPTION

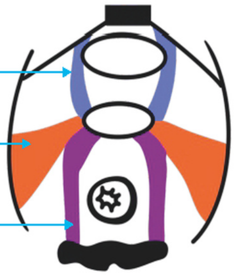
PELVIC ORGAN PROLAPSE

00:00:40

ETIOLOGY

- Weakness of the pelvic diaphragm (a group of voluntary muscles)
  - Levator ani
    - → Pubococcygeus
    - → Illiococcygeus
    - → Puborectalis → Lateral fibres from Pubococcygeus forms sling around the rectum
  - Ischiococcygeus (Coccygeus)
- Injury to pelvic Fibromuscular support → condensation of Endopelvic connective tissue
  - Pubocervical ligament
  - Cardinal ligament
  - Uterosacral ligament
- Nerve supply of pelvic diaphragm → Nerve to Levator ani & pierces from the pelvic surface of the muscle





Important Information

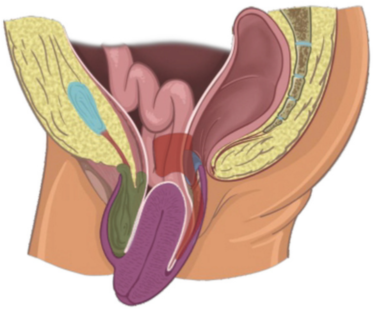
- Cardinal uterosacral complex helps suspend the external os at the level of the ischial spine
- Cardinal uterosacral complex maintains the Axis of vagina → Horizontal
- Round ligament forms the false support
- Broad ligament does not form the support

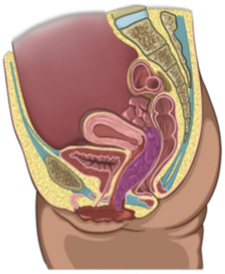
Risk Factors

- Frequently spaced deliveries
- Mismanagement of labor, faculty instrumentation
- Advanced age
- Atrophic changes
- Increased abdominal pressure

De LANCY'S LEVELS OF VAGINAL SUPPORT

00:04:30





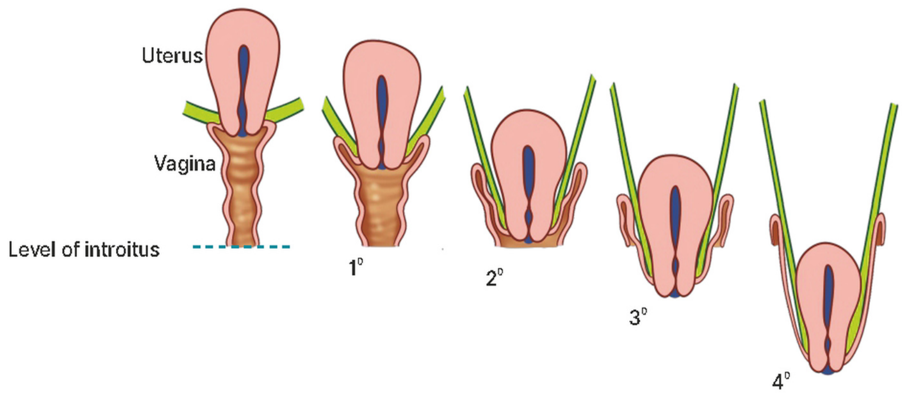
Levels of support	Associated defects
Level 1/Apical • Cardinal- Uterosacral complex	• Uterocarvical descent • Vault prolapse • Enterocele
Level 2/Midlevel • Posteriorly- Rectovaginal septum • Anteriorly- Vesicovaginal septum, Pubocervical fascia	• Rectocele • Cystocele
Level 3/Distal • Pelvic diaphragm and Perineal Body	• Urethrocele • Gaping introitus • Deficient perineum

Grading Of Uterocervical Descent

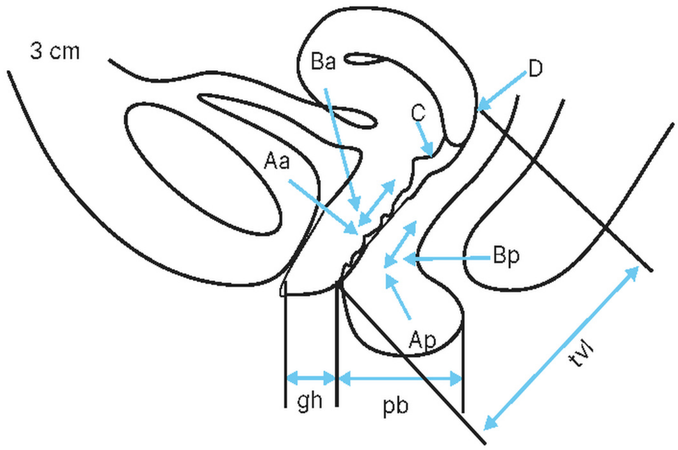
00:08:00

NEET PG 2025

- **Shaw's classification:** Reference point → Level of Introitus



  - 1st Degree → Descent of cervix below ischial spine but above introitus
  - 2nd Degree → Descent of cervix up to introitus
  - 3rd Degree → Descent of cervix outside the introitus
  - 4th Degree → Fundus outside the introitus → Procidentia
- **POPQ (Pelvic Organ Prolapse Quantification) System:** Reference point → Hymen



Anterior wall	Anterior wall	Cervix or cuff
Aa	Ba	C

Yourwish

Yourwish

Genital hiatus gh	Perineal body pb	Total vaginal length tvl
Posterior wall Ap	Posterior wall Bp	Posterior fornix D

Stage 0	No prolapse demonstrated
Stage I	Most distal portion of prolapse >1cm above the level of the hymen
Stage II	Most distal portion of prolapse within 1cm of the hymen
Stage III	Most distal portion of prolapse >1cm below the level of the hymen
Stage IV	Complete / near complete eversion of the vagina

FMGE 2025

Q. Identify the image

Cystocele
- Bulge from the anterior vaginal wall
- Rugosities of the vagina present
- The bulge is reducible
- Cough impulse present
- C/O difficulty in urinating, stress urinary incontinence

Q. Identify the image

Uterocervical descent with Cystocele and Rectocele
- Decubitus ulcer is seen- Occurs due to Venous congestion
- Treatment → Vaginal packing with Glycerine and Acriflavine

Treatment

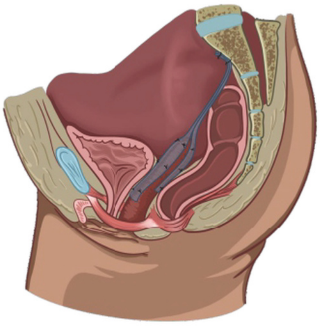
00:15:15

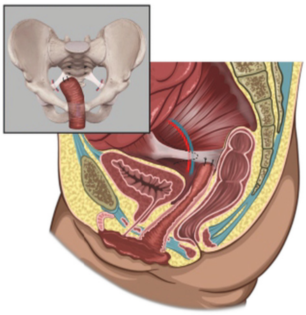
SURGICAL MANAGEMENT

- Vaginal Hysterectomy with Pelvic floor repair
  - Done in Post menopausal women
  - Vaginal Hysterectomy → Ward Mayo's technique
  - Pelvic floor repair → Defect-specific repair
    → Anterior defect → Anterior Colporrhaphy
    → Posterior defect → Posterior Colporrhaphy
    → Deficient perineum and gaping introitus → Perineorrhaphy
- Mc Cull Culdoplasty
  - Procedure to suspend the vault and Enterocele repair
  - Failure to repair the enterocele or suspend the vault → Increases the risk of Vault prolapse in the future
- Le Fort's Colpoclesis
  - Obliterative procedures
  - Done in women who are not fit for major surgery, and for those who are not sexually active

Vault prolapse (Post hysterectomy)

- Disadvantages: Limit vaginal access to the cervix and uterus for future
- Halban's and Moschowitz's repair
  - Abdominal procedures for enterocele repair
- Vault prolapse
  - Sacrocolpopexy → Best surgery
  - Sacrospinous fixation
  - Colpocleisis
  - Uterosacral ligament fixation



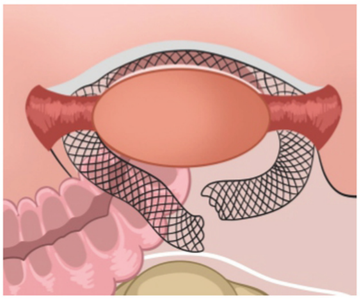


Q. A 28-year-old female, P2, presents with complaints of a mass descending per vagina for the last 1 year. On pelvic examination, there is a uterocervical descent beyond the introitus and supravaginal elongation of the cervix. She does not want to conceive in the future. Which of the following is the most acceptable management option for this patient?

A. Fothergill's repair
B. Vaginal Hysterectomy
C. Perineal exercise for 3months
D. Le Fort's repair

Answer: A

- Fothergill's repair (Manchester surgery)
  - Involves D&C, amputation of the cervix, and plication of the cardinal ligaments in front of the stump
  - Sturmdorf suture → Cover cervical stump with vaginal mucosa
  - Shirodkar's modification → Avoids cervical amputation
  - Done in a young multiparous woman, family complete, who wants to retain the uterus, generally has supravaginal elongation of the cervix
- Sacro hysteropexy
  - AKA Sacro cervicopexy
  - The mesh is placed at the level of the isthmus between the uterus and the sacrum
  - Done in women who want future childbearing → Uterus preserving option

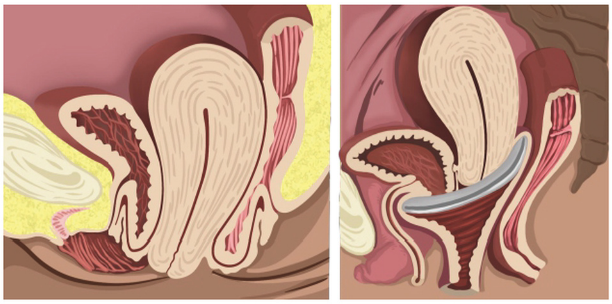


FMGE 2025

- Sling surgeries → Done in nulliparous women
  - Shirodkar sling → Posterior sling
    → Best outcome
    → Isthmus to Sacrum
    → Previously done using fascia lata. Now a days done using Merselene tape
    → Risk of nerve injury → Near the Psoas major muscle → Genitofemoral nerve
  - Purandare sling → Anterior sling
    → Isthmus to rectus
    → Risk of Enterocele
  - Khanna sling → Anterior sling
    → Isthmus to ASIS
  - Virkud sling → Composite sling

Conservative Management

- Pessaries
  - Done in females with any degree of prolapse who are unfit for surgery, who are not willing for surgery, Pregnant female with prolapse
- Pelvic floor strengthening exercise
  - Kegel's exercise → Advised to pregnant women and those with a mild degree of prolapse, and as non-surgical management of SUI



Q. A 47-year-old multiparous woman underwent vaginal hysterectomy with pelvic floor repair for procidentia. She was discharged after 3 days with no complications. She returned after 2 weeks with C/O involuntary passage of urine on coughing, sneezing, and laughing. She had no dysuria or urgency. What is the likely diagnosis?

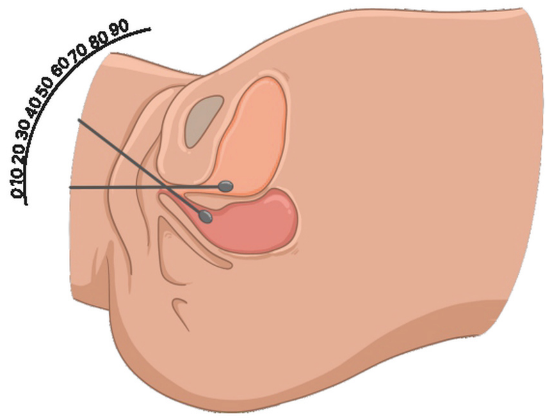
A. Urinary tract infections
B. Stress Incontinence
C. Detrusor Instability
D. Vesicovaginal Fistula

Answer: **B**

URINARY INCONTINENCE

00.32.10
FMGE 2022

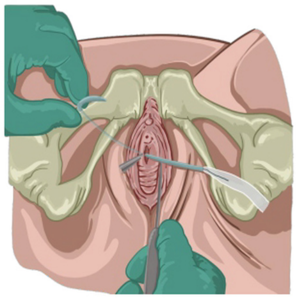
- Stress Urinary Incontinence
  - MC type in women
  - Cause
    - → Urethral hypermobility → Bladder neck descent
    - → Intrinsic sphincter deficiency
  - Test for urethral hypermobility
    - → Q-tip test
    - → Bonney's test
  - Treatment
    - → Lifestyle modification
    - → Pelvic floor exercise
    - → Duloxetine → α adrenergic agonist
- Urge Incontinence
  - Incidence increases with age
  - It is a/w Detrussor Instability
  - Treatment
    - → Bladder training exercise
    - → Darifenacin, Solifenancin → Anticholinergic drugs
    - → Mirabegron → β adrenergic agonist
- Mixed type
  - MC type in older women

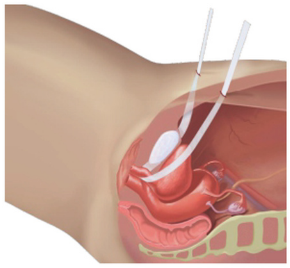


Important Information

- UTI must be excluded in patients with urinary incontinence
- Urodynamic studies should be done in any patient with h/o urgency

Surgeries Of Sui





- Midurethral slings- Procedure of choice
  - Transobturator tape
    - → The tape passed through the obturator canal
    - → Risk of injury to the obturator nerve and the obturator vessel injury
  - Transurethral tape
    - → Tape passed through the retropubic space and through the bladder
    - → Risk of injury to the bladder and retropubic vessels
- Kelly's Plication
- Needle suspension surgery → Stamey's, Pereyera
- Retropubic Urethropexy → Proximal urethral suspended
  - Reestablish the intra-abdominal location of the urethra
  - Bursch Colposuspension → Proximal urethral suspended to Cooper ligament
  - Marshal Marchetti Krantz → Proximal urethral suspended to pubic bone → risk of pubic osteitis

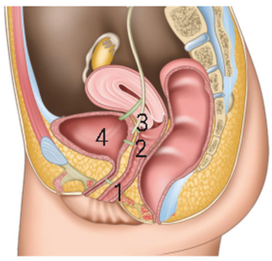
Important Information

Vault prolapse with SUI → Sacrocolpopexy + Colposuspension

GENITOURINARY FISTULA

00:39:26

- Occurs due to Ischemic necrosis
- Types
  - Urethrovaginal fistula
  - Vesicovaginal fistula
  - Ureterovaginal fistula
  - Vesicouterine fistula



1. Urethrovaginal
2. Vesicovaginal
3. Ureterovaginal
4. Vesicouterine

Vesicovaginal Fistula

- MC Cause
  - Worldwide - Post surgery (Traumatic)
  - Low resource settings - Obstructed labour
- Clinical presentation
  - Continuous dribbling of urine from the vagina
  - Fistulous opening seen/felt through the anterior vaginal wall
  - Not able to hold urine

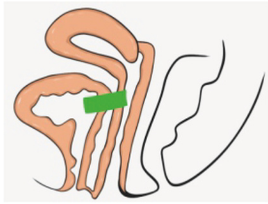
Urethrovaginal Fistula

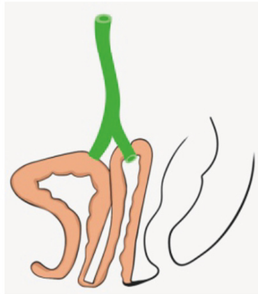
- Clinical presentation
  - No constant dribbling of urine
  - During urination, urine comes out from both the vagina and the urethra

Vesicouterine Fistula

- Clinical presentation
  - Triad of urinary continence, Amenorrhea, and Menouria (Cyclic Hematuria) → Youssef syndrome

Investigations





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- Three swab test
  - AKA Methylene blue test
  - Done in case → On P/S, fistulous opening not seen /felt, and blades of speculum fill up with urine
  - The bladder is filled with Methylene blue dye, and three swabs are placed in the vagina
  - Interpretation
    → Uppermost swab stain blue → Vesicovaginal Fistula
    → Lowermost swab stain blue → Urethrovaginal Fistula
    → Swabs wet with urine but not stain blue in colour → Ureterovaginal Fistula (post-surgical)
- Cystocopy
  - Best investigations for VVF

Treatment

- UTI should be treated before surgical repair
- A sample to detect UTI is collected from the catheter
- The timing of surgical repair of VVF is individualized, based on the physical condition of the surrounding tissues
- Surgery
  - Chassar Moir Technique → Fistulous tract is excised
  - Latzko's colposcleisis → Fistulous tract is not excised, suitable for small post hysterectomy fistulas

CONTRACEPTION

00:48:03

- Pearl's Index
  - Number of contraceptive failures per 100 women per year
  - Efficacy of contraceptive method
- Contraceptive method with the least failure rate → Implanon (Progesterone implant)
- Longest acting reversible methods of contraception
  - Mirena
  - CuT
  - Implants
- Tubal ligation is an irreversible method of contraception
- Medical eligibility criteria for contraceptive use
  - Category 1 - Condition for which no restriction on the use of the method
  - Category 2 - Condition where the advantage of using the method outweighs the risks
  - Category 3 - Condition where the risk outweighs the benefit of the method
  - Category 4 - Condition where use of the method is absolutely contraindicated

FMGE 2023
00.51.28

Barrier Method of Contraception

Type of contraception	Image	Description
Condoms		• Protects against STIs and HIV • MC reason for failure → Inconsistent use

Vaginal sponge	Contains Non-oxynol -9	• Prevents against STIs and not against HIV • Cannot be used in females with prolapse • Used along with spermicidal jellies ○ Surface-acting agents to disrupt sperm cell membrane and immobilize the sperm
Diaphragm	Diaphragm	
Cervical cap	Cervical cap	
Vaginal gel - PHEXXI GEL		• FDA approved, not available in India • Non-hormonal, not a spermicidal jelly • Maintains acidic vaginal pH • Immobilize the sperm → Decrease the motility

HORMONAL METHOD OF CONTRACEPTION

00.55.17

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Combined Hormonal Contraceptive (OCPs)

- MOA: Suppression of GnRH → Decreases FSH and LH → Inhibits Ovulation
- OCPs and their association with various cancers
  - Increases the risk of Adenocarcinoma of the cervix and Hepatic adenoma
  - Decreases the risk of Endometrial, Ovarian and Colon cancer
  - No relations with Hepatocellular cancer and Gall bladder cancer
- The risk of breast cancer may be slightly increased with current use

Classifications of OCPs	
Basis: Type of Progesteron	**Basis: Dose of Estrogen**

• 1st generation: Norethindrone/norethisterone
  ○ S/E → androgenic side effects, altered lipid profile, Insulin resistance
• 2nd generation: Levonorgestrel & Norgestral
• 3rd generation : Desogestrel, Gestodene, Norgestimate
  ○ Least androgenic
• 4th generation: Drosperinone, Cyproterone, Dienogest
  ○ Anti androgenic
  ○ Drosperinone is a spironolactone derivative and in addition have antimineralocorticosteroids activity, as a result, weight loss noted
	• Usual dose OCPs : 30 mcg EE + 15 mcg LNG
	  ○ Mala N and Mala D → Ovral
	• Low dose OCPs: 20 mcg EE
	• Ultra low dose: 10 mcg EE
	  ○ Lowest possible dose of estrogen among OCPs

NEET PG 2020
FMGE 2019, 2022

- Absolute Contraindications to OCPs
  - Age >35 years and smoker
  - Migraine with aura
  - Stroke & past h/o venous thrombosis
  - Breast cancer
  - CAD, complicated valvular heart disease
  - Hypertension → uncontrolled/complicated
  - Diabetes with vasculopathy
  - Active liver disease & Decompensated cirrhosis

Progesterone-only Contraceptives (POPs)

- MOA: Progesterone makes cervical mucus thick, alters tubal motility, and makes the endometrium thin
- Cerazette → 75 mcg Desogestrel is the only POPs → which also inhibits ovulation, safe period → 12 hrs
- MC S/E of POPs: Irregular Vaginal bleeding
- Contraindications to progesterone
  - Undiagnosed vaginal bleeding
  - Breast cancer
  - Active liver disease
  - Decompensated cirrhosis

Q. A young woman was prescribed low-dose OCPs for contraception. She returned after 1 month with C/O spotting episodes. She is concerned about the failure of the method. She is counselled all of the following except?

A. She should continue the method

B. With consistent use, no increased risk of failure of the method

C. She should be switched to another method immediately

D. This is most likely to resolve in a few months

Answer: **C**

- MC side effect of progesterone is breakthrough bleeding
- Estrogen prevents breakthrough bleeding
- In low dose OCPs → decreased estrogen → causes break through bleeding

Mala N

- Hormonal OCPs
- 3 weeks → hormonal pill
- 1 week → Iron pill, non-hormonal pill, Ferrous sulphate
- Start within 1st 5 days from LMP, If late start backup method for 7 days
- If one/two 30 mcg EE pills missed or one 20 mcg EE pill missed take one pill as soon she remembers and continue rest as usual
- If three or more 30 mcg EE pills missed or two or more 20 mcg EE pill missed, take one pill as soon she remembers and continue rest as usual + Back up method for 7 days + consider emergency contraception
- If pills are missed in 3rd week finish the hormonal pill, discard non-hormonal pill and start new pack the next day

01:12:11

Injectable Method of Contraception

Depot Medroxy Progesterone Acetate (DMPA)

- Available free of cost → through the Government of India → ANTARA
- MOA: Inhibits ovulation
- Dose: 150 mg IM every 3 months
- Can be given 2 weeks before or 4 weeks after the due date of the injection
- If a female comes after 4 weeks → then pregnancy should be ruled out with backup method of contraception for 7 days
- Avoided in Adolescents and Perimenopausal women due to its S/E of decreased Bone Mineral Density
- It is a contraceptive of choice in
  - Epilepsy
  - Sickle cell disease
- Can be used freely postpartum after 6 weeks
- MC S/E → Irregular Vaginal bleeding
- Return of fertility is 12 months (Maximum - 18 months)

INICET 2022
NEET PG 2019, 2021

Q. Identify the image

Image	Description
	**Implanon** • Contains Etonorgestrel 68 mg • Placed in the medial side of the upper arm • MOA: Inhibits ovulation • The life span of contraception is for 3 years • MC S/E is irregular vaginal bleeding **Nexplanon** • Radio opaque **Capranor** • Biodegradable implant • Efficacy is for 1 year • Contains LNG
 	**NUVA RING** • Vaginal ring → OCPs • 3 weeks on and 1 week off • Safe period: 3 hours
	**EVRA** • Transdermal patches - a total of 3 • 1 patch for 1 week • 3 weeks on and 1 weeks off • Applied to the buttocks, outer arm, lower abdomen • Risk of Venous Thromboembolism with the transdermal patch is absent

Yourwish

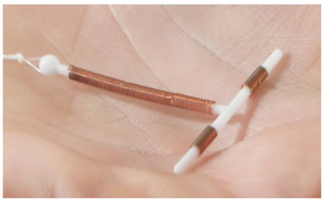
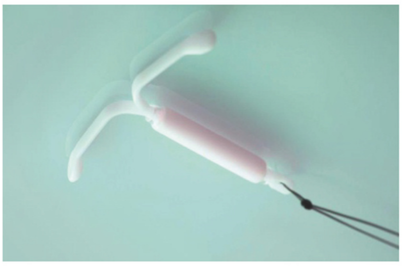
	**ANNOVERA** • One ring for 1 year

INTRAUTERINE CONTRACEPTIVE DISEASE

01.20.00
NEET PG 2022
AIIMS 2018
FMGE 2020

CLASSIFICATIONS OF IUDs

- 1st generation IUCDs → Non medicated IUDs
- 2nd generation → Copper-containing IUDs
  - CuT 380A → Releases copper at rate of 50 mcg/day, effective for the period of 10 years
  - Multiload CuT 375 → Effective for the period of 5 years
- 3rd generation → Hormonal IUDs
  - MIRENA → Contains 52 mg LNG, released at 20 mcg/day, effective for 5 years

	CuT	Mirena
MOA	Inhibition of fertilization > Inhibition of Implantation	Inhibition of Implantation
Inhibition of ovulation	No	No
Failure rate	0.3-0.8%	0.2%
Special point	Can be used as emergency contraception	Used in the treatment of AUB and does not cause weight gain
Image	 	

Q. Which of the following would not be an ideal time for CuT insertion in women?

A. Within 5-7 days of LMP

B. Before 5 to 7 days of the expected period

C. Immediately after placental expulsion
D. Within 48 hrs of postpartum

Answer: **B**

Time of insertion of IUDs
- Interval insertion → Within 5-7 days of LMP
- Postplacental insertion → Within 10 min of of expulsion of placenta
- Postpartum insertion → Within 48 hours of postpartum or after 4-6 weeks only
- Postabortal insertion → IUDs inserted after abortion. E.g: Surgical MTP followed by CuT insertion

ABSOLUTE CONTRAINDICATIONS OF IUDs

INICET 2025
FMGE 2025
NEETPG 2024

- Active genital tract infection
- Current pelvic inflammatory disease
- Genital tract malignancy, Gestational Trophoblastic Neoplasia
- Unexplained genital bleeding
- Suspected pregnancy
- Anatomical abnormalities of the uterus
- Puerperal sepsis, post septic abortion
- Wilson disease → C/I to CuT
- Breast cancer → C/I to Mirena

Important Information
- Past H/O PID or ectopic is not a C/I to IUDs
- HIV infection is not a C/I to IUDs

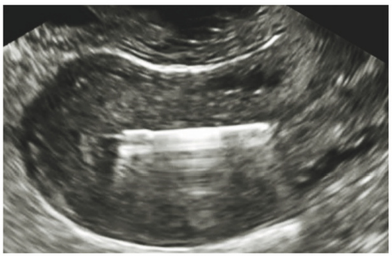
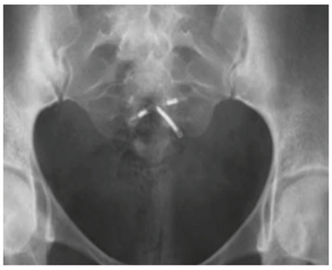
Side Effects of IUDs
- Bleeding (most common) > Pain
- Infections
  - Most infections occur within 3 weeks of insertion
  - Ascending infections from the genital tract
  - Mostly polymicrobial
  - Most typical infection → Actinomyces
  - Routine antibiotics during insertion are not recommended
- Perforation
  - 1 in 1000 cases
  - Occurs mostly during insertion

Q. A woman had a CuT inserted 3 months ago. Her youngest child is 6months old , and she is breastfeeding the baby. On routine check up, the threads are not seen on per speculum examination. USG is done and shows that the CuT is in the correct position within the uterus. What advice do you give?
A. Reassure and leave the CuT in place
B. Remove and reinsertion of CuT
C. Hysteroscopic removal of CuT

D. Removal of CuT after cervical dilatation

Answer: **A**

H/O CuT insertion and Thread not seen

SWEEP THE ENDOCERVIX WITH A CYTOBRUSH

↓

USG Pelvis

- CuT not seen in uterus
  ↓
  X Ray abdomen and pelvis
  - CuT seen- Laparoscopic removal
  - CuT not seen- Expelled already
- CuT seen in uterus
  ↓
  Try hooking out with CuT hook
  If embedded in myometrium then needs Hysteroscopic removal

Q. A 30 year old P2L2woman is pregnant with CuT in situ. USG shows 6 weeks healthy intrauterine pregnancy. On per speculum examination, the CuT threads are seen. What is the next step?

A. Remove the CuT

B. MTP

C. Continue the pregnancy with CuT in situ

D. Remove the CuT and proceed with D & C

Answer: **A**

Pregnancy with CuT in SITU

1st **step** - USG Pelvis , USG shows intrauterine pregnancy

Desired pregnancy

- **Threads seen**
  Remove CuT
- **Threads not seen**
  If CuT in cervix, remove after counselling If CuT above cervix- do not remove but counsel

Undesired ⟶ MTP

If surgical MTP
Remove CuT in same setting and proceed
If medical MTP
Remove CuT and prescribe the drugs

- Complications of CuT in situ
    - Abortion
    - Pre-term labour
        → Infections
        → PPROM
- If CuT is not seen

Placental examination during delivery
↓
No CuT
↓
X-ray abdomen and pelvis after pregnancy over

Q. A woman comes with the complaints of foul-smelling discharge from the vagina. She has H/O CuT insertion done 1 year ago. Her cycles have been regular with normal flow. On P/S exam, the CuT thread is seen, there is purulent cervical discharge. On P/V, the uterus is normal size and non-tender, B/L Fornices are free and tenderness present. Her pregnancy test is negative. What is the most appropriate management?

A. Remove the CuT
B. Start antibiotic treatment
C. Remove CuT & then start antibiotics
D. USG Pelvis

Answer: **B**

- Clinically PID → Start antibiotic treatment → if no response in 24-48hrs → then remove CuT

Emergency Contraception

01:46:41
NEETPG 2018, 2020

LNG PILL

- Available as I-pill, Ezzy pill
- MC used emergency contraception and available as over the counter
- Dose of 1.5 mg used within 72 hrs of unprotected intercourse
    - After taking the pill- Abstinence/contraception for next 7 days
- MOA: Delays ovulation

CuT

- Most effective emergency contraception
- Inserted within 5 days of unprotected intercourse
- MOA: Inhibition of fertilization > Inhibition of Implantation

ULIPRISTAL ACETATE

- Available as Ella
- Most effective hormonal contraception
- Dose of 30 mg used within 120 hrs of unprotected intercourse

OTHERS

- OCPs → YUZPE

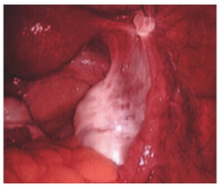
- Mifepristone
- Centchroman
  - 2 tablets of 60 mg taken within 24 hrs of unprotected intercourse and after an interval of 12 hrs another 2 tablets of 60 mg taken

Tubal Ligation

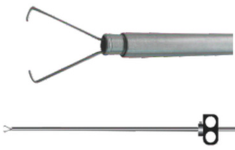
01:50:35

INICET 2020, 2022
FMGE 2019

- Guidelines for tubal ligation
  - Client should be ever married
  - Age of woman >22 years
  - Woman should have at least 1 child, at least 1 year old
  - Consent of spouse is not mandatory
- Interval ligation ideally within 7 days of LMP → MC by Laparoscopy
- Postpartum tubal ligation within 7 days of delivery → By Minilap, Technique used is Modified Pomeroy's
- Post abortal tubal ligation
  - Surgical MTP → Ligation done immediately or within 7 days of MTP
    - → 1st trimester MTP → Laparoscopy
    - → 2nd trimester MTP → Minilap
  - Medical MTP → Ligation done after the next cycle
- Tubal ligation after C section can also be done
- Site → Isthmus
- Falope ring is placed over isthmus by Laparoscopic ring applicator

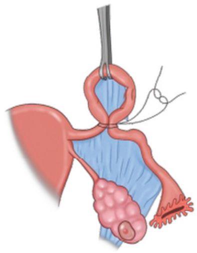


Falope ring



Laparoscopy Ring applicator

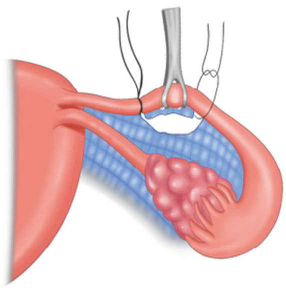
- Technique
  - Modified Pomeroy's
    - → The Fallopian tube is ligated at the isthmus with absorbable plain catgut, and tube is cut
    - → Failure rate is 0.4%



Important Information

- Pomrey's uses Chromic catgut as the suture material

  - Parkland's method
    - → The Fallopian tube is ligated
    - → Mesosalphinx is cut
    - → Failure rate is 0.2%
  - Irving's and Uchida
    - → Extra steps taken to burry proximal tubal stump



Yourwish

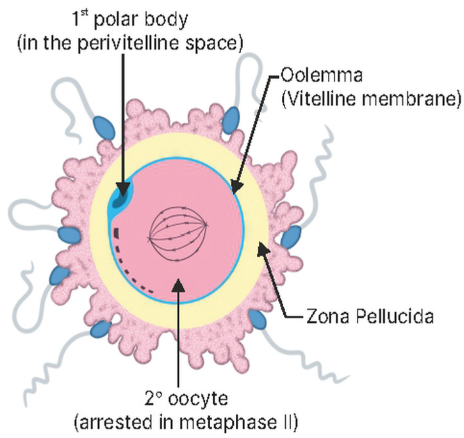
8. OBG BASICS

BASICS OF CONCEPTION

00.01.22

Fertilisation

- Site of fertilization: Ampulla of tube
- Sperm binds to Zona pellucida (via ZP3 Receptor), triggers Acrosome reaction
- Sperm penetrates ZP & binds to oocyte membrane via fertilin protein on sperm head
- Binding of sperm to oocyte membrane leads to resumption of Meiosis II
- Cortical reaction occurs & triggers Zona reaction (Zona hardens), preventing polyspermy



Q. What is the typical time between fertilization and implantation in human reproduction?

a. 2 days

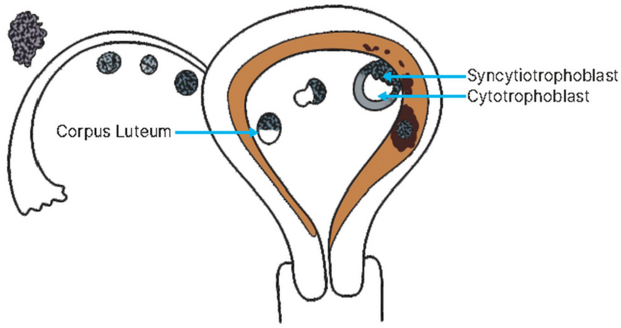
b. 8 days

c. 14 days

d. 16 days

Answer: b. 8 days

- Zygote formed after fertilization undergoes 1st cleavage 30 hrs after fertilization.
- Progesterone increases the tubal secretions, which are rich in pyruvate; nourish the zygote → progesterone decreases the tube motility
- The 8-celled morula enters the uterine cavity on the 4th day of fertilization.
- Zona Hatching: Occurs around D5
- Blastocyst implants on D6 - D10 of fertilization.
- Window of implantation: D20 - D24 of the cycle.
- Trophoblast differentiates into Syncytiotrophoblast (Produces hCG) and Cytotrophoblast.
  - hCG (Human Chorionic Gonadotropin) from syncytiotrophoblast acts to support the Corpus Luteum of pregnancy → Progesterone



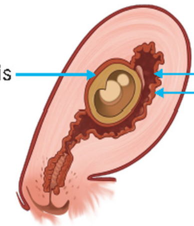
NEETPG Aug 2024

Implantation

- M/c site: Upper posterior wall of uterus
  - The invasiveness of trophoblasts is responsible
- The stages of implantation:

Stage	Molecule Involved
Apposition	Selectins
Adhesion	Integrins
Invasion	MMPs

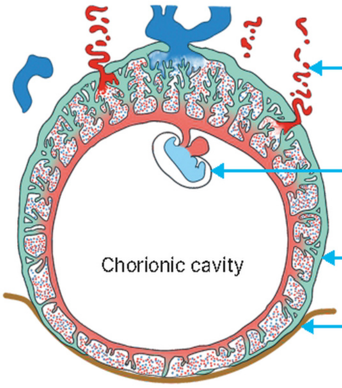
- Hormone preparing the endometrium for implantation: Progesterone
- Predominant histological finding in endometrium: Stromal edema
- In humans, it is interstitial implantation (completely covered by the endometrium)
- Decidua formation is completed by Day 10 of fertilization
- Hormone responsible for decidualization of endometrium: Progesterone
- Bleeding during implantation: Hartmann's sign
- Decidua differentiates into:
  - Decidua capsularis
  - Decidua basalis
  - Decidua parietalis
- The D. parietalis and D. capsularis fuse to form the Decidua vera.



- The placenta develops from the decidua basalis & chorion frondosum.
- The decidual space is obliterated by 14-16 weeks.
- The fetal membranes consist of the Amnion & chorion laeve.
  - Amnion
    - Derived from fetal ectoderm.
    - It is avascular.
    - Responsible for tensile strength.
    - Rich in Collagen.
    - Synthesizes PGE_2 & fetal fibronectin.

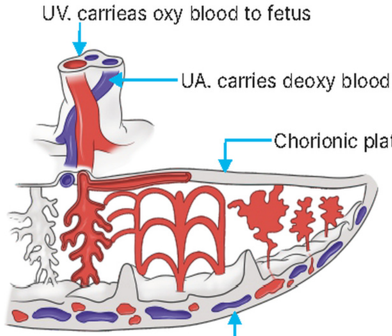
Important Pointers

- Lacuna appears in D12 of fertilization, filled by maternal blood & uteroplacental circulation is established by D15 of fertilization.
- Fetal vessels in chorionic villi become functional by D17 of fertilization & connect to the main fetal circulation to establish fetoplacental circulation by D21 of fertilization
- The final chorionic plate forms at 8-10 weeks of gestation
- Extravillous cytotrophoblasts (endovascular) invade the spiral A., leading to vascular remodeling in the region of d. Basalis completed by ~16 wks.
  - This is defective in pre-eclampsia.



Placenta

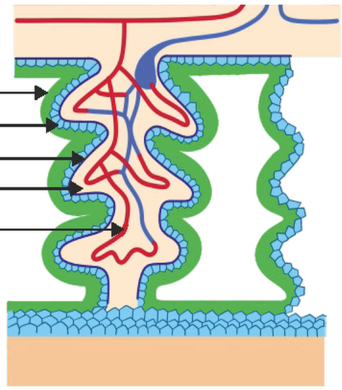
- Discoidal shape & deciduate, weighs 500 gm
- Contains 500 ml of blood (150 ml in IVS)
- Placenta weight: fetal weight at term is 1:6
- Placental weight = fetal weight at 17 wks
- Physiologically functional unit of placenta: Lobule (Cotyledon)
- Protective connective tissue covering of umbilical cord: Wharton's jelly
- Left umbilical vein carries oxygenated blood to the fetus
- The umbilical artery carries deoxygenated blood to the placenta



- Uteroplacental circulation at term: 700 - 900 ml/min.
- Fetoplacental circulation at term: 400 ml/min.
- O_2 saturation in intervillous space: 65 - 75% & partial pressure of O_2 30 - 35 mm Hg.
- O_2 saturation in the umbilical vein is similar & slightly lesser partial pressure, and HbF has a greater affinity for O2, which ensures O_2 delivery to the fetus.
- O_2 delivery to fetus at term is ~8 ml/min/kg

Placental Barrier

- The placental barrier is composed of the following layers (from maternal to fetal):
  - Syncytiotrophoblast
  - Cytotrophoblast
  - Basement membrane
  - Mesenchyme
  - Basement membrane & endothelium of fetal capillaries



- Nitabuch layer: The zone of fibrinoid necrosis that prevents deeper penetration of the placenta into the uterus.
- The apparent continuity of the cytotrophoblast layer is lost by 16 weeks; it is scant or absent at term
- Cytotrophoblast is also known as the Langhans cell layer
- Hofbauer cells are fetal macrophages present in the mesenchyme.
- Hemochorial placenta: Maternal blood in the IVS (Intervillous Space) is in direct contact with the syncytiotrophoblast.

Prevention of Fetal Rejection

- The following mechanisms help prevent the mother's immune system from rejecting the fetus:
  - Villous trophoblasts lack MHC molecules.
  - Extra-villous cytotrophoblasts express only MHC class Ia molecules & HLA G.
  - Immunomodulated state of pregnancy:
    - Th2 >> Th1 cytokines → Suppressed cytotoxic immunity by Th1
    - Pregnancy hormones play a role in suppression.
  - Decidual NK cells (Natural Killer cells).

hCG

- Type: Glycopeptide hormone
- Half-life: 24 hours
- Produced by: Syncytiotrophoblast
- Primary Function: Maintains the corpus luteum in pregnancy.

Yourwish

- Physiological Actions
  - Fetal: Stimulates fetal testes to produce testosterone, which leads to male genital differentiation.
  - Maternal: Stimulates the maternal thyroid gland.
- Detection Timelines:
  - In Maternal Serum: First detected 8 days after fertilization (approx. Day 22 of the cycle).
  - Urine Pregnancy Test (UPT) becomes positive as early as the day of the missed period (reaches approx. 100 IU/L; UPT sensitivity is at least 25 IU/L).
    - Order of Sensitivity: FIA > RIA > ELISA (ELISA is used for UPT).

Conditions with High hCG	Conditions with Low hCG
• Multiple pregnancy • Molar pregnancy (Hydatidiform mole) • Gestational Trophoblastic Neoplasia (GTN) • Erythroblastosis fetalis • Trisomy 21 (Down Syndrome)	• Failing Intrauterine Pregnancy (IUP) / Abortion • Ectopic Pregnancy • Trisomy 18 (Edwards Syndrome)

- Hormone that decreases after 1^{st} trimester: hCG
  - Doubling time of hCG: 1.4 - 2 days in a healthy intrauterine pregnancy
  - Peak hCG levels at: 8 - 10 wks (60 - 80 days) ~ 1 lac IU/L
  - Plateau at: 16 wks (~ 10,000 IU/L)
  - Normalize: 2 wks after delivery
  - In case of abortion, normalisation occurs by 3-4 weeks after abortion

HPL

- Hormone produced in maximum amount by term placenta (~ 1 g/day): HPL (exclusively by placenta)
- Polypeptide hormone secreted by syncytiotrophoblast
- Half-life: ~ 15 min, structurally similar to GH
- HPL 1st detected in maternal serum: 3 wks post fertilisation
- Role: insulin resistance in pregnancy, promote lipolysis
- Levels of HPL reflect placental well-being

Progesterone

- Placenta lacks 17 alpha hydroxylase activity but has 3β HSD & aromatase activity.
- Raw material for progesterone production by placenta: LDL-cholesterol from maternal blood
- Placenta takes over progesterone production as early as 8 wks (Definitely by 10 wks)
- If the corpus luteum is removed before 7 weeks leads to pregnancy loss
- Progesterone from the placenta → Substrate for fetal adrenal gland production of corticosteroids.

Estrogen

- Raw material for estrogen production by the placenta: fetal adrenal DHEA-S
- Estrogen produced in the greatest amount: Estriol
- Estriol 1st detectable in maternal serum: 9 weeks of gestation
- Estrogen in maximum concentration in maternal blood: Estradiol
- Estrogen specific to pregnancy: E4 > E3

Corpus Luteum of Pregnancy

- The CL of pregnancy secretes: (Later also secreted by the placenta).
  - Estrogen (E)
  - Progesterone (P) — Inhibits LH; ovulation is suppressed.
  - Inhibin A — Inhibits FSH; follicle growth is suppressed.
    - Result: Amenorrhea in pregnancy.
  - Relaxin

Relaxin

- Protein hormone:
  - Relaxes smooth muscle in the myometrium
  - Renal vasodilation (leads to increased Renal Blood Flow).
  - Remodel of the reproductive tract.
  - No role in peripheral joint laxity.

Q. A 26-year-old woman comes to the clinic with amenorrhea for 2 months, breast tenderness, nausea, and increased frequency of micturition. On clinical examination, there is the presence of linea nigra on her abdomen and bluish discoloration of the vagina. What is the most likely clinical interpretation of these findings?

a. Probable pregnancy

b. Presumptive pregnancy

c. Confirmed pregnancy

d. Normal premenstrual

Answer: a. Probable pregnancy

- Probable pregnancy
  - Uterus enlargement/ballotment
  - Various signs
  - +ve hCG
- Confirmed pregnancy
  - Palpation of fetal parts
  - Auscultation of Fetal Heart Sounds
  - USG confirmation

PHYSIOLOGICAL CHANGES IN PREGNANCY

00.36.10

INICET May 2023

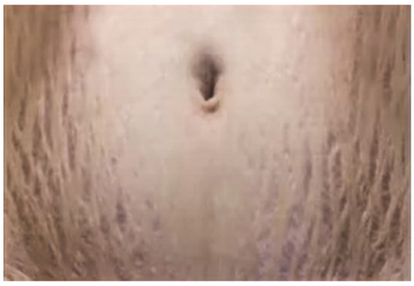
- Non-pregnant state: Weight is 70 gm; volume of cavity is 10 mL.
- At term: Pregnant uterus weighs about 1100 gm; volume of cavity is ~5 L.
  - Growth of the pregnant uterus is mainly due to myometrial hypertrophy > hyperplasia.
- Round Ligament Pain: Pain in the groin, mostly in the 2nd trimester, especially with sudden jerky movements.

- Clinical Signs

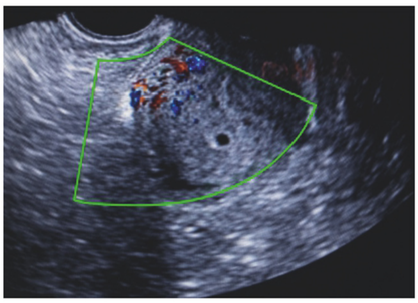
Osiander Sign	• Increased flow in uterine arteries, pulsations felt through lateral vaginal fornix.	Appear by 8 weeks
Chadwick (Jacquemier) Sign	• Bluish hue of the vagina and cervix.	
Palmar sign	• Rhythmic uterine contractions	
Piskacek's sign	• Lateral implantation and unequal enlargement of uterus	
Goodell Sign:	• Softening of the cervix.	Appear by 6 weeks
Hegar Sign	• Softening of the isthmus.	

Important Pointers

- FHS can be heard by a hand-held Doppler as early as 10 weeks & by an ordinary stethoscope earliest, by 18 - 20 weeks.
- Soft, blowing sound heard over the sides of the uterus, produced by blood flow across the dilated uterine artery, is Uterine souffle → Synchronous with maternal pulse.
- Funic souffle, synchronic with FHR, is produced by blood flow across the umbilical artery

 Linea nigra	 Striae gravidarum
Linea nigra: Dark vertical line on abdomen	Stria gravidarum: Stretch marks on abdomen

- Pigmentary changes over forehead, nose & malar area: Chloasma / Melasma
- Pigmentary change in the breast appears as 2° areola
- Hypertrophied sebaceous glands in breasts: Montgomery tubercles

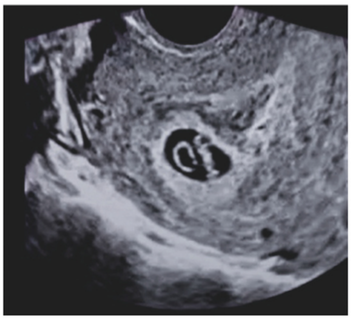
		

Yourwish

Intradecidual sign → Gestational sac	True gestational sac → Double decidual sac sign (Decidua capsularis and parietalis)	Double Bleb sign → Yolk sac inside gestational sac

USG Diagnosis of Pregnancy

- Earliest finding of IUP: Gestational sac
  - True gestational sac: Eccentric in location, smooth & DDSS +ve
- Earliest most definitive sign of intrauterine pregnancy: Double Bleb sign
- Gestational Sac
  - Seen earliest on TAS by 5 weeks.
  - On TVS: 4 weeks 1-3 days
- Cardiac Activity
  - Seen earliest on TAS by 6-7 weeks.
  - On TVS: 5.5-6 weeks



Double bleb sign

Q. To meet the demands of a growing fetus, approximately 15% of maternal cardiac output is directed towards the uterus, and blood volume increases. What contributes to the increase in blood volume during a woman's pregnancy?

a. Increased fluid retention by the kidneys

b. Aldosterone and Estrogen

c. Aldosterone and ADH

d. Both A & B

Answer: d. Both A & B

- RAAS system is stimulated by Estrogen.
  - Angiotensinogen levels are increased by Estrogen.
- Progesterone causes Angiotensin refractoriness to the pressor effects → vasodilation → decreases blood Pressure.

MATERNAL ADAPTATION TO PREGNANCY

00.51.38

Hematological Changes

- Blood volume: Increased by approximately 40-50%.
- Plasma volume: Significantly increased
- RBC mass: Increased
  - Estrogen-related effect → increase in erythropoietin production.
- Water retention: Approximately 6 liters total.
- Hemodilution: Occurs due to the disproportionate increase in plasma volume compared to RBC mass.
- O_2 carrying capacity: Increases.
- O_2 consumption & BMR: Increased by approximately 20%.

Cardiovascular Changes

- Cardiac Output, Heart Rate, Stroke Volume: All are increased
- Cardiac Output (CO): Increases by approximately 40-50%.
  - Starts increasing by ~5 weeks.
  - Peaks at 28-32 weeks

Yourwish

  - Returns to normal by 10 days of delivery
  - Ejection fraction, CVP, and PCWP remain the same
- Maximum cardiac output / Maximum risk of heart failure:
  - Immediate postpartum > Intrapartum > 28-32 weeks.
- Dizziness during pregnancy, most around the late 2nd trimester: BP falls
  - Nadir ~24-26 wks
- Peripheral vascular resistance: Decrease
- Cardiac output is lower at term, particularly in the supine position, d/t compression of the IVC by the gravid uterus: Supine hypotension syndrome
  - Left lateral position is best: CO and Placental perfusion are better
  - Hence, during LSCS left lateral tilt is maintained or a wedge under the right hip
- Physiological edema in pregnancy d/t venous pooling in lower limbs, compression of iliac veins by the gravid uterus & hypoproteinemia
  - Protein concentration decreases due to increased plasma volume, but total protein amount increases
- Cardiovascular findings:

Normal	Should be Evaluated
• Apex beat in 4th ICS lat. to mid-clavicular line • Straightening of left heart border • Loud heart sounds • Exaggerated split S1, S3 • ESM (Ejection Systolic Murmur) up to grade 3 • Slight left-axis deviation on ECG • Mammary murmur: Continuous sound due to increased blood flow to the breast vasculature.	• Any cardiomegaly • Any diastolic murmur • ESM grade 3 / more • Split S2, presence of S4

Respiratory Changes

Increases- Progesterone stimulates respiratory center	Decrease	No change
• Increased awareness of breathing. • Tidal volume. • Minute volume • Inspiratory Capacity • Diaphragm rises ~4cm, causing respiratory discomfort.	• Residual Volume. • FRC • ERV • Airway Resistance: Unchanged or slightly lower	• Respiratory Rate • VC. • Lung Compliance

- Breathlessness → Abnormal
- Acid-Base Balance
  - Pregnancy is a state of compensated Respiratory Alkalosis.
  - Kidneys increase HCO_3 excretion.
  - Serum HCO_3 levels: Slightly lower
  - Blood pH: Within Normal Limits (WNL), but on the slightly higher side (alkalotic).

Renal

- Increased frequency of micturition, polyuria & nocturia because of ↑ RBF & GFR
- Serum creatinine & uric acid decrease
- Glucosuria: May not be abnormal; check blood sugar
- Significant proteinuria >= 300 mg/day
- S. creatinine >= 0.9 mg/dl alert to the possibility of renal pathology.
- Ureteral compression by gravid uterus (R > L) & progesterone-mediated smooth muscle relaxation → Hydroureteronephrosis
- Increased predisposition to UTI in pregnancy:
  - Asymptomatic bacteriuria, detected on Urine Culture: > 10^5 CFU/ml
  - Incidence ASB 5-7%, same as in non-pregnant
  - But the chances of becoming symptomatic are more
  - DOC (Empirical): NITROFURANTOIN

Coagulation Profile

- Pregnancy is a hypercoagulable state.
- All clotting factors increase except factors XI & XIII
- Increase in fibrinogen of ~50%, leads to ↑ ESR
- Platelet count decreases & TLC increases.
- aPTT, PT, BT & CT are WNL
- During pregnancy, there is APC resistance; Protein S & Antithrombin levels are lower.

GIT

- Heartburn, constipation & decreased gall bladder contractility.
- AST & ALT levels: Lower
- ALP levels ↑ (due to placental ALP).
- Gastric emptying time is unchanged during pregnancy but decreased in labor; therefore ♀ in active labor is put on clear fluids.

Anaemia

- Total iron requirement in pregnancy: 1000 mg
  - 300 mg for fetus & placenta
  - 500 mg for RBC mass
- Daily iron requirement in the 2^{nd} half of pregnancy: 6-7 mg/day
- Routine Oral Iron & Folic Acid Supplementation in Pregnancy (Anemia Mukt Bharat Scheme)
  - 60 mg of elemental Iron + 500 mcg of FA (Folic Acid)
  - For 180 days in antepartum & 180 days in postpartum
  - Start from the 2nd trimester (14 weeks onwards)
- Physiological Anemia
  - Starts: 7-8 wks
  - Peaks: 32 wks
  - Hb concentration & Hematocrit: Decreased
  - S. Iron: Decreased
  - S. ferritin: Decreased
  - TIBC: Increased

- MCV: ↑ minimally
- MCHC: Same
- RBC production ↑ → Iron Absorption ↑ → Fe stores mobilized
- Even in severe Fe deficiency, the fetus is not anemic

- Pregnancy is a diabetogenic state; insulin resistance increases as pregnancy advances.
- There is postprandial hyperglycemia & fasting hypoglycemia.
- Pregnancy is a state of accelerated starvation; FFAs lipolysis is increased (hPL) as pregnancy advances (glucose diverted to fetus).
- Prolonged fasting & excessive vomiting lead to ketosis & ketonuria.
- There is increased calcium absorption from the gut, and increased 1,25 Vit D levels
- Total serum calcium concentration decreases
  - Ionized calcium remains the same.
  - Bound form of calcium (to albumin) decreases

Thyroid

- Thyroid hormone & TBG production from the liver → Increase
- Fetal thyroid hormone production starts by ~12 wks
- TT4 & TT3 → Increase
- fT3 & fT4 → Same
- TSH is lower than non-pregnant levels but WNL.
- Upper reference limit for S. TSH during pregnancy:
  - 1st trimester: 2.5 mIU/L
  - 2nd & 3rd trimester: 3.0mIU/L
- Any goiter in pregnancy is abnormal, hence evaluated.
- Hypothyroid on levothyroxine Tx: Increased dose, as needed
- Other Glandular Changes:
  - Pituitary gland size & spleen size: Increase
  - Adrenal gland size is unchanged, but cortisol production increases

NAUSEA & VOMITING IN PREGNANCY (hCG)

01.22.18

- Timeline: Peaks at around 8-10 weeks and subsides for most by ~16 weeks.
- Exacerbated with: Multiple & molar pregnancy, hyperthyroidism, DM, GERD.
- Management:
  - Mild cases: Diet adjustment.
  - 1st line drug: Doxylamine + Pyridoxine (Vit B_6).
  - 2nd line: Promethazine, Metoclopramide, Ondansetron.
  - If hospitalized, use parenteral antiemetics, IV fluids & electrolyte replacement, with thiamine (B_1).
    - Deficiency of Vit B_1: Wernicke's encephalopathy.
- Hyperemesis Gravidarum: A more severe form characterized by:
  - Weight loss
  - Dehydration
  - Alkalosis followed by acidosis
  - Hypokalemia
  - Ketonuria & Ketosis

CALCULATION OF OBSTETRIC SCORE

01.25.55
NEETPG 2021, 2023

- G - Gravida refers to the number of pregnancies, irrespective of outcome
- P - Parity refers to the number of pregnancies in the past that crossed 20 weeks
- L - Number of living children
- G - Gravida
- T - Term deliveries
- P - Preterm deliveries
- A - Abortions
- L - Living children

- Case Study 1:
  - A pregnant woman is seen in the OPD. She has h/o a vaginal delivery at 8 months in her 1st pregnancy, 5 years ago, the child died after 7 days. This was followed by a normal vaginal delivery at term 2 years back, and the child is healthy.
    - Obstetric Score: $G_3 P_2 L_1$
    - GTPAL formula: G_3 P(1-1-0-1)

- Case Study 2
  - A woman is pregnant for the second time. She has h/o twin vaginal delivery at 8 months in her 1st pregnancy, 5 years ago; both children are healthy.
    - Obstetric Score: $G_2 P_1 L_2$
    - GTPAL formula: G_2 P (0-1-0-2)

CALCULATION OF EDD

01.28.54

- EDD (Estimated Date of Delivery) corresponds to ~280 days (40 weeks).
- ~5% of women deliver exactly on EDD.
- Term: 37 weeks to $41^{6/7}$ weeks.
- Post term: Beyond 42 completed weeks.
- Preterm: < 37 weeks.
- Early preterm: < 34 weeks.
- Late preterm: 34 - $36^{6/7}$ weeks.
- Naegele's Formula
  - Formula: Add 9 months + 7 days to 1st day of LMP (based on a 28-day cycle).
  - Shorter cycles: Subtract extra days.
  - Longer cycles: Add extra days.
    - Example Calculation: LMP: 10th Apr 2025, Cycle length: 32 days (4 days longer than standard 28 days)
      -Standard EDD: 17th Jan 2026
      -Corrected EDD: 21st Jan 2026 (17th + 4 days)
- EDD in IVF Cycles
  - For EDD calculation in IVF cycles, the date of Embryo Transfer / Oocyte retrieval is needed.
    - Fresh ET / Oocyte Retrieval: Date of fertilization (retrieval) + 266 days.
    - Frozen ET: Calculation varies based on the age of the embryo at transfer

Yourwish

Q. A G2P1L1 woman is seen in ANC OPD with 3 months of amenorrhea. Her UPT is positive. She is unsure about her LMP as she has been having irregular cycles over the past 2 years. She is breastfeeding her baby and is not using any contraceptives. The uterus is not palpable on abdominal exams. You order a TVS. Which parameter on USG will help you best date her pregnancy?

a. Biparietal diameter
b. Head circumference
c. Crown rump length
d. Mean Gestational sac diameter

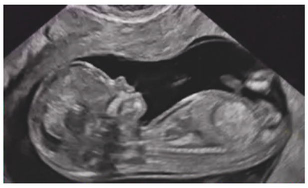
Answer: c. Crown rump length

- Crown rump length can be done till 14 weeks.
  - Most accurate 7-9 weeks of gestation
- Calculation of LMP is reliable only if:
  - The woman is sure of LMP
  - Menstrual cycles are regular
  - No use of hormonal contraceptives 6 months prior to LMP

GESTATIONAL AGE ESTIMATION

01.36.56

- Best parameter to be done in 1st trim: CRL (Crown-Rump Length)
- After 14 weeks in 2nd trim: BPD (Biparietal Diameter)
- In 3rd trim: FL (Femur Length)
- The earlier the scan is done, the more accurate it is for gestational age estimation.
- Single most accurate parameter for fetal growth: AC (Abdominal Circumference)
- Targeted Imaging For Fetal Anomalies (TIFFA)
  - Level II Scan done between 18 - 20 wks - Routine



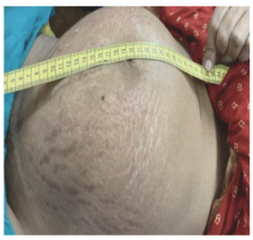
Q. A 28-year-old, unbooked primigravida is seen in emergency at 8th month gestation with c/o decreased fetal movements for 4 days. She is unsure of her dates. There is no c/o of abdominal pain, bleeding, or leaking P/V. Her vitals are stable. On P/A exam, the FH corresponds to 28 weeks & the FHS cannot be localized on the stethoscope. What investigation would you like to do next?

a. USG for fetal well-being.
b. Biophysical profile
c. NST
d. Amniotic Fluid Index

Answer: a. USG for fetal well-being.

Important Pointers

- ANC Visits Guidelines
  - Government of India recommends: Minimum 4 ANC visits.
  - WHO recommends: 8 antenatal contacts.
- Fundal Height Landmarks
  - FH just above the pubic symphysis: 12 weeks
  - Midway between PS & umbilicus: 16 weeks
  - At the level of the umbilicus: 24 weeks
  - At the level of xiphisternum: 36 weeks
  - Term size uterus 37+ weeks (with flanks full)



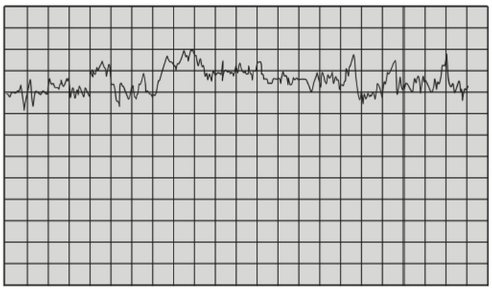
- Between 24-36 weeks, SFH (Symphysio-Fundal Height) in cm corresponds to gestational age in weeks.

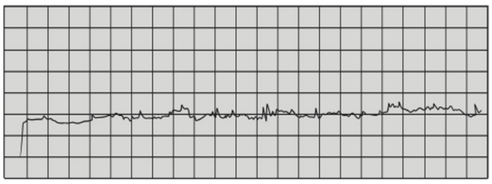
FH > POG (Uterus larger than dates)	FH < POG
• Wrong Dates (Most common) • Full bladder • Molar pregnancy • Multiple pregnancy • Polyhydramnios	• Fetal growth restriction (IUGR) • Fetal death • Transverse lie • Oligohydramnios
1st line Investigation: USG (Ultrasonography) is the gold standard to confirm findings.	

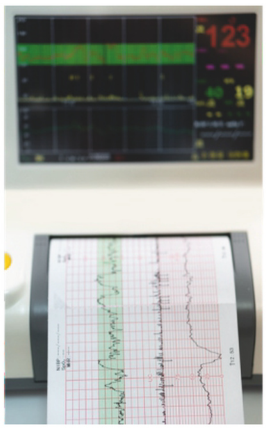
ANTEPARTUM FETAL SURVEILLANCE

01.43.56
FMGE Jan 2025
INICET Nov 2022

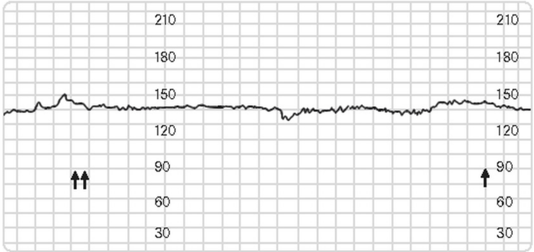
- Fetal Movement Monitoring
  - Cardiff Count-to-10: 10 movements in 2 hours is reassuring.
  - Quickening is the 1st perception of fetal movements by the mother. Occurs for most women by 20 weeks (5th month).
- Cardiotocography (CTG): NST Parameters
  - Baseline FHR (Fetal Heart Rate): 110-160/min
  - BTB Variability (Beat-to-Beat): Normal is 5-25 bpm.
    - Indicates the maturity of the Autonomic Nervous System
  - Generally done beyond 32 weeks.
- Reactive Non-Stress Test (NST)
  - A "Reactive" NST is defined by the following criteria:
    - At least 2 accelerations in 20 min.
    - Each acceleration must be >15 bpm (above baseline).
    - Lasting for at least 15 sec.
  - Clinical Significance
    - A Reactive NST indicates that the fetus is not acidotic and not neurologically depressed.







Q. Primigravida at 37 weeks presents with the c/o decreased fetal movements. There is no h/o abdominal pain, leaking, or bleeding P/V. P/A exam shows the uterus is term size and relaxed. NST is done, and the strip is shown below. What is the most appropriate next step?



a. Immediate induction of labor
b. Immediate cesarean section
c. Perform NST for 40 min
d. Follow up in OPD after 1 week

Answer: c. Perform NST for 40 min

- NST Strip: Shows a fetal heart rate baseline around 130-140 bpm with minimal variability and an absence of accelerations.
- The rationale for the answer is that a fetal sleep cycle can last up to 40 minutes. Therefore, an initially non-reactive Non-Stress Test (NST) should be extended to at least 40 minutes before being classified as truly non-reactive and proceeding to further biophysical profile (BPP) testing or delivery.
  - Biophysical Profile (Manning Score): Components
    - Fetal Breathing
    - Gross body movement
    - Fetal Tone
    - Amniotic fluid volume (2 x 2 cm pocket)
  - Scoring and Interpretation
    - Score 10/10 or 8/10: Reassuring
    - Score 6/10: Equivocal → Repeat again
    - Score <= 4/10: Plan for delivery
- Overall sensitivity of BPP to predict cord blood pH & fetal acidemia is poor.
- Modified Biophysical Profile: includes two specific parameters:
  - NST: Indicates the acute status of the fetus.
  - AFI (Amniotic Fluid Index): Indicates the chronic status

IMMUNIZATION IN PREGNANCY

01.53.43

- Routinely given: Td / TT vaccine
  - 1st dose - Early in pregnancy
  - 2nd dose - At least 4 weeks later
    - Dosage/Route: 0.5ml / IM (Intramuscular)
  - If subsequent pregnancy within 3 years: Booster
  - ACOG recommends Tdap in every pregnancy irrespective of prior vaccination, one dose preferably between 27-36 weeks.
- Other Recommended Vaccines: Inactivated influenza vaccine (one dose IM) & Covid-19 vaccine are also recommended for pregnant women.

Vaccines Contraindicated (C/I)	Vaccines That Are Safe

• MMR
• Varicella
• Live influenza
• Polio, Cholera, Typhoid
• Conditional:
  ○ Yellow fever
  ○ Japanese encephalitis
	• Hepatitis A & B
	• Pneumococcal & meningococcal inactivated vaccines
	• Postexposure rabies vaccine

- Generally, live vaccines are contraindicated during pregnancy, while inactivated vaccines are considered safe or recommended based on risk-benefit analysis.
  - YF and JE can be given if travelling to endemic countries
- MMR vaccine
  - Ideally given in pre-pregnancy to prevent rubella
  - Avoid conception for 1 month at least after pre pregnancy dose
  - If accidentally given to pregnant women: Not an indication for MTP
  - Susceptible females are vaccinated postpartum.

Yourwish

9. EARLY PREGNANCY COMPLICATIONS

ABORTIONS

00:00:40

- Pregnancy loss before 20 weeks or a fetus weighing <500 gm
- The overall incidence of spontaneous abortion is 10-15%, with the majority occurring in the 1st trimester.
- MCC of spontaneous abortion: Embryonic chromosomal abnormalities
  - 50% in the 1st trimester and 30% in the 2nd trimester
  - MC chromosomal abnormalities: Aneuploidy > trisomies > T-16 > Monosomy X
  - MC trisomy is responsible for abortions: Trisomy 16
  - MC individual anomaly: Monosomy X
- The most important risk factor is women's increasing age
- Structural uterine anomalies typically cause 2nd-trimester abortions:
  - Congenital (septate, bicornuate uterus)
  - Acquired (submucosal fibroids, uterine synechiae)
  - Cervical incompetence

Clinical Presentation of Abortion

	Threatened	Inevitable	Incomplete	Complete
Symptoms	Mild	BPV+ Pain+	BPV+, pain+	H/o BPV and pain now stopped, passage of fresh mass
Vitals	Stable	Stable/Unstable	Stable/Unstable	Stable/Unstable
Uterus size	~Period of gestation	~Period of gestation	<Period of gestation	<Period of gestation
Cx OS	Closed	Opened	Open os/closed OS	Closed
TVS	Embryo/ fetus inside	Embryo/fetus inside	Products in vagina/ RPOC +	The uterus is empty
Mx	Conservative	Left in progress. Intervene if needed	Evacuation of the uterus	No evacuation

Q. A 32-year-old G2A1 presents with 8 weeks of amenorrhea, light P/V bleeding, and pain in the lower abdomen. On the P/S exam, the OS is closed. TVS reveals a single live intrauterine pregnancy corresponding to 8 weeks of gestation with a small subchorionic bleed. What is the preferred management?

A. Dilation and curettage

B. Misoprostol

C. Bed rest and progesterone

D. Beta HCG injection

Ans: C. Bed rest and progesterone.

- Diagnosis: Threatened abortion
- Subchorionic bleed- Bleeding into the decidua basalis
- Avoid exertion and intercourse
- Vaginal micronized progesterone is given when a previous history of abortions is present

Q. A 29-year-old G2P1 presents to the emergency at 10 weeks with painful vaginal bleeding. Her PR is 110/min, and her BP is 90/65 mmHg. Large blood clots are evacuated during the PV exam, and active bleeding is seen from the open cervical OS. Bedside USG reveals a 9-week fetus in the lower uterine segment with no cardiac activity. What is the preferred management?

A. Resuscitation and expectant management

B. Administer oxytocin

C. Administer misoprostol

D. Suction and evacuation

Ans: D. Suction and evacuation

- Diagnosis: Inevitable abortion
- T/t: Suction and evacuation along with resuscitation

Septic Abortion

00:12:40

- Clinical presentation of spontaneous abortion + infection of the uterus and its contents
- Mostly followed by unsafe abortions
- MC in the setting of RPOC (incomplete)
- Clinical profile: Fever, septic shock, foul-smelling/purulent vaginal discharge
- MC infection: Ascending polymicrobial infection.
- T/t: Broad-spectrum antibiotics initiated as soon as possible + resuscitation + evacuation of uterus if RPOC+ (under antibiotic cover)

Q. A woman attends the emergency, 6 weeks amenorrheic with heavy vaginal bleeding and lower abdominal cramps for 4 hours. There is h/o passage of a fleshy mass from the vagina in the toilet. There is no bleeding and pain now. UPT at home was positive. A USG shows an empty uterus with thin endometrium and normal adnexa. What should be done next?

A. Reassure and send home

B. Send serum beta-hCG

C. Admit for suction and evacuation

D. Follow up after 1 week

Ans: B. Send serum beta-hCG

- Diagnosis: ? Complete abortion

Confirmation Of A Complete Abortion Is Established When

- Prior USG report documenting an intrauterine pregnancy and the later empty uterus
- True products of conception are seen grossly
- In unclear settings, serial serum beta-hCG and clarification (drastically fall >50%)

Q. A woman is seen at 12 weeks of gestation with c/o mild spotting on and off and cramping in the lower abdominal wall. TVS reveals an intrauterine gestational sac corresponding to 5 weeks of gestation with no fetal plate inside and a closed cervical OS. What is the likely diagnosis?

A. Threatened abortion
B. Incomplete abortion
C. Missed abortion
D. Inevitable abortion

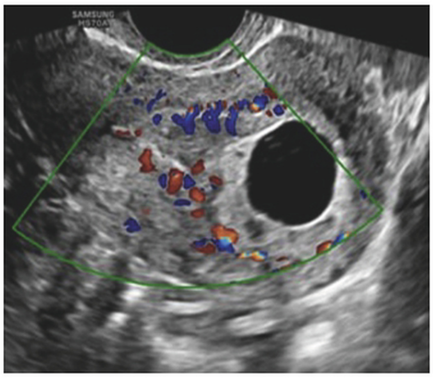
Ans: C. Missed abortion

- Dead products of conception are retained inside (time variable)

Missed Abortion

00:21:25

- Non-viable intrauterine pregnancy within the first 12 weeks, 6 days
- Symptoms of pregnancy subside; the uterus is smaller than POG, and the OS is closed.
- Dx made on TVS
  - MSD >25 mm and no embryo OR
  - CRL >7 mm and no CA
- Anembryonic pregnancy, previously called a Blighted ovum
- MCC missed abortion: Embryonic chromosomal abnormality
- T/t: Evacuation of uterus (medical/surgical)



Q. A primigravida has come at 6 weeks of gestation with a dating scan. On TVS, a uniform gestational sac with a yolk sac is seen; a fetal pole is present with a CRL of 7 mm, but no cardiac activity. What is the next step?

A. It is a failed pregnancy; offer MTP
B. High probability of non-viable pregnancy, repeat scan after 7 days
C. High probability of viable pregnancy, repeat scan after 7 days
D. Give progesterone therapy

Ans: B. High probability of non-viable pregnancy, repeat scan after 7 days

Recurrent Pregnancy Loss

00:25:46

- ≥3 pregnancy losses (traditional definition), 1% incidence
- ≥2 confirmed (USG/HPE) pregnancy losses
- **Risk of subsequent pregnancy loss:**
  - After 2 consecutive losses: 24%
  - After 3 consecutive losses: 30%
  - After 4 consecutive losses: 40-50%
- MCC of recurrent pregnancy loss: Idiopathic
- Age >35 years and repeated anembryonic pregnancy losses are the most likely causes of repeated embryonic chromosomal abnormalities
- Uterine structural anomalies are more likely a/w second trimester recurrent pregnancy loss

Recommended Tests

- Evaluation of the uterus: 3D TVS

- Testing for APLA
- Serum TSH and anti-TPO antibodies
- HbA1c and FBS
- VDRL
- Parental karyotyping looks for balanced reciprocal translocation in either parent, as the embryo will have an unbalanced translocation
- No role of TORCH testing
- ± thrombophilia testing

Q. A 27-year-old woman has come with h/o 2 prior spontaneous abortions, one at 10 weeks and the other at 15 weeks of gestation. Each time, USG had shown cardiac activity in the fetus. Her 1st pregnancy was complicated with severe pre-eclampsia at 28 weeks. What is the most likely diagnosis?

A. Endocrinological abnormalities
B. Syphilis
C. APLA
D. Uterine structural anomalies.

Ans: C. APLA

- Syphilis causes stillbirth

APLA

Modified Sapporo Criteria

- The diagnostic criteria of APLA

CLINICAL CRITERIA (any 1 is needed)	• One or more unexplained deaths of a morphologically normal fetus at or beyond 10 weeks. • H/o severe preeclampsia or placental insufficiency with delivery before 34 weeks. • Three or more unexplained consecutive spontaneous abortions before 10 weeks. • One or more episodes of arterial, venous, or small vessel thrombosis in any tissue
LAB CRITERIA (any 1 is needed)	Checked on 2 occasions, at least 12 weeks apart (preferably done in a non-pregnancy state) • Lupus anticoagulant: Dilute Russell viper venom test • Anticardiolipin: Raised in medium to high titres • Anti-β2-glycoprotein 1: Raised in medium to high titres

Treatment

- TOC of APLA: LMWH + low-dose aspirin throughout pregnancy
- 2nd line Tx: IVIg and plasmapheresis

CERVICAL INSUFFICIENCY

00:35:17

- H/o recurrent preterm births and/or 2nd trimester
- Pregnancy losses at successively lesser POG
- H/o sudden, spontaneous, painful expulsion of fetus (classical)

T-shaped cervix

Y-shaped cervix

DIAGNOSIS

- Based on classical h/o + TVS measurement of cervical length (during pregnancy)
- Closed cervical length <25mm (16-24 weeks)
- Internal OS open >1 cm; funneling of the internal OS
- V-shaped cervix and U-shaped cervix

MANAGEMENT:

- If h/o ≥3 RPL: History indicated cerclage during 12-14 weeks
- H/o 1 or 2 RPL: Weekly cervical length assessment-when it fits the criteria, USG-guided cerclage (before 24 weeks)
- Diagnosis of CI outside of pregnancy could be suggested by the easy passage of Hegar's 8 dilator in the cervix

Q. A 40-year-old G3A2 woman at 18 weeks of gestation presents with painless cervical dilatation. She has a history of 2 prior spontaneous pregnancy losses at 4 months and 3 months of gestation. A TVS shows a cervical length of 15 mm. She is planned for a cervical cerclage procedure in this pregnancy. Which of the following is an absolute contraindication for the procedure?

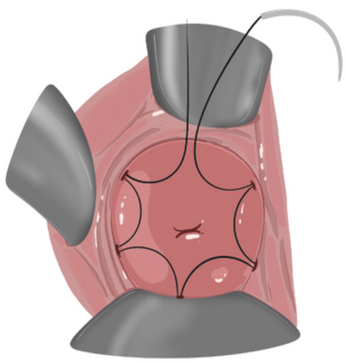
A. Ruptured membranes
B. Prolapse of membranes into the vagina
C. Fetal fibronectin positive in cervicovaginal secretions
D. Advanced maternal age

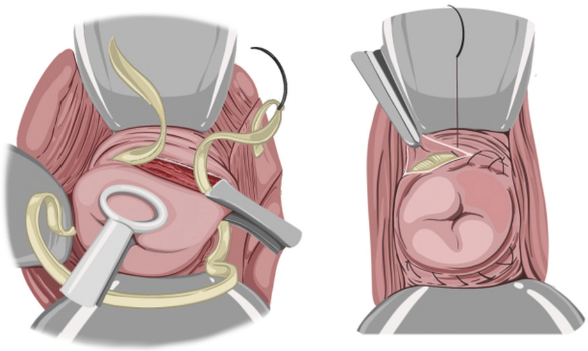
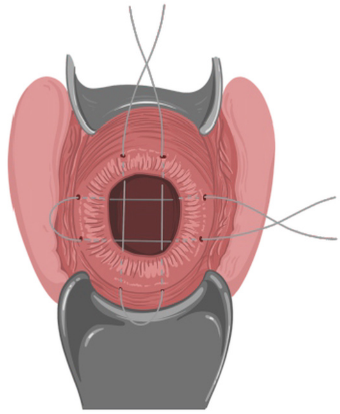
Ans: **A. Ruptured membranes**

Absolute Contraindications for Cervical Cerclage Procedure

- Ruptured membranes
- Leaking PV
- Already having contractions
- Bleeding PV
- Presence of infection
- Abnormal fetus

Types of Cerclage Procedures

McDonald's cerclage	• Most commonly used method 

Modified Shirodkar's cerclage	
Rescue cerclage, Hefner's cerclage, or the Wurm suture	• With h/o cervical insufficiency and OS open, ±bulging membranes, if attempted in this situation, c/a rescue cerclage, Hefner's cerclage, or the Wurm suture technique can be attempted 

Bensen and Durfee's cerclage	• The abdominal cerclage procedure is Bensen and Durfee's
	  ○ Done if there was prior failed vaginal discharge, short, or amputated cervix
	  ○ It could be done before or during pregnancy; LSCS will be done for delivery with cerclage present, even for the next pregnancy

Lash and lash cerclage	• Lash and lash is a vaginal cerclage procedure that can only be done in a non-pregnant state

- Removal of cerclage: Usually, once the 37 weeks of pregnancy have been completed, or earlier when she goes into labor, leaking PV, or bleeding PV

INDUCED ABORTIONS

00:46:55

Medical Abortion

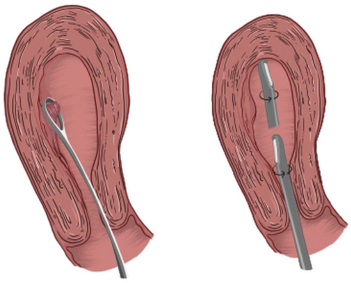
- 1st trimester: GOI allows till 9 weeks of gestation
  - Mifepristone 200 mg oral f/b 48 hours later misoprostol (PGE1) 800 mcg SL/PV/Buccal (oral route only if <7 weeks of gestation)
- 2nd trimester: Beyond 12 weeks and <24 weeks
  - Mifepristone 200 mg oral f/b 48 hours, later misoprostol (PGE1) 400 mcg every 3 hours until expulsion (GoI says max 5 doses in 24 hours)

Keypoint:

- The best method for the 2nd trimester MTP is the medical method
- PGE1 is the best method

- Misoprostol is associated with limb defects and Möbius syndrome (facial paralysis)
- Before procedure:
  - Confirm POG
  - Rule out infection
  - Confirm the size of the uterus
  - Send the BG, Hb, and urine routine
  - USG pelvis (not mandatory): Done if suspicion of ectopic pregnancy or POG doubtful

Surgical Methods

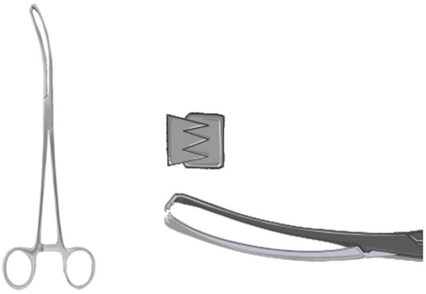
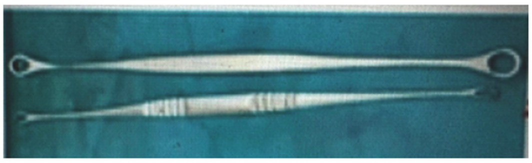


- GoI allows up to 12 weeks of gestation
- 1st Trimester methods: Vacuum aspiration methods, dilation & curettage
- Sequence of steps:
  - Note the position and size of the uterus.
  - Cervical dilatation
  - Evacuation of the uterus
    → Karmans canula connected to an MVA or electric VA (Suction and evacuation)
  - Note completion of procedure
- Signs that the uterus is empty:
  - No more tissue, pink bubbles coming out
  - The uterus is gripping the suction cannula
  - Grating sensation felt

Identify The Images

	• Manual aspiration syringe (MVA) syringe • Capacity 60 ml • Suction pressure 660 mmHg • Used till 12 weeks of gestation
	• Menstrual regulation syringe • Capacity is 50 ml • Could be used till 6 weeks of gestation
	• Bivalve self-retraining speculum • Cusco's speculum

Yourwish

	• Sims speculum • Not self-retaining, but gives more space for procedures
	• Volselum • Used to hold the anterior lip of the cervix
	• Vaginal wall retractor • The serrations at the end differentiate from the uterine curette.
	• Cervical dilators • Hawkin's ambulances and Hegar's dilator
	• Uterine curette
	• Uterine sound. • Has markings for the measurement of uterocervical length. • Also, assess the position of the uterus
	• Ovum forceps • Helpful in the dilatation and curettage

Important Information

- The size of the cannula/dilator is determined by the size of the uterus (in weeks).

Yourwish

Q. While performing suction and evacuation for an 8-week pregnancy, there is a sudden give-way feeling, and you realize that you might have perforated the uterus. Considering that the vitals are stable, what is the most appropriate next step?

A. Keep the patient under observation.

B. Perform laparoscopy

C. Perform laparotomy

D. Confirm by USG

Ans: B. Perform laparoscopy

- Use a suction cannula and abdominal exploration, which is a must
- Laparotomy only if the vitals are unstable
- If perforated with a dilator, stop the procedure and observe the vitals; completion of the procedure by a senior

Q. Which of the following is required for MTP at 21 weeks for a fetus diagnosed with meningomyelocele?

A. Consent of the husband with the opinion of one doctor

B. Her consent with the opinion of 2 doctors

C. Opinion of 2 doctors

D. All above

Ans: B. Her consent with the opinion of 2 doctors

MTP AMENDMENT ACT, 2021

01:05:02

FMGE 2022, 2023

- Husband/partner consent is not mandatory
- If minor/unsound mind: consent from the guardian
- Consent 'Form C' is for consent.
- Allowed till 24 weeks
- The first 20 weeks' opinion of only 1 RMP
- 20-24 weeks opinions of 2 RMP
- I-Form is for the medical practitioners giving opinions
- For failure of contraception, allowed till 20 weeks for the woman and her partner
- Allowed till 24 weeks in,
  - Survivors of rape/incest
  - Substantial fetal anomalies (if beyond 24 weeks, approval by the medical board is required)
  - Minor and mentally ill
  - A woman with major physical disabilities
  - Change of marital status
- No other documentation other than the admission register has to be maintained, and the record has to be maintained for 5 years from the date of the last entry
- Not required to record the sex of abortus

ECTOPIC PREGNANCY

01:08:19

FMGE 2022, 2024, 2025

- MC site of ectopic pregnancy: Fallopian tube (ampulla>>isthmus)
- MC risk factor: PID (salpingitis)
- Maximum risk with a history of prior ectopic pregnancy >> prior tubal surgeries
  - 1 prior ectopic pregnancy: 10-15% recurrence

  - 2 prior ectopic pregnancy: 30% recurrence
- Risk increases with infertility, smoking, IVF, prior abdominal surgeries, and failure of contraceptives (failure of tubal ligation > Mirena > copper T)
- MC consequence of tubal ectopic pregnancy: Tubal abortion (vascular insufficiency of the embryo)
  - As the tube lacks the submucosa
- The earliest to rupture is the isthmus (in 6 weeks) > ampulla
- The last to rupture among tubal ectopics is the interstitial portion of the fallopian tube; if it ruptures, it is more dangerous
- Overall, the ectopic that survives the longest is the abdominal ectopic
- Classic triad of tubal ectopic pregnancy: amenorrhea, pain, and vaginal bleeding; the first step is a pregnancy test.

Q. A 25-year-old woman with 2 months of amenorrhea is seen in the emergency department with sudden lower abdominal pain and a syncopal attack. On examination, the abdomen is soft, and there is tenderness in the hypogastrium. There is no vaginal bleeding. What is your step?

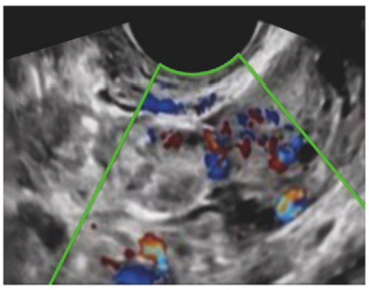
A. Do a urine pregnancy test.
B. Send a serum beta-hCG
C. Perform TVS
D. Perform laparoscopy

Ans: A. Do a urine pregnancy test

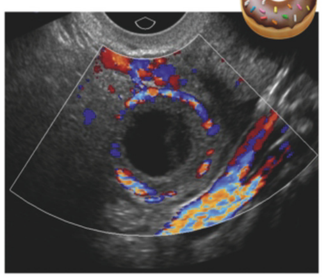
Unruptured ectopic	Vs	Ruptured ectopic
Stable	**Vitals**	Unstable or stable depends on the blood loss
Localised	**Pain**	Generalised
Tenderness localised to one side of the iliac fossa or hypogastrium	**P/A**	Abdominal distention, shifting dullness, guarding, tenderness, and rigidity are other signs and symptoms of hemoperitoneum Bluish discoloration: • Around the umbilicus: Cullen's sign • In flanks: Gray Turner's sign • Shoulder tip pain: Danforth sign
Uterus N/S, tender adnexal mass, Cx motion tenderness	**P/V**	Bogginess felt through the fornices

Investigations

- IOC for ectopic pregnancy: TVS
- 1st finding that raises suspicion of ectopic is an empty uterine cavity
- Most definitive: G-sac with CA in the region of adnexa
- MC finding complex adnexal mass
- With a ruptured ectopic: Empty uterus + hemoperitoneum
- Vascularity around the mass- Tubal ring of fire sign



Blob sign



Bagel sign

Clinical management

Ruptured ectopic

- Salpingectomy
- If stable: Laparoscopy
- If unstable: Laparotomy

Unruptured ectopic

Medical management

- Criteria
  - Stable, compliant
  - beta-hCG <5000 IU/L (the most important factor for the success predictor)
  - CA preferably absent
  - Sac size <4 cm
- DOC: Methotrexate
- D1: Inject methotrexate 50 mg/m^2, repeat serum beta-hCG on D4 and D7
  - If <15% weekly Serum beta-hCG is done till negative,
  - If <15% decline: Repeat dose
- Stop folic acid and ask her to avoid exertion and intercourse.

Surgical Management

- Any C/I methotrexate
- Criteria for medical management were not met
- Failed medical management
- Non-compliant for F/U
- Family is complete
- If other tubes are healthy and/or the family is complete: Salpingectomy
- If the other tube is unhealthy, R/F for infertility+: Salpingostomy
  - Route: Preferably laparoscopic

Q. A 29-year-old woman presents with 6 weeks of amenorrhea and on-and-off abdominal pain and spotting. Abdominal and vaginal examination is unremarkable. TVS shows an empty uterine cavity and no adnexal mass. Her serum beta-hCG is 1200 IU/L, which is below the discriminating zone. What is the next step in management?

A. Perform laparoscopy
B. Methotrexate therapy
C. Repeat beta-hCG after 48 hours
D. S. progesterone and dilatation and curettage

Ans: **C. Repeat beta-hCG after 48 hours**

- Discrimination zone: TAS 6000; TVS 1500
- Serum progesterone levels >25 ng/ml are suggestive of an intrauterine pregnancy; levels <5 ng/ml indicate pregnancy failure and do not indicate the location of the pregnancy.

PREGNANCY OF UNKNOWN LOCATION

01:33:43

Asymptomatic/mild symptoms, TVS:
Empty uterus or inconclusive.
Check serum beta-hCG

≥ 3510 IU/L → Most likely ectopic
Can proceed with medical Mx

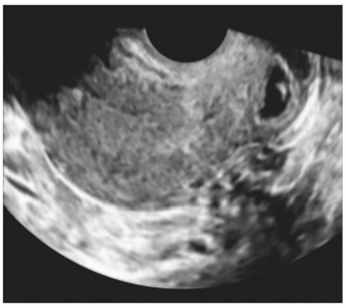
< 3510 IU/L ↓

Serial serum beta-hCG every 48 hours

- Doubling values: Likely IUP
- Plateau values → D&C → Chorionic float in saline is IUP
No chorionic villi, endometrial tissue sinks in saline is ectopic pregnancy
- Fall > 50%: Likely **failing** IUP

Extra pointers:

- Heterotopic pregnancy: One IUP + one ectopic pregnancy (MC tubal). MC is seen in IVF; for the ectopic, it's always surgical management
- An angular pregnancy is eccentrically implanted, IUP, medial to the round ligament (interstitial ectopic lateral to the round ligament)
- An ectopic that presents with painless vaginal bleeding: Cervical ectopic
- Criteria for cervical ectopia: Paalman, Rubin
- Criteria for primary ovarian ectopic: Speigelberg
- Criteria for primary abdominal: Studdiford



Paalman Criteria

- Ballooned cervix
- POCs firmly attached to the endocervix: Sliding sign negative on USG
- Internal OS closed
- External OS partially open

Note: Inevitable abortion: The sliding sign will be positive

FMGE 2025
01:41:55

MOLAR PREGNANCY - BENIGN GTDS

Complete mole	Vs	Partial mole
Diploid	**Ploidy status**	Triploid
MC- 46 XX	**Karyotype**	MC- 69 XXX
Mostly monospermic (empty egg fertilized)	**monospermic/dispermic**	Dispermic
All nuclear material is paternal	**Genetic material**	Extra genital material is paternal

Yourwish

Negative	**P57kip2 immunostain**	Positive
Absolutely absent	**Fetal/embryonic tissue**	Present (dead)
Complete	**Hydropic swelling of chorionic villi**	Partial/cystic placenta
Extensive	**Trophoblastic proliferation**	Trophoblastic scalloping
Avascular	**Vascularity of villi**	Vascularity in parts
Usually >10^5 IU/L	**Excessive hCG**	<10^5 IU/L
More likely	**Med complications**	Very rare
15-20%	**Risk of progression to GTN**	1-5%

Risk Factors

- Extremes of maternal age
- H/o prior molar pregnancy
- Ethnic predisposition
- Genetic factors

Important Information

- H/o 1 prior complete molar pregnancy: recurrence rate is 1-2%
- H/o 2 prior complete molar pregnancy: recurrence rate is 20%
- Familial recurrent complete moles: NLRP7 locus on chromosome 19

Associated Medical Complications

- Hyperemesis
- Thecal lutein cysts
- Preeclampsia
- Hyperthyroidism
- Pulmonary edema

High Risk Complete Moles

- Age >40 years
- hCG >1 lakh IU/L
- Uterus size >16 weeks
- B/L theca lutein cysts >6 cm

Q. A 19-year-old primigravida, 12 weeks POG, % has had excessive nausea and vomiting and irregular vaginal bleeding for the last 1 week. UPT positive at home. PR 100/min, BP 110/70 mmHg, cardio-resp exam normal, no h/o breathlessness or tremors. P/A exam-uterus enlarged at 20 weeks, feels soft, and fetal parts not palpable; FHS not heard. P/V exam shows mild bleeding, OS closed, and b/l adnexal masses of about 5 cm felt through the fornices. What is the most likely diagnosis?

A. Molar pregnancy

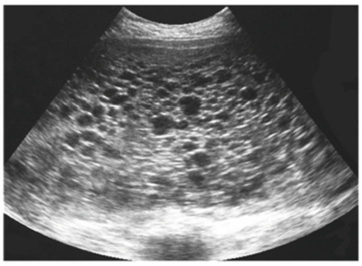
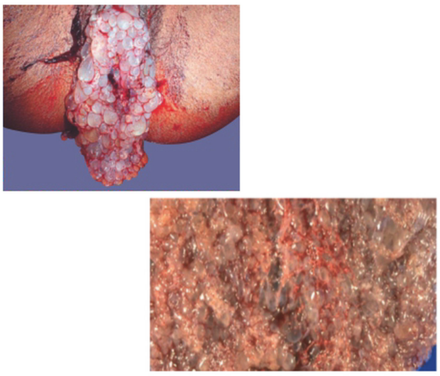
B. Multiple pregnancy

C. Polyhydramnios

D. IUD

Ans: **A. Molar pregnancy**

Identify The Images

	• Snowstorm appearance is seen in complete molar pregnancy.
	• Passage of h/o grape-like vesicles • Complete molar pregnancy

- A partial molar pregnancy is often misdiagnosed as a missed abortion
  - On scan, a dead fetus/embryo, hydropic placenta
  - Final diagnosis confirmed on HPE
- Definitive differentiation between complete and partial mole:
  - HPE
  - DNA ploidy status
  - Immunostaining

One-liners:

- The treatment of choice for a molar pregnancy is suction and evacuation
- Thecal lutein cysts: No additional treatment is needed, unless a/w complications
- Follow-up after evacuation done with serum beta-hCG (48 hours after evacuation and weekly till 3 consecutive normal values, then monthly for 6 months)
- Average time taken for hCG levels to normalize is 7 weeks in complete and 6 weeks in partial
- Contraception during follow-up: IUDs are C/I; contraception of choice is POPs, inj. DMPA and progesterone implants are safe
- Prophylactic chemotherapy not a routine
- Possible role of hysterectomy in complete moles:
  - Age >40 years, and a complete family
  - Intractable bleeding
  - Invasive mole perforating the uterus

GESTATIONAL TROPHOBLASTIC NEOPLASIA

01:57:33

- GTN can occur after any pregnancy event, but it most commonly occurs after a molar pregnancy. NEET PG 2021
- The marker for GTN is beta-hCG. HPE is not necessary for diagnosis
- Invasive mole: Villi structure preserved, invading into the myometrium

- Choriocarcinoma: Villi structure lost, neoplastic dimorphic cells
- Placental site trophoblastic tumor: Villi structure lost, and proliferation of extravillous intermediate trophoblast cells, marker hPL and PLAP
- Epithelioid trophoblastic tumor
- MC GTN developing after molar pregnancy: Invasive mole > Choriocarcinoma
- CC develops most commonly after a molar pregnancy event
- GTN after full-term pregnancy: Choriocarcinoma
- PSTT and ETT are rare and always develop after a full-term pregnancy

Q. A 40-year-old P3L3 woman had an uncomplicated pregnancy and delivered a full-term healthy baby 3 months ago. She has complained of persistent bleeding since then. She also underwent D & C at a peripheral hospital. HPE repost is not available. She has no relief from symptoms. What is the most likely diagnosis?

A. PPH

B. DIC

C. GTN

D. Normal lochia

Ans: C. GTN

- H/o AUB not responding to medical/hormonal therapy
- Underwent D&C
- Raised hCG and absence of pregnancy

Clinical Presentation

- Persistent or irregular bleeding
- Uterine subinvolution
- Intraperitoneal bleeding or shock
- Persistence of theca lutein cysts
- Evidence of metastases

Diagnostic Criteria Of Gtn

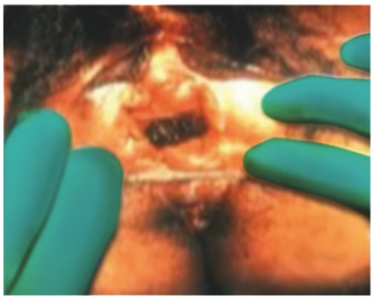
02:03:41

- 4 consecutive hCG levels showing plateau (±10%) over 3 weeks
- 3 consecutive hCG levels showing rising values over 2 weeks.
- Persistence of beta hCG after 6 months of evacuation
- HPE diagnosis
- Evidence of metastases with elevated hCG levels (after molar pregnancy or no established primary site or absence of pregnancy)
- MC site of metastases: Lungs > vagina > pelvis > liver > brain
- MC route of metastases: Hematogenic

Figo Staging

- Stage I: Confined to the uterus
- Stage II: Adnexa/vagina mets
- Stage III: Lung metastases
- Stage IV: All other mets

Identify The Images

	• Cannonball mets in the lungs
	• Suburethral nodule, just below the urethra: evidence of mets • Vaginal mets: NEVER biopsy due to risk of heavy bleeding

Q. A 35-year-old woman is diagnosed with choriocarcinoma 6 months after a molar pregnancy evacuation. USG abdomen and pelvis show a tumor of 3 cm in diameter in the uterus, with no other deposits. Further workup shows an isolated metastasis to the lungs and pretreatment serum hCG levels of 10000 IU/ml. What is the most appropriate therapy?

A. Methotrexate with folinic acid
B. Methotrexate
C. EMACO regimen
D. Hysterectomy

Ans: **A. Methotrexate with folinic acid**

Treatment

- The treatment of choice for GTN is chemotherapy

Modified WHO Prognostic Scoring System				
Figo Score	0	1	2	4
Age (years)	< 40	≥ 40		
Antecedent pregnancy	Molar	Abortion	Term pregnancy	
Interval from index pregnancy	<4 months	4-6 months	7-12 months	≥ 12 months
Pre Tx hCG (mIU/mL)	< 1000	1000 - 10,000	10,000 - 100,000	> 100,000
Largest tumor size (cm)	< 3	3-5	> 5	
Site of mets	Lung	Spleen, kidney	GIT	Brain, liver

Yourwish

Number of mets	0	1 -4	5-8	>8
Previous failed chemo			Single drug	≥ 2 drugs

- Low risk score ≤6: Single-agent chemotherapy (Methotrexate, IM 1 mg/kg with Folinic acid- multidose regimen)
- High risk score ≥7: Multiagent chemotherapy, EMACO regimen (Etoposide, Methotrexate, Actinomycin, Cyclophosphamide, Oncovin)
- MC factors to assess risk:
  - Term pregnancy, 7-12 months: 2 points
  - hCG values >10,000: >2 points
  - Mets increases the score (lung is 1)
- Role of hysterectomy in preventing invasive mole, failed chemotherapy, and PSTT & ETT (not chemo-sensitive)

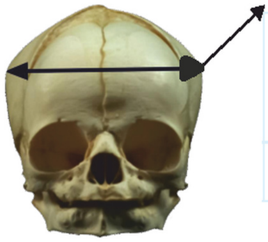
Yourwish

10. LABOR & DELIVERY

FETAL SKULL

00.00.41

NEET PG 2024



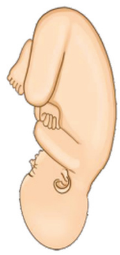
Biparietal diameter

Super-sub parietal 8.5cm
Bitemporal- 8 cm
Bimastoid- 7.5cm

Largest diameter of fetal skull

	Diameter	Measurement
Transverse diameter	Biparietal diameter - Between two parietal eminences	9.5cm
	Super sub parietal - Between one point above and one point below the parietal eminence	8.5cm
	Bitemporal diameter - Farthest points on the coronal suture	8cm
	Bimastoid - Between two mastoid processes • Present posteriorly • Non compressible	7.5cm

Engaging Diameter in Relation To Attitude of the Fetus

Attitude	Presentation	Engaging diameter	Measurement
Well-flexed head 	Vertex	Suboccipitobregmatic	9.5cm
Deflexed head 	Vertex	Occipitofrontal Suboccipitofrontal	11.5cm 10cm

Neutral position 	Brow	Mentovertical	14cm
Extended head 	Face	Submentobregmatic	9.5cm

Important Information

- Smallest diameter of fetus skull: Bimastoid → 7.5cm
- Largest diameter of fetus skull: Mentovertical → 14cm
- Normal attitude of fetus → Flexion

Q. Which among the following is the largest diameter of the fetal skull?

A. Biparietal diameter

B. Submentovertical

C. Suboccipitobregmatic

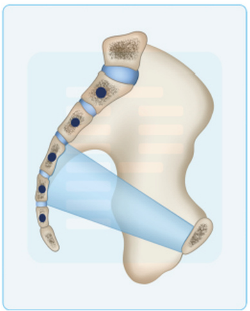
D. Bitemporal

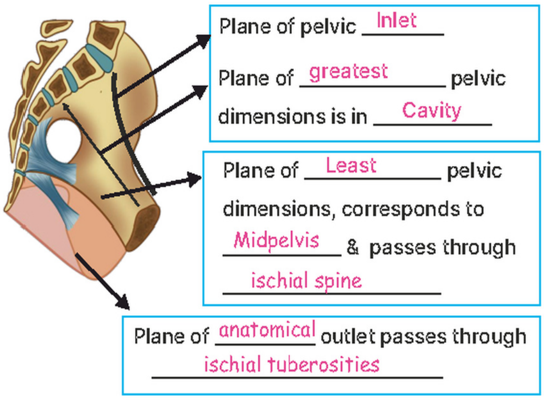
Answer: **B**

MATERNAL PELVIS

- Plane of greatest pelvic dimensions
  - Present in the cavity
- Plane of least pelvic dimensions
  - Corresponds to Midpelvis
  - Passes through the ischial spine
- Midpelvis
  - Present between the planes of the greatest and least pelvic dimensions

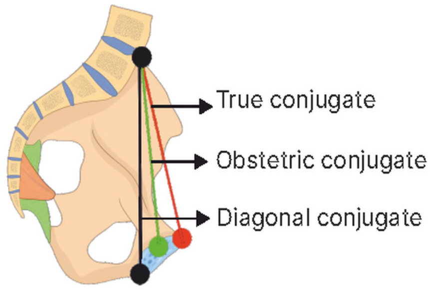
NEET PG 2024





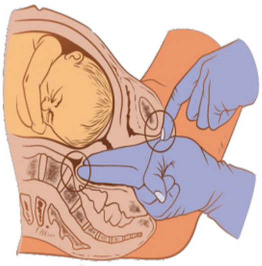
- Plane of Obstetric outlet → Passes through Ischial spine
- Plane of anatomical outlet → Passes through the ischial tuberosities

AP Diameters of Pelvic Inlet



- True conjugate
  - Upper border of pubic symphysis to sacral promontory
- Obstetric conjugate
  - Mid pubic symphysis to sacral promontory
  - Smallest Diameter
  - OC = DC - 1.5 to 2cm
  - OC = 10 to 10.5cm
- Diagonal conjugate
  - Lower border of pubic symphysis to sacral promontory
- Angle of pelvic inclination
  - Angle between the plane of pelvic inlet with the horizontal
  - Normal angle of pelvic inclination is 55°
- Subpubic angle: Obtuse angle of 85°
- High inclination: Sacralization of Lumbar vertebrae

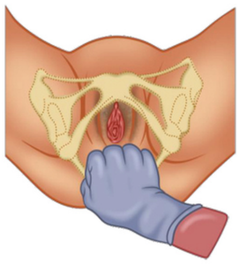
Diagonal Conjugate



- Lower border of pubic symphysis to sacral promontory
- Only AP diameter which can be clinically measured
- Normal Diagonal conjugate is 12cm

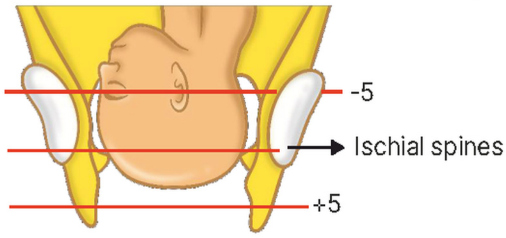
Intertuberous Diameter

NEET PG 2022



- Transverse diameter of the outlet
- Normal intertuberous diameter is 11cm

Ischial Spine



- Station → Leading point of the presenting part
- The ischial spine corresponds to 0 station
- Above the level of the ischial spine is - station
- Below the level of the ischial spine is + station

Interischial Diameter

- A/K/A Interspinous diameter
- Smallest diameter of the true pelvis
- At this level, internal rotation occurs, and the forward curve of pelvis begins

Engagement

- Biparietal diameter crosses the pelvic brim/inlet
- Head is 0/5th or 1/5th palpable above the pelvic brim

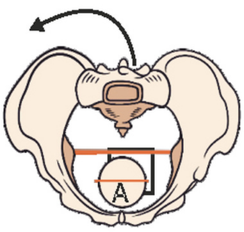
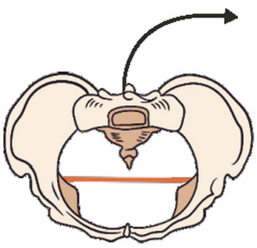
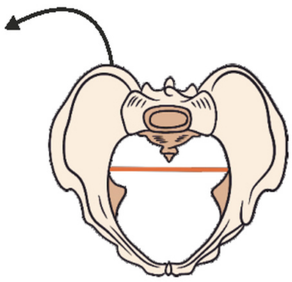
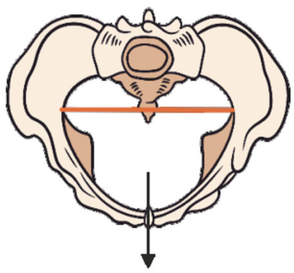
- Station corresponds to 0
- Engagement occurs
  - During the term for primi
  - During labor for multiparous
- Unengaged head / free-floating head at term → Rule out:
  - Full bladder
  - Deflexed head
  - CPD
  - Placenta previa

Contracted Pelvis

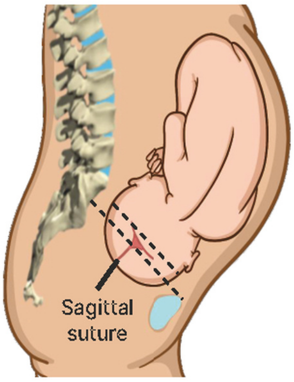
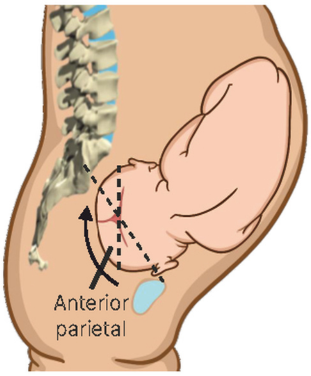
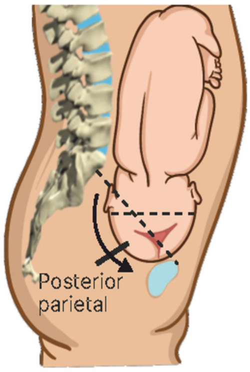
- Contracted inlet → OC <10cm / OC <11.5cm
- Contracted cavity → Interischial diameter <8cm
- Contracted outlet → Transverse diameter of the outlet < 8cm
- Grossly abnormal pelvis:
  - Both sacral ala absent → Robert Pelvis
  - One sacral ala absent → Naegele Pelvis
- Best for pelvic assessment / CPD assessment → Trial of labor > Clinical assessment
- Best timing for clinical assessment
  - Nulliparous → anytime when the period of gestation is > 37weeks
  - Multiparous → during labor
- Mild CPD at the inlet → Trial of labor
- CPD at midpelvis/outlet → Caesarean section

Types of Maternal Pelvis

NEET PG 2024
INICET 2021

Caldwell Moloy Classification			
Gynecoid pelvis	**Anthropoid pelvis**	**Android pelvis**	**Platypelloid pelvis**
• Round/oval • M/C type of pelvis 	• Anteroposteriorly oval • A/w Direct occipitoposterior position • Face to pubis delivery 	• Triangular, prominent ischial spines, IID narrow • A/w: ○ Right occipitoposterior position ○ Deep transverse arrest ○ Dystocia Dystrophica syndrome 	• Flat pelvis / Transversally oval • A/w face and brow presentation • In flat pelvis head can engage by exaggerated asynclitism 

Difference Between Syncylitism And Asynclitism

Syncylitism	Asynclitism	
	Anterior	Posterior
• Sagittal suture is present midway between pubic symphysis and sacral promontory 	• Sagittal suture towards sacrum • Seen in multiparous female 	• Sagittal suture towards pubic symphysis • Seen in primi gravida 
• Engaging diameter is Biparietal	• Engaging diameter is Supersubparietal • Exaggerated asynclitism can be associated with CPD	

LEOPOLD MANEUVERS

00:25:51

1 2 3 4

- 1. Fundal grip
- 2. Lateral grip
  - It gives idea about the position
- 3. Pawlick's grip
  - Identifies the part of fetus
- 4. Pelvic grip
  - Gives idea about Engagement , Descent and flexion of head

Fetal Lie

- Relationship between long axis of fetus to that of centralized uterine axis > maternal spine
- Unstable lie/Oblique lie → Lie not stable at term
- Causes of Unstable lie / Oblique lie
  - Full bladder
  - Placenta previa
  - Polyhydramnios
  - Idiopathic - M/C

MECHANISM OF LABOR

00:29:39

Sequence Of Events

- Engagement
- Flexion and Descent
  - Occurs throughout the course of labor
- Internal rotation
- Crowning
  - Head becomes visible at the introitus distending the vulva
  - Fetus does not recede back after the contraction
- Delivery of head by extension
- Restitution
  - Untwisting of the neck
- External rotation
- Expulsion

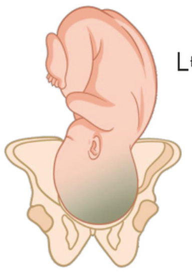
Important Information

- Cardinal movements of labor → Engagement , Flexion&Descent , Internal rotation , Delivery of head by extension , External rotation , Expulsion

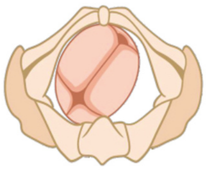
Identify The Position

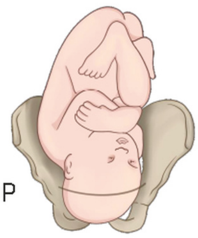
FMGE 2024

- Left Occipitoanterior
  - Posterior fontanelle is towards the pubic symphysis
  - Sagittal suture is oblique
  - 2nd M/C
- Left Occipitotransverse
  - Sagittal suture is transverse
  - M/C position
- Right Occipitoposterior
  - Posterior fontanelle is towards the sacrum
  - Sagittal suture is oblique

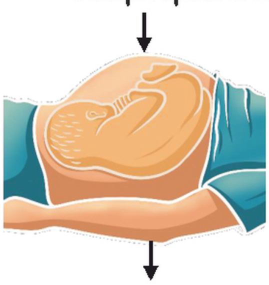


LOA





ROP

Occipitoposterior	Occipitoanterior
	
• Infraumblical flattening • Limbs felt more anteriorly • FHS is best heard at maternal flanks • Head is often unengaged and deflexed • On P/V anterior fontanelle felt easily • Labor often prolonged, and early ROM occurs	• Infraumblical bulge is seen • Back felt more anteriorly • FHS heard at the midpoint of spinoumbilical line (between ASIS and the umbilicus)

Right Occipitoposterior

- M/C cause → Android pelvis > Deflexed head
- More common in Primi
- Favorable outcome with good contractions, favorable shape and size of pelvis, average size of baby, and progressive flexion of head
- Management during labor
  - Allow for spontaneous progress of labor
  - With deep transverse arrest → Cesarean section

DIRECT OCCIPITOPOSTERIOR

- Face to pubis delivery is possible if anthropoid pelvis and spacious gynecoid pelvis
- Head delivers by flexion f/b extension
- More chance of perineal tears
- Diameter distending vulval outlet: Occipitofrontal

NEET PG 2020, 2023, 2024, 2025
FMGE 2020, 2021, 2023, 2024, 2025
INICET 2021, 2024 , AIIMS 2020

PHASES OF PARTURITION

00.41.25

Phase 1 - Quiescence	• Uterus unresponsive

Phase 2 - Activation	• Preparation of labor
	  ○ Oxytocin receptor and gap junction (connexin 43) in the myometrium increased
	• Formation of the lower uterine segment
	• Lightening Or Welcome Sign - fetus enters the pelvis.
	  ○ Size of uterus corresponds to 32 weeks of gestation, with flanks full
	  ○ Respiratory and GI symptoms relieved
	• Cervical ripening
	  ○ Soft and dilatable mainly due to PGE2
	  ○ Collagen breakdown
	  ○ Increase Hyaluron and water content
	  ○ Decrease chondroitin and Dermatan sulphate

Signal for the onset of labor • Maturation of the fetal endocrine cascade ↑ Fetal CRH ↓ ↑ Fetal ACTH ↓ ↑ Fetal DHEAS ↓ ↑ E from placenta (↑ estrogen/progesterone ratio) • Mechanical stretch of the uterus and membrane • Local release of prostaglandin from the fetal membrane, amnion, and decidua	

Phase 3 - Stimulation	• Clinical stage of labor
	  ○ Stage 1 - onset of true labor pain to full cervical dilatation (10cm)
	  ○ Stage 2 - Delivery of fetus

	◦ Stage 3 - Delivery of placenta ◦ Stage 4 - 1hr observation
Phase 4 - Involution	• Puerperium

Labor

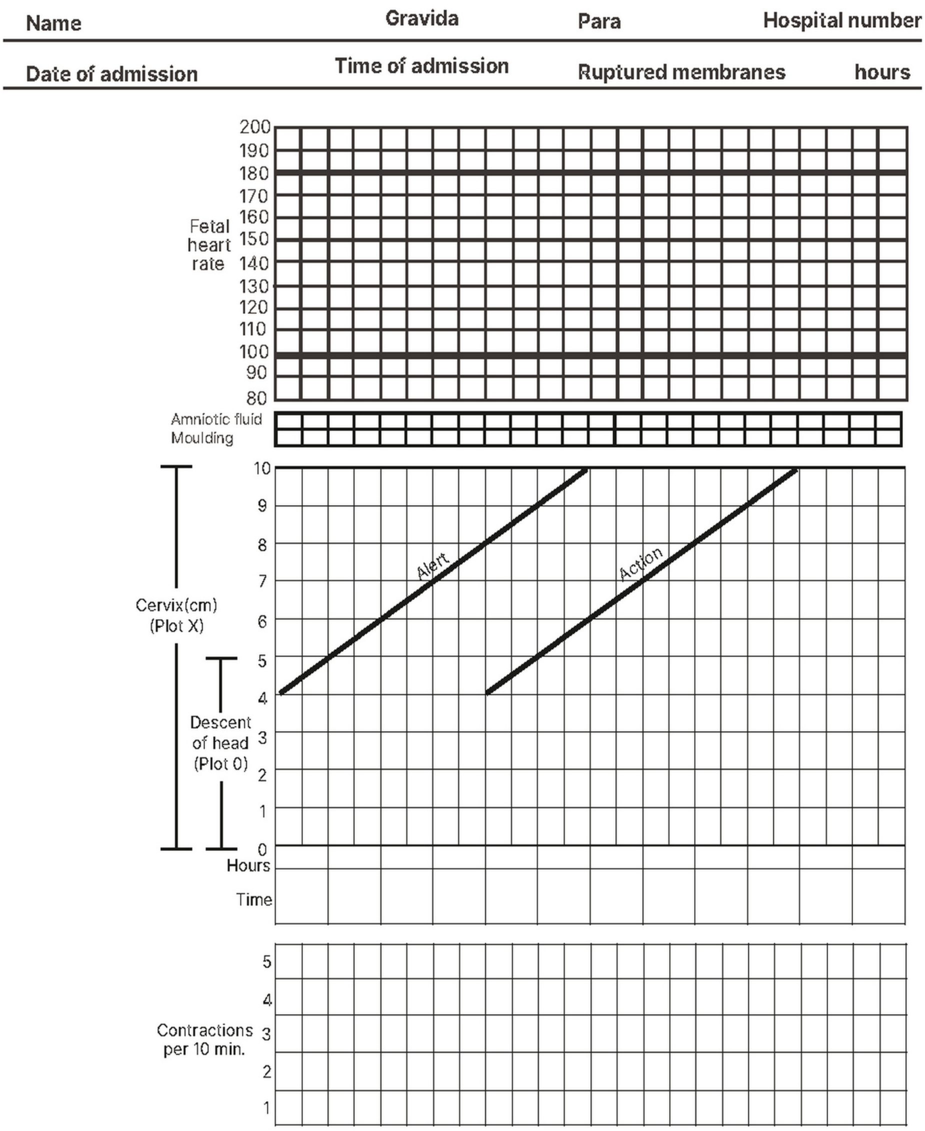
- True labor pains occur at regular intervals with increased intensity, frequency & duration
- True labor is differentiated from false labor pain by
  - Progressive cervical dilatation and effacement > Bag of membranes
- Most important factor for promoting cervical dilatation & effacement → Uterine Contractions (Property Of Retraction)
- Braxton Hicks contraction → Painless uterine contractions
  - At 10mm Hg intensity → contractions become palpable
  - At 15mm Hg → Painful & capable of causing dilatation
  - Moderate intensity → 40mm Hg
- Oxytocin
  - Nonapeptide
  - Synthesized in the hypothalamus → Paraventricular and supraoptic nucleus
  - Stored and released from the posterior pituitary
- Amnion → Synthesizes PGE2
- Decidua → Synthesizes PGF2
- Show → Blood mixed with vaginal discharge
- In primi → effacement occurs first, followed by dilatation
- In multiparous → effacement and dilatation occur simultaneously
- According to WHO:
  - Active labor begins with cervical dilatation of 5cm with substantial degree of effacement
- According to ACOG:
  - Active labor begins with cervical dilatation of 6cm with substantial degree of effacement
- Average rate of cervical dilatation in active labor:
  - Nulliparous → 1.2cm/hr
  - Multiparous → 1.5cm/hr
- Duration of the active phase should not exceed
  - 12 hrs → nulliparous
  - 10hrs → multiparous
- Protracted active phase dilatation → Rate of dilatation is slower
- Protracted descent
  - <1cm/hr in primi
  - <2cm/hr in multiparous
- Duration of the second stage of labor:

	Nulliparous	Multiparous
Average duration of the 2nd stage	50min	30min
Usually completed for most women	3hrs	2hrs

Yourwish

WHO MODIFIED PARTOGRAM

00.56.00



- General parameters
  - Name , gravida , para , hours since the ruptured membrane
- Fetal parameters
  - Fetal heart rate noted every 30 minutes
  - Color of Amniotic fluid - clear, blood-stained, meconium-stained
  - Moulding

Frequency of FHR monitoring	1st stage	2nd stage
Low risk	30min	15min
High risk	15min	5min

- Mother parameter
  - Pulse
  - BP
  - Mother receiving IV fluids, Oxytocin infusion are noted
- Labor progress
  - Cervical dilatation - plot X

- Descent of head - plot O
- Contraction
- Partogram is based on Friedman's Curve
- Concept of alert line was given by Philpott & castle
- Plotting begins at 4cm
  - No latent phase
- Alert line corresponds to cervical dilatation of 1cm/hr
- Distance between alert and action line is 4 hr
- No. of boxes = NO. of contractions in 10 minutes
- Contractions are monitored every 30 minutes
  - Mild: contractions lasting <20sec
  - Moderate contractions lasting 20-40sec
  - Good: contractions lasting >40sec

    → Need at least 3 good contractions in 10 minutes for progress of labor
- >5 contraction in 10min → Uterine Tachysytole

Who Next Generation Partogram

Alert Column → ALERT

		Time	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
			ACTIVE FIRST STAGE												SECOND STAGE		
	Pulse	<60, ≥120															
	Systolic BP	<80, ≥140															
	Diastolic BP	≥90															
	Temperature °C	<35.0, ≥ 37.5															
	Urine	P++, A++															
LABOUR PROGRESS	Contractions per 10 min	≤2, >5															
	Duration of contractions	<20, >60															
	Cervix [Plot X] 10																
	9	≥ 2h															
	8	≥ 2.5h															
	7	≥ 3h															
	6	≥ 5h															
	5	≥ 6h															
	Descent [Plot O] 5																
	4																
	3																
	2																
	1																
	0																

In active first stage, plot 'X' to record cervical dilatation. Alert triggered when lag time for current cervical dilatation is exceeded with no progress. In second stage, insert 'P' to indicate when pushing begins.

- Fetal component
  - Baseline FHR
  - FHR deceleration
  - Amniotic fluid
  - Fetal position
  - Caput
  - Moulding
- Mother component

  - Pulse
  - BP
  - Temperature
  - Urine protein and acetone
- Labor progress
  - Contraction per 10min
  - Duration of contraction
  - Cervical dilatation
  - Descent of the fetal head
- Begins at 5cm dilatation
- No alert or action line
- Specific alert thresholds defined
- Monitoring for the 2nd stage
- Supportive care documentation

Q.A 25-year-old primigravida at term is admitted to the labor room with mild labor pains. At the time of admission, she is 2 cm dilated with a partially effaced cervix. 12 hours later, she is still getting mild uterine contractions, and she is still 2cm dilated but 80% effaced with a bulging bag of membranes. All of the following are done except :

A. Sedation

B. Rest

C. Encourage ambulation

D. Oxytocin augmentation

Answer: **D**

PROLONGED LATENT PHASE

- >20hrs in primi
- >14hrs in multi
- Causes
  - False labor
  - Excessive sedation
  - Epidural
  - Poor cervical condition
  - Poor contractions
- Management
  - Wait and watch
  - Therapeutic rest
  - No ARM and Oxytocin

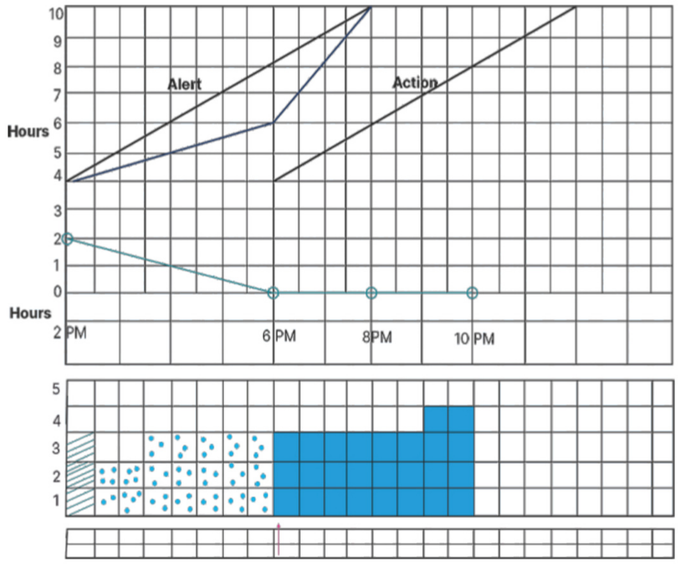
Q. A 30-year-old multigravida at term in active labor in vertex presentation, undergoes cesarean section for arrest of active phase labor. This is her partogram. What is the likely cause of her situation?

A. CPD

B. Inadequate uterine contractions

C. Uterine Tachysystole

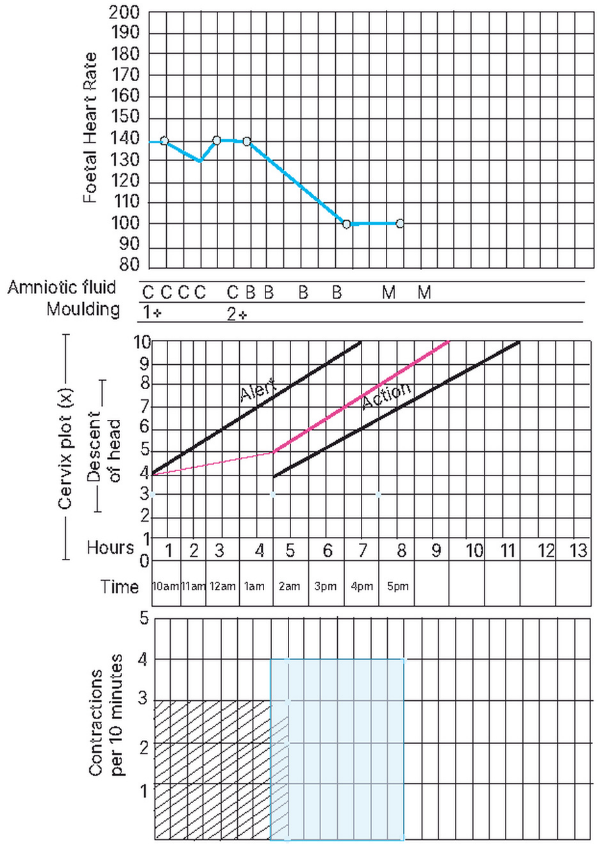
D. Malpresentation



Answer: **A**

Q.A partogram of a woman who is in labor is shown below. Oxytocin infusion is already given. How will you manage the condition?

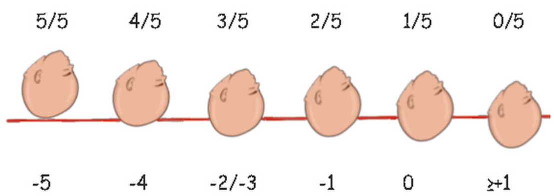
A. Forceps-assisted delivery
B. Vacuum-assisted delivery
C. Oxytocin infusion
D. Cesarean section



Answer: **D**

RULE OF FIFTH

P/A finding	5/5	4/5	3/5	2/5	1/5	0/5
Station	-5	-4	-3/-2	-1	0	≥1



Q.A primi is admitted to LR in active labor. At 6 am, she is 6 cm dilated, fully effaced, Vx at 0 station. Spontaneous rupture of the membrane takes place, and the liquor is clear. Repeat examination after 4 hours of good uterine contractions shows that the cervical dilatation is 7 cm. What should be the next step in management?

A. Reassess after 4 hours
B. Immediate Cesarean
C. Oxytocin augmentation
D. Reassess for occipitoposterior position & CPD

Answer: **D**

ARREST IN ACTIVE PHASE DILATATION

- Cervical Dilatation ≥6cm with ruptured membrane & there is no change in dilatation for 4 or more hours with good contractions
- No change in cervical dilatation with 6 hours of oxytocin infusion
- Indication for Cesarean section

SLOW PROGRESS IN ACTIVE PHASE

- If contractions inadequate
  - If bag of membrane present → Do ARM f/b oxytocin if needed
  - If membrane absent → Oxytocin infusion
- contractions inadequate
  - Reassess for
    - Deflexed head
    - Malpresentation
    - Malposition
    - CPD

Q.You are examining a multigravida in the second stage of labor for the past two hours. On examination, contractions are adequate, the cervix is dilated with the head at station 0 with molding 3+ and caput 2+. The sagittal suture is in the right occipitotransverse position. The FHR is 110 beats/minute. Which of the following is carried out for the management of this patient?
A. Midpelvic forceps application
B. Vacuum-assisted vaginal delivery
C. Wait and watch for one more hour
D. Cesarean section

Answer: **D**

- Due to evidence of CPD

Molding → Alteration in the shape of the fetal head

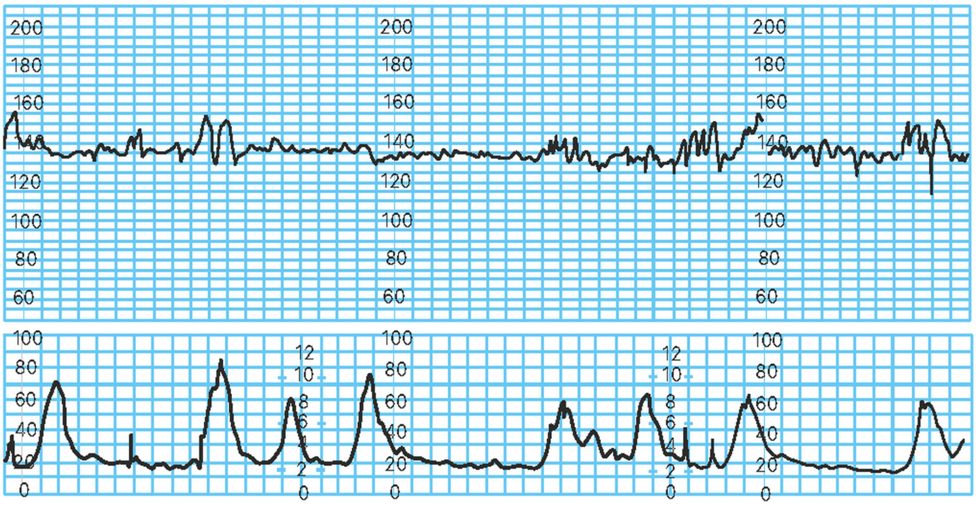
- Grade 1 - Bone touching, not overlapping
- Grade 2 - Bones overlapping but easily separated
- Grade 3 - Fixed overlapping

Second stage arrest

- No descent or no rotation of the head for
  - 3 hours in nulliparous
  - 2 hours in multiparous
- 2nd stage prolonged / arrest:
  - With evidence of CPD and molding grade 3 → Cesarean section
  - No evidence of CPD, pelvis adequate, fetua is well → Instrumental vaginal delivery if criteria is met

CARDIOTOCOGRAPHY

01.27.31



- Fetal heart rate monitoring during labor
- Components
  - Fetal heart rate
  - Uterine contractions
- Normal CTG
  - Baseline FHR 110-160/min
  - Beat-to-beat variability 5-25 bpm
  - No deceleration
  - Acceleration +/-
- FHR
  - Fetal tachycardia >160/min → Check for Maternal fever
  - Fetal bradycardia <110/min
- Intensity of contraction
  - No. of contractions in 10 minutes x average increase in intensity
  - SI unit is Montevideo units

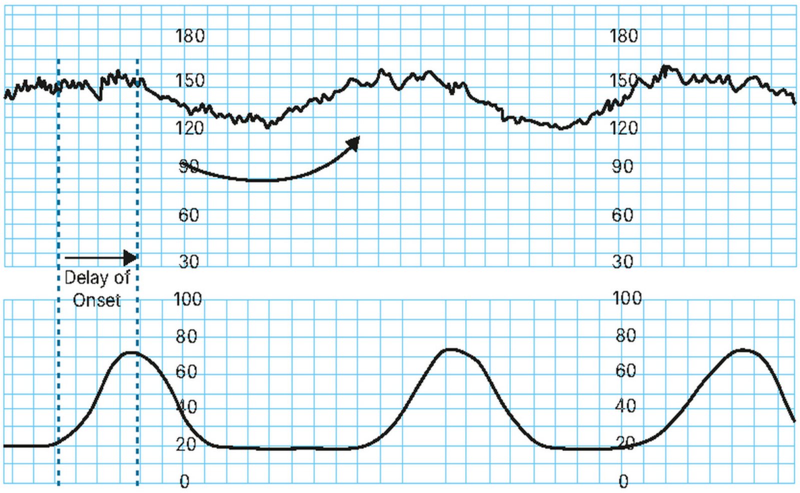
Acceleration

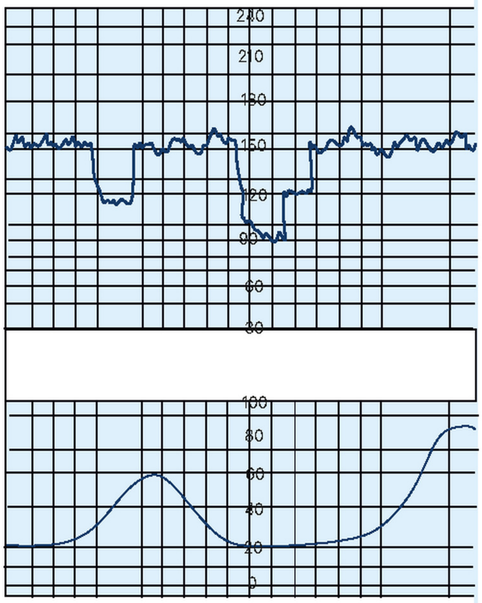
- Transient increase in FHR above baseline at least 15/min for at least 15sec

Deceleration

- Transient decrease in FHR below baseline at least 15/min for at least 15sec
- Prolonged deceleration → Deceleration lasting > 2min but < 10min
- Types
  - Early deceleration
  - Late deceleration
  - Variable deceleration

Types of Deceleration		
	Cause	Features
Early deceleration	Head compression	• Decrease in FHR corresponding to peak of contraction • Head compression causes vagal stimulation in fetus and deceleration

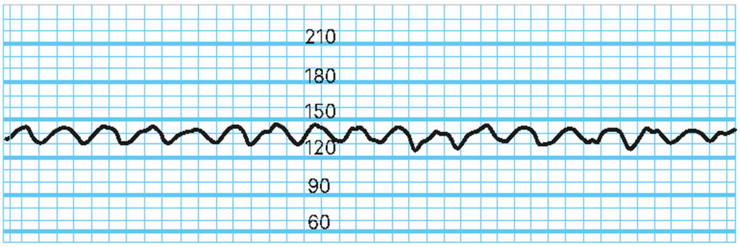
		
Late deceleration	Fetal hypoxia and Uteroplacental insufficiency	• Decrease in FHR after the contraction • Associated with excessive uterine contractions, maternal hypotension, dehydration, and epidural • Chemoreceptors mediated 

Variable deceleration	Cord compression	• Abrupt decrease in FHR
		• Not related to contractions
		• Baroreceptor mediated
		• More likely associated with post-term, Oligohydramnios, malpresentation
		• Concerning features
		  ○ No shoulders
		  ○ Depth >60/min
		  ○ Deceleration lasting >60sec
		• If Persistent Variable Deceleration In Labor → Only Indication For Amnioinfusion
		

Yourwish

Yourwish

- Causes of decreased variability
  - Prematurity
  - Fetal sleep
  - Fetal hypoxia
  - Fetal infection
  - Analgesic drugs in labor
  - Corticosteroids and $MgSO_4$
- Sinusoidal baseline
  - Sine wave pattern for 2-5 cycles/min
  - Variability absent and acceleration absent
  - Associated with severe fetal asphyxia and severe fetal anemia
  - Causes of fetal anemia → Rh-affected fetus, severe fetomaternal haemorrhage, bleeding vasa previa, TTTS, and fetal ICH



Q. A 26-year-old primigravida at term gestation is seen in labor. Her vitals are stable. She is getting good contractions. The baseline FHR is 102/min & not picking up. On vaginal exam, the cervical dilatation is 3 cm, 60% effaced, liquor is meconium-stained. Which of the following is the most appropriate management?

A. Start oxygen, IV fluids & shift to OT for Cesarean section

B. Oxytocin drip to accelerate labor pains

C. Attempt a vacuum delivery

D. IV drotaverine to improve cervical dilatation

Answer: **A**

- Sudden drop in fetal HR and not picking up
  - Rule out → Maternal hypotension, tetanic contractions, placental abruption, maternal hypoxia, cord prolapse
- Category 1 CTG → Reassuring
  - Normal baseline
  - Beat-to-beat variability
  - Acceleration +/-
  - Deceleration -
- Category 2 CTG → Resuscitative measures
  - Shift to the left lateral position
  - O_2 by mask
  - Stop oxytocin infusion
  - IV fluids
  - P/V examination
- Category 3 CTG → Delivery Expedited
  - Absent variability with any one
    - → Bradycardia
    - → Recurrent late deceleration
    - → Recurrent variable deceleration
    - → Sinusoidal baseline

INSTRUMENTAL VAGINAL DELIVERY

01.43.43

Pre-Requisites

- Fully dilated cervix
- Occipitoanterior, Occipitoposterior vertex presentation
- Rotated head, Ruptured membrane
- Consent, CPD absent
- Engaged head, empty bladder, Experience
- Plus 2 station & Beyond

Absolute Contraindications

- Cephalopelvic disproportion
- Inadequate pelvis
- Known bony deformities & coagulopathy in fetus

Special Situations

- Conditions where vacuum is contraindicated, but forceps can be used
  - Preterm head
  - Mento anterior face
  - After coming head of breech
  - Dead fetus

Complications

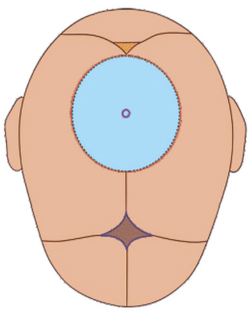
	Forceps Delivery	Vacuum Delivery
Mother	Perineal injuries	Acute perinatal injuries
Fetus	Brachial plexus injury, anterior eye injury, facial nerve palsy, depressed skull fracture	Retinal hemorrhage, Cephalhematoma, Subgaleal hemorrhage

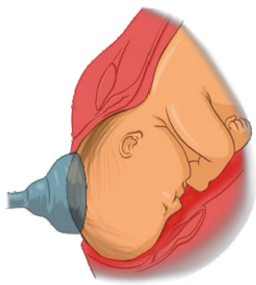
Instruments

FMGE 2024, INICET 2024

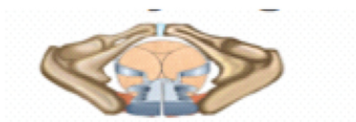
Vacuum Delivery

- Silicon cup
  - Applied at the flexion point → 3cm in front of posterior fontanelle & 6 cm behind anterior fontanelle
  - Suction pressure used is 0.8kg/cm^2, 600mm Hg
- Kiwi omnicup





Suction pressure 0.8 kg/cm2,



Forceps Delivery

- Wrigley's forceps

- Outlet forceps
- Blades of forceps are equidistant from the sagittal suture
- Forceps applied along the occipitomental diameter

Q. A 25 year old primigravida at 40 weeks of gestation presents with a prolonged second stage of labor. She is exhausted, and her bearing-down efforts are poor. She is getting good contractions, and FHR is 100/min. On examination, the fetal head is at station +3 ith caput +1 , sutures in AP diameter. What is the most appropriate management?

A. Vacuum

B. Outlet forceps

C. Low cavity forceps

D. Wait and observe

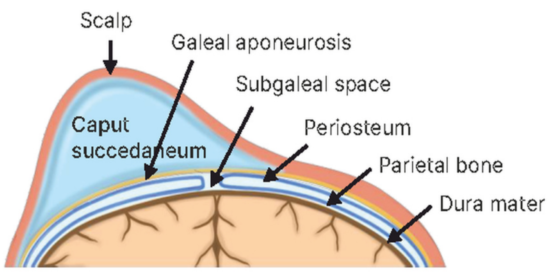
Answer: **B**

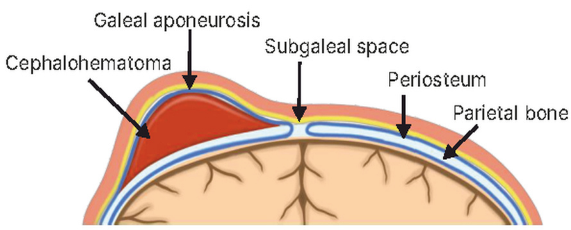
Outlet forceps application	Low forceps application
Scalp visible at introitus	Fetal station at +2 or below
Fetal skull reached pelvic floor	Fetal skull not reached pelvic floor
Head at perineum	

CAPUT SUCCEDANEUM Vs CEPHALOHEMATOMA

FMGE 2024
NEET PG 2023

Caput succedaneum	Cephalohematoma
Edema in the layers of scalp above periosteum	Subperiosteal collection of blood
Crosses the suture line	Does not cross the suture line
Present immediately after birth and resolves o24-48 hoursn in 24-48hrs	Increase in 1st few days after delivery





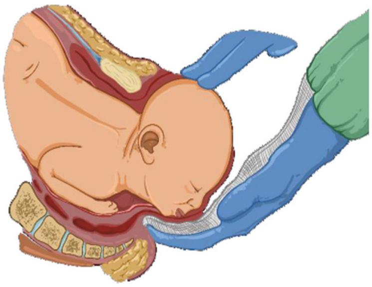
PERINEAL INJURY

01.53.47

Prevention

- Controlled delivery of the head
  - Ritgen Maneuver is used for controlled delivery of head
  - Modifies Ritgen Maneuver- done along with contractions

Yourwish



- Delivery of head by extension in between contractions
- Suboccipitofrontal diameter distends the vulval outlet
- Perineal massage
- Perineal support
- Warm and wet compresses
- Routine episiotomy is not recommended

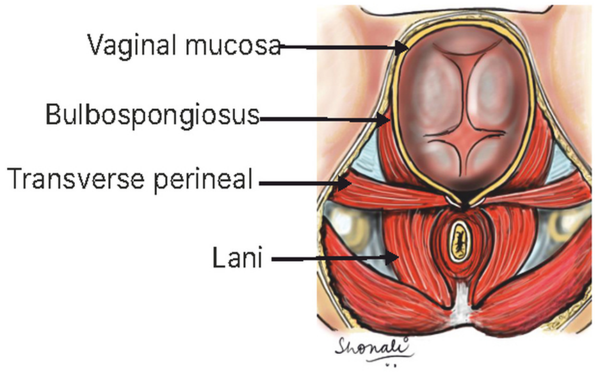
Obstetric Anal Sphincter Injuries (OASIS)

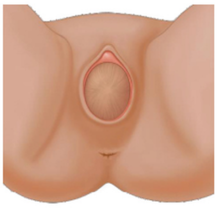
Degree of perineal injury	
1st degree perineal tear	• Injury to vaginal mucosa and/or perineal skin
2nd degree perineal tear	• Injury to vginal mu,cosa , muscle and perineal skin • Not involving the anal sphincter • Episiotomy is a type of 2nd degree perineal tear
3rd degree perineal tear	• 3a : <50% EAS torn • 3b : ≥50 EAS torn • 3c : IAS also torn
4th degree perineal tear	• Rectal mucosa also torn • Complete perineal tear

- Injury identified immediately after delivery → Repair at same time in OT
- Delayed presentation → Delayed repair , once wound is free of exudate and infection
- Complication
  - Long-term complication - Fecal or flatus incontinence, Rectovaginal fistula
- Sequence of repair: Absorbable suture
  - Rectal mucosa → IAS → EAS → rest as episiotomy
  - EAS repair: End-to-end anastomosis and overlapping technique
  - Most women offered Cesarean section in next delivery

Episiotomy

- Type of second degree perineal tear
- Wides the introitus
- Best timing → During Crowning
- Preferred is Mediolateral
- Structure which are cut
  - Vaginal mucosa
  - Bulbospongiosus
  - Transverse perineal muscles
  - Deep fibers of Levator ani
  - Superficial branches of the pudendal vessels
  - Superficial fibers of the Pudendal nerve
- Muscle Which Are Not Cut
  - Ischiocavernous

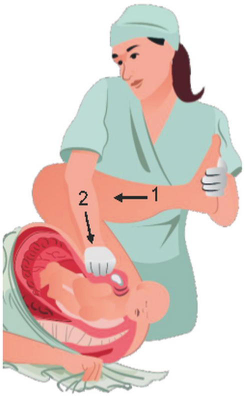




- External Anal Sphincter
- Angle at which incision is given → 60°
- Sequence of repair → Absorbable suture - Rapid Vicryl
    - Vaginal mucosa
    - Perineal muscle
    - Skin

SHOULDER DYSTOCIA

02.01.26



- Occurs at the level of the pelvic brim
- Head to body delivery time >60sec
- Sign → Turtle Sign (Head recedes back onto perineum)
- Do not push from above / pull from below
- M/C fetal injury with shoulder dystocia → Brachial plexus injury
- M/C maternal nerve injury with the maneuver → Lateral cutaneous nerve of thigh
- M/C maternal complication with shoulder dystocia → PPH
- Maneuvers
    - Mc Robert's maneuver → Thighs hyperflexed and abducted with suprapubic pressure → Does not increase dimensions of pelvis
    - Delivery of the posterior arm
    - Rubin's maneuver and Woods Corkscrew maneuver → Internal rotation maneuver
    - Gaskin's maneuver
    - Cleidotomy → Clavicle of the fetus is cut
    - Symphysiotomy → Pubis symphysis is cut
    - Zavanelli maneuver

NEET PG 2020, 2023, 2024, 2025
FMGE 2020, 2021, 2023, 2024, 2025
INICET 2021, 2024 , AIIMS 2020

THIRD STAGE OF LABOR

02.05.35

- Plane of placental separation passes through the Decidua spongiosa
- Most important factor for placental separation & controlling blood loss → Uterine contractions
- 1st sign of placental separation → Globular , firm & Ballotable uterus
- Definitive sign of placental separation → Permanent lengthening of the cord, placenta in the lower uterine segment
- Kustner sign → Absence of umbilical cord retraction on suprapubic pressure
- Shroeder's sign → Elevation of fundus on P/A exam

Methods Of Placental Separation

- Schultz method
    - Central separation
    - Retroplacental Hematoma
    - Fetal side of placenta comes out first

- Mathew Duncan method
    - Marginal separation
    - Visible bleeding is more
    - Maternal side comes out first

Active Management Of Third Stage Of Labor

INICET 2021, 2022, 2024

- Duration of AMTSL → 5-15min

- Done routinely for decreasing the incidence of PPH
- Component are terotonics is given immediately (within 1min) after the delivery of the baby
  - → According to the Government of India → Drug of choice is Oxytocin 10 IUIM
  - → According to WHO → Oxytocin can be administered as IV infusion but not as IV bolus
  - Delayed cord clamping → according to WHO, 1-3 min (not before 1min after delivery)
    - → It is recommended for all vigorous babies, irrespective of birth weight
    - → Delay in 1min → leads to 80ml of extra blood, which supplements 50mg of iron to the fetus
    - → Preferred in preterm delivery, Rh-negative pregnancy, and HIV positive pregnancy
  - Controlled Cord Traction
  - Intermittent Uterine Tone Assessment

Important Information

- Early cord clamping is indicated when the newborn is asphyxiated, increased maternal bleeding in the 3rd stage, or known heart disease of baby

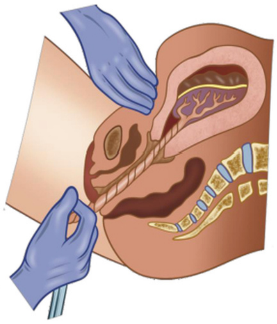
Q.Consider the following actions under AMTSL (Active Management of the Third Stage of Labor). Arrange them in the correct order

1.Uterine massage
2.Give uterotonic (Oxytocin 10 IU)
3.Exclude the presence of another fetus
4.Controlled cord traction

A. 3,1,2,4
B. 3,2,4,1
C. 2,4,3,1
D. 2,4,1,3

Answer: **B**

Controlled Cord Traction



- Modified Brandt Andrew's method → Traction on the umbilical cord with countertraction upwards
- Done only when a skilled birth attendant is available
- It is done with uterine contractions

Drugs	AMTSL	Treatment of PPH	Description
Oxytocin	10U IM/IV infusion	20U in 500ml IV infusion	• Oxytocin is never administered as IV bolus • Oxytocin stored at 2-8 °Half-lifeife of3-5 minutescin is 3-5min • /E Hypotension tachycardia , water intoxication
Carbetocin	100μg IM or slow IV		• Synthetic analogue of oxytocin, octapeptide • Heat stable • Used when cothe ld chain to maintain oxytocin is not available

Methergin	Not given in AMTSL (WHO)	0.2g IM/IV	• S/E : ypertension , Vasconstriction , risk of retainedplacenta • C/I : ypertension ,preeclampsia , Cariac disease , peripheral vasular disease , HIV positive on proteae inhibitor , before delivery of 2nd twin,Rh negative mother
Misoprostol	400-600μg orally	800μg sublingual	• S/E : Fever , shivering , nausea & vomiting , Diarrhea
Syntometrine	Not recommended		
Carboprost/ Hemabate (PGF2)	Injectable PGs are not recommended for AMTSL	250μg IM every 15min (max 8 doses upto 2mg)	• /E : Diarrea , nausea and vomitng , Bronchoconstriction • C/I Bronchial asthma

Uterotonics

MALPRESENTATION

02.21.46

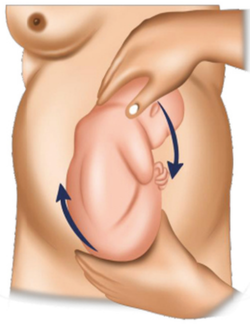
Breech Presentation

- Incidence of breech
  - At 28weeks - 25%
  - At term - 3%
- MC position - LSA
- Denominator - Sacrum
- MC cause is prematurity
- MC fetal morbidity with breech → prematurity
- MC cause of fetal mortality in breech delivery → Intracerebral Hemorrhage
- Types of Breech
  - Frank breech
    → Hip flexed and knee extended
    → Presentation is Buttock
    → More common in primi
  - Complete/flexed breech
    → Both hip and knee are flexed
    → Presentation is buttocks and limbs
    → More common in multi
  - Footling breech
    → Both hip and knee are extended
    → Presentation is foot
- Risk of cord prolapse is maximum in transverse lie > footling
- Least risk of cord prolapse is in Frank Breech

Management Of Breech Presentation

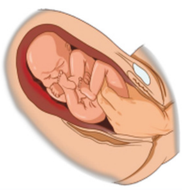
External Cephalic Version

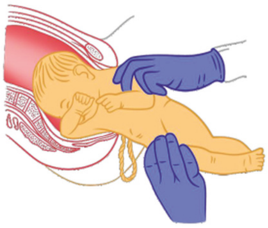
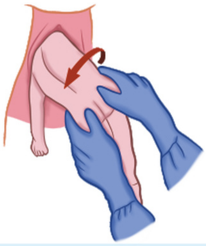
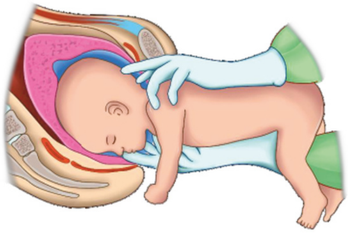
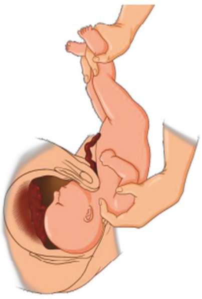
- Breech presentation at term → 37weeks (> 36weeks) to all who fulfill the criteria
- Done with USG / CTG, guided with OT kept ready
- Outcome
  - If ECV is successful → allow for spontaneous labor
    → No routine induction of labor
  - If fetal distress is observed → stop ECV → Revert back
    → If still distress noted → Cesarean section is planned
- Indications
  - Singleton fetus
  - Pelvis adequate
  - Not a low-lying placenta
  - Liquor adequate and membrane +
  - No gross congenital anomalies - a healthy fetus
  - No preeclampsia / HTN



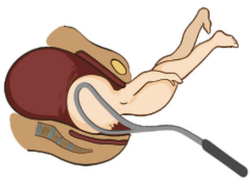
- Complications
  - Cord compression
  - Cord entanglement
  - Placental abruption
  - Risk of Fetomaternal hemorrhage
- Absolute Contraindications
  - Placenta previa
  - Inadequate pelvis
  - Multiple pregnancy
  - Preeclampsia
  - Oligohydramnios
  - Post term
  - Known uterine structural anomaly
  - IUGR with deranged Doppler
- Relative contraindications
  - Previous LSCS
  - Macrosomia

Maneuvers Used In Breech Delivery

Groin traction 	• Delivery of Buttocks
Pinard's maneuver 	• Delivery of extended legs

Loveset's maneuver  	• Delivery of extended arms
Mauriceau Smellie Veit maneuver 	• Malar flexion & shoulder traction • Used for the delivery of the after-coming head • After coming head engages by the suboccipitofrontal diameter and is delivered by flexion
Prague maneuver 	• Delivery of the after-coming head in breech in Dorsoposterior
Burns Marshall 	

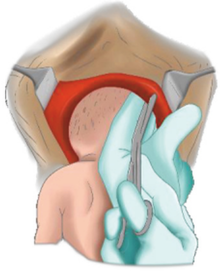
Other Methods



- Piper's forceps → Pelvic curve absent, complete support to fetus's neck
- Durrhsen's incision → Incision is made in the cervix
  - 3'O clock and 9'O clock positions are avoided due to injury to the descending cervical artery
- Cesarean section
  - Absolute indication

→ Footling breech
→ Stargazer breech → Breech with hyperextended head
→ C/I to vaginal delivery

- Elective C-section in breech is scheduled at 39 completed weeks
- If obstetric experience , resources of emergency CS not there → Counsel for Elective CS

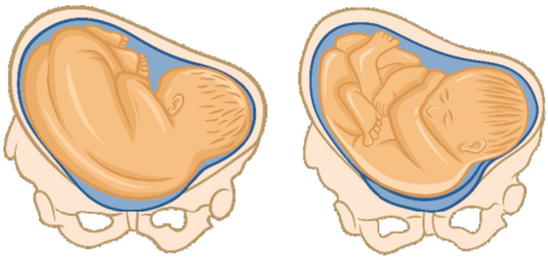


Important Information

- Conditions Where Cesarean Is Preferable
  - Large fetus: EFW >3800 - 4000grams
  - Apparently healthy & viable preterm fetus, either in active labor or indicated preterm
  - Fetal anomaly incompatible with vaginal delivery
  - Severe FGR
  - Macrosomia
  - Previous cesarean section
  - H/O prior perinatal death
  - Patient request

Transverse Lie

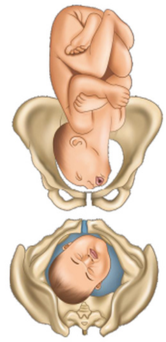
- MC cause → Prematurity
- MC cause at term → Placenta previa
- Presentation → Shoulder
- Denominator → Acromion process



Left dorsoanterior Left dorsoposterior

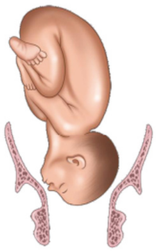
- Flying fetus → Transverse lie with extended head
- Findings on P/A
  - Fundal height less than the period of gestation
  - Head felt in the flanks
  - Fetal heart sound is best heard below the umbilicus
  - Pawlick & pelvic grip empty
- Findings on P/V
  - Gridiron feel of ribs
- Transverse lie at term, not in labor → ECV
- Transverse lie in labor → Cesarean section
  - Planned for elective cesarean section done at 39weeks
- Corpora conduplicate
  - Fetus doubles up and delivers vaginally (Extremely preterm, dead & macerated)

Face Presentation



- MC cause of face presentation is Prematurity > Anencephaly
- MC position is Left Mentoanterior → Vaginal delivery possible
  - Delivery of the face occurs by flexion
- Mentoposterior in active labor → Cesarean section

BROW PRESENTATION



- MC cause of brow presentation → Platypelloid
- P/V finding → Supraorbital ridges & forehead felt
- Management → Cesarean section

Q.A woman is being planned for induction of labor. In which of the following situations is use of oxytocin contraindicated?

A. Previous CS

B. Heart disease

C. Abnormal lie

D. Intrauterine death

Answer: **C**

INDUCTION OF LABOR

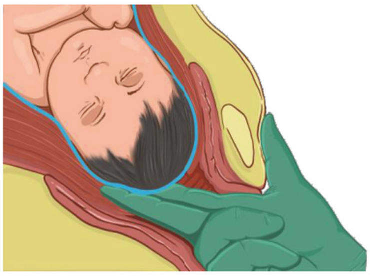
02.46.16

Contraindications

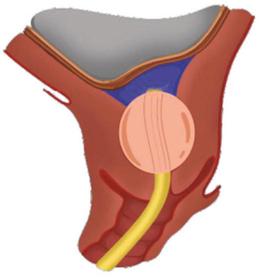
- Maternal
  - Placenta previa
  - Inadequate pelvis
  - Previous 2 LSCS
  - Previous classical Cesarean section
  - Active genital herpes
  - Cervical cancer
- Fetal
  - Significant macrosomia
  - Malpresentation → Mentoposterior, Transverse lie, Brow presentation
  - Non-reassuring fetal status
- Offer elective CS:
  - If maternal diabetes and EFW >4.5Kg
  - If no maternal diabetes and EFW >5kg
- Avoid ARM in the following conditions
  - IUD
  - HIV positive women
  - Active genital herpes
  - Free-floating head
  - Polyhydramnios

Methods For Induction of Labor

Sweep & Stretching the membrane → Cervical ripening

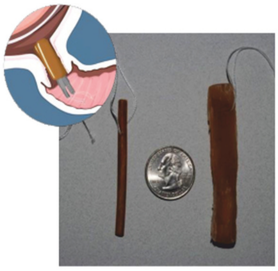


Trans cervical foley's catheter → preferred in women of previous C-section



Dinoprostone → 0.5mg Cerviprime gel, PGE2

Laminaria tents → Hygroscopic dilators used for cervical ripening in second-trimester MTPs



Cervidil 10mg → PGE2 vaginal insert, release at a rate of 0.3mg/hr

PGE2 insert Cervidil 10 mg

Pharmacological methods for cervical ripening

- Methods:
  - Dinoprostone (PGE2)
  - Misoprostol (PGE1)
  - Mifepristone is used only for MTPs
  - Oxytocin
  - Hyaluronic acid
  - NO donors
- PGE1 C/I in previous Cesarean section beyond 28 weeks

Yourwish

Bishop Score

INICET 2021

	0	1	2	3
Dilatation	Closed	1-2	3-4	≥5
Effacement	0-30	40-50	60-70	≥80
Station	-3	-2	1 , 0	1 , +2
Consistency	Firm	Medium	Soft	
Position	Posterior	Mid position	Anterior	

- Used for assessing the favorability of the cervix for the induction of labor
- Score >6 is favorable
- Score ≥9 high chance for successful induction
- Modified Bishop score → Cervical length is used instead of Effacement
  - As effacement progresses, cervical length shortens
- Simplified Bishop score (maximum score is 9, if ≥ 5 → favorable)
  - Cervical dilatation
  - Effacement
  - Station

11. OBSTETRIC HEMORRHAGE & COMPLICATIONS

ANTEPARTUM HEMORRHAGE

00.00.55

Low Lying Placenta

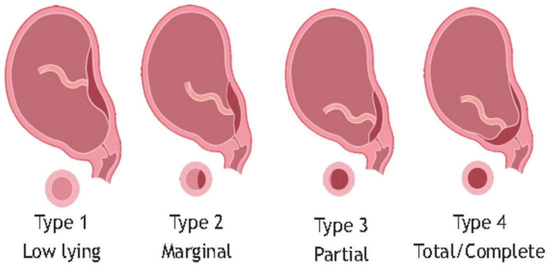
- Placental edge is within 2cm of the internal os

Placenta Previa

- Placenta covering the internal os partially or totally

Classification

- Type 1 - Low Lying
- Type 2 - Marginal } Minor degree
- Type 3 - Partial
- Type 4 - Total / Complete } Major degree



Risk Factors

- Increasing age, parity, and smoking
- Past H/O placental previa, previous cesarean section
- Multiple pregnancy
- Uterine structural anomalies

Important Information

- Type 2 placental previa a/w Stallworthy sign
  - As head descends down → compress the umbilical cord → decrease FHR

Management

- Low-lying placenta in Level II scan confirmed at 32 weeks and 36 weeks
- Schedule Elective Cesarean section at 37 completed weeks if the female never bleeds
- MC fetal complication → Increased risk of Fetal Growth Restriction due to repeated bouts of hemorrhage without delivery

Pregnant female with bleeding

↓

Check the hemodynamic status and resuscitation done

↓

Conservative management in preterm cases if:

- No active bleeding
- Viable fetus
- No fetal distress
- Not in labor

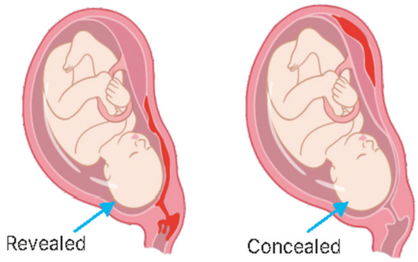
Emergency Cesarean section

- Hemodynamically unstable
- Patient in labor
- Female presents >=37 weeks
- Fetal distress
- Dead fetus
- Non viable fetus

Mc Caffey protocol
- Steroids if <34 weeks
- Anti D if Rh -ve
- Tocolysis not preferable

Placental Abruption
- Premature separation of a normally situated placenta
- Bleeding occurs in Decidua basalis

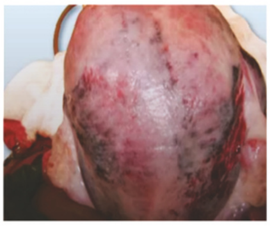
Types



- Revealed abruption
  - Placental separation from the margins
  - Bleeding is manifested
- Concealed abruption
  - Placental separation occurs in the centre
  - Formation of retroplacental clot
  - More dangerous, due to the release of Placental thromboplastin, which can result in DIC
- Clinical classification for severity → PAGE classification

Risk Factors
- Increasing age, parity, smoking
- Hypertension, preeclampsia
- Abdominal trauma
- APLA (Antiphospholipid Antibody Syndrome)
- Polyhydramnios → leads to overdistension of the uterus
- PROM

Clinical Features



- Asymptomatic with small retroplacental clots
- Fetal distress
- Shock in mother
- DIC in mother
- Couvelaire uterus
  - Bleeding in the myometrium
  - More likely with concealed abruption
  - Not a direct reason for Hysterectomy

Important Information
- MC cause of DIC in obstetrics is Placental Abruption

Q.A 35-year-old, primigravida, hypertensive woman is seen at 35 weeks with c/o continuous pain abdomen, bleeding P/V, and loss of fetal movements for 1 hour. Uterus corresponds to POG, contractions are present with increased uterine tone. FHR is 120/min. What is the most likely diagnosis?

A.Placental abruption

B.Polyhydramnios

C.Placenta previa
D.Preterm labor

Answer: A

Difference Between Placenta Previa And Abruption

	Placental previa	Placental abruption
Presentation	Presents with APH	Presents with APH Antecedent h/o abdominal trauma / HTN / prolonged rupture of membrane
Character of Bleeding & pain	• Bright red and fresh • 1st episode is usually a warning hemorrhage • Painless, causeless bleeding	• Bleeding altered dark colored • Pain is present

Abdominal examination	• Fundal height corresponds to POG
	• Associated with
	  ○ Free-floating head
	  ○ Transverse lie
	• Uterus relaxed
	• FHR is usually normal
		• Fundal height >POG - in concealed abruption
		• Fundal height corresponds to POG in revealed abruption
		• Uterus tense, tender, tone is increased, contractions present
		• Fetal distress

P/V & P/S	P/S and P/V not done at first. USG (TAS f/b TVS if needed) done to rule out placenta previa	
USG	• Placenta in lower uterine segment	• Placenta in upper segment with/without retroplacental hematoma

- Clinical suspicion of placental abruption

Placental previa ruled out.
↓
P/V examination is done
↓
ARM done
↓
Blood-stained liquor

- Double setup examination
  - P/V examination done in OT, and emergency Cesarean section is made ready

Management

FMGE 2022, 2023

- Simultaneous resuscitation & Delivery
- Steroids are given if the gestational age is <34 weeks
- Continuous CTG monitoring
- DIC with abruption: DIC correction and vaginal delivery attempted
- Preferred route of delivery

Yourwish

  - Vaginal delivery with IOL / Augmentation
- Indications for Cesarean Section for a case with abruption:
  - Fetal distress
  - C/I in vaginal delivery
  - Far from delivery with severe abruption
- MC fetal complication with abruption is Prematurity

Q. A 30-week primigravida presents with placenta previa and complains of mild vaginal bleeding. Her blood pressure is 110/70 mmHg, fetal heart rate is 140/min, and there are no uterine contractions. What is the most appropriate next step in management?

A. Initiate labor induction with oxytocin

B. Admit and manage expectantly

C. Perform immediate caesarean delivery

D. Perform amniotomy to augment labor

Answer: B

Q. A primigravida with 36 weeks of pregnancy is in labor with 3 cm dilatation and minimal uterine contraction. On rupture of membranes, fresh bleeding is noted with late fetal deceleration up to 50 beats/min. The patient was taken for LSCS, but the fetus could not be saved. The placenta was in the upper segment & there were no retroplacental clots. The likely diagnosis is?

A. Placental previa

B. Revealed abruption

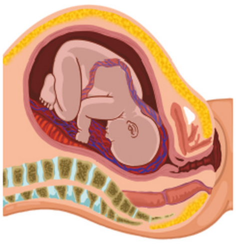
C. Vasa previa

D. Succenturiate placenta

Answer: C

- In revealed abruption to cause fetal distress, at least 50% of the placenta should be separated, and there must be 2500 ml of blood loss.
  - As the mother will be hemodynamically unstable
  - Hemorrhage is maternal blood

Vasa Previa



- Fetal vessels in front of the presenting part
- Fetal vessels are not inside the umbilical cord covering
- Hemorrhage is fetal blood

Types

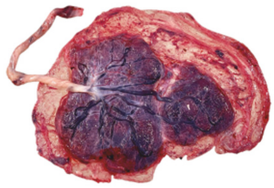
- Type I Vasa Previa → associated with Velamentous cord insertion
  - Velamentous cord insertion can increase the risk of PPH due to avulsion of the umbilical cord
- Type II Vasa Previa → associated with Succenturiate placenta
- Bedside test to differentiate between fetal vs maternal blood (qualitative):
  - APT test

- Fetal blood vessels lack a covering, which leads to compression of fetal vessels by the presenting part, producing fetal distress.
- With antenatal diagnosis, elective CS at 34-36 weeks is recommended.

TYPES OF PLACENTA

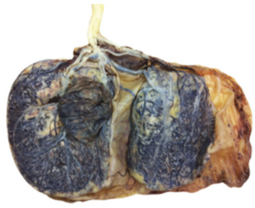
00.34.11

Succenturiate Placenta



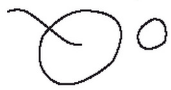
- Additional lobe of the placenta
- Leash of connecting vessels present
- Leads to increased risk of retained tissue and a/w PPH

Bilobed Placenta



- The additional lobes of the placenta are of equal size
- Blood vessels present on one lobe of the placenta or in between
- Leash of connecting vessels present

Placenta Spuria



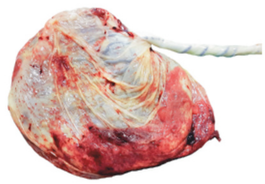
Placenta Spuria

- Extra lobe of placenta with no leash of blood vessels

Circumvallate Placenta

- Rim of membrane around placenta → formed due to double folding of the Chorion and amnion.
- Chorionic plate is smaller
- A/w increased risk of abortion, APH, IUGR, preterm birth

Battledore Placenta



- Marginal cord insertion
- Complication
  - Cord Compression → During antepartum period
  - Cord avulsion & PPH can occur

POSTPARTUM HEMORRHAGE

00.37.44

FMGE 2023, 2025
INICET 2021, 2022, 2025

- Blood loss >500 ml in a singleton vaginal delivery
- Blood loss >1000 ml in a twin vaginal delivery or cesarean section.
- ACOG defines PPH as cumulative blood loss > 1000 ml within 24 hours of delivery, irrespective of the route of delivery or any amount of blood loss with signs & symptoms of hypovolemia.
- Significant PPH → Blood loss leading to a fall in Hematocrit of > 10% after delivery.

Types

- Primary PPH → Occurs within 24 hrs of delivery
  - Cause of primary PPH
    → Atonic > Traumatic
- Secondary PPH → Occurs beyond 24 hrs and upto 12 weeks of delivery

- Cause of secondary PPH
  → Retained placental tissue (MC)
  → Placental site subinvolution
  → Endometritis
  → Placental polyps
- WHO update in PPH → Routine objective assessment of blood loss

First Response Treatment Bundle

- Initiate if: (Whichever occurs 1st with 24 hours of birth)
  - Blood loss ≥ 500 ml
  - Blood loss ≥ 300 ml with any abnormal hemodynamic status
    → PR > 100/min
    → SBP <100 mmHg or DBP <60mmHg
    → Shock index > 1
- Management
  - Massage
  - Uterotonics
  - Tranexamic acid
  - IV fluids
  - Examination
  - Escalation of care as needed

Management of PPH

Management of PPH

Immediate measures :
Call for help, 2 wide bore IV lines,
Blood Ix & crossmatch

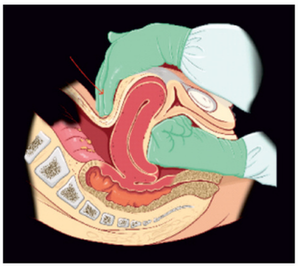
- IV crystalloids
- Catheterize bladder
- Monitor vitals

↓

Feel the uterus on P/A exam

↓ Uterus flabby- ATONIC PPH

↓ Initiate massage & uterotonics



- Uterotonics escalated
- IV tranexamic acid
- Examine completeness of placenta & membranes
- Explore cervix & vagina

↓ Bimanual Uterine Tamponade

↓ Uterus contracted
TRAUMATIC PPH
Explore & repair

↓

Uterotonics exhausted
Uterus is still atonic

↓
- Mobilize patient to OT
- Explore the uterus & genital tract

Balloon Uterine Tamponade

↓

Surgical methods - Laparotomy

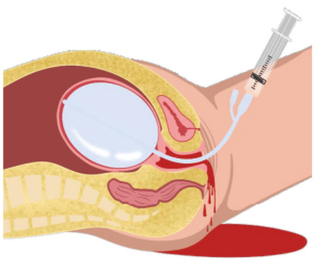
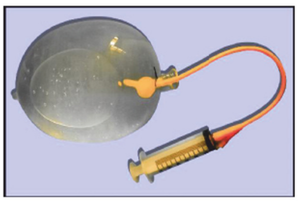
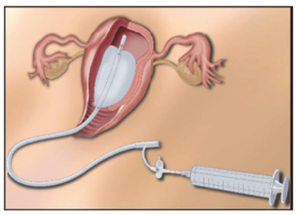
↓
- Uterus compression sutures
- Step-wise devascularization procedures

Hysterectomy

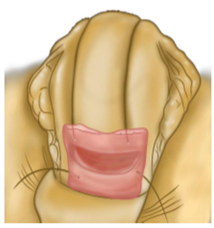
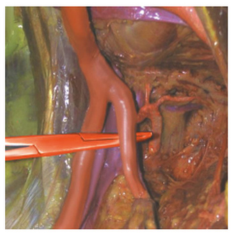
↓

Pelvic pressure pack (parachute pack)

- Initiate uterine massage and uterotonics.
  - Uterotonics → Oxytocin infusion is the drug of choice
- IV Tranexamic acid
  - Decrease morbidity if given within 3 hrs of diagnosis of PPH (irrespective of the cause)
  - Dose 1 g (10 ml of 100 mg/ml solution over 10 min)
- Bimanual uterine tamponade → Done only after emptying the bladder
- External aortic compression , anti-shock garments recommended as a temporizing measure
- Uterine packing is not recommended
- Balloon Uterine Tamponade
  - Can also be done in LR, ideally done in OT
  - Bakri Balloon filled with 500ml Normal saline
  - Condom catheter used in low-resource settings

- Laparotomy
  - Uterus compression suture - Especially in case of Atonic PPH
    - → B-Lynch suture
    - → Hayman's suture
    - → Cho's square suture
  - Stepwise devascularization sequence:
    - → Uterine > Ovarian > Internal iliac
    - → Never common iliac

- Hysterectomy - Last option
- Pelvic pressure pack → parachute pack

Yourwish

Yourwish

- Goal of blood transfusion
  - Hb >8 g/dl
  - Platelet count >50,000
  - PT and aPTT <1.5 times normal
  - Serum fibrinogen >2 g/dl

Q. A 25-year-old primigravida delivered vaginally, and the uterus remains atonic after placental delivery. Uterine massage and IV fluids are started. She has received oxytocin & Methergin, and the bleeding still continues. Which prostaglandin derivative can be given in this situation?

A.Dinoprostone

B.Misoprostol

C.Latanoprost

D.Carboprost

Answer: D

- Methergin is C/I in hypertension.
- Dinoprostone is a PGE2 analogue → Not recommended for PPH
- Misoprostol is a PGE1 analogue
  - Misoprostol 800μg sublingual is recommended by WHO
  - Misoprostol 1000μg P/R is followed in India
- Carboprost is a PGF2α analogue
  - Carboprost 250μg IM can be given every 15min maximum of 8 doses.
  - Used cautiously in patients with Hypertension
- If retained placenta is suspected, then Injectable PGs and Methergin are avoided.
- Carbetocin is not recommended for the treatment of PPH.

Q. A 25-year-old woman delivered her first child by cesarean done for arrest of labor. You are assisting your senior. The placenta & membranes are expelled, but the uterus remains atonic. Fluid resuscitation is begun; bimanual uterine compression is being done, and the available uterotonics are exhausted. Her PR is 120/min & BP is 90/60 mmHg. 2 units of blood is on its way. What could be the most appropriate next step?

A.B Lynch sutures

B.Balloon uterine tamponade

C.Stepwise devascularization

D.Uterine artery embolization

Answer: A

- Uterine artery embolization is not done in unstable patients with rapid ongoing bleeding and those with coagulopathy.

Q.A multigravida delivers a stillborn baby after laboring for 8 hours at gestational age of 32 weeks. AMTSL followed. During attempts with controlled cord traction, the umbilical cord gets avulsed & the patient begins to bleed profusely. Which of the following is the most appropriate next step in patient management?

Yourwish

A. Start oxytocin infusion & wait for spontaneous placental expulsion
B. Administer methergine
C. Manual removal of placenta in OT
D. Inject oxytocin in the umbilical cord

Answer: C

- MC cause of retained placenta is Inefficient uterine contractions
- During manual removal of the placenta, antibiotics are administered

Retained placenta

Trapped placenta

- Signs of placenta separation +
- The uterus is contracting well
- The risk of bleeding is low

Placenta Adherens

- Placenta attached to decidua
- Myometrium behind the placenta fails to contract
- The plane of placental separation is present during manual removal of the placenta.

Morbidly Adherent Placenta

- Placenta attached to myometrium
- No placental plane of separation

Management

No PPH and No spontaneous expulsion after 15 min of delivery
↓
Steps taken for removal of placenta
↓
Controlled cord traction , empty the bladder
→ (15 min) → Manual Removal of Placenta

No PPH but placenta undelivered after 30 min of birth → Manual Removal of Placenta

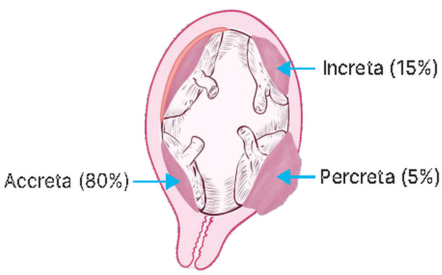
Bleeding present and female is under regional anaesthesia → Manual Removal of Placenta

Manual Removal of Placenta
↓
After completion continue oxytocin infusion

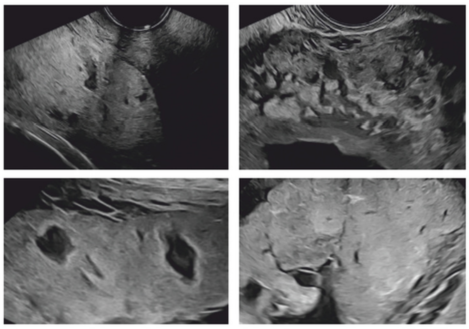
NEET PG 2024

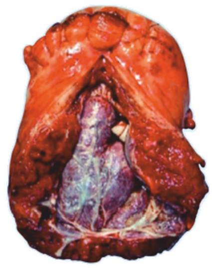
PLACENTA ACCRETA SEPTUM

- Placenta accreta → Placenta attached to the myometrium
- Placenta increta → Placenta penetrates into the myometrium
- Placenta percreta → Placenta perforated the myometrium
- Placenta accreta spectrum results in failure or incomplete separation of the placenta after delivery



- PAS is identified during attempts at manual removal of the placenta, and the plane of cleavage for placental separation is not found
- Partial or total absence of Decidua basalis
- Defective development of the Nitabuch layer
- MC risk factor → Previous cesarean section
  - Risk α Number of previous cesarean sections
- Maximum risk with previous cesarean section + placenta previa in present pregnancy
- Investigation
  - Initial investigation: USG - Doppler
    - → Moth-eaten / Swiss cheese appearance
    - → Loss of retroplacental sonolucent zone
    - → Thinning of myometrium overlying the placenta
    - → Hypervascularity of bladder-serosa interface
    - → Placental lacunae or lakes with turbulent flow.
  - MRI can also be done
- Management
  - Planned delivery at tertiary center between 34-37 weeks
  - Elective cesarean section
  - Do not attempt removal of placenta
  - Proceed with Hysterectomy
    - → Specimen taken for HPE





Q. A 40-year-old multiparous woman with intrauterine fetal death was admitted with strong labor pains. She collapses immediately after delivery & suddenly develops breathlessness & cyanosis; vaginal bleeding is not excessive. What is the most likely diagnosis?

A. Rupture of uterus

B. Congestive heart failure

C. Amniotic fluid embolism

D. Concealed accidental hemorrhage

Answer: C

POSTPARTUM COLLAPSE

01.21.43

	Cause	Clinical features
Vaginal bleeding with hemodynamic instability	Atonic PPH	• Uterus relaxed • Fundus may be palpable above umbilicus
	Retained tissue	• Suspected if Atonic PPH not responding to uterotonics
	Traumatic PPH	• Uterus well contracted • Explore the cervix and vagina for tears
	Ruptured uterus	• No tear in perineum, vagina, or cervix, and bleeding from os → tear in uterus • Signs and symptoms of hemoperitoneum

		• H/O difficult delivery • H/O VABC • Grand multiparity
Vaginal bleeding within normal limits and Hemodynamic instability	Genital hematoma	• Uterus is contracting well • Perineal pain and not passing urine • Can involve vulva and extends upto vagina
	Broad ligament hematoma	• Vulva, vagina, cervix normal • The uterus deviated to one side • Fullness through fornices
	Uterine inversion	• Mismanagement of 3rd stage of labor • P/A - fundus not palpable • Bradycardia occurs due to neurogenic shock
	Pulmonary embolism	• Breathlessness, cyanosis, hypoxia, signs and symptoms of heart failure • DVT to be ruled out
	Amniotic fluid embolism (clinical diagnosis)	• Occurs during delivery or within 30 min of placental delivery • Hypertension & RHF occur first • Followed by Hypotension and cardiogenic shock • In later stages, DIC occurs • No sepsis or fever is noted

Genital Hematoma

- Vulval Hematoma
  - Involves branches of Internal pudendal artery
- Vaginal Hematoma
  - Involves branches of vaginal artery and descending cervical artery

Management

- Hemodynamically unstable, severely symptomatic, and hematoma > 5 cm in size or increasing in size
  - Resuscitation + Drainage in OT + Ligation of the bleeder
- Hemodynamically stable patients, small hematoma & asymptomatic
  - Observation

Uterine Inversion

Risk Factors

- Atonic uterus
- Fundal placenta
- Morbidly adherent placenta

Types

- Complete → Fundus descended below the cervix
- Incomplete → Fundus not descended below the cervix

Yourwish

Clinical Features

- Neurogenic shock out of proportion to bleeding
- Hemorrhagic shock (MC cause of death)
- Boggy, reddish mass appearing at the introitus

Management

- Call for help
- Resuscitation
- Do not separate the placenta (stop oxytocin during reposition)
- Johnson's method
  - Manual reposition of the placenta done in OT
  - After repositioning, start oxytocin infusion
- Other methods
  - O Sullivan's Hydrostatic Replacement
  - Abdominal laparotomy
    → Huntington's
    → Haultain's

Q.A multiparous woman with PPROM at 32 weeks is admitted in LR. The nurse was examining the woman for contractions & suddenly noticed a prolapsed umbilical cord. She calls you on the phone. What do you ask her to do?

A. Replace the cord inside the vagina

B. Put the woman in Trendelenburg position

C. Shift patient to OT

D. Start oxytocin infusion

Answer: B

- Avoid unnecessary handling of the cord
- Do not try to reposition above the presenting part

CORD PROLAPSE

01.42.35

Precautions

- Always check the FHS & P/V examination after Rupture of membrane
- Careful P/V examination with malpresentations
- Avoid ARM with high presenting part & polyhydramnios
  - Controlled ARM can be done
- Safe confinement of transverse /oblique lies at term
- Cord presentation in labor
  - On P/V membranes are intact.
  - Bag of membrane feels like a bag of worms
  - Managed by Cesarean section

Methods To Relieve Cord Compression

- Trendelenburg position with pillow under buttocks

- Vago's Method
  - Retrograde filling of the bladder
- Sim's position, Knee-chest position
- Manual relief
  - Push the presenting part up

Management

- Call for help
- Check for FHR to rule out fetal distress
- Positional changes made to relieve cord compression
- Stop oxytocin
- Steps taken to manage accordingly
  - P/V → Vaginal delivery if possible
  - Category I Cesarean section to save the fetus

Important Information

- Category I Cesarean section
  - Duration from decision to do Cesarean section till the delivery of the baby: 30 min

Q.Unbooked 21-year-old, primigravida is seen in emergency at term with labor pains for 2 days & leaking P/V for over 24 hrs. History of Dai handling present. She is febrile, PR 110/min, BP is 110/70 mm Hg. On P/A exam, uterus term size feels tense & tender, fetal parts are not easily palpable & FHR cannot be localized. On P/V exam, vagina feels hot & dry, the cervix feels thick & edematous & 6 cm dilated, membranes absent, thick meconium, huge caput reaching +2 station & grade 3 molding. Urine is blood-stained. What is the most likely diagnosis?

A. Placental abruption

B. Obstructed labor

C. Rupture uterus

D. CPD

Answer: B

Obstructed Labor

- Bandl's ring: Formed in obstructed labor
  - Ring formed at the junction of tonically contracted upper uterine segment & thin, stretched LUS, felt on P/A exam.
  - AKA: Pathological retraction ring
- Management → Resuscitation with Emergency Cesarean section, even if the fetus is dead

RUPTURE UTERUS

01.50.39

Q.Unbooked G4P3L3 with 9-month gestation in labor, is seen in the emergency in a collapsed state. On examination, the fetal parts are superficially palpable; FHS cannot be heard. She is 5 cm dilated & the presenting part cannot be felt on P/V exam. There is bright red vaginal bleeding. What is the most likely diagnosis?

A.Rupture uterus

B.Abdominal pregnancy

C.Abruptio placenta

D.Placenta previa

Answer: A

- Key words:
  - Uterine contour lost
  - Fetal parts are superficially palpable
  - Sudden cessation of contractions
  - Loss of station
- Management → Resuscitation and Emergency Laparotomy

Risk Factor

- Unscarred uterus:
  - Lower uterine segment ruptures in obstructed labor
  - Upper uterine segment ruptures in Grand multiparous
  - Uterine structural malformations
- Scar rupture
  - 1 prior LSCS increases the chance of uterine rupture by 0.5% (1 in 200)
  - Risk of scar rupture with H/O scar rupture

    → Lower segment - up to 6%

    → Upper segment - up to 32%
- Risk increased with
  - Excessive uterine contractions
  - Induced or augmented labor
  - Intrauterine manipulation

Important Information

Type of Incision

- Kerr's Incision: Low transverse uterine incision
- Kronig's Incision: Lower segment vertical incision
- Sanger's Incision: Classical upper segment cesarean section

Pregnancy with previous cesarean section

Absolute indications of elective repeat cesarean section

- Previous classical/T/J shaped uterine incision
- Previous 2 LSCS
- H/O prior rupture
- C/I to vaginal delivery, like Inadequate pelvis, Transverse lie, Placenta previa
- CPD in current pregnancy
- Non-Reassuring fetal status
- Woman does not consent to TOLAC (Trial of labor after Cesarean)
  - Risk of rupture
  - Risk of JIE in newborn
- 24-hour OT facilities not present

Timing

- If scheduling Elective CS → at 39 completed weeks
  - To reduce risk of TTN in newborn
- If H/O prior classical CS or prior rupture:
  - Schedule Elective CS at 37 completed weeks

Tolac

- Increased success rate
  - Average success rate of TOLAC: 70 - 75 %
  - Most important factor that increases the chances of success is H/O prior vaginal delivery at term & when the woman goes into spontaneous labor
- Decreased success rate → CS preferable; TOLAC can be done
  - > 40 weeks
  - Induced Labor
  - Macrosomia
  - Multiple pregnancy
  - Breech
  - Preeclampsia
  - Short interdelivery interval
    → Ideal Inter-delivery interval - at least 18 months.
    → Inter-pregnancy interval - Minimum time to conception from prior CS - 6 months.

Q.A woman with prior cesarean section is in active labor at term, with good uterine contractions. Her CTG trace is showing a baseline FHR of 120 beats/min with persistent late decelerations. Her PR is 114/min. On P/A examination, the uterine contour is maintained, and there is no scar tenderness. Meconium-stained liquor is noted on the perineal pad. What is the most likely diagnosis?

A.Fetal head compression

B.Cord compression

C.Meconium aspiration

D.Impending rupture

Answer: D

- Most consistent sign of early rupture or Impending rupture → Non-reassuring FHR on CTG.
- Incomplete rupture → Peritoneal covering intact
- Managed by Category I cesarean section

Q. A 19-year-old primigravida at 30 weeks of gestation is seen in the emergency with C/O pain in the abdomen. There are no medical risk factors, no fever, and vitals are normal. On P/A exam SFH is 30 cm, cephalic presentation, and mild contractions are present. On P/V exam, cervix is 2 cm dilated, 80% effaced, BOM felt. What is the management?

A. Let her progress in spontaneous labor

B. Give steroids & tocolysis

C. Give steroids & allow labor to progress

D. Give steroids & cervical cerclage

Answer: B

Yourwish

PRETERM LABOR

02.11.09

- Regular uterine contractions with progressive change in cervical dilatation, effacement, or both.
- Cx dilatation of at least 2 cm at initial presentation and regular uterine contractions
- Increased chance of labor within 7 days if: (Update by WHO)
  - ≥6 regular contractions in 1 hr
  - ≥3cm dilatation of cervix
  - ≥75% effacement of cervix
- Preterm labor is allowed to progress in the following conditions:
  - Active Labor
  - POG ≥ 34 weeks
  - Fetal status non-reassuring
  - IUD, lethal fetal anomaly
  - Placental abruption
  - Preeclampsia/eclampsia
  - PPROM already in labor
  - Chorioamnionitis
- Diagnosis in case of no Cx changes:
  - TVS cervix length < 20mm
  - TVS cervix length 20 - 30 mm with Fetal FFN positive

Important Information

Fetal Fibronectin

- Secreted from amnion into cervical-vaginal secretions
- During 23 - 34 weeks
- Positive → >50ng/ml → Suugestive of preterm labour

Management

- Goal: To decrease Perinatal morbidity in preterm labor:
- Antenatal corticosteroids are given if POG is < 34 weeks with established preterm labor or planned preterm birth
  - DOC: Dexamethasone 6 mg IM 12 hourly, a total of 4 doses
  - Steroids are C/I in chorioamnionitis
- Tocolysis
  - Nifedipine
  - β adrenergic agonists are not preferred due to:
    - → Tachycardia
    - → Tremors
    - → Hyperglycemia
    - → Pulmonary edema
  - Indomethacin
    - → Oligohydramnios
    - → Premature closure of Ductus arteriosus if used <32 weeks of gestation
  - Atosiban
    - → Oxytocin receptor antagonist
    - → Used if maternal heart disease is suspected

- Magnesium sulphate
  - Used for fetal neuroprotection in extreme preterm labor (<30-32 weeks) with imminent delivery

Prediction

- Done in asymptomatic, currently singleton pregnancy
- Most important risk factor for preterm birth is H/O prior preterm birth
- Utility in high-risk women: H/O prior spontaneous preterm birth or 2nd-trimester recurrent pregnancy loss
- Done by TVS to measure cervical length at 16-24 weeks
  - Cervical length < 25 mm is predictive of increased risk of preterm birth

Prevention

- Drug of choice is Progesterone

H/O preterm birth and short cervical length	• Cerclage • Vaginal progesterone
No H/O spontaneous &prior preterm birth, incidental diagnosis of short cervix	• No cerclage • Vaginal progesterone
H/O spontaneous preterm birth & normal cervical length	• No cerclage • No vaginal progesterone • 17-OH progesterone caproate IM (controversial)

Q.A primigravida complains of leaking of fluid from the vagina at 32 weeks of gestation. There is no complaint of pain in the abdomen or vaginal bleeding. Her PR is 88/min, BP is 110/70 mm Hg, afebrile. The uterus is relaxed, and FH corresponds to a 32-week, cephalic presentation. FHS is 140 beats/min. What is the next step?

a.Start broad-spectrum antibiotics

b.Perform a sterile per speculum exam

c.Perform a per vaginal exam

d.Perform a USG

Answer: b.Perform a sterile per speculum exam

- If liquor is coming out of the os → Diagnosis is made
- If not sure after P/V → USG to check AFI
  - Admit and observe

Amniotic Fluid Identification

Test for identification of Amniotic fluid

- Done on a pool of secretions in the vagina
  - Litmus test, Nitrazine paper turns blue due to the alkaline nature (pH >6)
    → False positive seen when stained with blood, semen, meconium
  - Ferning pattern on a glass slide under the microscope due to presence of NaCl

Test for Amniotic fluid proteins in cervicovaginal sample

- Placental alpha macroglobulin 1
- IGFBP -1
- IGFBP -1 + AFP

PRELABOR RUPTURE OF MEMBRANE (PROM)

02.31.14

- Admit and evaluate
- Term PROM → ≥37 weeks
  - Delivery preferable with intrapartum antibiotics
- Preterm PROM → < 37 weeks
  - Expectant management if <34 weeks and fetus is viable
    - → Steroids given
    - → Antibiotics given for latency: Drugs like Ampicillin and Erythromycin are given, and Augmentin is avoided to prevent NEC
    - → Watch for signs and symptoms of chorioamnionitis
- Indication of delivery in PROM
  - Already in labor
  - Placental abruption
  - Previable fetus
  - CTG abnormal
  - Chorioamnionitis
    - → Fever (temp >39°C)
    - → Rising TLC and CRP
    - → Uterine tenderness
    - → Non-reactive NST
    - → Foul-smelling vaginal discharge

Intrapartum Antibiotic Prophylaxis

- To prevent early-onset Group B Streptococcus
  - GBS implicated in chorioamnionitis, endometritis, P.sepsis & wound infection
  - ACOG recommended routine culture-based screening for all pregnant females at 36-38weeks
  - Not for those undergoing elective LSCS before the onset of labor/ROM
  - Sample from the lower 1/3rd vagina and anorectum
- Indications
  - Prolonged rupture of membranes > 18hrs
  - Intrapartum fever, chorioamnionitis
  - Preterm labor with imminent delivery
  - Previous infant with GBS disease
  - H/O GBS bacteriuria in current pregnancy
  - Known GBS colonization in current pregnancy
- Management
  - Drug of choice - Benzyl penicillin
  - Alternative - Ampicillin / Amoxycillin
  - In India → Ampicillin
  - Allergic to penicillin - cephalosporin given
  - In Intrapartum fever, chorioamnionitis - Ampicillin + Gentamicin + Metronidazole given.

Q. A 27-year-old primigravida, at 28 weeks, has not been feeling fetal movements for the past 2 days. There is no h/o leaking or bleeding P/V or pain in the abdomen. She has no other medical problems, and her pregnancy has been uncomplicated so far. Her blood group is O negative, and her recent Hb is 12 g/dl. Fundal height is 24 cm. FHR is not heard by a handheld Doppler. What is the next step in evaluation of the woman?

A.CBC & Coagulation profile
B.Kleihauer Kleihauer-Betke-Test
C.Non-stress test
D.Transabdominal USG

Answer: D

TAS helps to find out

- To confirm the diagnosis
- Look for fetal cardiac activity
- Rule out FGR and fetal infection
- Gross congenital anomalies
- Hydrops
- Maceration

INTRAUTERINE FETAL DEATH

02.43.14

- Early fetal death - 20 to 28 weeks
- Late fetal death - Beyond 28 weeks
- Risk of DIC
    - 1st 4 weeks 10% and thereafter 30%
- Mode of delivery
    - Vaginal delivery
    - CS only for obstetric indications.
- Immediate delivery in case of sepsis, pre-eclampsia, abruption, membrane rupture
- In a pregnant woman with h/o prior unexplained stillbirth, schedule for delivery at 39 completed weeks if no other medical/obstetric complications.
- Diagnosis: USG

Usg Findings In Iud

- Robert's sign
    - Appearance of gas in the chambers of the heart
- Ball sign
    - Hyperflexion of the spine
- Spalding sign
    - Overlapping of skull bones usually
    - Appears on the 7th day after IUD.

Yourwish

12. HIGH RISK OBSTETRICS

HYPERTENSIVE DISORDERS OF PREGNANCY

00:00:26

INI CET JULY 2021, MAY 2022, FMGE JAN 2023

- BP > 140/90 mmHg, on at least 2 occasions, at least 4 hours apart
- High BP beyond 20 weeks with no proteinuria and no end-organ changes: Gestational Hypertension
- High BP beyond 20 weeks of pregnancy with proteinuria &/or any end-organ changes: pre-eclampsia
  - To check proteinuria,
    - → Dipstick: ≥1+ (persistent)
    - → Urine Pr: Crt ≥ 0.3
    - → 24 hr urine protein ≥ 300 mg
- Pre-pregnant HTN/before 20 weeks, or BP not normal even after 12 weeks postpartum: chronic hypertension

Important Information

- In Gestational HTN and Pre-eclampsia, BP normalizes within 12 weeks post-partum
- If worsening HTN/new-onset or worsening proteinuria &/or end-organ changes beyond 20 weeks: Chronic hypertension with superimposed pre-eclampsia.

Preeclampsia

00:05:44

NEET PG 2022, AUG 2024, 2025, INI CET MAY 2022, NOV 2024

- Pathology begins in the placenta (chorionic villi)
  - Risk factors:
    - → Primi / New paternity
    - → Extremes of maternal age
    - → Multiple pregnancy
    - → Obesity
    - → DM, GDM
    - → Chronic HTN
    - → CKD
    - → APLA
  - Smoking decreases the risk of preeclampsia
- The centerpiece of pathology is endothelial dysfunction
- NO and PGI_2 decreased & TXA_2 increased, and HCT elevated
- Peripheral vasoconstriction, tissue edema, ischemia, hemorrhage, and thrombotic sequelae
- Low-dose aspirin (75 mg OD) therapy is recommended for the prevention of at-risk women, starting preferably before 16 weeks and continuing until 36 completed weeks.

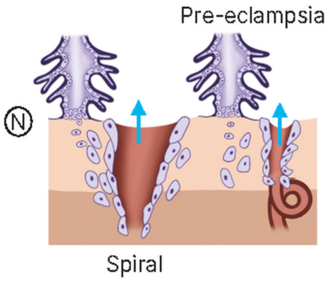
Important Information

FIGO screening (11 to 13+6 weeks)

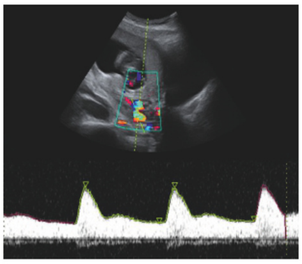
- Based on:
  - High-risk history
  - Mean arterial BP
  - Uterine artery pulsatility index
  - Serum PIGF & PAPP-A
- Recommend: Aspirin 150 mg OD

Uterine Artery Doppler (Uad)

- Defective spiral artery remodelling:



  - Imbalance between angiogenic factors and anti-angiogenic factors
    → VEGF and PIGF decreased; sFLT and sEng increased
  - This is particular in the case of early-onset pre-eclampsia (<34 weeks of gestation)
- Uterine artery doppler



  - UAD measures maternal vascular adaptation and assesses maternal placental perfusion
  - Normally, increased diastolic flow in pregnancy
  - Inadequate remodelling increased resistance and decreased diastolic flow
  - PI = (S - D)/mean
    → UA PI > 95th percentile is predictive of pre-eclampsia and FGR
    → When done between 11 and 14 weeks, particularly predictive of early-onset pre-eclampsia

Important Information

Severe pre-eclampsia: Presence of any of the following features indicate severe pre-eclampsia

- BP persistently > 160/110 mmHg
- Platelet count < 1 lakh/mm^3
- S. creatinine > 1.1 mg/dL
- AST and ALT > twice the upper limit of normal
- Headache, blurring of vision, epigastric pain
- Pulmonary edema

NOTE:

- Glomerular endotheliosis, decreased renal perfusion and GRF, oliguria, raised S. uric acid
- The degree of proteinuria does not define the severity
- Periportal hemorrhages (RUQ pain), risk of hepatic hematoma and rupture

Hellp Syndrome

- The term "coined by Weinstein" and the Tennessee criteria is used
- Hemolysis: elevated unconjugated bilirubin, peripheral smear schistocytes, increased LDH, and low haptoglobin
- Elevated liver enzymes
- Low platelets
- Recurrence risk is 4-7%
- BP could be normal in 10-15% cases

Eclampsia

- Preeclampsia + convulsions (GTCS)

- Pathology: Cerebral hypoperfusion and vasogenic edema

Important Information

Impending eclampsia

- Headache and blurring of vision, epigastric pain / RUQ pain
- Brisk tendon reflexes (clonus)
- Altered mentation

- Antepartum eclampsia is more dangerous
- MC cause of sudden death: intracerebral hemorrhage (stroke)
- Immediate concern: maintaining airway & preventing injury and further convulsions
- DOC for eclampsia: magnesium sulfate
- Definitive Mx: delivery (preferably vaginal), Cesarean section for obstetric indications
- Also control HTN
- Blindness in 15%, MC occipital blindness (Amaurosis)
- Eclampsia and coma: mannitol for cerebral edema

Important Information

- Note: Start anti-Hypertensive Tx with BP persistently > 150/100 mm Hg
  - Control BP to decrease Risk of stroke, cardiac failure, placental abruption & convulsions
- DOC for control of hypertension in pregnancy: labetalol
  - Alternative (in cases where labetalol is C/I): Oral nifedipine
- DOC for severe hypertension (>160/110): IV labetalol (max 300 mg in 24 hours)
  - Alternative (if IV labetalol cannot be used): Oral nifedipine (never sublingual), IV hydralazine, IV nicardipine
  - Avoid hypotension (to avoid tissue & placental hypoperfusion)
- Drugs C/I: ACEi, ARB, and other beta blockers
- Diuretics are used for Tx for pulmonary edema
- Labetalol is contraindicated in asthma, bradycardia, and decompensated cardiac status

Magnesium sulfate

- Role: neuroprotective, centrally acting anti-convulsant
- Pritchard regimen:
  - Loading dose: 4 g IV and 10 g IM, give irrespective of renal function
  - Maintenance dose: 5 g IM on alternate buttocks, every 4 hourly for 24 hours from the last seizure/delivery, whichever is later.
- Therapeutic S. Mg levels: 4-7 mEq/L
- 1st sign of toxicity is DTRs absent (at levels of 10 mEq/L) f/b respiratory depression (12 mEq/L) and cardiac arrest (15 mEq/L)
- Antidote for Mg toxicity: calcium gluconate
- $MgSO_4$ is excreted renally; therefore, in cases of oliguria, toxicity can be precipitated

MCQ

Q. A woman diagnosed with impending eclampsia is started on the Pritchard regimen for magnesium sulfate administration. Under which of the following conditions should the treatment be stopped?

a. Respiratory rate < 18 breaths per minute

b. Visual disturbances start
c. Knee jerk reflex is present
d. Urine output less than 60 ml in 4 hours

Ans: d

Clinical Management Of Preeclampsia

MCQ

Q. A 33-year-old woman at 35 weeks' gestation presents to the emergency department with a chief complaint of a headache for the last 2 days. Her BP is 160/110 mmHg. The urine dipstick test is negative for protein. How is she managed?

a. Admit, start antihypertensives, and deliver at 37 weeks
b. Admit, start antihypertensives, and deliver
c. Admit, start antihypertensives and magnesium sulfate, and deliver
d. Admit, start antihypertensives and steroids, and deliver at 37 weeks

Ans: c

Clinical Management 00:37:05

- Mild preeclampsia with well-controlled BP, the baby, and the mother are well → deliver at 37 completed weeks
- Severe preeclampsia:
  - Admit, send investigations, control BP, evaluate the fetus, and monitor.
  - Deliver irrespective of POG:
    - → Eclampsia
    - → S/s of impending eclampsia
    - → Evidence of HELLP syndrome
    - → Placental abruption
    - → Fetus compromised/dead/previable
    - → Worsening maternal status
  - If ≥ 34 weeks: deliver
  - If < 34 weeks: intensify monitoring, steroids, repeat labs, and w/f signs and symptoms of impending eclampsia
- Note:
  - Prophylactic $MgSO_4$ is given in cases of severe preeclampsia, HELLP, and impending eclampsia
  - Preferred mode of delivery is vaginal; CS for obstetric indications

FETAL GROWTH RESTRICTION 00:40:42

MCQ

Q. A 25-year-old primigravida came at 32 weeks of gestation. She is sure of her dates. Fundal height corresponds to 28 weeks. BP is normal. USG shows the following parameters: BPD-31 weeks, HC-30 weeks, FL-32 weeks, AC-28 weeks, AFI decreased, and EFW-1000 gm. What is the likely diagnosis?

a. Small for gestational age
b. Fetal growth restriction
c. Constitutionally small fetus
d. Wrong dates

Yourwish

Ans: b

- EFW/AC < 10th percentile for that gestational age: SGA
- Rate of growth is slowed, uteroplacental insufficiency: fetal renal hypoperfusion, causing fetal oliguria, causing oligohydramnios

Diagnosis Of Fgr

NEET PG 2022

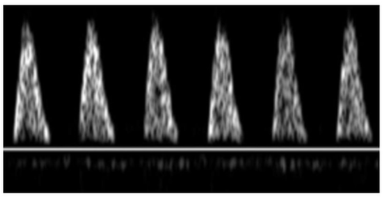
- This criteria is used in the absence of congenital abnormalities
- Late FGR ≥ 32 weeks,
  - AC/EFW < 3rd percentile
  - At least 2 out of 3 should be present:
    - → AC/EFW < 10th percentile
    - → AC/EFW crossing > 2 quartiles on growth percentiles
    - → CPR < 5th percentile or UA-PI > 95th percentile
- Early FGR < 32 weeks,
  - AC/EFW < 3rd percentile or AEDF in UA
  - AC/EFW < 10th percentile + UtA-PI > 95th percentile and/or UA-PI > 95th percentile

Important Information

- The gold standard for evaluating a growth-restricted fetus and timing delivery is the umbilical artery Doppler.
- Normally, UA S/D ratio decreases as pregnancy advances; with uteroplacental insufficiency, diastolic flow decreases, and S/D ratio increases (UA-PI increasing)
- UA AEDF and POG ≥ 34 weeks: deliver
- UA PEDF and POG ≥ 30-32 weeks: deliver
- Preterminal Doppler changes causing myocardial ischemia:
  - Reversal of flow in the ductus venosus
  - UV pulsations
- Long-term neurodevelopmental outcomes depend on gestational age and birth weight at delivery
  - The goal is to take the pregnancy to at least 37-38 weeks
  - If EFW < 3rd percentile/oligo, it's best to deliver at 37 weeks

MCQ

Q. A woman with mild preeclampsia is being monitored for fetal growth regularly from 28 weeks onwards, when IUGR was first detected. During her 32-week follow-up, the umbilical artery Doppler showed the following findings. What is the next step?



a. Repeat Doppler after 1 week
b. Termination of pregnancy
c. Monitor with a biophysical profile
d. Admit, steroid administration, and monitor with BPP

Ans: d

Q. A 24-year-old woman is seen at 32 weeks with jaundice, accompanied by nausea and vomiting and RUQ pain. Her PR is 90/min, and BP is 150/100 mmHg. Urine albumin is negative by dipstick. Her labs show Hb 8 g/dL, platelet count

80000/mm^3, peripheral smear showing schistocytes, serum bilirubin levels 2 g/dL, and AST 75 IU/L. What is the likely diagnosis?

a. Obstetric cholestasis
b. Acute hepatitis
c. HELLP syndrome
d. Acute fatty liver of pregnancy

Ans: c

- Acute hepatitis: prodromal symptoms, liver enzymes > 1000, S. bil > 10 g/dL, hepatosplenomegaly
- Acute fatty liver of pregnancy(rare): 50% can present with HTN, proteinuria, edema, s/s of liver failure, encephalopathy, hypoglycemia, coagulopathy

INTRAHEPATIC CHOLESTASIS IN PREGNANCY

00:56:36

- Estrogen-dependent condition with genetic predisposition
  - Mutation in the;
    - → ABCB4 gene encoding the MDR-3 protein
    - → ABCB11 gene encoding the bile salt exporter protein
- There is no inflammation or liver necrosis, resolves after delivery, but there is a high risk of recurrence
- Usually present in the 3rd trimester with pruritus (generalized), including palms and soles
- Jaundice happens in 10% cases, rarely exceeds >5 g/dL, and increases AST and ALT < 200 IU
- Dx: raised serum bile acid levels
- DOC: Ursodeoxycholic acid + symptomatic Tx
- IOL preferred between 37 and 38 weeks
- Increased risk of preterm birth, fetal distress, MSL, and sudden stillbirth
  - Risk directly proportional to bile acid levels
- AFLP
  - A/k/a acute yellow atrophy (shrunken liver)
  - Accumulation of microvesicular fat, linked to mitochondrial abnormalities of fatty acid oxidation
  - Recurrence is rare
  - Can be a/w acute pancreatitis and transient diabetes insipidus
  - Management is supportive and delivery

FMGE DEC 2021, JAN 2025, INI CET NOV 2021, MAY 2022

DIABETES IN PREGNANCY

01:00:28

- Diabetes, first identified during pregnancy, is labelled as gestational diabetes and most likely occurs after 24 weeks, and blood sugar levels return to normal usually within 6 weeks postpartum
- Pre-pregnancy diabetes, abnormal blood sugar levels in the periconceptional period, and not normalized even after 6 weeks pp → overt diabetes mellitus
- The risk of congenital anomalies increases in overt DM
- MC anomalies CVS > NTDs
  - MC CVS anomaly VSD
  - The most specific CVS anomaly, TGV
- The most specific anomaly is overall sacral agenesis (caudal regression syndrome)
- The most sensitive indicator for risk of congenital anomalies is HbA1c.
  - Risk directly proportional to HbA1C levels
- A woman with pregestational DM should attend preconceptional counseling.

  - HbA1c is checked most frequently
  - > 10, the risk of congenital anomaly is 22%, and counselled against pregnancy
  - HbA1c is controlled to less than 6.5; thus, OHA therapy is discontinued, and insulin is preferred for better glycemic control.
- Stop ACEi, ARBs, statins before pregnancy or as soon as pregnancy is confirmed

Diagnosis Of Diabetes In Pregnancy

- DIPSI guidelines:
  - Screening is universal, by 75 g OGTT, irrespective of fasting, done in the 1st ANC visit, then again at 24 weeks
  - Abnormal if 2-hour blood glucose ≥ 140 mg/dl (Dx: GDM)
- According to IADPSG (adapted by WHO), 75 gm OGTT,
  - Fasting ≥ 92, 1 hour ≥ 180, 2 hours ≥ 153: if anyone is abnormal, it is GDM
  - Fasting ≥ 126, 2-hour ≥ 200, HbA1c > 6.5, random ≥ 200 + symptoms: likely overt DM

Identify Images

	Caudal regression syndrome (sacral agenesis)
	Sirenomelia (mermaid deformity)
	**Macrosomia** • Birth wt. > 4 kg • Large for gestational age: EFW > 90th percentile • Pederson's hypothesis: fetal hyperinsulinemia (beta cell hyperplasia) • Fetal growth is dependent on IGF-1 and insulin • Risk factors: o Advanced maternal age o Multiparity, obesity o Excessive weight gain during pregnancy o Post-term

Important Information

- Usually, there is macrosomia and polyhydramnios, but FGR and oligohydramnios can occur in case of diabetic vasculopathy (pre-existing).
- There is an increased risk of shoulder dystocia, but elective CS does not decrease the incidence of brachial plexus injury
- Neonatal complications:
  - Hypoglycemia, due to beta-cell hyperplasia of the pancreas
  - Polycythemia and hyperbilirubinemia
  - RDS, hypocalcemia, and hypomagnesemia
  - Hypertrophic cardiomyopathy, renal vein thrombosis

MCQ

Q. A 32-year-old pregnant woman presents for her routine ANC at 28 weeks of gestation. She has a history of obesity but no previous history of diabetes. Her fasting plasma glucose level is 104 mg/dl, and her 2-hour plasma glucose level after a 75g OGTT is 167 mg/dl. Based on these findings, what is the most appropriate next step?

a. Start lifestyle modifications and repeat OGTT at 32 weeks of gestation
b. Diagnose her with pre-existing diabetes and initiate insulin therapy
c. Diagnose her with GDM and initiate dietary modifications with close monitoring of blood glucose levels
d. Monitor her closely without intervention since her glucose levels are borderline

Ans: c

Management Of Diabetes In Pregnancy

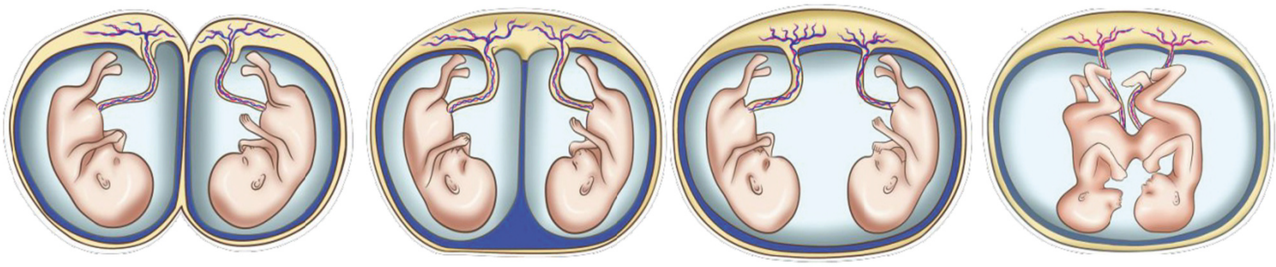
- DOC in pregnancy, insulin (admit and start); self-monitoring with a glucometer is taught
- Blood sugars in GDM range; initial Mx: diet and exercise
- Blood sugars in the overt range: diet and exercise with insulin therapy
- Targets for control: FBS < 95, 1 hour post-meal < 140, 2 hours post-meal < 120
- Insulin requirements increase during pregnancy
- Metformin and glyburide: safe (in GDM cases)
- Note
  - Fetal ECHO (22-24 weeks) was done in case of pre-gestation DM.
  - Fetal growth scans, esp. In 3rd trimester
  - Weekly NST/BPP from 32 weeks onwards
  - Fetal Doppler only if FGR is present, not routine
- Timing of delivery,
  - Schedule IOL done at 39 completed weeks if well-controlled sugars and no vascular disease and reassuring fetal status; offer CS if EFW > 4.5 kg
  - The day before IOL or scheduled CS - night dose of insulin is given, and the morning dose is omitted; check FBS and electrolytes; start NS @ 100 ml/min
- During labor:
  - BS monitoring at 1-2 hourly, urine ketone and sugar at 4 hours
  - Target blood sugar is 70-110 mg/dL
  - Ideally, titrate with regular insulin IV infusion dose at 1-1.25 U/hour
  - Insulin requirements decrease during labour and postpartum

Yourwish

TWIN PREGNANCY

01:24:37

INICET NOV 2021, MAY 2024, NEET PG AUGUST 2024



- Overall, the MC type of twins is dizygotic > monozygotic; always DZ will be DCDA
  - The incidence of DZ twins varies with
    - → Ethnicity and race
    - → Increased maternal age and parity
    - → Tall and heavier women
    - → Family history of
    - → OI and ART procedures
  - The incidence of MZ twins is constant worldwide: 1 in 250
  - Zygosity determined by fertilization
  - Chorionicity refers to placentation
- Monozygotic twins: based on the timing of the division,
  - Within 3 days of fertilization: DCDA
  - 4-8 days of fertilization: MCDA
  - 8-12 days of fertilization: MCMA
  - ≥ 13 days of fertilization: conjoined twins (MC is thoracopagus)
- Superfetation: fertilization of 2 different eggs in 2 separate menstrual cycles.
- Superfecundation: fertilization of 2 separate ova in the same menstrual cycle by different acts of coitus; could be same or different partners
- MC fetal complication: prematurity
- Fetal complications: (more in Monochorionic, monozygotic)
  - Abortion and congenital malformations
  - Low birth weight and FGR
  - Discordant growth
- The cumulative risk of aneuploidy is higher in DZ
- Discordant growth = (wt of larger twin - wt of smaller twin) / wt of larger twin > 20 %
- Complications specific to MC twins:
  - Twin-to-twin transfusion syndrome
  - Twin anemia polycythemia sequence (TAPS)
  - Twin reversed arterial perfusion
- Cord entanglement and interlocking of twins is specific to monoamniotic twins
- TTTS is more likely in MCDA than MCMA because of deep artery-to-venous anastomoses
  - Donor twin:
    - → Oligohydramnios
    - → Growth restricted
    - → Anemic
    - → Renal failure

- Recipient twin:
  → Polyhydramnios
  → Plethoric, polycythemia
  → Cardiac failure
  → Vascular thrombosis
- Risk of cerebral palsy and hydrops in BOTH

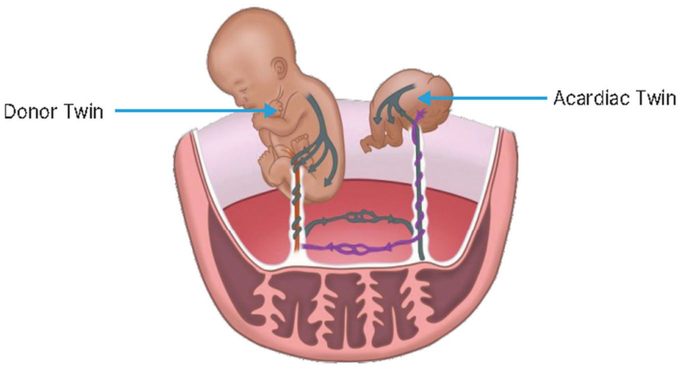
Grading Of Severity

- QUINTERO staging for TTTS
  - Stage 1: One twin has oligohydramnios, and the other has polyhydramnios
  - Stage 2: No urine in the bladder of the donor twin
  - Stage 3: abnormal Doppler in either twin
  - Stage 4: hydrops of either twin
  - Stage 5: death of either twin
- Possible Tx: fetoscopic laser coagulation of vascular anastomosis (Solomon's technique)

Important Information

- NOTE: antenatal Dx of TAPS - MCA Doppler
  - MCA-PSV > 1.5 MoM in donor twin
  - MCA-PSV < 1.0 MoM in the recipient

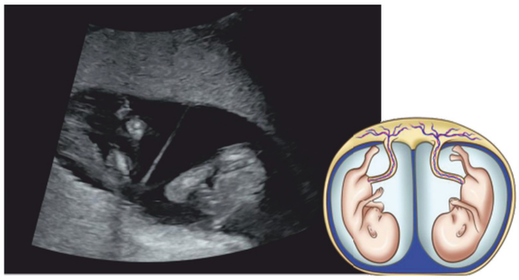
Identify Images

	TRAP • Donor twin (cardiac failure) • UA to UA anastomosis
	Fetus compressus (papyraceus) • Seen in higher-order multiple pregnancies • Selective fetal reduction is usually performed at 10-14 weeks • If one fetus dies early → it gets compressed between membranes and uterine wall → forms flattened, parchment-like fetus (papyraceus)

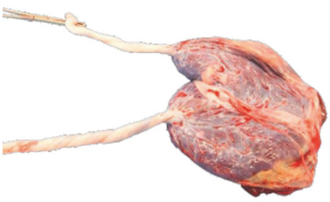
- If one twin dies in the
  - 1st trimester: vanishing twin
  - Later gestation: risk of the other twin dying, neurological damage to the surviving twin

Important Information

- The outcome of a twin pregnancy depends on chorionicity
- Best for antenatal determination of chorionicity: USG
    - Ideal timing: 10-14 weeks (best done before 14 weeks)
- If 2 separate placentas are developing DCDA
- If in an early pregnancy scan, 2 separate gestational sacs (chorionic cavities): DCDA

 Lambda sign (twin peak sign) → DCDA	 T-sign → MCDA

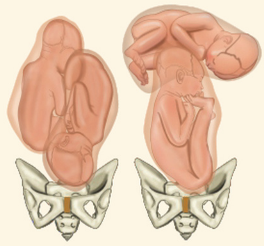
- Also note the thickness of the intertwin membrane:
    - ≥ 2 mm in DCDA
    - < 2 mm in MCDA
- No intertwin membrane in MCMA twins
- Fetal growth scans done:
    - Every 4 weeks in the DC twins
    - Every 2 weeks in the MC twins
- Screen for TTTS from 16 weeks onwards

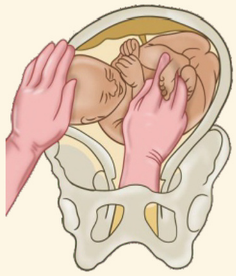
	DCDA
	MCDA
	MCMA

- If the opposite sex, DZ
- If same sex, but different blood group DZ
- Same sex, same blood group DZ/MZ
- Best for zygosity DNA fingerprinting

Important Information

- MCMA twins are always delivered by elective LSCS between 32 and 34 weeks of gestation after steroid cover
  - Uncomplicated DC: 38 weeks
  - Uncomplicated MC: 37 weeks
- Mode of delivery depends on the lie and presentation of 1st twin/presenting twin
- MC lies both longitudinal
- MC presentation, both cephalic (vertex)
- 1st twin vertex vaginal delivery
- 1st twin non-vertex LSCS
- The only indication of internal podalic version in obstetrics for the 2nd twin in transverse lie
- The 2nd twin has the worst prognosis





ANEMIA IN PREGNANCY

01:51:04

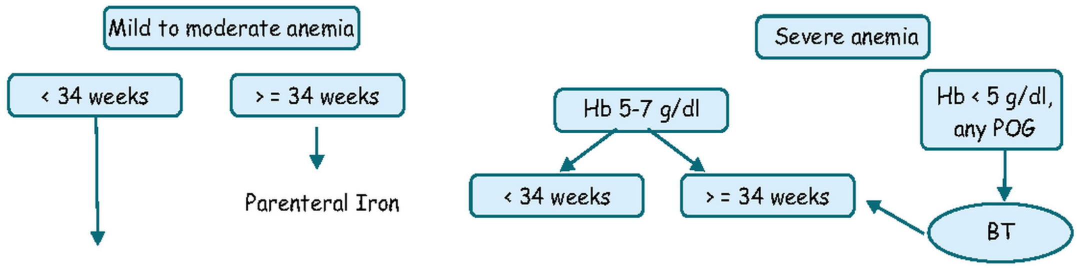
- Hb < 11 g/dL
  - CDC defines anemia as,
    → Hb < 11 g/dl in 1st and 3rd trimester
    → Hb < 10.5 g/dl in 2nd trimester
- Severe anemia < 7 g/dL
- Very severe anemia < 4 g/dL
- MC: indirect cause of maternal mortality
- MC causes nutritional deficiency
- MC-type iron deficiency anemia
- Hb testing is repeated in each trimester

Q. Primigravida is seen at 32 weeks with easy fatiguability. There is no % breathlessness, cough, or palpitations. Her HB is 8 g/dl. Peripheral smear shows microcytic hypochromic anemia. She has not been taking oral IFA tabs during pregnancy because they cause her severe nausea and gastrointestinal upset. What is the most appropriate treatment?

a. 60 mg elemental iron once daily
b. 60 mg elemental iron twice daily
c. IV iron sucrose
d. Continue oral iron at a lower dose

Ans: c

Management Of Iron Deficiency Anemia In Pregnancy



Advice
- Twice daily oral IFA tabs
- High protein & iron rich diet & Vit C
- Deworming

- DOC for deworming is albendazole 400 mg HS
  - Preferably given from 2nd trimester
  - If in the 1st trimester → mebendazole
- Mild to moderate anemia ≥ 34 weeks: parenteral iron
- Severe anemia (Hb less than or equal to 5 g/dl, any POG): blood transfusion
- Severe anemia and Hb 5-7 g/dl
  - < 34 weeks → parenteral iron
  - ≥ 34 weeks → blood transfusion
- Severe anemia with s/s impending heart failure: blood transfusion is indicated in any POG
- No response to oral iron therapy:
  - Non-compliance
  - Continuous blood loss
  - Malabsorption
  - Incorrect diagnosis
  - Coexistent infection

Parenteral Iron Therapy

- Indications for parenteral iron therapy:
  - Intolerance to oral iron
  - Malabsorption
  - Ensure compliance
- Before parenteral iron therapy:
  - Confirm: iron deficiency anemia (serum ferritin is decreased)
  - Rule out: hemoglobinopathies
  - Also, parental iron C/I in the 1st trimester and liver disease
  - Stop oral iron at least 24 hours before therapy
- Iron sucrose—1 vial (100 mg Fe) in 100 ml NS
  - Rate of infusion: not to exceed 1 mg/min
  - Max dose: 600 mg/week
- A ferric carboxymaltose 1000 mg IV infusion can be given as a single dose (15 mg/kg)

Yourwish

AMNIOTIC FLUID DYNAMICS

02:01:53

MCQ

Q. A 35-year-old primigravida with gestational diabetes has come for a routine ANC visit at 32 weeks. The abdomen feels tense but not tender; the uterus is relaxed; SFH measures 36 cm; the abdominal skin appears stretched and shiny; it is difficult to palpate fetal parts; and FHS is heard but muffled. Her level II anomaly scan is normal. She is perceiving adequate fetal movements. What is the most likely diagnosis?

a. Uterine fibroids
b. Polyhydramnios
c. Twin gestation
d. Concealed abruption

Ans: b

Main Source Of Amniotic Fluid

- 1st 12 weeks → ultrafiltration from maternal plasma
- 12-20 weeks → transudate across fetal skin
- Beyond 18 weeks → fetal urine
- Maximum amount → 30-32 weeks
- Note
  - Fetus swallowing starts at 10 weeks
  - Fetus skin keratinization at 22-24 weeks
  - Fetal urine production starts at 12 weeks

Regulation Of Amniotic Fluid Volume At Term

- Fetal urine production → 1000 ml/day +
- Fetal lung secretions → 350 ml/day +
- Fetal swallowing → 750 ml/day -
- Resorption across chorionic vessels at the placenta

NEET PG 2023
FMGE JUNE 2021, DEC 2021, JAN 2024
INICET NOV 2021

Oligohydramnios	Normal	Polyhydramnios
• AFI < 5 cm • SDP < 2 cm • Fluid < 2000 ml	• AFI: 5-25 cm • SDP 2-8 cm • AFI sensitive • SDP specific	• AFI ≥ 25 cm or SDP ≥ 8 cm • Fluid > 2000 ml
• Renal agenesis • Infantile PCKD • Post-urethral valve • Other causes: ◦ Post-term ◦ PROM ◦ Uteroplacental insufficiency	Associated anomalies	• MC GIT > NTDs • MC cleft lip and palate • Esophageal/duodenal atresias, CDH, TEF • Other Cause: ◦ Idiopathic (Mild poly) ◦ Multiple pregnancy ◦ Maternal diabetes ◦ Fetal hydrops ◦ Rh-affected fetus ◦ Chorioangioma of the placenta ◦ Fetal infections

Q. Which of the following conditions is associated with oligohydramnios? FMGE JUNE 2021

a. Renal agenesis
b. Neural tube defects
c. Esophageal atresia
d. Preterm labor

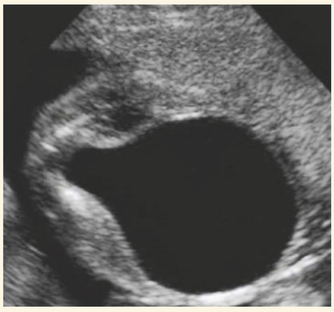
Ans: a

- Polyhydramnios
  - Can trigger Preterm labor
  - Can be a/w PROM
  - More likely a/w unstable lie > malpresentation
  - Increase risk of cord prolapse
- Oligohydramnios
  - More often a/w malpresentation
  - Increase risk of cord compression

Important Information

Early-onset oligohydramnios

- Risk of pulmonary hypoplasia, compressed facies, and limb contractures
- If a/w renal agenesis, called Potter's syndrome
  - On USG, the lying-down adrenal sign
- If a/w other cause c/a potter's sequence
- Keyhole sign (posterior urethral valve)
- If polyhydramnios + GCA → increased risk of aneuploidy
- Polyhydramnios + duodenal atresia, think of: Trisomy-21
- Polyhydramnios + GCA + FGR: Trisomy-18
- Option for Mx of polyhydramnios can include
  - Therapeutic amniocentesis if there is severe respiratory compromise or risk of early PTL
  - Drug Tx options are indomethacin (decrease AF)



HEART DISEASE IN PREGNANCY

02:19:31

- MC heart disease affecting pregnant Indian women: RHD, MS
- Heart disease is most commonly responsible for maternal mortality: MS
- MC congenital heart disease in pregnancy: ASD
- MC congenital valvular heart disease in pregnancy: MVP
- Heart disease with max risk of maternal mortality: Eisenmenger syndrome
- Very high risk of maternal mortality, pregnancy C/I, and MTP discussed:
  - Eisenmenger syndrome/Pulmonary HTN
  - Marfan syndrome with aortic root dilatation
  - CoA with aortic root dilatation
  - Severe MS and AS
  - NYHA class III/IV
  - EF < 30%
  - H/o peripartum cardiomyopathy with residual dysfunction
- If needed, balloon valvuloplasty can be done in pregnancy in the 2nd trimester

- Valve replacement surgeries are C/I in pregnancy

Peripartum Cardiomyopathy

- Development of heart failure in the last month of pregnancy or within 5 months of delivery, but no underlying structural/organic heart lesion
- LV systolic dysfunction, decreased EF, and dilated LV. exact cause uncertain
- Risk factors: preeclampsia and multiple pregnancy
- Possible role of vasoinhibin (prolactin metabolite) implicated
- Recurrence occurs in approximately 1/3 of cases. (more if residual dysfunction)

Important Pointers

- Preferred mode of delivery: vaginal
- LSCS is recommended for
  - Aortic root dilatation > 4 cm
  - Aortic aneurysm
  - Severe symptomatic AS
  - Recent MI, acute severe CHF
- Induction and augmentation of labor are not C/I
- Cut short the 2nd stage of labor if needed: forceps are preferred
- Methergine use is C/I
- Preferred mode of analgesia is an epidural
- Conduction analgesia/anesthesia is C/I:
  - AS
  - Pulmonary HTN
  - Cyanotic heart disease
- IE prophylaxis during delivery is not routine
- IE prophylaxis during delivery is given only for high risk patients:
  - Prosthetic heart valves
  - Prior h/o endocarditis
  - Unrepaired cyanotic heart disease
  - Valvulopathy after heart transplant
  - DOC: ampicillin 2 g IV, alternative: cefazolin IV

Important Information

- Warfarin is teratogenic, risk highest with daily dose > 5mg & also increase risk of miscarriage & still birth
- If a woman is on warfarin ≥ 5 mg/day, switch to LMWH in the 1st trimester and continue till 12 weeks.
- From 12 to 36 weeks, warfarin is preferable; then switch back over to LMWH at 36 weeks. Peripartum delivery UFH is preferred and stopped once the woman is in active labor.
- A woman on warfarin (within the previous 2 weeks) goes into labor, LSCS is preferred after correcting INR with FFP, vitamin K,
- A woman on LMWH goes into labor; stop further dosages, and vaginal delivery is allowed

Yourwish

13. MIXED BAG TOPICS

PUERPERIUM

00:00:26

NEET PG 2022

- Duration: 6 weeks
- Begins after placental expulsion
- Period during which pregnancy-related anatomical and physiological changes return to the non-pregnant state.
- The process by which the genital tract reverts to a non-pregnant state is involution
- Immediately after birth, the fundus is just below the umbilicus, and the uterus weighs ~1000 gm.
- After 24 hours, FH decreases by about 1.25 cm/day
- Fundal height
  - On the 2nd day postpartum → 1 finger below the umbilicus.
  - 1 week postpartum → midway between PS and the umbilicus.
- The uterus becomes a pelvic organ by 2 weeks (10-12 days), and weighs ~100 gm by 4 weeks postpartum
  - Size of myocytes decreases, not the number
- The superficial layer of decidua sheds off along with RBCs, WBCs, and epithelial Cells → Lochia
  - Duration: 3-5 weeks
  - Sequence: Rubra → serosa → alba
- The basal layer of the decidua is a source of new endometrium, histologically reparative endometritis
- The entire endometrium was resorbed by 16 days postpartum
- Involution of the placenta site takes 6 weeks (exfoliation process)

Important Information

- The 4th trimester is from delivery to 12 weeks postpartum.
- The size of myocytes decreases, not the number of myocytes.

Important Information

- Afterpains:
  - MC in multiparous
  - Milder by D3 postpartum d/t uterine contractions
  - Worse with infant suckling (as it increases the secretion of oxytocin)
- NOTE: Causes of uterine subinvolution,
  - Incompletely remodeled spiral artery
  - Infection (endometritis)
  - Retained tissue
  - Maternal ill health, anemia.

- GFR returns to normal by 2 weeks postpartum
- Blood volume returns to normal by 1 week postpartum
- CO returns to normal by 10 days postpartum
- WBC counts are elevated after delivery
- The fibrinogen level remains elevated up to 2 weeks after delivery
- Prevention of DVTs postpartum:

- Early ambulation after delivery is encouraged
- If not possible, pneumatic compression devices are used

LACTATION:

00:07:11

FMGE JAN 2024
INICET JULY 2021

- Sequence: Mammogenesis → Lactogenesis → Galactokinesis → Galactopoiesis
- The main hormone responsible for milk synthesis is prolactin
- The hormone responsible for the milk-ejection reflex is oxytocin
- Prolactin levels increase throughout pregnancy, reaching a maximum at term, and levels decrease after delivery
- The first stimulus for milk production is progesterone withdrawal
- The stimulus for continuous milk production is infant suckling
- To promote milk secretion, first promote infant suckling; if needed, a drug can be used (Dopamine antagonist)
- To suppress milk secretion, drug used is a dopamine agonist (cabergoline), which is C/I in hypertension

CONTRAINDICATIONS OF BREASTFEEDING:

00:10:10

- IV drug abuse, alcoholism
- Undergoing Tx for breast cancer
- Drugs, cytotoxic drugs
- Active herpetic lesions on the breast
- Active or untreated pulmonary TB
- Galactosemia in newborn
- HIV-positive mother +/-

NOTE:

- Hepatitis B and mastitis are not C/I for breast feeding
- Lactation amenorrhea
  - It is due to prolactin
  - Prolactin only if less than 6 months postpartum, exclusively breastfeeding, and nighttime feeds
  - The failure rate is about 2%

CONTRACEPTION IN LACTATION:

00:11:49

- Not breastfeeding, should start contraception in the 3rd postpartum week
  - Menstruation normally returns at 6-8 weeks postpartum
- Breastfeeding women can begin to ovulate by 10 weeks postpartum
- A breastfeeding woman should start contraception in the 3rd postpartum month
- Contraception of choice within 48 hours postpartum CuT
  - Progesterone-only pills can be started soon after delivery
- Contraception of choice at 6 weeks is CuT>injectable DMPA
  - injectable DMPA is not started before 6 weeks in breastfeeding women
- OCPs are C/I till 6 months in breastfeeding women and till 6 weeks in non-breastfeeding women

PUREPERAL PYREXIA:

00:15:31

MCQ

Q. A 22-year-old primigravida delivered a 4 kg baby with a forceps delivery after a prolonged labor. A third-degree perineal laceration was repaired. She develops a persistent fever of 101^{0} F on the 3rd PPD. What is the most likely cause of the fever?

A. Mastitis
B. Endometritis
C. UTI
D. Thrombophebitis

Answer: B

Pureperal Pyrexia

- Definition: Temperature > 100.4° F within the first 10 days postpartum that lasts longer than 24 hours, excluding the first 24 hours.
  - Fever on 2 separate occasions, at least 24 hours apart.
- Cause
  - Breast engorgement
  - Mastitis
  - Atelectasis
  - Genital tract infection
  - Urinary tract infection
  - Wound infection (episiotomy site)
  - Foreign body
  - Septic pelvic thrombophlebitis
  - Deep venous thrombosis

Mastitis vs. Breast engorgement

MASTITIS	BREAST ENGORGEMENT

• Usually, after 1 week postpartum, with a high-grade fever and chills
• Painful, tender swelling on the affected breast
• MC infection is Staph aureus from the infant's nose and throat (through the nipple cracks)
• Management is supportive and antibiotics
  ○ DOC is dicloxacillin
  ○ Breastfeeding is not C/I
• No response to initial Tx → think breast abscess (fluctuant mass)
  ○ Tx for breast abscess is I & D
	• Within the first 2-3 days postpartum, there are B/L tense and heavy breasts, painful breastfeeding, and a fever rarely exceeding 39° C.
	• Management is supportive for breast milk expression and correct the feeding technique

PUERPERAL SEPSIS:

00:22:27
FMGE JAN 2025

- Metritis with pelvic cellulitis (within 42 days of delivery)
- Clinical presentation
  - Usually PPD 2-3 days
  - Fever is the most important feature
  - Abdominal pain
  - On P/A exam: uterine tenderness and subinvolution
  - L/E: foul-smelling lochia, dirty vaginal discharge

- P/V: forniceal tenderness, mass, or induration in the parametrium.

- The single most important risk factor route of delivery
- MC site of infection following vaginal delivery, the placental site
- MC site of infection following a cesarean section is the uterine incision site
- Most infections are polymicrobial > anaerobes (ascending infection)
- Single MC pathogenic organism: peptostreptococci
- Group A streptococci: associated with TSS, scant odorless lochia
- Gold standard antibiotic (post-CS): clindamycin + gentamicin (broad-spectrum antibiotics)

Important Information

- In the setting of P. sepsis, symptoms improve with antibiotics, but a spiking fever persists. Think of septic pelvic thrombophlebitis originating from thrombosed veins at the placental site.
  - Dx is mainly clinical but can be supported by pelvic CT or MRI
  - Mx continue IV antibiotics +/- heparin
- P.Sepsis not improving; look for retained POCs, pelvic abscess (a/w diarrhea, fluctuant pelvic mass), pelvic peritonitis (adynamic ileus)
- Parametral phlegmon:
  - Pelvic pain & fever that persists, tender indurated mass on the side of the uterus,
  - Tx with longer duration of antibiotic course.

FETAL HYDROPS:

00:29:56

INI CET NOV 2022, MAY 2023

MCQ

Q. All of the following can result in non-immune fetal hydrops except.

A. ABO incompatibility

B. Alpha thalassemia major

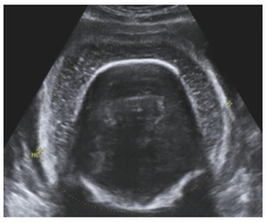
C. Parvovirus B19

D. Chromosomal defects

Answer: A

- ABO incompatibility can cause mild hemolysis (Hemolytic Disease of the Newborn), but it rarely presents with fetal hydrops and is not usually associated with severe fetal hemolysis.

Important Points



- Definition: ≥2 effusions in fetus (pleural, pericardial, ascites) or one effusion + generalised anasarca (skin thickness ≥ 5 mm)
  - Halo sign/Buddha sign (scalp edema)
- Can be associated with polyhydramnios, placentomegaly, cardiomegaly, hepatosplenomegaly
- Non-immune hydrops is more common than immune hydrops
- Overall, MCC is fetal cardiovascular anomalies
- 2nd MCC chromosomal abnormality: MC is aneuploidies
- Fetal hydrops on USG in the 2nd trimester → monosomy X
- MC fetal infection causing hydrops parvovirus B-19 infection
- Mirror syndrome: fetal hydrops + maternal edema + placentomegaly

Yourwish

Pregnancy in Rh-Negative Woman:

00:34:34

INI CET MAY 2023

- Rh incompatibility can cause hemolytic disease of the fetus and newborn
  - Congenital anemia of the newborn
  - Icterus gravidarum neonatorum
  - Fetal anemia
  - Fetal hydrops when hematocrit < 15%

Important Information

- There can be hepatosplenomegaly in the fetus, but no jaundice.
  - Erythroblastosis fetalis: destruction of fetal RBCs in the spleen, causing overproduction of immature fetal RBCs

- Maternal sensitization occurs because of FMH:
  - The minimum amount of FMH enough for sensitization is 0.1 ml
  - The risk of sensitization is maximum in intrapartum > antepartum (3rd trimester)

Important Information

- The gene of Rh Ag is located on the short arm of chromosome 1
- Rh incompatibility means an Rh-negative mother carrying an Rh-positive fetus
- The 1st pregnancy is usually spared, IgM Abs do not cross the placenta
- Once the mother is sensitized, the outcome worsens with each successive pregnancy
- ABO incompatibility, along with Rh incompatibility, decreases the risk of maternal sensitization
- I antigen & Lewis Ag are minor RBC antigens, NOT involved in fetal hemolysis.
- Kell Ag incompatibility causes more severe, fatal anemias.

Q. A primigravida woman with an O-negative blood type, whose husband has a positive blood type, received an anti-D injection at 28 weeks of pregnancy. Under which condition should she receive another anti-D injection after delivery?

A. All cases
B. If the baby is negative
C. If the baby is O positive and DCT negative,
D. If the baby is O negative and DCT positive

Answer: C

- DCT: checking anti-D abs attachment to the fetal RBCs.
  - Negative: mother not sensitized
  - Positive: mother could be sensitized

Prevention Of Sensitization Of Rh-Negative Mother → Routine Antenatal Anti-D Prophylaxis

INICET MAY 2024

- Rh-negative pregnant woman, check the ICT and the husband's blood group
- No fetal risk if the mother is Rh^- and the father is also Rh^-.
- If the father is Rh-positive, the fetus could be Rh-positive.
  - Inj. Anti-D 300 mcg IM given to an ICT-negative woman at 28 weeks
  - Then again, within 72 hours of delivery, if the baby's blood group is Rh-positive and DCT-negative.
- A dose of anti-D in abortion less than 12 weeks gestation is 50 mcg.

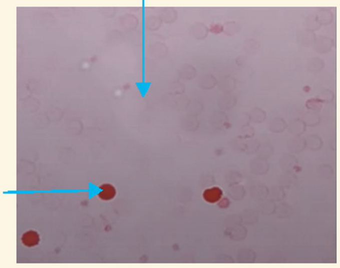
Yourwish

NOTE: Sensitizing events are also covered irrespective of RAADP.

- Abortion, ectopic pregnancy, IUD
- Invasive fetal testing
- Molar pregnancy evacuation
- APH, ECV, MRP

Important Information

- 300 mcg/1500 IU of anti-D neutralizes 30 ml of fetal whole blood, 15 ml of fetal RBCs,
- Test for quantification of FMH: Kleihauer-Betke test (acid elution test, citrate buffer)
  - FMH (ml) = % fetal cells counted x 50
  - 10 mcg anti-D is needed for every 1 ml of FMH.



Management if mother is already sensitized:

- Rh-negative pregnant woman, ICT-positive, check ICT titers
- Criteria titer is 1:16
- If the titer remains low, repeat the ICT titers monthly until 28 weeks (after that, every 2 weeks) and consider IOL between 38 and 40 weeks
- Once the critical titer is crossed, F/U is done with MCA Doppler (PSV) for early detection of fetal anemia & if the value is > 1.5 MoM & she is already ≥ 34 weeks, then deliver
- However, if she is less than 34 weeks, F/U with cordocentesis
- Intrauterine transfusion is done if fetal Hct < 30%.
- NOTE: Mother is isoimmunized with h/o prior affected pregnancy: monitor directly with MCA-PSV Doppler from 18 weeks of gestation.

DOWNS SYNDROME SCREENING

00:51:46

INI CET NOV 2021, FMGE JAN 2023

- Most common non-lethal trisomy

Screening:

TEST	COMPONENTS
1st trimester combined screening (11 - 13+6 weeks)	• Serum beta-hCG • Serum PAPP-A • NT on TVS
Quadruple test (15-20 weeks)	• Serum beta-hCG • MS-AFP • Unconjugated estriol • Inhibin A
NIPT (beyond 10 weeks) BEST DETECTION RATE 99%	• cffDNA from the maternal blood sample comes from apoptotic placental trophoblasts • Available for T21, 13, 18, and monosomy X

- Integrated screening: 1st trimester scanning + quad test, offers a detection rate of 94-96%

- For Down syndrome
  - Serum beta-hCG ↑
  - Inhibin A ↑
  - All other markers are low
- With Trisomy 18
  - All markers are low
  - Inhibin A is not involved in calculation of risk

IDENTIFY IMAGE

- Nuchal Translucency scan (TVS) done between 11 and 14 weeks, and when CRL is 45-84 mm.
- Abnormal NT ≥ 3 mm.
- Increased risk of trisomy 21 > monosomy X > fetal cardiac abnormalities (other GCAs)

NOTE: Other soft markers on 1st trimester USG for Down's:

- Absent nasal bone
- Tricuspid regurgitation
- Abnormal ductus venous flow

Important Information

- Prenatal aneuploidy screening is offered to all pregnant women
- It tells about the degree of risk; a positive result does not mean affected.
- Not provide information about all genetic abnormalities.
- Confirmation will need invasive fetal testing and karyotyping
- If the 1st trimester screen is positive: perform CVS
- If the 2nd-trimester screen is positive, perform amniocentesis.
- If there is a h/o a prior affected child with Down syndrome, offer invasive fetal testing.
- If a prior affected child has a translocation type of trisomy 21, and either parent is a t(21,21) carrier, the risk of recurrence is 100%

2nd Trimester Usg Soft Markers For Down's:

- Nasal bone absence/hypoplasia
- Nuchal skin fold thickness
- Single transverse palmar crease
- Hypoplasia of the 5th digit (clinodactyly)
- Sandals gap (between 1st and 2nd toe)
- Echogenic cardiac focus
- Echogenic bowel
- Short femur, short humerus
- Renal pelvis dilatation
- Single umbilical artery

NOTE:

- As an isolated marker, nuchal skin fold thickness (2nd trimester marker) confers the highest risk of T-21, abnormal > 6 mm
- As an isolated marker, there is no increased risk of T-21 with a choroid plexus cyst.
    - If Choroid plexus cyst + structural fetal anomalies increase the risk of T-18.
- MC GCA in T-21: CVS > GIT (atresias)
- MC CVS anomaly in T-21 is an endocardial cushion defect > VSD
- The incidence of single umbilical artery increases in twins, in perinatal deaths, and in those fetuses with major malformations.
- MC GCA a/w single umbilical artery: renal>cardiac
- With SUA, if GCA is identified on targeted sonography, the risk of aneuploidy is increased (MC T-18)
- Short femur with FL/AC < 18%, suspect skeletal dysplasia in fetus (normal is 20-24% at all GA)
- MC fetal anomaly a/w renal pelvis dilation (> 4 mm in 2nd trimester and > 7 mm ~ 32 weeks): ureteropelvic junction obstruction.

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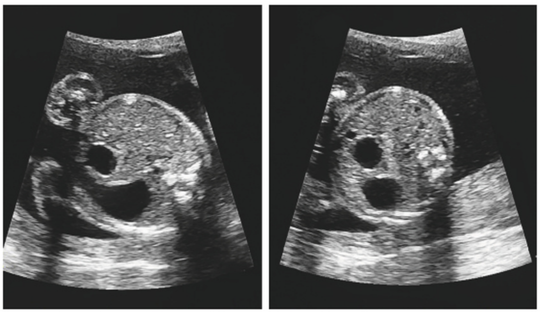


- Double bubble sign
- Seen in duodenal atresia.
- A/w other GCA
- Very particular finding for T-21 fetuses.

Q. A 35-year-old primigravida comes with the quadruple test report at 18 weeks showing raised MS-AFP levels. What should be done next?

A. Amniocentesis
B. Chorionic villus sampling
C. Targeted sonography
D. Fetal echocardiography

Answer: C

- Fetal echocardiography is done if suspected fetal cardiac defects
- Timing: 22-24 weeks

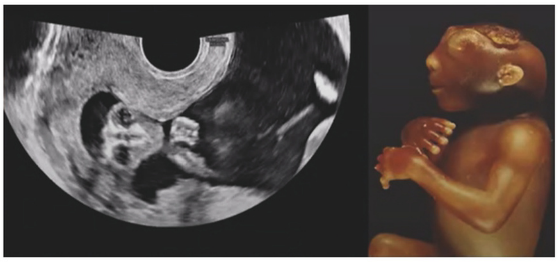
NEURAL TUBE DEFECTS

Important Pointers

- NTDs are a/w raised MS-AFP; next step targeted sonography (IOC for diagnosis of NTDs)
- Open NTDs are associated with raised amniotic fluid AFP and acetylcholine esterase levels
- Periconceptional folic acid is given for the prevention of NTDs in the fetus, at least 1 month prior to conception and through the 1st trimester.
- Recommended dose is 400 mcg orally
- H/o prior affected fetus, woman on AEDs, dose is raised to 4 mg/day.
- NOTE:

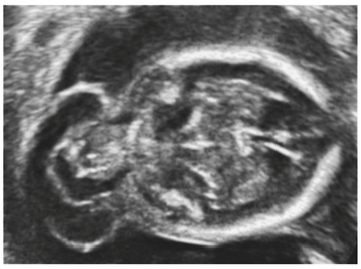
- NTDs result from failure of closure of the neural tube, have a multifactorial origin, and are associated with increased risk associated with folate deficiency, maternal diabetes, and anti-epileptic drugs
- In Maternal diabetes, folic acid dose↑ +/-
- 4-5 mg/day FA given to pregnant women with hemoglobinopathies (g/o rapid red cell turnover)
- Dose of FA for Tx of megaloblastic anemia: 1 mg/day (also in maternal diabetes)

Identify Image

	• Anencephaly fetus
	• USG diagnosis in the 1st trimester (as early as 10 weeks and definitely by 14 weeks)
	  ○ Frog eye sign or Mickey Mouse sign
	• Associated with,
	  ○ Polyhydramnios
	  ○ Post-term usually
	  ○ Preterm
	  ○ Face presentation
	  ○ Pseudo shoulder dystocia


Frontal bone scalloping
Lemon sign

Anterior curvature of cerebellum
Banana sign
 
	• Frontal bone scalloping (lemon sign)
	• Anterior curvature of cerebellum (banana sign)
	• Associated with,
	  ○ Arnold-chiari malformations
	  ○ Spina bifida

 	• Encephalocele

Omphalocele

Central through umbilicus, covered by thin membrane

- Omphalocele
  - Defect centrally through the umbilicus, covered by a thin membrane
  - A/w, underlying GCA, and aneuploidy risk.

Lateral to umbilicus
No membrane covering

Gastroschisis

- Gastroschisis
  - Lateral to the umbilicus, no membrane covering
  - Not a/w any underlying GCA
  - Usually seen in fetuses of younger women
  - A/w FGR

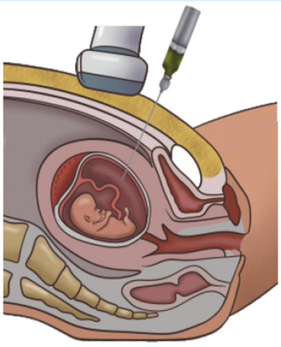
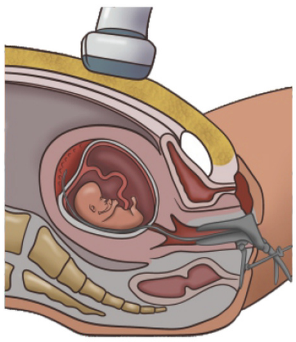
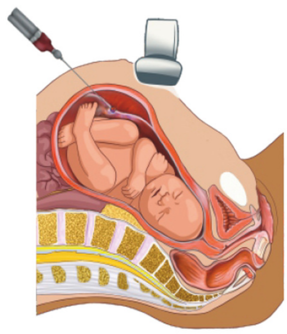
Venolymphatic malformation, fluid filled jugular lymphatic sacs extending from the posterior neck

Cystic hygroma

- Venolymphatic malformation → fluid-filled jugular lymphatic sacs extending from the posterior neck
- Associations
  - 1st Trimester
    - → ↑ risk of Trisomy 21 (M/c) > Monosomy X > Trisomy 18> Cardiovascular anomalies (e.g., hypoplastic left heart)
  - 2nd Trimester
    - → M/c associated with Monosomy X

INVASIVE FETAL TESTING:

01:20:12

AMNIOCENTESIS	CHORIONIC VILLOUS SAMPLING	CORDOCENTESIS
		
Timing after 15 weeks, best at 16-18 weeks	10-13 weeks (not earlier due to risk of limb reduction defects)	Beyond 18 weeks
Sample: amniocytes, epithelial cells, and GI mucosal cells	Trophoblast cells	• A blood sample is taken from a Umbilical vein • If accidental UA piercing could cause sudden fetal bradycardia.

Diagnosis of fetal genetic disorders, aneuploidies, fetal infections is possible by analysing these tissue		
Can detect fetal anemia	Cannot detect fetal anemia & NTDs	Can detect anemia but not NTDs.

Important Pointers

- With amniocentesis, cells are cultured first and then karyotypic analysis is done, resulting in 7-10 days, but with CVS (trophoblasts and dividing cells), results are in 36-48 hours
- Chromosome microarray analysis is preferred when
  - Fetal major structural anomalies.
  - Genetic evaluation in stillborn fetus

DRUGS IN PREGNANCY:

01:26:31

- The most crucial period for teratogenesis extends from the 2nd through the 8th week post-fertilization embryonic period
- The period beyond 10 weeks from LMP is called the fetal period (begins at the 11th week from LMP / from begins at 9th week post-fertilization).
- Fetuses are most susceptible to radiation-induced mental retardation between 8 and 15 weeks
- No observed adverse effect level of 5 rads
- The threshold for GCAs is 20 rads (0.2 Gy)
- Fetal alcohol syndrome: is a/w IUGR, mid-facial hypoplasia, microcephaly, short palpebral fissures, smooth philtrum
- Thalidomide is associated with phocomelia
- Antiepileptic drugs cause orofacial clefts, cardiac malformations, and NTDs, with the highest risk with valproate.
  - Pregnant women with epilepsy on AED monotherapy with safer drugs, in the least possible doses, preferred levetiracetam & lamotrigine (levetiracetam >lamotrigine)
  - Ideally, drug and dosage adjustments are done pre-pregnancy
  - For most women, seizure frequency remains unchanged.
  - There is a 10% risk of seizure disorder in children of epileptic mothers, as it is not teratogenic
  - Breastfeeding is not C/I on AEDs.
- Antithyroid drugs in pregnancy,
  - Methimazole: a/w choanal atresia and fetal aplasia cutis
  - Preferred drug:
    - → In the 1st trimester → propylthiouracil
    - → 2nd trimester onwards → methimazole is preferred
- Radioiodine is C/I in pregnancy.
  - If received, it is advised to delay pregnancy for at least 6 months after Tx and avoid Tx for at least 3 months after stopping breastfeeding
- Fetal hydantoin syndrome → A/w Phenytoin
- Oligohydramnios → ACEi and ARBs
- Chondrodysplasia punctata → Warfarin
- Ebstein anomaly → A/w Lithium
  - Neonatal lithium toxicity can occur from exposure of the fetus near delivery. If possible, the dose is decreased or discontinued 2-3 days prior to delivery.

- Cardiac defects → Paroxetine
- Craniofacial abnormality (cloverleaf skull) → Methotrexate
  - If used, delay pregnancy for at least 3 months
- Acitretin os absolutely C/I in pregnancy d/t risk of Retinoic acid embryopathy
  - Delay pregnancy for at least 3 years after stopping the drug
- Tamoxifen: If used, stop at least 2 months prior to conception
- DOC in syphilis in pregnancy → Benzathine penicillin 2-4 units IM
  - Early syphilis or latent < 1 year duration 1 dose
  - > 1 year duration or unknown weekly x 3 doses
  - Diday-Kassowitz law: For a woman with untreated syphilis, the likelihood of fetal infection in later pregnancies becomes less, and the rate of vertical transmission (transplacental) decreases with time
- DOC in falciparum malaria
  - 1st trimester quinine (according to WHO, ACT therapy is safe)
  - 2nd and 3rd trimesters ACT therapy
- DOC for vivax malaria in pregnancy: chloroquine f/b primaquine (postpartum)
- DOC for venous thromboprophylaxis/DVT → LMWH

MCQ

Q. A 28-year-old primigravida is seen at 16 weeks. She is a known case of SLE and has been in remission for the past 1 year. All of the following are true except:

A. Pregnancy outcome is best if lupus activity is silent for at least 6 months before conception.
B. Hydroxychloroquine, azathioprine, prednisolone, and tacrolimus can be used to manage flares
C. SLE flares for the majority of women in pregnancy
D. There is an increased risk of preeclampsia

Answer: C

- Teratogenic drugs avoided: methotrexate, mycophenolate, cyclophosphamide
- Neonatal lupus is usually associated with anti-SSA and anti-SSB antibodies, and there is also a risk of congenital heart block in the fetus.

Q. A 28-year-old primigravida at 30 weeks presented with high-grade fever, nausea, and vomiting with periumbilical pain for 1 day. There is diffuse periumbilical tenderness; bowel sounds are normal. The uterus is relaxed, non-tense, and non-tender; SFH is 30 cm, and FS is 140/min. USG confirms fetal well-being. She is diagnosed with acute appendicitis on MRI. What is the preferred management?

A. Antibiotics and observation
B. Diagnostic laparoscopy
C. Antibiotics, immediate laparotomy, and appendectomy
D. Cesarean section at the time of appendicectomy

Answer: C

ACUTE PYELONEPHRITIS:

01:46:30

- In pregnancy, the risk of sepsis and preterm labor increases
- Features: flank pain, renal angle tenderness.
- Most common in the 2nd trimester and are U/L

Yourwish

- Management:
  - IV fluids,
  - urine output > 50 ml/hr,
  - IV antibiotics (MC is E. coli)
  - Reassess in 48 hours, and antibiotics could be switched to oral if the fever settles and continue for 7-10 days

VERTICAL TRANSMISSION

MCQ

Q. Which of the following infections is not transmitted perinatally?

A. CMV

B. Rubella

C. HSV

D. Hepatitis B

Answer: B

- Vertical transmission: transmission from mother to fetus
- Vertical transmission can happen
  - Transplacentally
  - During delivery (perinatal):
    → The infective agent comes in contact with the delivering fetus through the birth canal. e.g., HSV, hepatitis B, HIV, group B streptococci.
  - Breast milk
- GBS, HSV, HIV, and HEP B are undergoing perinatal transmission most commonly
- CMV and toxoplasmosis have a higher risk for vertical transmission (transplacental) as the gestation age increases.
- If infection occurs in the 1st trimester: can lead to a more severely affected fetus

Important Pointers

- The most teratogenic infection is rubella
- CRS is rare if maternal infection occurs beyond 16 weeks (cataract, deafness (SNHL), and cardiac defects (MC PDA)).
- Confirmed maternal infection in the 1st trimester offers MTP

Varicella In Pregnancy

- Can cause Congenital Varicella Syndrome (CVS)
  - Features: Cicatricial skin scars, limb hypoplasia
- Risk of vertical transmission is highest between 13-20 weeks of gestation
- Maternal Tx is mainly supportive, Acyclovir if needed.
- If delivery occurs 5 days before or up to 7 days after rash onset, the newborn is given varicella-zoster IG
- No risk to fetus with maternal herpes zoster
- Pregnant women exposed to varicella, if susceptible:
  - Check IgG levels on serology → negative → can give varicella-zoster Ig within 96 hours of exposure.

CMV:

- Triad of Congenital CMV

- Chorioretinitis
- Microcephaly
- Periventricular calcifications

- MC fetal infection: CMV infection
- MC infective cause of congenital brain lesions and childhood deafness: CMV infection
- Mild flu-like maternal illness, h/o contact with toddler from day care centers.
- NO vaccine, NO immunity, and NO treatment

Toxoplasmosis:

- Congenital toxoplasmosis:
  - Chorioretinitis
  - Convulsions
  - Intracranial calcifications (diffuse)
  - Hydrocephalus
- Maternal illness is subclinical, mostly, or a mild flu-like illness, h/o eating or undercooked meat, or contact with cat feces
- No risk of fetal infection with pre-preg infection.
- Acute/recent maternal infection: spiramycin to the mother to decrease the risk of placental transmission.
- Confirmed fetal infection: pyrimethamine and sulfadiazine are given to the mother to treat the infection.

Important Information

- The least teratogenic infection: HIV
- The maximum risk of maternal-fetal transmission of HIV is peripartum > intrapartum
- With no intervention and continued breastfeeding, the risk is 30-45%; the risk decreases to 2% with ARV prophylaxis even if breastfeeding continues.
- Initiate ART regardless of CD-4 count and continue life-long (preferred TLD regimen)
- Vaginal delivery preferable (CS for obs indications)
- Exclusive breastfeeding is preferred; avoid mixed feeding.
- An infant receives ART prophylaxis (single or dual drug dependency on risk)

MCQ

02:01:56

Q. A pregnant woman at 37 weeks is seen in labor with painful herpetic lesions on the vulva. What is the best course in management?

A. Induction of labour

B. Oral acyclovir and allow spontaneous labor.

C. Oral acyclovir and cesarean section

D. Cesarean section

Answer: B

- Active lesions in the non-genital area, occlusive dressings, and vaginal delivery allowed
- H/o recurrences during pregnancy or h/o genital herpes, suppressive acyclovir therapy from 36 weeks onwards to decrease peripartum viral shedding.
- No active genital lesions during labour: vaginal delivery

Q. A 26-year-old woman is seen at 24 weeks of gestation. She is found to be HBsAg positive. The woman is concerned about transmitting the infection of her baby. She is counselled on all of the following except:

A. She will need an elective cesarean section

B. The newborn will be given hepatitis B vaccination and immunoprophylaxis immediately after delivery

C. She can continue to breastfeed the newborn

D. Antiviral treatment can be given to decrease the risk of vertical transmission if her HBV viral load is high

Answer: C

- HBsAg+ve and HBeAg -ve: 10-20% risk
- HBsAg+ve and HBeAg -ve: 90% risk
- A woman with a high HBV viral load (10 power 6 to 10 power 8 copies/ml) has a 10% risk of transmission, even with immunoprophylaxis.