CONTENTS

GYNAECOLOGY

OBSTETRICS

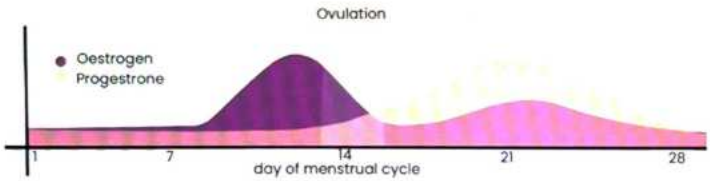
1 MENSTRUATION: BASICS OF MENOPAUSE, CONCEPTION, CONTRACEPTION, INFERTILITY

MENSTRUATION

00:00:17

- Primordial follicles: 6-7 millions at 20 weeks of IU Life
- 1-2 millions at birth
- 3-4 lakhs at puberty
- 400-450 utilized in a woman's life

MESTRUAL CYCLE



CASE 1 : WOMEN IN WHOM FERTILIZATION OCCURS

- Fimbria Ovarica – Extra long fimbria which takes up oocyte
- Life of oocyte - 24 hrs to 48 hrs (best answer 24 hrs)
- Sperms fertilize oocyte in ampulla
- Embryo reaches the uterine cavity on 3rd to 4th day of ovulation
- IMPLANTATION WINDOW
  Implantation on secretary or ripened endometrium on 6th to 9th day after ovulation or 20th to 24th day of the menstrual cycle
- Progesterone is responsible for secretory endometrium (Source → Corpus luteum (Follicle)
- Estrogen is responsible for proliferatory endometrium (source → follicle)

CASE 2 : WOMEN IN WHOM FERTILIZATION DOES NOT TAKES PLACE

- Oocyte dies in 24-48 hours
- Corpus luteum
  - begins to degenerate at → 9th to 10th day
  - Complete degeneration at 14th to 15th day → Shedding of endometrium
- Progesterone withdrawal is responsible for shedding of endometrium
- Uterine contractions to expel menstrual blood : cause dysmenorrhea
- Length of Cervix → 3.5 to 4cm (Short Cervix → 2.5 cm)

MITTLESHMERZ/ MID CYCLE PAIN

- d/t blood & debris (from follicle) collected into Pouch Of Douglas at the time of ovulation

DYSMENORRHEA (PAIN OF MENSTRUATION)

00:09:54

- During ovulation
  ↓
  Prostaglandins are released
  (d/t rupture of follicle)
  ↓
  Causes contractions of uterine muscle to allow cervix to open for passage of shed endometrium
  ↓
  These contractions causes pain

CASE 3 : ANOVULATORY CYCLES

00:18:00

- No MITTLESHMERZ/ mid cycle pain
- No Prostaglandins, shed endometrium keeps collecting in uterus intermittent recoil of uterus blood comes outirregular
- Painless (d/t no/less prostaglandins)

Important Information

Anovulatory cycles are irregular and painless. ovulatory cycles are regular & painful

DYSMENORRHEA

TYPES

00:25:17

Primary/Spasmodic Dysmenorrhea

- Pain starts 30 min before onset of periods and stays 10 hrs post onset
- Seen in normal women, women with fibroids

Congestive / Secondary Dy

- Pain starts 3-4 days prior and stays throughout menses
- seen in PID & endometriosis

Membranous Dysmenorrhea

- Fibrinolytic system in uterus is responsible for less/ non clumping of blood
- Total absence of fibrinolytic system
  - Endometrium shed like cast of endometrial cavity (due to clumping of blood)
    ↓
    More contractions
    ↓

More pain

TREATMENT

1. NSAIDS
- ibuprofen
- naproxen
- mefenamic acid

2. Anti Spasmodics
- dicyclomin
- drotavarine
- hyoscine

3. Combined oral contraceptives → Cycles become anovulatory
4. Surgical dilatation of cervix [Parous women have lesser spasmodic dysmenorrhea, cervix stays patulous after delivery]
5. Pre sacral nerve ablation → Laser or thermal resection of hypogastric plexus
6. GnRH analogues → Will stop the periods

BASIC DEFINITIONS OF MENSTRUAL CYCLE

00:39:34

- **Length of menstrual cycle**
  - 28 7 Days

Polymenorrhea	→	< 21 days
Oligomenorrhea	→	> 35 days

- **Duration**
  - 2-7 Days

Hypomenorrhea	→	< 2 days
Menorrhagia		> 7 days

- **Amount**
  - 30-50 ml per cycle
    Excessive blood loss → > 80 ml [menorrhagia]

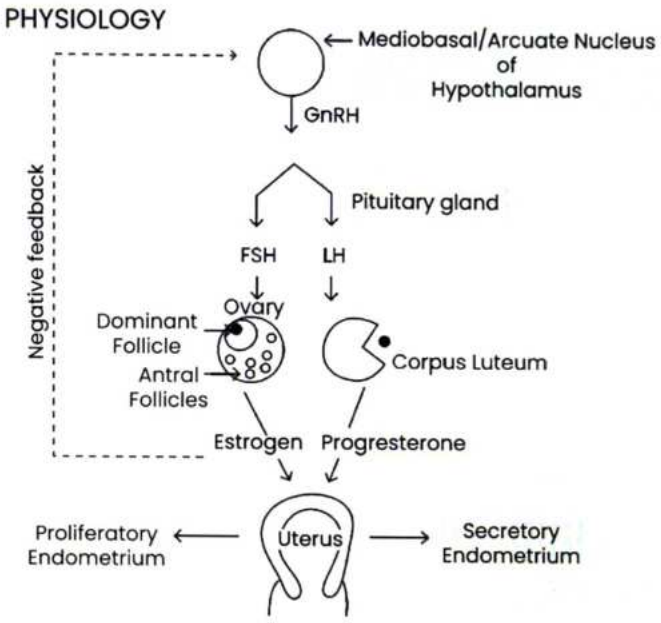
- **Polymenorrhagia** 00:42:25
  - < 21 days & > 80 ml of blood loss

- **Metorrhagia** 00:44:45
  - Irregular cycles superimposed on regular cycles
  - Intermenstrual bleeding [spotting]

- **Menometrorrhagia**
  - Irregular acyclical bleeding (Ca Cervix, Polyp)

- **Metropathia Hemorrhagica** 00:46:13
  - Prolonged amenorrhea followed by heavy withdrawal
  - amenorrhea → 2 ½ - 3 months
  - in a women > 40 yrs
  - Anovulatory cycle, irregular
    ↓
  - Hyperplasia of endometrial glands present
    ↓
  - Non Secretory Endometrium (as no progesterone)
    ↓
  - Diagnosed by curettage & microscopic examination
    → Cystic Glandular Hyperplasia (CGH)
    [SWISS CHEESE ENDOMETRIUM]
    → Very less stroma
  - Self limited condition
  - Curettage is also curative

PHYSIOLOGY



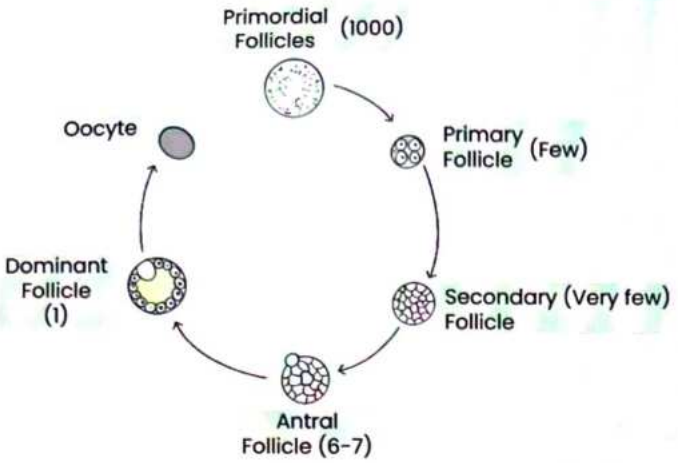
- GnRH releases in pulsatile fashion
  - 60 minutes in follicular phase
  - 90 minutes in luteal phase

How to remember

Faster (60min) in Follicular phase
Longer (90min) in LUTEAL phase

- GRANULOSA CELL OF FOLLICLE 00:57:09
  - Sex cord cells
  - Produces estrogen

- ANTRAL FOLLICLES
  - Fluid filled follicles
  - 6-7 recruited every month



- Women have set number of follicles, which exhaust every month and are over by menopause
- Perimenopausal women have irregular cycles due to OLD follicles
- Fate of Reproduction During Perimenopausal Period
  1. Anovulatory cycle
  2. Poor oocytes
  3. No fertilization
  4. Poor embryos → Abort
  5. Abortion [40% after 40 years]

- > 35 yrs Pregnancies → ELDERLY GRAVIDAS indicated for
  - LEVEL II scanning
  - Triple markers, dual marker
  - Amniocentesis

OVARIAN RESERVE

⏱ 01:25:44

QUANTIFICATION	OVARIAN RESERVE
1. ANTRAL FOLLICULAR COUNT [Young → 6 to 7, older → 1]	↓
2. OVARIAN VOLUME [young → 3.5 x 2.5 x 3cm, older → 1 x 1.5 x 1cm]	↓
3. AGE	↓
4. ESTROGEN	↓
5. FSH → [younger → 2 to 6IU, Older → > 15IU]	↓
6. ANTI MULLERIAN HORMONE → made from granulosa cells of ovary	↓

⏱ 01:30:50

Important Information

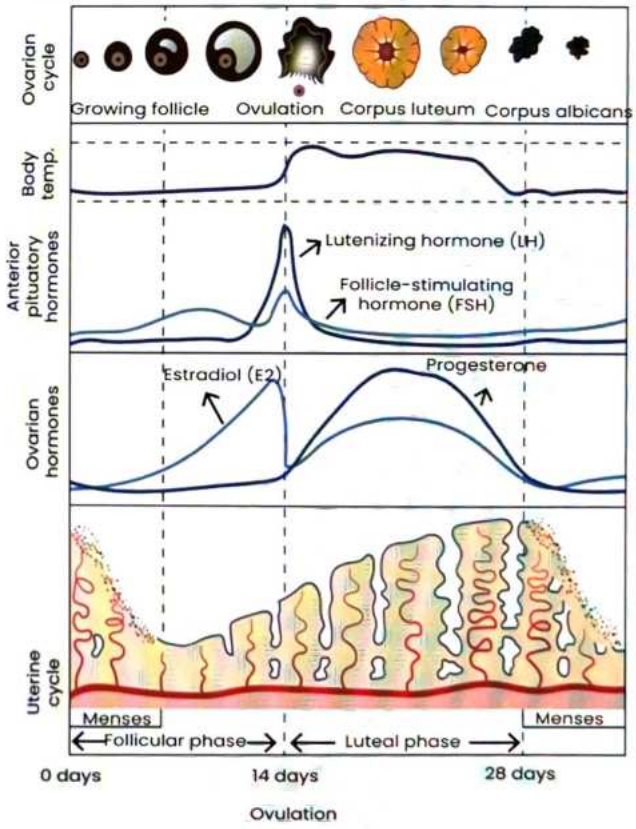
Purpose of FSH → Estrogen production
Purpose of LH → Progesterone production

Good indicators of ovarian reserve

- AFC
- FSH
- AMH [single best for assessment]

Important Information

Normal FSH → 2-6 IU
> 10 IU → suggestive of Menopausal women
> 40 IU → Diagnostic of Menopause

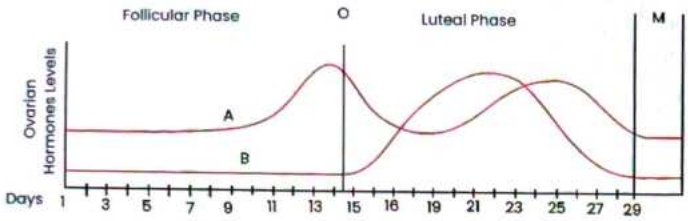


Previous Year's Questions

Q. Day 20 of menstrual cycle falls in which phase?
NEET 2019
A. Menstrual phase
B. Follicular phase
C. Ovulation phase
D. Luteal phase

Previous Year's Questions

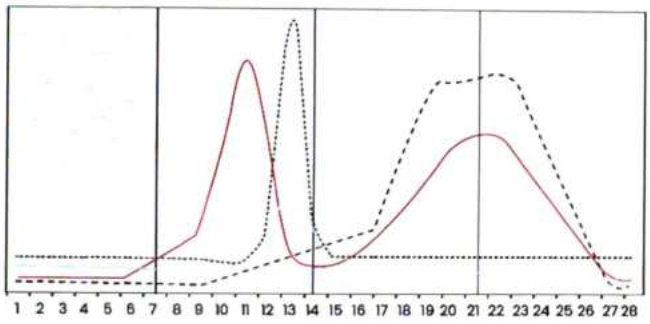
Q. In this graph of menstrual cycle. which alphabet shown is suggestive of ovulation? FMGE 2020



A. A
B. B
C. O
D. M

Previous Year's Questions

Q. In this graph of normal menstrual cycle. X represents? FMGE 2019



A. LH
B. FSH
C. Estrogen
D. Progesterone

Important Information

Unopposed estrogen (without progesterone) in anovulatory women : is the etiology of endometrial cancer

MAINTAINANCE OF PREGNANCY

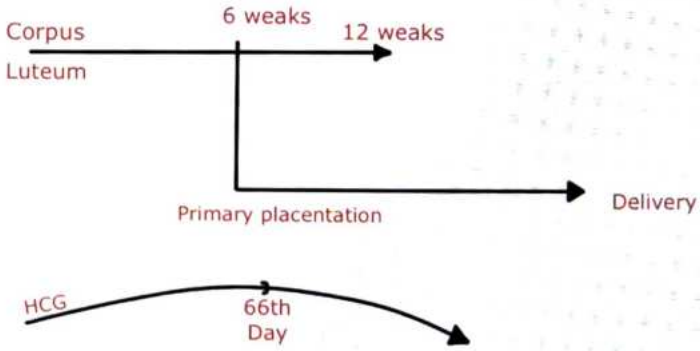
- Syncytiotophoblast of the embryo starts to make HCG, which is similar to LH maintains corpus luteum

Important Information

- Pregnancy is exclusively maintained by CORPUS LUTEUM upto 6wks
  - corpus luteum remains up to 12wks in pregnancy
- By corpus luteum & placenta → from 6-12 weeks
- Only by placenta → after 12 weeks
  Luteo-placental shift occurs at 6 weeks

Previous Year's Questions

Q. HCG is structurally and functionally similar to INI CET 2021
A. Prolactin
B. LH
C. ACTH
D. Oxytocin



- Hyperemesis is maximum at 66th day [9 wks + 3days]
- Abortion can be Prevented by

a. Progesterones
b. HCG

- Spinnbarkiet stretchability [cervical mucus stretchability] [max. at 14th day]
  ↓
  On drying
  ↓
  Fernning/arborizing pattern [NaCl crystals]

- FERTILE PERIOD → 11th to 16th day
  - Life span of sperm → 72 hrs

- Life span of ovum → 24-48 hrs

CASE

- Intercourse on 24th day of cycle
  - Cervical mucus is thick } fertilization doesn't occur
  - No oocyte }
  - Even if embryo forms : no implantation occurs
- SAFE PERIOD → Before 11th day & after 16th day

BILLING METHOD

- Natural method of contraception
- Based on cervical mucus physiology
- Thin and stretchable cervical mucous : wet days : intercourse done on these days can lead to pregnancy

PROGESTERONE PILLS [POP]

Mechanism of action

- Progesterone given from start of the month Cervical mucus on 14th day → thick & viscid
- Progesterone no LH surge Anovulation [No oocyte]
- Hyper secretory endometrium Unfavorable for implantation

[out of phase endometrium - pinopods are internalized]

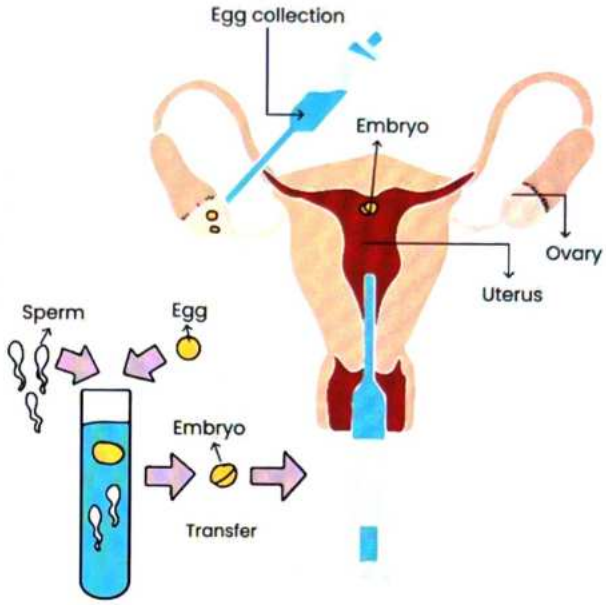
- Failure rate → 1 to 2%

HORMONAL MANAGEMENT OF AUB

02:22:20

- 1st line hormonal management of abnormal uterine bleeding: PROGESTERONE
  - Stabilizes endometrium in a physiological way
- Next line of management → ESTROGEN heavier withdrawal
- First line of drug in acute SEVERE Menorrhagia → ESTROGEN

IVF: CONTROLLED OVARIAN HYPERSTIMULATION



- Give FSH injection [multiple] from beginning of the cycle, many follicles will be recruited
- On 14th day, under general anesthesia & take all oocytes from the follicles with the help of TVS
- Take few of best oocytes & put them into test tube
- Fertilize with sperm in test tube → Embryo formed
- Put the embryo back in the uterus
- Excess embryos are stored in liquid N2 [- 196° c] [frozen embryo transfer]

- 1st IVF baby → LOUISE BROWN [1978]
- 1st IVF done by → STEPTOE & EDWARDS
- In 2010, Noble prize given to EDWARDS

2 OVARIAN HYPERSTIMULATION SYNDROME

CONTROLLED OVARIAN HYPER STIMULATION

⏱ 00:00:45

- Means trying to get many eggs in one cycle to improve chances of conception with IVF

Understand with an example

- Each egg makes 150-200 pg estradiol
- 200 x 15 eggs = 3000 pg of Estradiol: controlled ovarian hyperstimulation
- 200 x 40 eggs = 8000 pg of Estradiol: ovarian hyperstimulation

- > 3500 pg of Estradiol leads to
  - Vascular endothelial growth factor
  - Renin, pro rennin
  - Angiotensin

} ↑ Vascular Permeability

↑ Vascular Permeability → **Intravascular Compartment**

↑ Vascular Permeability

↓

Fluid shifts → Hemoconcentration → PCV> 45 or > 55

↓ packed cell volume [HCT] -33

↓

Thrombo embolic phenomenon

↓

Third space collections

- Ascitis
- Pleural effusion
- Pericardial effusion
- Edema

} Death

- Renal Emboli
- Cerebral Emboli
- Hepatic Emboli
- Limb Emboli

} Death

- Torsion
  Rupture of ovary
  Hemorrhage

} Death

PRE DISPOSING FACTORS

⏱ 00:10:23

- Inj HCG [Initiating factor] [used for rupturing the follicle]
- Vascular endothelial growth factor
- Renin, pro renin
- Angiotensin
- HCG along with these 3 leads to COH

Important Information

- Inj HCG given for follicle rupture, is the most important culprit and triggering factor for OHSS

Previous Year's Questions

Q. 26 yr lady with delayed cycles presents to the infertility clinic. After diagnosing her to be a case anovulation of 'Normogonadotropic Hypogonadism' type she was put on human menopausal gonadotropin (HMG) for ovulation induction from the second day of her menstrual period. She was 'Triggered' for follicular rupture with Human chorionic gonadotropin (hCG) and on the 19th day of this cycle she developed dyspnoea, reduced urine output, abdominal bloating and pain. What condition is this patient likely suffering from? (NEET 2020)

A. Theca lutein cysts
B. Ovarian hyperstimulation syndrome
C. Ruptured ectopic pregnancy
D. Ruptured corpus luteum cyst

MATHUR CLASSIFICATION

⏱ 00:11:00

Mild	< 8 cm	No Ascites
Moderate	8-12	USG Ascites
Severe	>12 cm	Clinical Ascites HCT → > 45
Critical		Tense Ascites HCT → > 55

- No pregnancy is advised in severe & critical OHSS as HCG is expected to rise further if patient gets pregnant. Embryos are frozen and are transferred on day 20 of next cycle (day 6 after ovulation).
- Can allow pregnancy in mild and moderate OHSS

MANAGEMENT

⏱ 00:17:30

- Avoid pregnancy in severe & critical forms
- Remove fluids: Tap Ascites & effusion

- Give oral fluids [Mild, moderate forms] IV Fluids
  - NaCl, DNS [crystalloids]
  - Albumin, Dextran, starch [colloids]

Important Information

- Colloids will hold the fluid in the Intra-vascular space and are thus important for management of OHSS

OCCURRENCE

00:20:01

- MC: 13-15% of pts on Clomiphene Citrate
- Severe forms: Gonadotropins
  - Inj. HMG [Human Menopausal Gonadotropins]
  - Inj. FSH recombination

3 TESTS OF OVULATION

TESTS OF OVULATION

⏱ 00:00:15

Tests the effects of progesterone

1. **BBT**: ↑0.5° F as progesterone is a thermogenic hormone
2. **S. LH**: > 15 IU
3. **S. progesterone** on day 21 [>3ng/ml]
4. **Serial USG**: Follicular monitoring [OPD -usual method used, start follicular monitoring on day 9 onwards

Understand with an example

- Follicular monitoring started on day 9, you observed increasing follicular size serially on day 11, 13, 14 and then on day 16 the follicle shrunk: this implies ovulation occurred between day 14-16

5. **Premenstrual Endometrial Biopsy** on day 21

⏱ 00:02:15

- to check secretory changes
- When the difference b/w observed & expected changes is > 2 days, it implies Luteal Phase Defects, which is an important cause of infertility.

6. **Serial Cervical Mucus Studies** ⏱ 00:05:54

- Spinnbarkeit & fern ing is due to estrogen : this is max around day 14.
- Loss of spinnbarkeit & fern ing are due to progesterone.

Important Information

- Spinnbarkeit and fern ing of cervical mucous are NOT suggestive of ovulation.
- Loss of spinnbarkeit and fern ing are suggestive of ovulation.

7. **Diagnostic Laparoscopy**: it is not usually done for diagnosing ovulation. However laparoscopy done for any reason, if shows a yellow punctum on ovary, is suggestive of ovulation

Previous Year's Questions

Q. A 32 year old woman visits an infertility clinic with regular cycles of 28 days. What should be the test for ovulation? (AIIMS 2020)

A. Serum LH at day 21
B. Serum progesterone at day 21
C. Serum LH at day 14
D. Serum progesterone at day 21

Previous Year's Questions

Q. A 30-year-old nulliparous lady, married for 5 years came for infertility treatment. Her tests for ovulation reveal that she is ovulating regularly and normally. Which of the following suggests that ovulation has taken place? (FMGE 2020)

A. High FSH
B. Low basal body temperature
C. High LH
D. High progesterone

4 ENDOMETRIOSIS, ADENOMYOSIS

ENDOMETRIOSIS

Etiology: Retrograde Menstruation 00:01:10

- Proposed by Samsons [Sampsons Implantation Theory]: endometrium also goes out through tubes (retrograde) and implants on ovary, ligaments, bowel
- 70 to 80% of all women have retrograde menses
- 5-10% of all women have poor immunity & ↑ estrogenecity & develop endometriosis

Previous Year's Questions

Q. 18 year old girl presents with partial transverse vaginal septum with dysmenorrhea and chronic pelvic pain. Which of the following is the likely complication? (NEET 2021)

A. Endometriosis
B. Tubo-ovarian abscess
C. Dermoid cyst
D. Theca lutein cyst

Age of Presentation: 3rd to 4th decade [25-35 yrs of age]

Diagnosis

- ↑ CA 125
- USG, MRI
- Laparoscopy [best]

Sites of Prediliction

- MC site: ovary
- 2nd mc site: POD
- Bowel
- Lung [periodic hemoptysis]
- Nose [Periodic epistaxis]
- Eyes [Periodic sub conjunctival hemorrhage]

} VICARIOUS MENSTRUATION

Pathology 00:03:43

- Powder Burn Lesions/ Blue Spots
- Chocolate Cyst of Ovary: endometrium sheds in ovary and since it cannot come out, keeps collecting to form a cyst
- Scarring & adhesions with fallopian tube: in the process of healing -causes Infertility by impairing oocyte pick up by fimbria

Symptoms 00:08:09

- Chronic pain
- Acute monthly exacerbation: Severe congestive dysmenorrhea
- Deep dyspareunia
- Menorrhagia
- Infertility
  - Altered tubo-ovarian relation by adhesion, impairing oocyte pick up
  - ↓↓ intercourse
  - Poor ovulation
  - Embryotoxic Endometriotic Deposits
    → Poor quality embryos
    → ↓ implantation
    → ↑ Abortion

Previous Year's Questions

Q. A woman with endometriosis is likely to suffer from? (INI CET 2021)

A. Infertility and dysmenorrhea
B. Infertility and irregular vaginal bleeding
C. Dysmenorrhea and Irregular vaginal bleeding
D. dysmenorrhea and Vaginal discharge

Previous Year's Questions

Q. A nulliparous 29-year-old woman presents with infertility. On examination, uterus is felt to be normal in size but is retroverted and fixed. Also, there is tenderness in posterior vaginal fornix. Diagnosis? (FMGE 2020)

A. Adenomyosis
B. Endometriosis
C. Fibroid uterus
D. Ovarian malignancy

Treatment 00:12:09

Surgical Rx

- Adhesiolysis for adhesion
- Cystectomy for chocolate cysts

- Ablation for deposits: Fulgration of Deposits
  - Thermal or Laser
- 60 -70 % Recurrence
- Other options: hysterectomy

Medical Management 00:16:53

1. INJ Depo medroxy progesterone acetate 150 mg once in 3 months
- Creates pseudo pregnancy state : progesterone stabilizes endometrium
- Atrophy of endometrium in 3-4 months of Rx

2. Tab Danozol
- Androgen: Anti estrogenic action
- Faster atrophy
- Side Effect: Hirsutism : reversible change Virilization
  - Breast atrophy
  - Hoarsness of voice
  - Clitromegaly

  } Irreversible
- 1st sign to stop Rx with Danazol: Hoarsness of voice

3. Combined oral contraceptive pills
- Anovulatory cycles: Painless
- Limits endometriosis

4. GnRH Analogues: Depot or Continuous Form
- Leuprolin, Naferelin, Goserlin
- Normal GnRH secretion is pulsatile. Here, GnRH is given as depot/ continuous form causing excessive stimulation of pituitary, ultimately causing desensitization/ down regulation of pituitary receptors

Important Information

- **Medical management aims at stopping the periods till the patient conceives or completes her family. when COCs can be started**

Understand with an example

Ques. 25 yrs with chocolate cyst. Surgery is done: what next ?

Ans. Medical management till conception

- Pregnancy: limits endometriosis family complete start on COCPs
- COCPs: 21 x 4 packs
  - 84 days continuously
  - Periods once in 90 days
- GnRH analogues
  - 6 months
    - → Estrogen dependent osteoblastic action will stop
    - → Estrogen independent osteoblastic action will continues

    } Osteoporosis
- Add Back Regime; to be started if GnRH are to be given for longer than 6 months: Low dose estrogens and RALOXIFINE [selective estrogen receptor modulator]

Previous Year's Questions

Q. 29 year old nulliparous lady presented with endometriosis and infertility. On laparoscopy there were severe pelvic adhesions and uterus had bowel stuck to its fundus with dense adhesions. The ovaries were cystic each around 6-8 cms in size and stuck to each other (kissing ovaries). What is the next line of management?

(FMGE 2020)

A. GnRH anaogues
B. OCPs
C. Hysterectomy with oophorectomy
D. B/L cystectomy with adhesiolysis and plan for IVF

ADENOMYOSIS/ ENDOMETRIOSIS INTERNA

00:39:19

Seen in
- Multiparous women
- > 40 yrs
- 30% of hysterectomy specimens

Endometriosis Interna
- Endometriosis within uterus, In the muscle layer. Due to disruption of endometrial-myometrial border due to repeated pregnancies

Associated with
- Menorrhagia
- Progressive dysmenorrhea
- Infertility in young women [Rare]
- Uterus: Uniformly enlarged & < 14 weeks size of pregnant uterus [14cm] (asymmetrically enlarged uterus in fibroid)

Previous Year's Questions

Q. A 38 year old P3L3 woman presents with secondary dysmenorrhea and on USG there is uniform enlargement of uterus upto 10 cms. What is the provisional diagnosis? (FMGE 2020)

A. Adenomyosis
B. Fibroid
C. Leiomyoma
D. Endometriosis

Diagnosis 00:45:44

1. **USG, MRI**

- Sub endometrial halo present
- Hetero echoic deposits in uterine myometrium
- Ill defined hypoechoic areas: Lakes of Endometrial Blood
  - Junctional zone b/w endometrium & myometrium
  - Normal: 5-8 mm
  - Adenomyosis: >12 mm [diagnostic]

00:48:58

2. **Uterine Biopsy/ Post Hysterectomy Uterine Analysis**

- Endometrial glands within uterine muscles: Pathognomic
- Localized adenomyosis: fibroids have pseudocapsule, adenomyosis has diffuse border

Treatment 00:51:04

- Menorrhagia: NSAIDS, Hormones
- Young women: Hormones
  - COCPs for longer duration
  - IUCD's with progesterone [mirena] localized excision
- Surgical Mx of Menorrhagia: D & C
- Overall best Rx: Hysterectomy

Important Information

- Best treatment of adenomyosis is hysterectomy

5 HORMONAL REPLACEMENT THERAPY

MENOPAUSE

⏱ 00:01:20

- Average age of menopause: 52 years (51 years)
- Average age of menopause in India: 47-48 years
- Range : 40 – 58 years
- FSH > 10 is suggestive of menopause
- FSH > 40 is diagnostic of menopause
- FSH > 40 before 40 years of age is premature ovarian failure

IMPORTANCE OF ESTROGENS

⏱ 00:03:00

Features at menopause due to lack of estrogens

- Skin: smooth, supple, glistening due to s/c collagen maintained by estrogen. At menopause low s/c collagen→ Lax -loose skin
- Voice: Hoarseness of voice
- Brain: Mood swings
  - Depression
  - Anger threshold ↓
  - Anxiety
  - Insomnia
  - Hot flushes
    - →coincides with LH rise
    - →increase in NA, serotonin, dopaminergic pathways vasodilatation in brain flash of heat from brain to neck to back
    - →Around 75% menopausal women get hot flushes
    - →Seen in up to 1-2 years in most women, can go upto 10 years
    - →Not just because of estrogen deficiency but due to estrogen withdrawal

Important Information

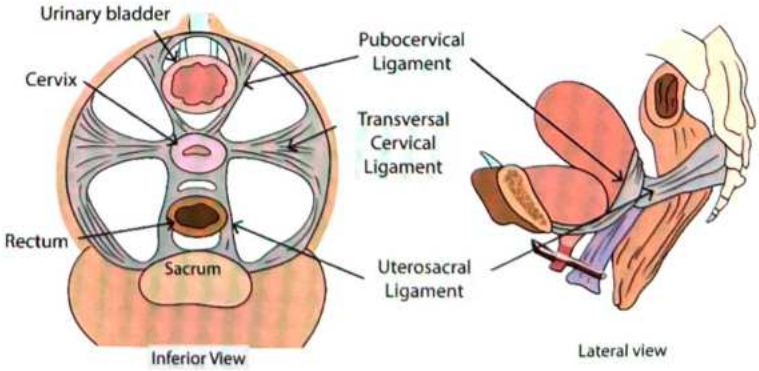
- Hot flushes are important indication for HRT
- Due to estrogen withdrawal

- Bones: ↑ Fractures due to osteoporosis
  - Vertebral compression fractures [MC]
  - Wrist fractures
  - Femur fractures
  - More osteoclastic activity, less osteoblastic activity

Important Information

- Most common fractures due to menopause : vertebral compression fractures

- Hair
  - Vellous hair: Soft, thin, light
  - Terminal: Hard, thick, dark
  - At menopause: Pilosebaceous unit is more under control of androgens: more terminal hair
- Pelvis
  - ↑ Fractures of hip bone
  - Normal PH of vagina→Acidic (protective against infections)
  - Glycogen $\xrightarrow{\text{lactobacillus}}$ Monosaccharides + lactic acid+ H_2O_2
  - No Estrogens→PH→Alkaline→↓Lactobacillus→↑ Anaerobes ↑ Infections
    - →Vaginitis
    - →Vulvitis
    - →Urethritis, UTI
    - →PID [Pelvic Inflammatory Disease]
      - Dry atrophic vagina: ↓ Intercourse
- Heart: Coronary artery disease↑
  - At 40 years, man : woman (risk of CAD) : 9:1
  - At 60 years, 1:1
- Pelvic organ prolapse: Supports of the uterus
  - Ligamentous support
    - →Round ligament: maintains anteversion
    - →Mackenrodt/ cardinal/ transverse cervical: best ligament support
    - →Uterosacral
    - →Pubocervical

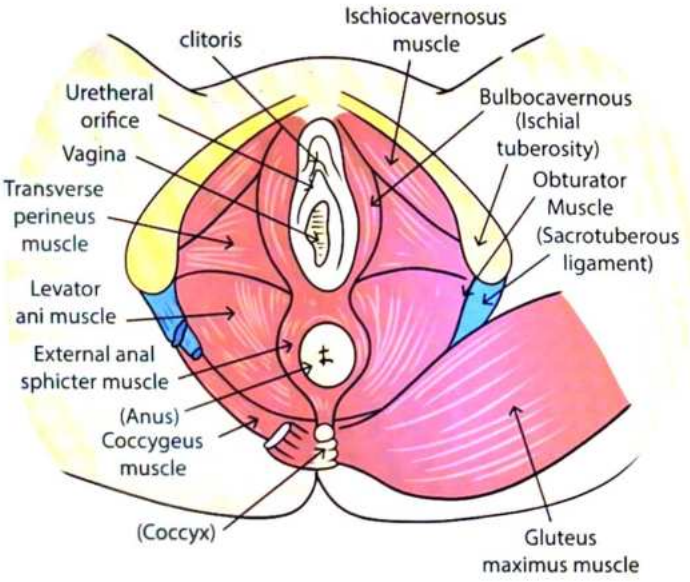


- Muscular support: levator ani/ pelvic diaphragm: best support
  →Puborectalis
  →Pubococcygeous
  →Iliococcygeous

Important Information

- **Best overall support of uterus: pelvic diaphragm**
- **Best ligamentous support: transverse cervical**

- Tone of these muscles is maintained by estrogen, which is lost at menopause: increases prolapse
- Main reason of prolapse is abnormal conduct of labour, but prolapse occurs at menopause due to loss of estrogenic tone



Important Information

- **Most important indications for HRT: hot flushes and osteoporosis**

INVESTIGATIONS BEFORE STARTING HRT

00:28:31

- LFT [Liver function tests]
- F/PP sugars
- Lipid profile
- Serum FSH
  - To diagnose menopause
  - To monitor HRT [if given to younger women (premature ovarian failure)]
- CBC
- Mammography
- USG →Endometrium→< 4 mm (If ≥ 5 mm→ investigate)
- Pap smear
- ECG
- BMD assessment: DEXA scan: Dual X ray Absorptiometry. To diagnose osteoporosis
  - T score: compare to woman of 30 yrs T+1 to T-1 (normal)
    →Osteopenia: T-1 to T-2.5
    →Osteoporosis: > T-2.5

CONTRAINDICATIONS TO HRT

00:32:50

- Abnormal liver function
- CAD or CVA
- DVT/ Thromboembolism
- Undiagnosed vaginal bleeding
- H/O Breast cancer
- H/O endometrial cancer
- Endometriosis
- Fibroids
- Porphyrias

HORMONE REPLACEMENT THERAPY

00:35:00

1. **Tab Estradiol**: 1-2 mg/day add
2. **Tab Conjugated Equine Estrogens**: 0.625 to 1.25 mg/day

} Progesterone

Important Information

- **High dose estrogen given for HRT should be given with progesterone to protect from endometrial cancer**

3. **Tab Tibolone**
   - Synthetic estrogen
   - Progestational metabolite present
   - 2.5 mg/day

4. **SERM [Selective Estrogen Receptor Modulators]**
   - Raloxifene
     - 60 mg/day
     - Estrogenic on bone
     - Anti-estrogenic on brain [C/I for hot flushes]

Important Information

- **Raloxifene is not to be given in menopausal women with hot flushes**

- Bazedoxifene
  - 20 mg/day

5. **Plant Estrogens**
- Safer
- ↓ effective

6. **Bisphosphonates**
- Non hormonal Rx of Osteoporosis
- Alendronate: 70 mg/ week
- Risedronate: 35 mg/ week
- Ibandronate: 150 mg/ month
- Zolendronic Acid: 5 mg/ year
- Major s/e: GI intolerance, reduce by taking on empty stomach and sit upright for ½ hour immediately after, with lot of water

Important Information

- Treatment for osteoporosis
- Bisphosphonates: Late osteoporosis > 60 years
- Estrogens: At around 50 years, prevention and treatment, DOC

Previous Year's Questions

Q. First line of treatment of osteoporosis in postmenopausal women?

(NEET 2020, INI CET 2021)

A. Estrogen
B. Raloxifene
C. Bisphosphonates
D. Ulipristal

7. **Calcitonin**
- Miacalcin: 200 IU intranasal puff
- ↓ osteoclastic action

8. **r-Parathormone Extract**
- Teriparatide
- Includes new bone formation

9. **Denosumab**
- Monoclonal ab: against k-B ligand

Rx OF HOT FLUSHES

00:48:10

- DOC
  - Estrogens takes some days to act
- Estrogen 0.45 mg + bazedoxifene 20 mg
- Clonidine Hydro Chloride
  - Acute relief
  - 100 -200 µg OD
  - ↓ vaso motor flushing
- Alprazolam
  - 0.25 – 0.5 mg
  - For acute relief
- SSRI [selective serotonin reuptake inhibitors]
  - Paroxetine: 7.5 mg/ day
  - Fluoxetine: 10-20 mg/day
  - Takes 6-7 days for action

CORONARY ARTERY DISEASE

00:50:36

Important Information

- Estrogens are cardioprotective
- HRT IS NOT CARDIO PROTECTIVE
- C/I to start HRT CAD
  - Initial few years (upto 10 years)→Cardio protective
  - Long term → increase risk of CAD

VAGINAL ATROPHY

00:52:28

- Local estrogens are better: estriol cream (evalon)
- local DHEA application
- oral ospemifene: SERM
  - Reduce dyspareunia

Important Information

- Start HRT only after 1 year of menopause

6 ENDOMETRIAL CARCINOMA

Important Information

- MC genital cancer of women in India: Ca Cervix
- MC cancer of women in India: Ca Breast
- MC tumor (benign/ malignant): fibroid uterus

Important Information

- Excess estrogen: 80% of Ca endometrium : Type I
- No association with E excess: 20% of Ca Endometrium : Type 2

ENDOMETRIAL CA

Etiology: High estrogens 00:00:50

- HRT: estradiol 1-2 mg/ day, CEE (conjugated equine estrogen 0.625- 1.25 mg/day). Must add progesterones to protect endometrium
- Tamoxifen: SERM: Highly estrogenic on uterus, anti-estrogenic on breast, used in Ca breast
- Early menarche and Late menopause: more menstrual cycles, more E exposure
- Estrogen producing ovarian cancers → Granulosa cell tumor
- Anovulatory conditions → PCOD: persistent high Estrogen
- Obesity: Fats (1.5-2.5 times more likely)

Androgens
↓ Aromatase
Estrogens

- Corpus cancer syndrome (Corpus= uterine body)
  - DM – HTN – Obesity
- Abnormal liver function tests: altered estrogen metabolism
- LYNCH II: HNPCC (Hereditary Non-Polyposis Colon Cancer): 40% association with Ca endometrium

- Familial predisposition
  - Ca Breast
  - Ca Endometrium
  - Ca Ovary

  } 1st degree female relatives can have either of these (even 2nd degree are predisposed)

- Nulliparous woman: no break from Estrogen exposure. Each pregnancy gives around a 2 year break from menstruation. Thus it is not a common Indian cancer

Previous Year's Questions

Q. A patient of carcinoma breast on tamoxifen is at a high risk of which of the following? (AIIMS 2020)

A. Ovarian cancer
B. Endometrial cancer
C. Myeloid cancer
D. Contralateral breast cancer

Etiology 00:11:40

- Hyperplasias: Cancer
- Age group: 45-55 yrs

ENDOMETRIAL HYPERPLASIAS [PRE MALIGNANT] 00:11:54

- Simple Hyperplasia without atypia: 1%
- Complex Hyperplasia without atypia: 3%

→ Give Progesterone Therapy

- Simple Hyperplasia with atypia: 8%
- Complex Hyperplasia with atypia: 29%

→ Do Simple Hysterectomy

Histo Pathology 00:16:18

- Endometroid adeno carcinoma [mc] [80%]
  - Papillary /villo glandular
  - Secretory
  - With Squamous differentiation (mc) 15-25%
- Mucinous Ca
- Serous Ca: Poor prognosis
- Clear Cell Ca: poor prognosis

Symptoms 00:17:31

- Co-existant obesity, DM, HTN
- Irregular acyclical bleeding [mc]: Menometrorrhagia
- Cyclical bleeding beyond age of menopause
- Post menopausal bleeding
- Pyometra: Dirty foul smelling vaginal discharge

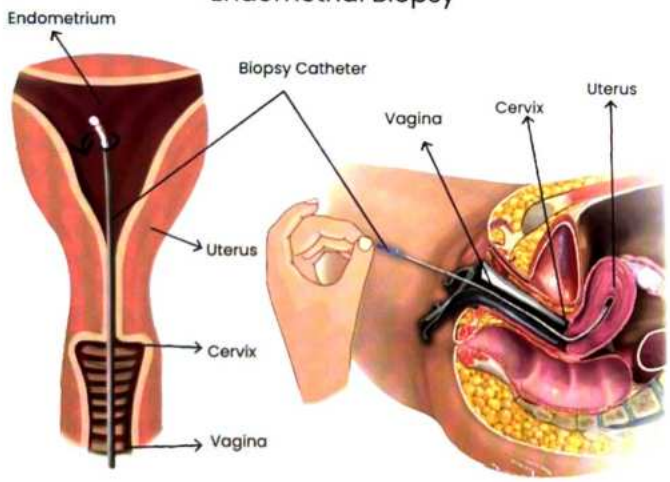
Important Information

- Post menopausal bleeding is not MC presentation. It is irregular acyclical bleeding
  - ~~Loss of weight~~
  - ~~Loss of appetite~~
  - ~~Ca cachexia~~
  - ~~Ca Pain~~ → Late presentation

Diagnosis 00:20:50

- 1st step: Local examination and Pipelle Endometrial Biopsy
  - On OPD basis, may use paracervical block
  - 90% sensitive

Endometrial Biopsy



- **Fractional currettage [D & C]**
  - Biopsy done from all walls, isthmus
  - 95-99% sensitive
  - Done in OT
- **Hysteroscopic biopsy**
  - 100% sensitive
  - Best
- **Transvaginal sonography:**
  - Not best/ first
  - Good adjunctive investigation
  - ET should be 4mm is normal
  - 5mm or more should be investigated in menopausal women

Important Information

- First step in diagnosis of Ca endometrium is not TVS.
- It is office endometrial biopsy.
- Hysteroscopic biopsy is best.

Previous Year's Questions

Q. A 50 year old woman presents with abnormal uterine bleeding for 2 years. What shall be the next step in management? (AIIMS 2020)

A. Hysterectomy
B. LNG-IUD
C. Endometrial aspiration and cervical curettage
D. Progesterone for 3 months

Staging Laparotomy 00:27:23

- TAH + BSO: total abdominal hysterectomy + B/L salpingo-oophorectomy
- Peritoneal cytology
- LN assessment: if involved do a biospy

STAGING OF CA ENDOMETRIUM 00:29:20

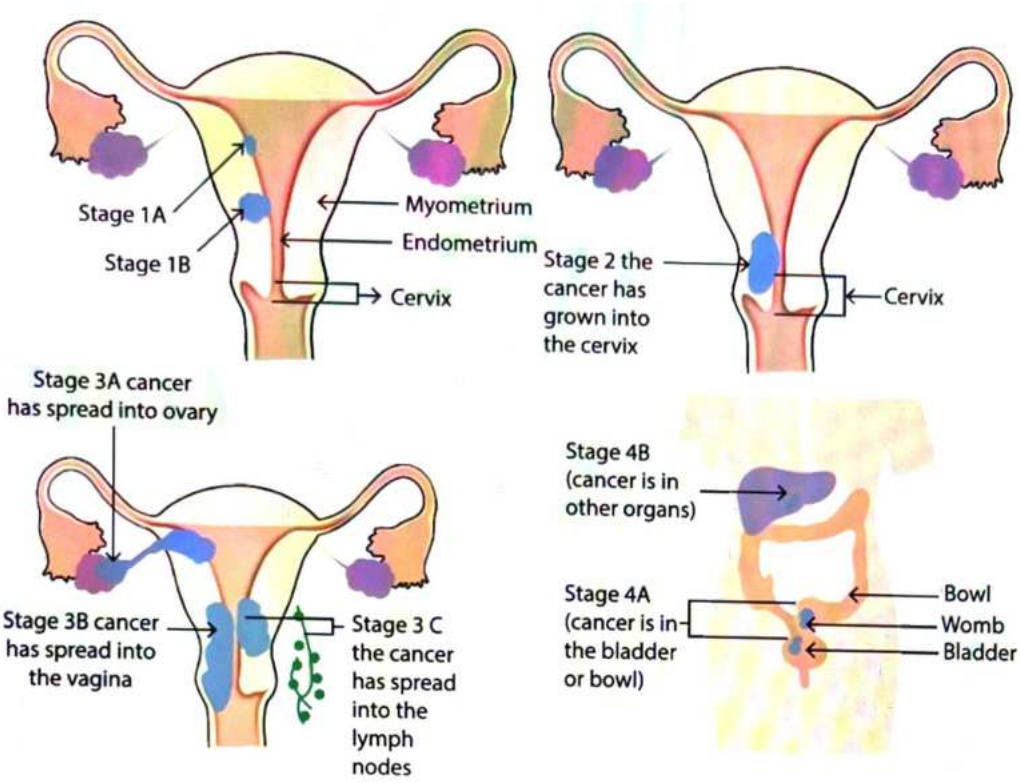
2009 FIGO staging system for carcinoma of the endometrium

Stage I: Tumor contained to the corpus uteri
- IA: Less than half myometrial invasion
- IB: Invasion equal to or more the half of the myometrium

Stage II: Cervical stroma involvement

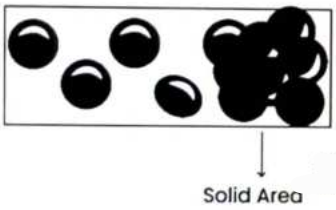
Stage III: Local and/or regional spread of tumor
- IIIA: Uterine serosa + positive peritoneal cytology
- IIIB: Vaginal and/or parametrial involvement
- IIIC: Metastases to pelvis and/or para-aortic lymph nodes
  - IIIC1 Positive pelvic nodes
  - IIIC2 Positive para-aortic lymph nodes

Stage IV: Tumor invades bladder and/or bowel mucosa and/ or distant metastases
- IVA Tumor invasion of bladder and/or bowel mucosa
- IVB Distant metastases, including intra-abdominal metastases and or **inguinal lymph nodes**



Prognostic Factors 00:33:30

- Staging: most significant
- Grading : Differentiation of cancer: Solid areas on HPE slides
  - Grade I: <5% solid areas
  - Grade II: 5-50% solid areas
  - Grade III: > 50% solid areas



Important Information

- **Most significant prognostic marker: Staging > Grading**

- Age
- Type: clear cell, serous type: poor prognosis
- LN metastasis: most important
- Estrogen & Progesterone receptors status: more the receptors, better prognosis
- Myometrial invasion: bad prognosis
- Previous Rx taken

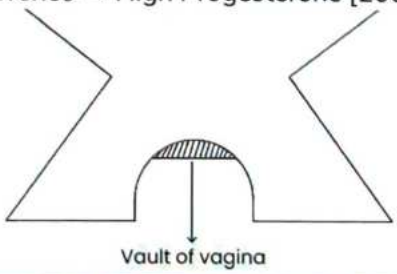
TREATMENT 00:31:50

- Hysterectomy is already done

- **Stage I**
  - Grade I, No Myometrium involvement: No more Rx required
  - Grade I-II, Myometrium < 1/2 involved: Vaginal irradiation
  - Grade III, Myometrium > ½ involved: Pelvic irradiation
- **Stage II**
  - Adnexal or cervical involved: Whole abdominal irradiation
- **Stage III/ Stage IV**
  - Individualized treatment
  - Radiotherapy/ Chemotherapy/ Surgical / Hormonal therapy (Progesterone)

Vault of the vagina

- Left over vagina after hysterectomy
- MC site of recurrence
- 1st line Mx of recurrence → High Progesterone [200-250 mg/day]



Important Information

- **Most common cause of postmenopausal bleeding in India: Ca Cervix**

CLINICAL QUESTIONS

Q1. A 42 year old woman presents with heavy menstrual bleeding for the past 6 months. Her cycles are irregular, along with some intermenstrual spotting with heavy flow during first 3 days of each period. She is a nullipara and was treated for infertility for 8-10 years in the past but did not conceive. She is a chronic smoker for the past 20 years and is a diabetic. She has been on tamoxifen therapy for breast cancer for the past 5 years. On examination her vitals are stable, systemic examination reveals nothing significant and vaginal examination is normal. She is then advised an endometrial biopsy which reveals endometrial malignancy. All of the following could have predisposed her for this condition, EXCEPT?

A. Smoking
B. Nulliparity
C. Infertility
D. Tamoxifen therapy

Answer: A

Solution

- Some of the predisposing factors for Ca endometrium are:
  - Nulliparity
  - Late menopause
  - Obesity & overweight
  - Diabetes mellitus
  - Unopposed estrogen therapy
  - Tamoxifen therapy
  - Atypical endometrial hyperplasia
  - [illegible]
- In Gynecological cancers, smoking is predisposing for Ca cervix & CA Vulva of the basaloid type in younger women.

7 OVARIAN TUMORS

- Normal ovary: 3 x 3.5 x 2.5 cm
- Almond shaped
- Rough surface due to scars by ovulation
  - Nulliparous
  - Ovulation induction
  - Early menarche
  - Late menopause
  - Perineal talc
  - Asbestos exposure

  } more ovulation; more scars

ETIOLOGY

⏱ 00:01:27

1. **Scars**

- ↑ scars → Epithelium → over healing → Epithelial ovarian CA

2. **Associated with Mutations in**

- BRCA 1 [On chromosome 17]
- BRCA 2 [On chromosome 13]

3. **Family history**

- Two 1st degree Relatives with cancers (breast/ ovarian/ endometrial) → 35-40% chance
- One 1st degree Relative and one 2nd degree relative: 2 to 10 times chances

EPITHELIAL CANCERS

⏱ 00:08:05

- 70% of all ovarian cancers: Surface epithelial ovarian cancers
- Age group: 6th 7th decades
- Mostly bilateral
- Associated with ↑ CA 125: Prognostic indicator (not a good diagnostic indicator as it is not very specific)
  - Significant values in a post menopausal women: > 35
  - Pre menopausal women: > 200
- Clinical features: abdominal mass (big abdominal masses are however mostly benign)

Diagnosis

⏱ 00:15:17

- USG features of malignancy TVS > TAS
  - Bilateral
  - Surface irregularities
  - Cystic +solid areas together (variegated)
  - Septated tumors: Irregular, thick
  - Ascites present

Previous Year's Questions

Q. An adnexal mass is palpable during bimanual examination in an asymptomatic woman. The next investigation to be done is? (JIPMER 2019)

A. CA-125
B. Trans vaginal sonography
C. MRI
D. CT abdomen and pelvis

Previous Year's Questions

Q. During a laparotomy of a 60 year old woman, a mass is seen next to the uterus as shown in the picture. What is this mass likely to be? (FMGE 2020)

A. Ovarian cancer
B. Hydrosalpinx
C. Fibroid
D. TB adnexa

Treatment

⏱ 00:18:10

- Staging Laparotomy + Optimal Debulking
  - Steps of Staging Laparotomy
    1. Midline incision / Paramedian incision
    2. Asses pelvis, Abdominal organs
    3. Washings/ Ascites → for cytology [malignant cells]
    4. Infra colic omentectomy
    5. Peritoneal biopsy
    6. Retroperitoneal lymph node sampling
- Optimal Debulking
  - < 1.5 cm is what maximum amount can be left

OVARIAN CANCER STAGING

00:27:54

- **Stage I:** Ovarian Involvement
  - A - One ovary involved
  - B - Both ovaries involved
  - C - A/B
    - → C_1 - Surgical spill
    - → C_2 - Surface growth
    - → C_3 - Malignant Ascites/ washings

- **Stage II:** Pelvis Involvement
  - IIA - Uterus, fallopian tubes
  - IIB - other pelvic organs

- **Stage III:** Abdominal Visceral Involvement
  - $IIIA_1$: Retro peritoneal lymph node involvement
    - → A_1 (i) - < 10 mm
    - → A_1 (ii) - > 10 mm
  - $IIIA_2$ Microscopic abdominal visceral involvement
  - IIIB Macroscopic involvement <2cm } superficial liver & spleen involvement
  - IIIC Macroscopic involvement >2cm }

- **Stage IV**
  - IVA: Malignant pleural effusion
  - IV B: Deep/ parenchymal liver & spleen deposits, Inguinal lymph node involvements

- Highlighted ones are new changes in staging

Chemotherapy: Platinum Based 00:37:56

1. **Epithelial ovarian tumor** 00:41:08

a. Cyclophosphomide
Adreomycin
Platins { Cis / Carbo

b. Platins } Better choice
Taxol

2. **Germ Cell Tumors** 00:42:13

a. Vincristine
Bleomycin
Platins

b. Bleomycin
Etopside } Better Choice
Platins

3. **Sex Cord Tumors** 00:43:34

- Surgery alone will suffice mostly

Radiotherapy

00:44:12

Important Information

- Normal ovary is radiosensitive. All ovarian tumors radioresistant
- Exception : Dysgerminoma: very radiosensitive

Previous Year's Questions

Q. All of the following are good treatment options for management of ovarian cancers. Except? (FMGE 2020)

A. Debulking surgery
B. IV chemotherapy
C. Intraperitoneal chemotherapy
D. Radiotherapy

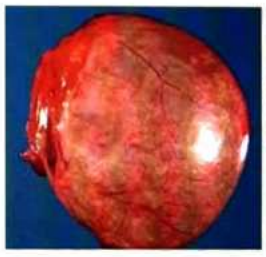
EPITHELIAL OVARIAN TUMORS

00:47:15

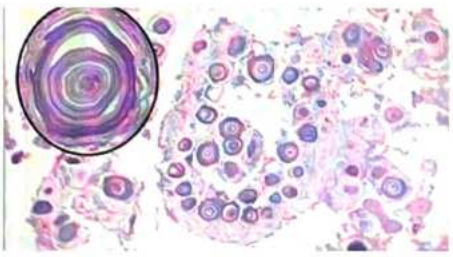
- MC [75%]
- Older age group
- Bilateral

Types

1. **Serous Cystadenoma [mc type]**
- Unilocular
- B/L in >50%
- Mostly malignant
- Surface growth present
- Psammoma Bodies present in 40-45%
- Cells are like fallopian tube



Serous Cystadenoma



Psammoma Body

2. **Mucinous Cystadenoma**
- Less malignant
- B/L in 10%
- Multilocular
- Pseudomyxoma peritonei: Mucinous cystadenoma ruptures to release mucin in peritoneal cavity which heals with peritoneal fibrosis → Severe hypoproteinemia

- MC cause in ovarian tumor → mucinous cystadenoma
- MC cause (Overall): Appendiceal cancer
  → Cells are like cervix

3. **Brenner Tumor**
- Mode of transitional cells
- Nests: Walthard Inclusions
- Puffed Wheat Type
- Benign
- Rubbery in consistency
- Cells are like bladder
- Associated with post menopausal bleeding

- Associated with Pseudomeig syndrome
  - Pseudomeig syndrome is mcly due to Brenner tumor

Meig syndrome	Pseudomeig syndrome
• Fibroma Ovary • Ascites • Pleural effusion	• Any other ovarian tumor: MC brenner • Ascites • Pleural effusion

4. **Endometroid Tumor**
- Endometrial type of collections
- 6-78% of epithelial ovarian tumors

GERM CELLS TUMORS

01:00:39

- Younger age group
- Unilateral

1. **Teratomas** [MC]
- Malignant [10% of teratomas]
  - Dermoid /Benign cystic teratoma [90% of teratomas]

  - All 3 germ layers present
    → Endoderm → Bone, teeth
    → Mesoderm → Sebaceous secretion
    → Ectoderm → Hair, Endocrine glands

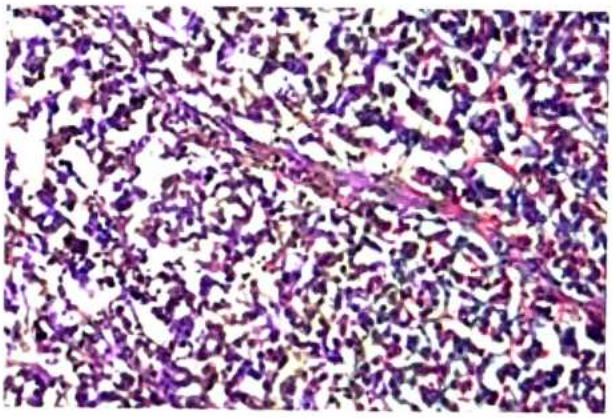
  - 10-15% are bilateral

Important Information

- **Dermoids can have malignant transformation → Sq. cell carcinoma**
- **Dermoids are MC tumors of pregnancy**
- **Dermoids are MC tumors of torsion**

Dermoid

2. **Dysgerminoma**
- Mc germ cell malignancy [40-45%]
- Only B/L germ cell malignancy [10-15%]
- Associated with dysgenetic gonads
- Large fleshy tumor
- Mostly malignant: Poor prognosis
- Seminoma Type Cells
  - Large polygonal cells with
  - Clear cytoplasm & dark stained nucleoli with
  - Back to back arrangement



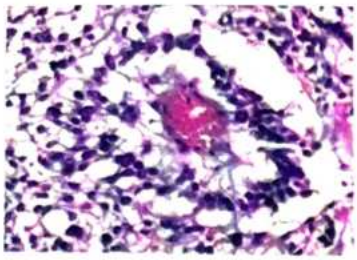
Seminoma Cells

- Associated with
  - ↑ LDH
  - ↑ Placental alkaline Po4
  - Alpha feto protein: Not increased

3. **Yolk Sac/ Endodermal Sinus Tumor & Embryonal Tumors Common Features**

Yolk sac tumor	Embryonal tumor
• Young women & girls • Poor prognosis • ↑ Alpha feto protein	

- ↑1 anti trypsin
- Schiller Duval bodies: vessels with tumor cells around in a cystic space



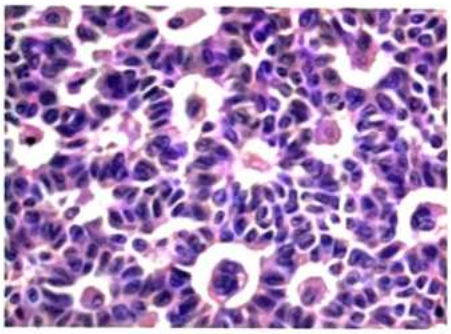
- HCG

SEX CORD TUMORS

01:13:24

1. **Granulosa Cell Tumors [MC]**

- ↑ Estrogens
  - Precocious puberty
  - Menorrhagia
  - Endometrial cancer



Carl Exner Bodies

- Marker: Inhibin
- Carl Exner Bodies
- Contralateral ovarian secondaries prior to systemic secondaries

2. **Sertoli Leydig Tumors / Arrhenoblastomas**

- Hirsutism: Male pattern baldness/ excess hair growth: reversible
- Virilization: Permanent changes
  - Hoarsness
  - Breast atrophy
  - Clitoromegaly
- Oligomenorrhea to amenorrhea
- Benign
- Rapid onset hirsutism

HIRSUTISM

01:18:16

- Rapid Onset: Seen in ovarian or adrenal tumors
- Puberty Onset: Seen in congenital Adrenal Hyperplasia
- Adult Onset: Seen in PCOS
- Causes: 25% → Idiopathic → 75% → 2° (MC → PCOS)

Important Information

- MC cause of Hirsutism: PCOS and not idiopathic

Previous Year's Questions

Q. Match the Column (INICET 2021)

A. Dysgerminoma	1. Inhibin
B. Epithelia cell tumor	2. AFP
C. Granulosa cell tumor	3. Beta HCG
D. Choriocarcinoma	4. LDH
E. Yolk sac tumor	5. CA-125

1. A-4,B-5,C-1,D-3,E-2
2. A-1,B-2,C-3,D-4,E-5
3. A-2,B-4,C-1,D-3,E-5
4. A-4,B-2,C-1,D-3,E-5

NON-NEOPLASTIC OVARIAN CYSTS

01:21:50

- Follicular Cyst: A follicle that didn't rupture
- Corpus Luteal Cyst
- Theca Lutein Cyst → d/t↑ HCG → Seen in molar pregnancy, twin preg.
- Hemorrhagic Cyst
- Resolves by themselves → Conservative Management
- MC ovarian tumor of pregnancy → Dermoid > serous cyst
- If it is small [< 5cm] & asymptomatic → No Rx required
- If it is large [> 10cm] & asymptomatic → Remove it in 2nd trimester
- If diagnosed in 3rd trimester → Remove 6 wks after delivery
- If doing a cesarean section → Remove at the time of CS

Previous Year's Questions

Q. 26 yrs old lady, a P2L1 with an uneventful postnatal history, presents with dull aching lower abdominal pain. USG imaging reveals a 5 cm ovarian cyst. What is the next best step? (INICET 2021)

A. CA-125 levels
B. PET CT
C. Excision of the cyst
D. Follow up after 4 months

Previous Year's Questions

Q. A 30 year old nulliparous woman presents for a routine check up when an USG reveals a unilateral ovarian cyst 6 x 6 cm. what is next line of management? (FMGE 2020)

A. CA 125 and follow up
B. Open oophorectomy
C. Laparoscopic cystectomy
D. Combined OCP and follow up

KRUKENBERG TUMOR

01:30:12

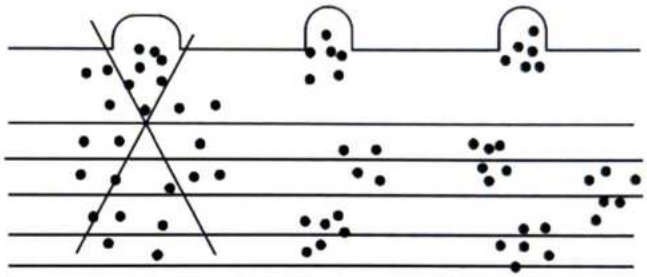
- Secondaries to ovary (Most commonly from Ca stomach > Ca breast)
- Signet ring cells
- Bilateral
- Firm to solid
- May have cystic degenerations
- Ovary retains its shape

BORDERLINE EPITHELIAL OVARIAN TUMORS

01:32:03

Features

- Epithelial hyperplasia, micropapillary projections, surface inv, tufting
- Mitotic activity present
- Nuclear atypia present
- Detached cell clusters present
- No destructive stromal invasion



CLINICAL QUESTIONS

Q1. A 68 year old woman presents with pain abdomen associated with abdominal distention. She also has some bloating post meals and indigestion. There is no vomiting or constipation and a past upper GI endoscopy is normal. She is a non smoker, non alcoholic, vegetarian with two living children. Her general examination is normal, however a per abdomen reveals a large abdominal mass with absence of shifting dullness. Her CA 125 is 1500. Her breast examination and recent mammogram are normal. A USG would most likely reveal ?

A. Serous cystadenocarcinoma of ovary
B. Malignant ascites
C. Meig's syndrome
D. Krukenberg tumor

Answer: A

Solution

- Serous cystadenocarcinomas are the **most common** malignant tumors of ovaries and the most common tumors associated with bilaterally. CA 125 is a tumour marker for epithelial ovarian cancer
- The peak incidence of invasive epithelial ovarian cancer is at about 60 years of age. About 30% of ovarian neoplasms in postmenopausal women are malignant. Symptoms are usually vague GI symptoms with abdominal mass
- Malignant ascites and meigs syndrome (both have ascites) are ruled out as there is no shifting dullness.
- Krukenberg tumors are also bilateral, but are associated with another primary malignancy (most commonly gastric carcinoma) and are also less common compared to epithelial tumours.

8 POLYCYSTIC OVARIAN SYNDROME

POLYCYSTIC OVARIAN SYNDROME

- Aka Stein Levinthal Syndrome
- 15-20% women (1/5th) have PCOS
- MC endocrine disorder of reproductive age women
- MC cause of hirsutism

> **Important Information**
> - MC cause of hirsutism is PCOS (75%) and not Idiopathic (25%)
> - Other causes: CAH, ovarian tumors, Cushing's etc

ROTTERDAM'S CRITERIA

00:03:35

Any 2 of 3 (Accepted for diagnosis by ESHRE, AFS, FOGSI)

1. Clinical/ Lab hyperandrogenism
2. Anovulation: irregular cycles
3. USG features of PCOS

- PCO: have no cysts, smooth surface of ovary
- Multiple small follicles arranged in periphery (Necklace of pearls), 2-6 mm (< 9mm) > 20 such follicles per ovary
- Thick stroma
- Slightly enlarged ovary, ovarian volume > 10 mL (L X W X H X 0.523)

PHENOTYPES

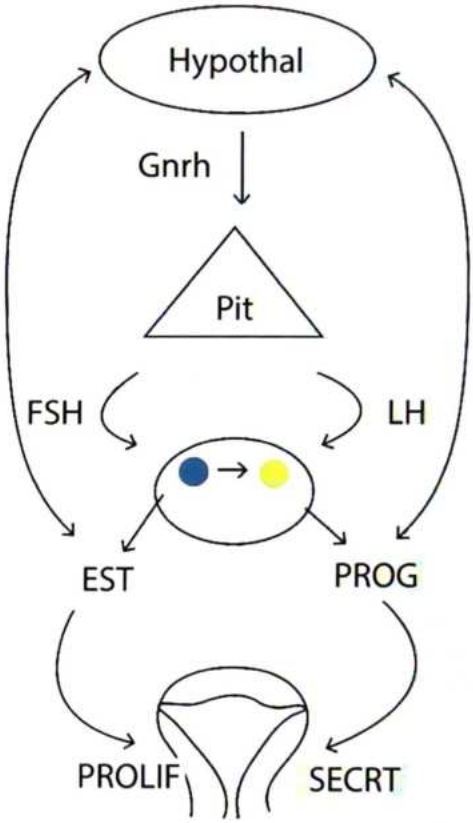
00:10:45

Type 1	Type 2
• HA (clinical/biochemical) • PCO morphology • Ovarian dysfunction	• HA (clinical/ biochemical) • Ovarian dysfunction
Type 3	**Type 4**
• HA (clinical/biochemical) • PCO morphology	• Ovarian dysfunction • PCO morphology

- MC: type 1 (70%)

PATHOPHYSIOLOGY

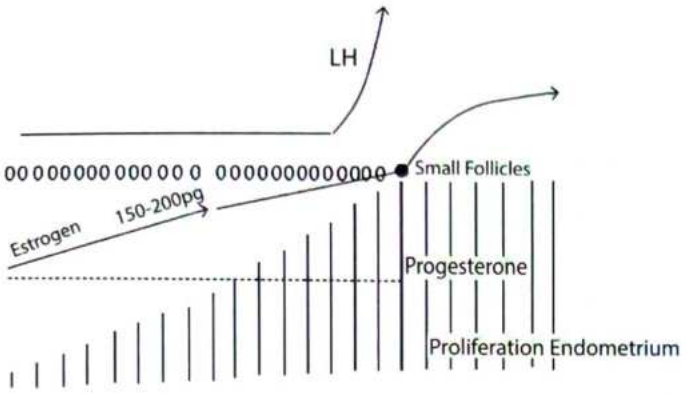
00:11:42

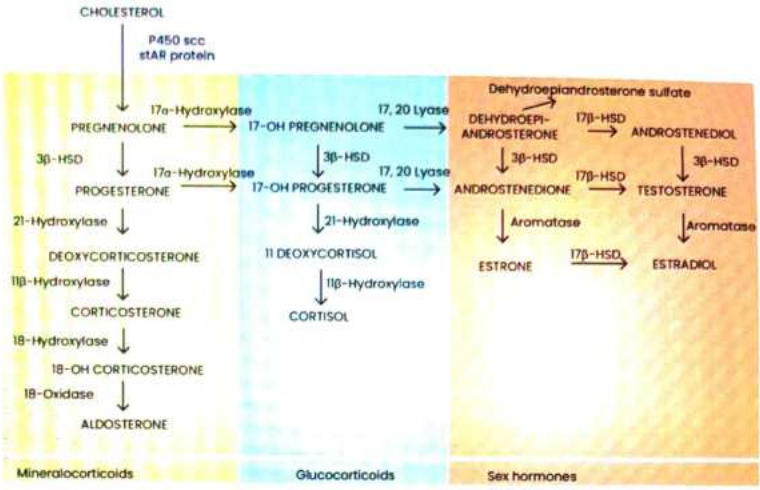


- FSH →Estrogens
- LH →Progesterone

Revise normal physiology

- Follicle matures at day 14 (20 mm) → 200 pg estradiol → LH surge→ ovulation→ corpus luteum→ progesterone→ secretory endometrium→corpus luteum dies → progesterone withdrawal → period
- LH surge occurs → small follicle → doesn't rupture → estrogen keeps increasing and no progesterone→ endometrium keeps proliferating: Anovulation → Associated Infertility





- Endometrium sheds due to ischemic withdrawal (E outgrow its blood supply): Oligomenorrhea, Amenorrhea (missed 3 cycles/ 6 months)
- High estrogen → LH very high, FSH is low LH: FSH ratio >2:1 or > 3:1(classical)
- High LH acts on stroma of ovary→High Androgens (Androstenedione/ Testosterone)→SHBG binds to androgens→Low SHBG and High Free Androgens→ Hirsutism

Important Information

- **High estrogens do not convert to androgens in periphery. Androgens convert to estrogens in periphery by aromatase enzyme**

Important Information

- **Cause of small follicle: Insulin resistance at ovarian receptor level**
- **No glucose uptake → less follicle growth → small follicle**

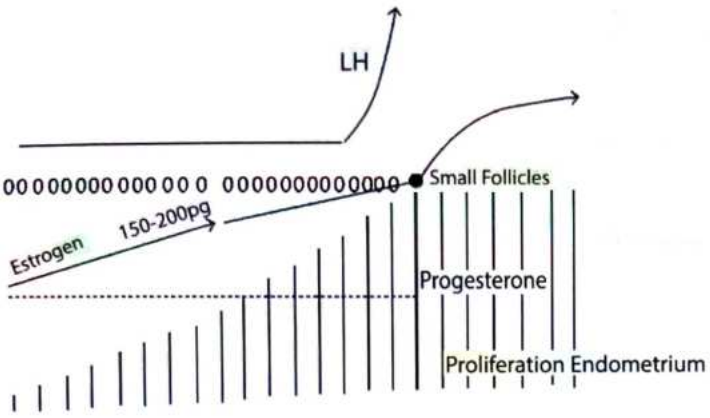
- Insulin Resistance, Obesity
- High F. Insulin (> 25 mIU)
- F. Glucose: Insulin ratio <4.5
- Polygenic inheritance
- Overexpression of 17 hydroxylase enzyme
- Cutaneous markers of Insulin resistance: Acanthosis Nigrcans: dark shiny, velvety crural deposits (nape of neck, axilla, cubital fossa, groin, MC: vulva)
- HAIR-AN: Hyperandrogenism, Insulin resistance, acanthosis nigricans
- Metabolic Syndrome/ Syndrome X
  - Waist → > 35 inches
  - Tri Glycerides → > 150 mg/dl
  - HDL → < 50 mg/dl
  - BP → > 130/85 mm Hg
  - Fasting glucose → 110-126
  - 75 gms OGTT 2 hr values → > 140-199
  - Atleast 3 or more → increased risk of CAD
- Long term consequences
  - DM
  - HTN
  - Ca endometrium
  - Ca ovary

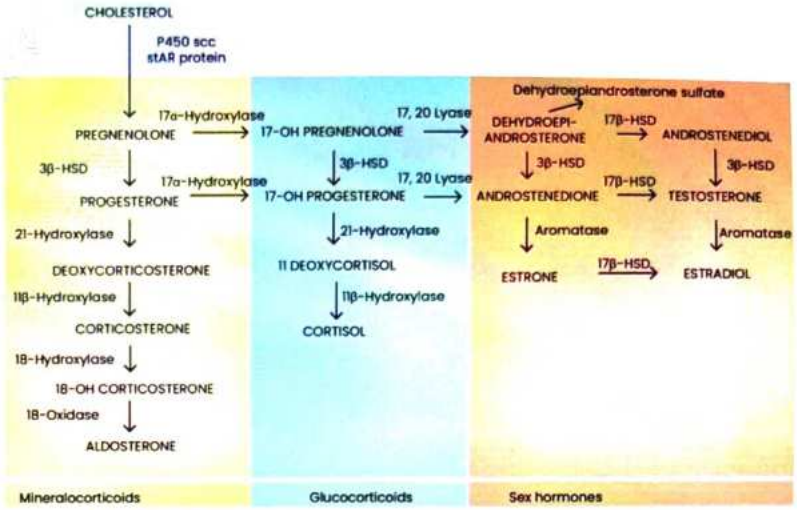
TREATMENT

00:35:10

Anovulation Treatment

- ↓ Weight→Ovulation [in 30% cases], lose 5-10% weight: increases insulin sensitivity
- Insulin sensitizer [metformin] →Ovulate [in 30% cases], not a first line treatment
- Clomiphene Citrate→Ovulate [in 80% cases]→ Pregnant [in 40% cases]
  - Excess estrogens in PCOD→negative feedback→low FSH→ less follicle development
  - Hypothalamic E receptor blocker (CC)→high FSH→follicle development
  - Day 2-6
  - 50 mg-250 mg
  - Combine with follicular monitoring
  - S/E: vasomotor flushing, headache, visual scotomas
  - incidence of twinning: 8-10 %
  - mild-moderate OHSS, cysts





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  - mild-moderate OHSS, cysts

- Aromatase Inhibitors → Letrozole [1st line Drug]
  - Inhibit conversion of androgens to estrogens
  - Less negative feedback to hypothalamus → increase FSH
  - Letrozole (vs Clomiphene)
    - → Higher birth rate
    - → Less multiples
    - → Better endometrial health (CC is anti-estrogenic on endometrium)
    - → Better cervical mucous
    - → Lesser anomalies
    - → Lesser abortions
    - → Lesser OHSS
- Inj Recombinant FSH
- Inj Human Menopausal Gonadotropin (LH + FSH)

Previous Year's Questions

Q. For PCOD all of the following are options for ovulation induction, EXCEPT? (AIIMS 2020)

A. Ovarian drilling
B. Ulipristal
C. Letrozole
D. Clomiphene citrate

Irregular Cycles Treatment 00:47:35

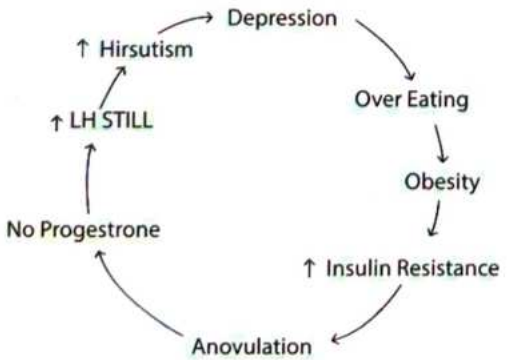
- Combined Oral Contraceptive Pills : DOC : gives artificial cycles, give for as long as regular cycles are desired
- Progesterone Pills: makes endometrium secretory
  - For 10 days [From 14th day/mid cycle]
  - For 5 days [day 20-25]

Hirsutism Treatment 00:51:35

1. Anti-Androgens

- Spironolactone [1st line drug]: 50-100 mg/day
- Cyproterone acetate
- Finasteride
- Flutamide

2. Cosmetic Treatment For hair → Prevents Depression



Understand with an example

Young girl with irregular cycles and acne, hirsutism: COC + cyproterone

- Estrogen: proliferates endometrium
- Progesterone: secretory endometrium
- Cyproterone: anti-androgen: has inherent progesterone action, so we don't need to give progesterone

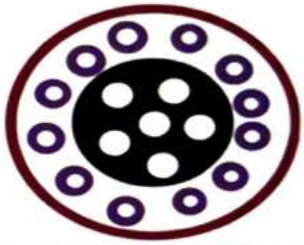
Give : estrogen+ cyproterone/ drosperinone

Surgical Treatment 00:59:27

For non-responders

1. **Laparoscopic Ovarian Drilling**: use cautery to burn ovarian stroma, 4-6 holes

Laparoscopic Ovarian Drilling



- Thick Stroma →↑ Local Androgens → Harder Follicles
- Purpose → ↓ Androgenic stroma → better response to ovulation inducing drugs → Better Follicular growth

Important Information

- ESHRE recommendations
- Rotterdam's criteria for diagnosis
  - JSG criteria: now changed to 20 small follicles (rather than 12)
- Emphasis on weight loss
- COC for menstrual irregularities
- Metformin for metabolic features
- Letrozole DOC for PCOS infertility

Lifestyle Modifications

- Healthy eating and regular physical activity
- 5-10% weight loss
- Adhere to lifestyle interventions

CLINICAL QUESTIONS

Q1. A 28-year-old woman comes for treatment of hirsutism. She is obese and has facial acne and hirsutism on her face. Serum LH level is 32 mIU/mL and FSH is 9 mIU/mL. Androstenedione and testosterone levels are mildly elevated, but serum DHEAS is normal. The patient does not wish to conceive at this time. Which of the following is the most appropriate treatment of her condition?

A. Oral contraceptive pills
B. corticosteroids
C. Wedge resection of ovary
D. GnRH analogues

Answer: A

Solution

This patient has PCOS, diagnosed by

- Clinical picture- Obese, Facial acne and Hirsutism
- Abnormally High LH-to-FSH ratio, and increased androgens but Normal DHEAS(excludes Adrenal sources of Hyperandrogenism)

To treat Hirsutism associated with PCOS:-

- OC pills suppress hair growth, act by directly suppressing ovarian steroid production and increasing hepatic binding globulin production, which binds circulating hormone and lowers the concentrations of metabolically active (free unbound) androgen.

9 CERVICAL CARCINOMA

Cervical Carcinoma

- MC cancer of women in India: Ca Breast
- MC gynecological cancer of women in India: Ca cervix
- HPV infection ~ 99% of cervical cancer

SCREENING

00:01:08

It is done for asymptomatic

- Pap Smear
  - by Ayre's spatula
  - Sensitivity: 47 to 62%
  - Incidence of Ca Cervix ↓by 75 – 80 % & death ↓by 70%
  - Cytobrush, Cytobroom } ↑ Sensitivity upto 90% 00:04:58; Drying artefacts prevented : wash in fixative and filter out cells
  - Place on a slide: Fixed by 95% alcohol; immediately in Coplin's jar
  - k/a Liquid based cytology

Previous Year's Questions

Q. Steps of preparing a paps smear are?

(INI CET 2021)

A. Vaginal wall retraction –scrape ectocervix – Thin smear – Fix the slide

B. Scrape ectocervix –vaginal wall retraction – Thin smear – Fix the slide

C. Vaginal wall retraction – scrape ectocervix – Thick smear – Fix the slide

D. Vaginal wall Retraction –scrape ectocervix – Thin smear

- Site 00:08:28
  - Transformation zone (squamo-columnar junction)
  - Endometrium: Columnar
  - Vagina & ectocervix: Squamous
  - TZ is more prone to infection by HPV (and thus cancer) as the cells are continuously dividing here.

Etiology 00:12:30

- HPV

Important Information

- 16: MC
- Elaborate E6, E7 onco-proteins at transformation zone
- 18: Most malignant

- HIV 1 & 2
- HSV 1 & 2
- Commercial sex worker
- Women with many partners
- Partner with STD
- Multiparous
- Immuno compromised
- Low socio Economic status
- Smokers

- Early intercourse [<16 yrs]
  - TZ is Located at 1.7 to 2.3 cm from the external Os changes location with age group. Early intercourse increases no of years of exposure of TZ to HPV as TZ gets externalized earlier
- Post partum/ puerperal time

Important Information

- HPV infection is self limiting (in most cases) in 9-15 months.

TIME TO DO PAP SMEAR 00:19:13

- Any woman > 2 yrs of age
- Any women 3 yrs after 1st sexual exposure in India
- From 21 to 29 years, sexually active women should have cytology every 3 years

- From 30-65 yrs: Co-TEST [PAP + HPV] : if negative then 5 yearly if only cytology done, then once in 3 years if cytology is negative

- After 65 yrs: No more PAP, if 3 cytology are negative or 2 Co-TEST are negative

Previous Year's Questions

Q. Cervical cancer screening is must for? (AIIMS 2020)

A. Women > 65 years of age
B. Woman < 15 years of age
C. Woman bet[illegible] years of age
D. All teenagers

Previous Year's Questions

Q. Which of the following procedures is done using following (INI CET 2021, AIIMS 2019)

A. Dilatation and curettage
B. Cervical biopsy
C. Pap smear
D. Endometrial aspiration

00:24:13

Dysplasia classification	Bethesda classification
• CIN I - < 1/3rd abnormal	Low Grade Lesion
• CIN II - > 1/3rd to <2/3rd abnormal	High Grade Lesion
• CIN III - > 2/3rd abnormal	
• CIS - All cells are abnormal	

Management

- CIN I Management 00:28:18
  - CIN I $\xrightarrow{5\text{ yrs}}$ CIN III $\xrightarrow{10\text{ yrs}}$ Ca CERVIX
  - CIN I not a precursor of Ca CERVIX
  - 6 monthly PAP smear
  - Antivirals & antibiotics given
  - HPV DNA is done
  - CIN I & CIN II
    → 65-80% regress spontaneously
    → High grade and precursor of Ca Cervix
  - CIN I > 2 yrs
    → Continue surveillance
    → Ablation/ Rx

CIN II & CIN III

- CIN III Management 00:30:36

Colposcopy biopsy

Important Information

- First step after CIN III is seen on paps smear is confirmation of diagnosis by COLPOSCOPIC [Vagino Scopic] BIOPSY

- Acetic acid used
  - Coagulate the proteins of the rapidly dividing areas Acetowhite
  - Biopsy is taken from Acetowhite areas
- Schiller iodine [LUGOL IODINE] can be used
  - Stains the glycogen rich areas → Mahogany Brown
    Biopsy taken from Unstained Areas
- VIAA: Visual Inspection under Acetic Acid
- VILI: Visual inspection under lugol's iodine

} Also done

Previous Year's Questions

Q. A 30 year old woman who is P2L2 underwent a screening PAP smear. The cytology report came out to be carcinoma in situ. What is the next step in management? (AIIMS 2020)

A. Colposcopy biopsy
B. Hysterectomy
C. Follow up after 6 months
D. Radiotherapy

Results of Colposcopic Biopsy

1. Invasive cancer Cx: Rx by Radical hysterectomy
2. Biopsy proven CIN III: Rx by LLETZ [LEEP] Cells not invading stroma)

- LLETZ: Large Loop Excision of Transformation Zone
- LEEP: Loop Electro surgical Excision Procedure

} Best Rx

Other Options

- Conization: not usually done
- Problem with conization
  - Short Cx → incompetence → abortions
  - Stenosed Cx → Infertility

- Can be done if colposcopic Biopsy is inconclusive
- Expensive & difficult
- Sx Conization (If > 35 yrs)

- Hysterectomy (If > 40 yrs)
- Cryocautery
- Laser ablation → required training & experience

SYMPTOMS OF CA CERVIX

00:52:12

- Abnormal bleeding
  - Post coital bleeding [mc] (However in newly Married couple post coital bleeding can be due to a post coital tear most commonly located in Posterior Vaginal fornix)
- Foul smelling discharge
- Pyometra: Dirty vaginal discharge
- Post-menopausal bleeding
- Cancer cachexia
- Cancer pain
- Uremic symptoms

Previous Year's Questions

Q. Which of the following is the most common cause of death in Carcinoma Cervix? (JIPMER 2019)

A. Uremia
B. Metastasis
C. Bleeding
D. Sepsis

Mx of Post Coital Bleeding

- Local examination: Cervix looks Normal (rule out lesion, take biopsy if obvious growth is seen)

↓

Do Colposcopic Biopsy (not a paps smear)

Indications for colposcopy biopsy

- CIN III [cervical intra epithelial neoplasia]
- CIS [carcinoma in situ]
- AIS (Adeno Ca) / endocervical curettage + → Hysterectomy
- VIN III: Superficial excision/ laser ablation

Previous Year's Questions

Q. Young female, multigravida, presenting with post coital bleeding on examination shows a normal vagina with normal endometrial cavity on USG. Next step in management? (AIIMS 2019)

A. Pap smear
B. Colposcopy Biopsy
C. Cryotherapy
D. Per vaginal examination

Previous Year's Questions

Q. A 25 year woman presents with h/o post coital bleeding. Speculum examination showed following appearance. What is the diagnosis? (FMGE 2020)

A. Cervical fibroid
B. Ca cervix
C. Cervical polyp
D. Nabothian cyst

STAGING

01:04:47

Clinical Staging Done with

- P/ Speculum examination
- P/ Vaginal examination
- P/ Rectal examination [for parametrium]
- Cystoscopy [for bladder]
- Procto sigmoidoscopy
- Imaging: USG, CT, MRI, PET CT

Important Information

- Imaging has now been added for clinical staging of ca cervix. PET CT is best amongst imaging, for clinical staging

Stage

- **I** - Limited to Cervix
  - **IA** - Microscopic Cancer
    - → A_1 - < 3 mm depth
    - → A_2 - 3-5 mm depth

    } transverse spread < 7mm is removed from staging
  - **IB** - Clinical/ macroscopic
    - → **B1** - < 2 cm: can consider fertility preservation
    - → **B2** - 2 – 4 cm
    - → **B3** - > 4 cm

Stage

- **IIA** - Upper Vagina Involved (II A_1 → < 4 cm ; II A_2 →> 4 cm)
- **IIB** - Parametrial involvement but short of pelvic side wall

Stage

- **IIIA** - Lower 1/3rd vaginal involvement
- **IIIB** - Parametrial involvement till the pelvic side wall [Hydronephrosis +]

Important Information

- MC Stage of Ca cervix presentation in India → STAGE III B

Stage

- **III C_1** - Pelvic lymphnodes involved
- **C_2** - Para Aortic lymphnodes involved

} Imaging [PET CT / MRI/ USG] required

Stage

- **IVA** - Bladder & Bowel Involvement
- **IVB** - Distant Metastasis

Important Information

- Cervix doesn't drain into inguinal lymph nodes
- Cervical cancer involving endometrium does not change staging
- Most commonly involved : anterior lip
- Downstaging is done for planning m/m when clinical staging is doubtful

Treatment 01:21:12

- For all stages: Radiotherapy is good
  - Stage I – IIA_1: Radical Hysterectomy
  - Stage IIA_2: Chemo Radiation

Management of Ca cervix

IA1	<3 mm NO LVSI	• Conization or Extra fascial Hysterectomy
	<3 mm with LVSI	• Radical Trachelectomy • Or Radical Hysterectomy + Pelvic LAD • Or SLN (External Illiac (MC)> obturator)
IA2	>3 mm <5 mm	• Same
IB1	>5 mm >2 cm	• Same
IB2	>2 cm <4 cm	• Radical Hysterectomy + Pelvic LAD
IB3	>4 cm	• Chemoradiation
IIA1	<4 cm + upper vagina	• Radical Hysterectomy + Pelvic LAD or Chemoradiation
IIA2	>4 cm + upper vagina	• Chemoradiation

Maximum Radiation Given At:

Point A

- 2 cm above & 2 cm lateral to external os
- Here ureter is under the uterine artery

How to remember

- Ureter crosses the uterine artery [bridge over water]

- Parametrium seen here
- Upto 7500 to 8000 RADs given here

Point B

- 3 cm lateral point A
- Obturator lymph nodes at the pelvic side walls
  - Obturator LN → Sentinel group of LN : New studies : most commonly involved group : external iliac
- Upto 6000 RADs given here

Histopathology 01:34:46

- Squamous cell carcinoma: most common
  - Large cell Keratinising variant [mc]
  - Large cell Non Keratinising variant
  - Small cell variant
- Adenocarcinoma: Also related to HPV; similar treatment

Important Information

- MC cause death in CA cervix - Uremia
- 2nd mc cause of death - Haemorrhage
- 3rd mc cause of death - Infection

VACCINES 01:36:50

HPV

- Cervarix
  - Bivalent 16, 18
- Gardasil
  - Quadrivalent: 6, 11, 16, 18
  - Nano valent vaccine (Gardasil 9): 6, 11, 16, 18, 31, 33, 45, 52, 58

- HPV Schedule
  - 0 day
  - 2 months
  - 6 months

Previous Year's Questions

Q. Which of the following types of HPV is least associated with cervical malignancy? (JIPMER 2019)

A. Type 16
B. Type 31
C. Type 33
D. Type 42

Previous Year's Questions

Q. 16 year old girl, not sexually active, came for vaccination against cervical cancer. Which vaccine to be given? (AIIMS 2019)

A. Gardasil
B. Rubavac
C. Biovac
D. Tdap

- Chance of prevention if given before exposure: upto 90%
- Chance of prevention if given after exposure: upto 40%
- Given after 9 yrs, upto 45 yrs (all women)
- All serotypes are not covered, so continue screening protocol

CERVICAL CANCER IN PREGNANCY 01:41:40

All pregnant women – pap smear
↓
Malignant cells positive
↓
Conization done
(> 12 wks → abortion reduces)

- If Ca Cx: Diagnosed
  - IA - Go till term → C.S → RAD HYST + LAD
  - IB - wait till Fetal lung maturity:
    - → 28 wks
    - → 32 wks (wait max 4 wk)

    } C.S + RAD HYST + LAD
  - II – IV - Radiotherapy
    - → Beyond 28 wks - C.S → Radiotherapy
    - → First Trimester - Radiotherapy (Baby will abort)
    - → Second Trimester - Try to see Viability

CLINICAL QUESTIONS

Q1. A 37 year old female, P3L3 with all normal deliveries presents with post coital bleeding. Her periods are regular with normal flow. She is using OCP for the past 5 years. On vaginal examination, there is a normal vagina and an irregular hypertrophied cervix. A USG shows a normal endometrial cavity with no uterine or adnexal lesion. Which of the following is the next best step in management?

A. Paps smear
B. Colposcopy biopsy
C. Cryotherapy
D. MRI pelvis

Answer: B

Solution

- Post coital bleeding is the → **most common presentation of CA cervix**
- PAP smear is done when a patient is asymptomatic or sexually active women
- Here, The patient is symptomatic hence a confirmatory test is warranted to make a diagnosis.
- **Doing a four Quadrant biopsy may help, but it is more of a 'Hit and trial' kind of method since invasion could be starting in a different place away from the 4 biopsies sites. Performing a Colposcopic is the best procedure here** than a Pap smear or the 4 Quad biopsy.
- If diagnosis is not confirmed even with a Colposcopic biopsy then the next step here is Conization of cervix.

10 POST MENOPAUSAL BLEEDING

POST MENOPAUSAL BLEEDING 00:00:20

- Any bleeding after 1 year of menopause

Symptoms of CA Cervix & CA Endometrium 00:01:16

CA Cervix	CA Endometrium
• Post coital bleeding (MC) • Post menopausal bleeding • Irregular vaginal Bleeding • Foul smell discharge • Pyometra • Cancer cachexia • Uremia, pelvic pain	• Post menopausal bleeding • Irregular vaginal bleeding • Pyometra • Ca cachexia is not seen here • Obese, DM, HTN

Causes of Post Menopausal Bleeding 00:05:11

Important Information

- MC cause of PMB in India: Ca cervix (MC presentation of ca cervix, however, is post coital bleeding)
- MC cause of post menopausal bleeding: Ca cervix
  MC cause of PMB in world: ca cervix

- MC cause of post-menopausal bleeding [western]
  - Endometrial atrophy [60-80%]
  - HRT [30%]
  - CA endometrium [10%]
  - Endometrial hyperplasia [10%]
  - Polyps [10%]
- Endometrial Atrophy → Senile Endometritis → Bleed

11 VULVAR CARCINOMA

- 2-5% of all genital tract malignancies of women in India
- Age group: Approximate 65 yrs
- Associated with Field phenomenon: a/w Ca vagina, Ca Cervix (27%)
- Association with Syphilis, LGV, Granuloma inguinale, HIV, immunosuppression

TYPES

00:02:20

- Squamous cell carcinoma [92%]: Mc
- Melanoma [2-4%]: 2nd mc
- Basal cell carcinoma [2-3%]: 3rd mc

Squamous Cell Carcinoma

Basaloid [warty]	Keratinizing

• Younger age group
• Multifocal lesions
• Predisposing factors
  ○ HPV 16
  ○ VIN
  ○ Smoking/ Alcohol
	• Older age group
	• Unifocal lesions
	• Predisposing factors
	  ○ No a/w HPV
	  ○ a/w lichen sclerosis
	  ○ a/w squamous hyperplasia

Sites

00:05:00

- Labia majora: MC (60%)
- Clitoris 2nd MC: (15%)

Growth

- Exophytic
- ulcerative

Symptoms

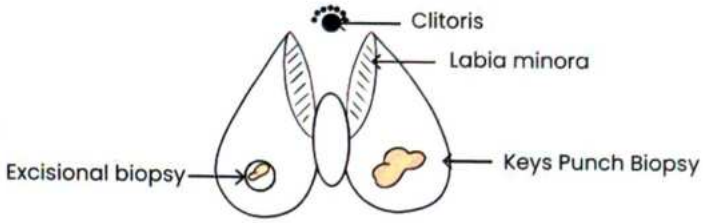
00:05:45

- Pruritis (MC): Itch-scratch cycle
- Mass/ lump in perineum
- Cancer cachexia
- Cancer pain

Diagnosis

00:07:00

- Wedge biopsy
- Key's biopsy
- If lesion is
  - </= 1 cm: Excisional biopsy
  - > 1 cm: Incisional biopsy



KEYS PUNCH

LYMPHATIC DRAINAGE OF VULVA

- Crossing lymphatics
- Pelvic group: not involved (if involved: distant mets)
- MC involved: Inguino-femoral

- Lymph node involvement: poor prognosis
  - without LN involvement: 90% success rate
  - involved: < 40 % success rate

- Radical vulvectomy + B/L Inguino-femoral LAD: very extensive surgery
  - 50% wound breakdown
  - 40% death in Ca vulva is surgery related

- Sentinel lymph node biopsy
  - Sentinel LN: inguino-femoral
  - Dye (Tecnitium 99/ isosulphane blue)
  - Put dye to find out the first draining LN
  - Do a biopsy of this LN: if involved do radical LAD also, else only a vulvectomy
  - Limits morbidity

STAGING

00:15:30

Stage I	• Limited to Vulva
I A	• Size: < 2 cm, invasion < 1mm
I B	• Size: > 2 cm, invasion > 1mm
Stage II	• Adjacent organ involvement • Lower 1/3 rd vagina • Lower 1/3 rd of urethra • Anus
Stage III	• Inguino femoral LN involvement
III Ai Aii	• One LN: > 5 mm • One or two LN: < 5 mm
III Bi Bii	• Two LN: > 5 mm • 3 or more LN: < 5 mm
III C	• LN involvement , with extra capsular spread
Stage IV	
IV Ai Aii	• Upper urethra, upper vagina, rectal involvement, growth fixed to pelvic bone • Fixed or ulcerated LN
IV B	• Distant metastasis • Pelvic LN

- Staging of all cancers in gynae done surgically except Ca cervix which is done clinically

TREATMENT

00:22:23

Stage I A	• Limited to Vulva • Size < 2cms, • Invasion < 1mm	• Wide Local excision + Sentinel Lymph Node Biopsy • Sentinel LN Biopsy ○ If negative: Radical vulvectomy alone ○ If positive: Radical vulvectomy + LN removal
Stage I B	• Size > 2 cms • Invasion > 1mm	• Radical Local Excision ○ Central Lesion: B/L LAD ○ Lateral Lesion: U/L LAD (> 2 cm from midline)
Stage II	• Any size: Spread to Lower 1/3 urethra, Lower 1/3 vagina, Anus	• Radical Vulvectomy Plus B/L LAD
Stage III	• Inguino-Femoral LN positive	• Radiation + Surgery + LAD
Stage IV	• IV A: Upper Urethra, Upper Vagina, Bladder, Rectum Pelvic side wall • IV B: Distant Metastasis Pelvic LN	• Radiation + Surgery + LAD

- Wide local excision: 1 cm margin
- Radical local excision: 2cm margin

Chemotherapy

- Bleomycin
- 5-FU

PROGNOSIS: 5 YEAR SURVIAL

00:25:12

- Ca vulva without Inguino femoral LN involvement: > 90%
- Ca vulva with Inguino femoral LN involvement: 50%
- Groin recurrence: Poor Prognosis

12 FIBROIDS

- MC tumor of women overall. Also known as Leiomyoma
- MC cause of hysterectomy around the world.

ETIOLOGY

- Incidence
  - 30% of all women
  - >50 years: 80%
  - Age group 35-45 years
- 2.5 times more likely to get affected if one female relative has fibroid.

- Associated with chromosomal abnormality in 40%
  - 12-14 Translocation
  - 12 Trisomy
  - 7 deletion

- Nulliparous women
- Increased Estrogen & Progesterone

> **Important Information**
>
> - **Fibroids are not seen before puberty or after the menopause due to absence of estrogen.**

- Obese women
- Red meat eaters
- Increase in Growth Factors
  - Transforming growth Factor β
  - Platelet derived growth Factor
  - Epidermal growth Factor
  - Vascular Endothelial Growth Factor (VEGF)

PATHOLOGY

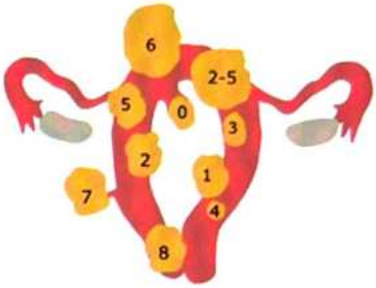
00:04:37

- Monoclonal smooth muscle cell tumors.
- Always start in intramural area of the muscle layer like Whorls of smooth muscle cells surrounded by pseudocapsule.
- Fibroid present in the intramural area is treated as the foreign body by the uterus.

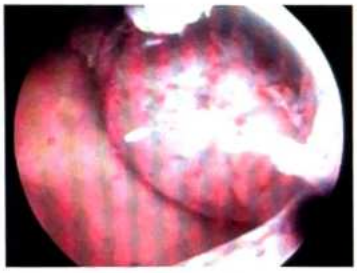
- Uterus responds by contracting to push the fibroid either outwards (subserosal fibroid) or inwards (submucosal fibroid)

FIGO CLASSIFICATION

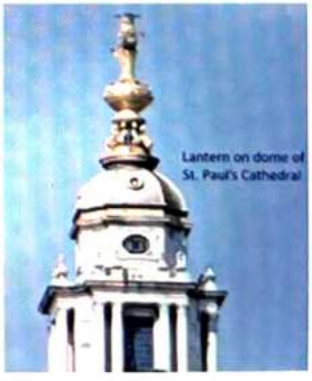
00:06:47



- Type 4: Intramural
- Type 3: 100% intramural but touches the cavity.
- Type 2: >50% intramural and a part in cavity or submucosal.
- Type 1: <50% intramural and rest in cavity
- Type 0: Pedunculated or intracavitary or submucosal
- Type 5: >50% intramural and rest in serosa (subserosal)
- Type 6: <50% intramural and rest in serosa (subserosal)
- Type 7: Subserosal Pedunculated
- Type 8: Parasitic fibroid (Detached fibroid that may be stuck to the diaphragm or omentum) and cervical fibroid.
- Type 2-5: Part of the fibroid is present both in cavity (Type 2) and in the serosa (Type 5) and this is known as Hybrid Fibroid



Type 3, Type 2 & Type 6 fibroid Type 0 Fibroid



Type 8 Fibroid

3-5 Hybrid Fibroid

SYMPTOMS

00:19:40

- Pain
  - Dysmenorrhea (congestive & spasmodic)
  - Compression of vital organs (hydronephrosis)
  - Torsion
  - Degeneration
    - → MC degeneration: Hyaline degeneration
    - → Calcific degeneration aka "Womb stone"
    - → Cystic degeneration
    - → Lipoid degeneration
    - → Necrotic/infectious degeneration

Important Information

- **MC degeneration in pregnancy: Red degeneration. It starts in 2nd trimester and the treatment is conservative.**
- **Rarest degeneration: Sarcomatous/malignant degeneration <0.5%**

- Menorrhagia (MC symptom) due to ↑ endometrium
  - Ineffective contraction
  - ↑ Pelvic congestion as a result of ↑ vasodilator prostaglandin
- Infertility
  - Uterine factors
    - → ↑ Uterine contractility resulting in increased expulsion of embryos
    - → ↓ Implantation
    - → ↑ Abortion
  - Tubal factors
    - → Blocked tube especially at cornu
    - → Stretched tubes
- Bowel & Bladder symptoms
  - Posterior fibroids can cause constipation
  - Increased frequency/hesitancy of urination
  - Urine retention: Commonly caused by posterior cervical fibroid pushing the uterus forward

DIAGNOSIS

00:31:47

- USG
- MRI
  - Best imaging
  - Fibroid mapping
- Endometrial biopsy: To rule out endometrial hyperplasia (↑ estrogen)

PRINCIPLES OF TREATMENT

00:33:35

- Small fibroid <5cm and No pain, bleeding, infertility → no treatment required
- Small fibroid with pain or bleeding or infertility → treatment required
- Large fibroid (>10 cm) with pain or bleeding or infertility → treatment required

- Large fibroid (>10cm) with no pain, bleeding, infertility
  - It may undergo torsion, compaction, degeneration, compression of bladder and bowel or it can detach (parasitic fibroid)
  - Treatment required

Medical Management

00:38:05

- NSAIDS: ↓ pain & bleeding
- Tranexamic acid: ↓ bleeding

- GnRh analogues (Leuprolin, Goserlin)
  - Downregulation of pituitary → no FSH, LH → stops periods
  - Reduces the size and vascularity of fibroid (good before surgery)

- GnRh antagonist (cetorelix, ganirelix): direct suppression of pituitary
- Mifepristone: "Anti-growth" (anti-progestin)
- Ulipristal: selective progesterone receptor modulator (pure antagonist action on progesterone receptor)

Newer Methods

00:42:33

- Uterine artery embolization with PVA particles (Poly Vinyl Alcohol) and preferably >35 years
- HiFU: High Frequency Focused USG
- MRgFUS: MR guided focused USG
- Intrauterine progesterone devices (MIRENA – levenergosterol IUCD) resulting in atrophy of the endometrium (no bleed)
- Myolysis needle
  - Electrocautery or laser needle is used.

Surgical Management

00:48:55

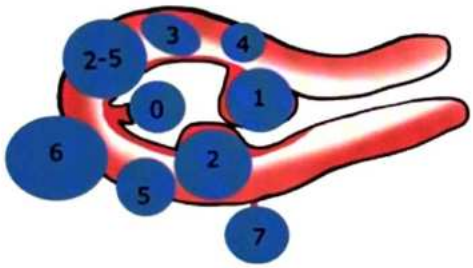
- Hysterectomy for patient who completed family and can be done either by open technique or laparoscopy

Previous Year's Questions

Q. A 45-year-old multipara lady has a single fibroid detected on a routine USG. The fibroid is in fact palpable clinically and is found to be 14-16 cms in size. The patient is currently asymptomatic. What is the next line of management? (AIIMS 2020)

A. No treatment as asymptomatic
B. Myomectomy
C. Hysterectomy
D. Medical management

- Myomectomy for those planning pregnancy.
  - Open technique – for all sizes
  - Laparoscopic myomectomy – high skilled procedure
- Criteria for laparoscopic myomectomy
  - If no of fibroids is 3-4 if ≤ 5cm can be removed
  - Only 1 fibroid ≤ 15 cm can be removed



- For Type 7, 6, 5 – Lap myomectomy can be done

Pre-Requisites for Myomectomy 00:52:37

- Hb > 10 gm
- Techniques for reducing blood loss → pre-op → GnRh
- Intra-op
  - Uterine clamp
  - Tourniquet
  - Injection of vasopressin (Pitressin)
- Minimal fimbrial tube handling
- Minimal incision on the uterus
- Avoid posterior uterine wall incision → fixed retroversion leading to infertility
- Avoid opening the cavity
- Semen analysis

Criteria for Hysteroscopic Myomectomy

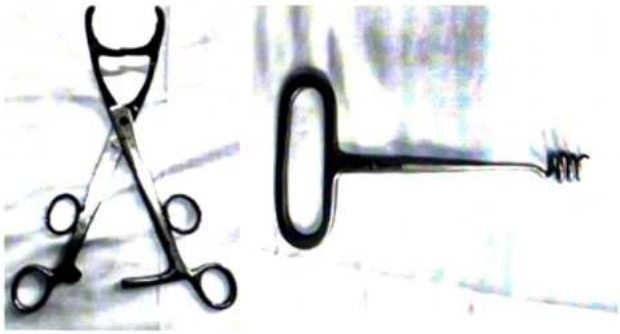
- Fibroid inside the uterus with size ≤ 3cm
- Type 1, 0 or even type 2 fibroids can be removed
- Distention of uterus using fluids may be required for visualization and manipulation.
  - Fluid can escape into peritoneal cavity or into circulation. Hence fluid deficit should be monitored

	Warning	Stop the Sx
Non-electrolyte media (glycine)	500-750ml	> 1500ml
Electrolyte media (saline)	1000ml	2500ml

- Glycine (non-conducting media) can be used with unipolar current
- Ionic solution (conducts electricity) used with bipolar current

Side effects of fluid overload 01:06:54

- Pulmonary edema
- Cerebral edema
- Cardiac failure
- Hyperammonemia (glycine)
- Hyponatremia
- Death



Myoma clamp Myoma screw

CLINICAL QUESTIONS

Q1. A P3L3 woman presents with history of heavy menstrual bleeding. She attained menarche at 8 years of age, now has regular cycles with heavy flow, with passage of clots. Her BMI is 30 kg/m2 and she has a family history of fibroids. All of the following in patient's history predispose her to having fibroids, EXCEPT?

A. BMI of 30 kg/m2
B. Having 3 children
C. Family history of fibroids
D. Early age of menarche

Answer: B

Solution

Risk factor of Fibroids:

- Family history
- Genetic
- High estrogen exposure: nulliparity, early menarche, use of high dose OCP
- Red meat eater
- Obesity
- Black women
- Growth factors
  - Transforming growth factor B
  - Platelet derived growth factor
  - Epidermal growth factor

Protective factors

- Smoking
- Pregnancy, multiparity
- Excercise
- Diet: leafy vegetables

13 HYSTERECTOMY

CLASSIFICATION 00:00:37

- Total/ Subtotal
- Abdominal/ Vaginal
- With or without U/L or B/L Salpingo Oophorectomy
- Emergency/ Planned
- Obstetric indication/ Gynecological indications
- Laparoscopic/ Open/ robotic

INDICATIONS 00:04:38

- Fibroid uterus [40-45%] [mc]
- Endometriosis [15-20%]
- Prolapse [15%]
- Dysfunctional uterine bleeding
- Pelvic inflammatory Disease
- Chronic Pelvic Pain

PRE-REQUISITES 00:05:44

- Consent
- rule out pregnancy
- Pap smear examination
- arrange blood
- Precautious measures For Venous thromboembolism : leg exercises, DVT pump
- INDUCTIVE Antibiotics [within 1 hr of anaesthesia]

COMPLICATIONS 00:08:03

Intra OP Injuries to Bowel, Bladder & vessels

- Ureter Injury

Important Information

- in a hysterectomy, mc site of injury → at the site of Crossing the Uterine artery
- Overall, mc site of injury → at the Pelvic Brim

Post OP Complications

- Hemorrhage
  - Immediate → visualized
    → If retroperitoneal [Look for signs- ↑ PR, Shock]

Reactionary → in 1st 24hrs d/t slippage of ligature
Secondary → > 24 hrs uptill 2-3 weeks d/t infections

- Wound Infections [4-6 % cases]
- Cuff/ Vault Ceilulitis [vaginal cuff]
- Urinary Retention – d/t bladder hypotonia
- Ureteric Injury
  - Post op Flank pain
  - do USG/CT for Dx
  - do cystoscopy to localise the block: can attempt uretric catheterization
- Bladder Injury
  - vesico vaginal Fistula
  - Uretero vaginal fistula
- Prolapse of Fallopain Tube through the vault
- Cuff Dehiscence
  - Advise not to have intercourse for 6 weeks

Previous Year's Questions

Q. A woman on second post operative day after hysterectomy shows distended abdomen. Which of the following is the most likely electrolyte abnormality that may be found? (FMGE 2020)

A. Hyperkalemia
B. Hypokalemia
C. Hypernatremia
D. Hyponatremia

LAPAROSCOPIC HYSTERECTOMY 00:20:14

1 LAVH [Laparoscpic Assisted vaginal Hysterectomy]

- Diagnostic laparoscopy +Vaginal Hysterectomy
- Adhesiolysis + Vaginal Hysterectomy
- Resection of Adnexae
- Uterine vessels are resected after bladder mobilization

2 Total Laparoscopic Hysterectomy

- Entirely laparoscopic

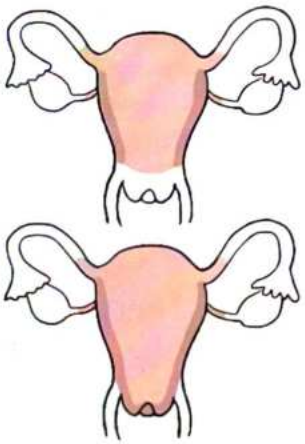
Previous Year's Questions

Q. 47 year old woman presented with a uterine fibroid with menorrhagia and is planned for hysterectomy. Anaesthetist classified her as moderate risk in view of a severe heart disease. What procedure should NOT be performed?
(FMGE 2020)

A. Non decent vaginal hysterectomy
B. Total abdominal hysterectomy
C. Total laparoscopic hysterectomy
D. Subtotal abdominal hysterectomy

TYPES OF HYSTERECTOMY

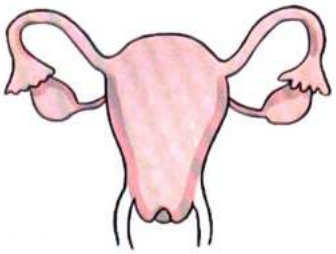
Types of Hysterectomy



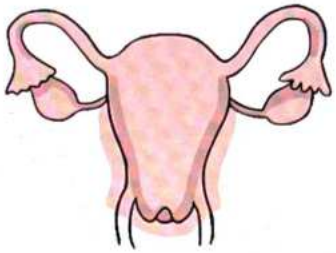
Key removed

1. Subtotal hysterectomy

2. Total hysterectomy



3. Total Hysterectomy with bilateral salpingo-oophorectomy



4. Wertheim's hysterectomy

Refer Diagram 13.1

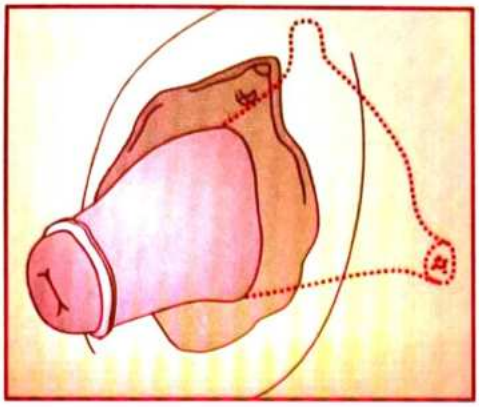
PRESERVATION OF OVARIES 00:23:50

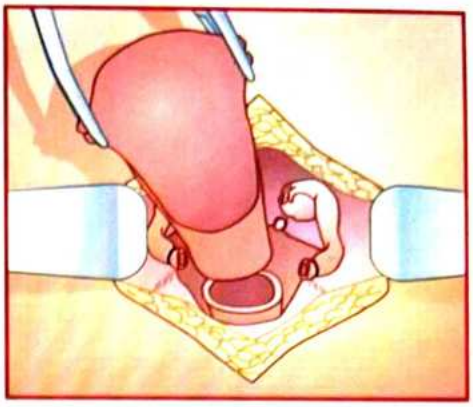
- Conserve ovaries at least till 50 yrs
- If Surgical oophorectomy done < 50 yrs, more chances of coronary Artery Disease by 65 yrs

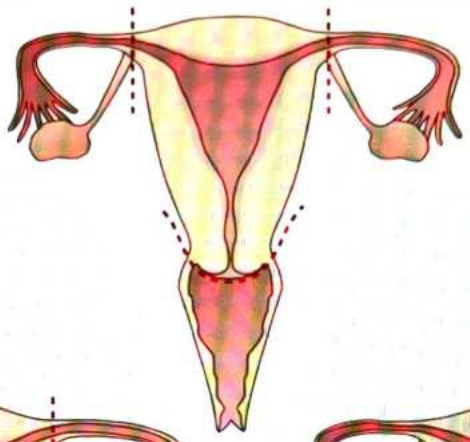
PROPHYLACTIC OOPHORECTOMY 00:25:32

- BRCAI & BRCA II mutations
- 1° Female relatives having CA Breast, CA ovary, CA ovary → 10-50% lifetime Risk

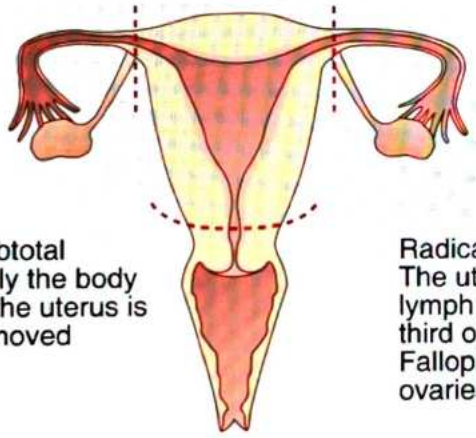
A hysterectomy can be performed through the vagina or the abdomen



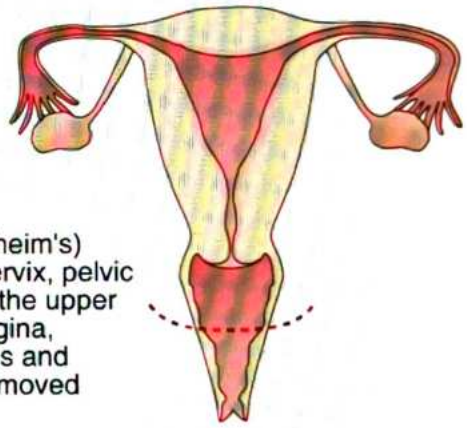




Total
The body of the uterus and the cervix are removed



Subtotal
Only the body of the uterus is removed



Radical (Wertheim's)
The uterus, cervix, pelvic lymph nodes, the upper third of the vagina, Fallopian tubes and ovaries are removed

14 MULLERIAN ABNORMALITIES

- 0.5% of all women have Mullerian defects
- Often associated with renal defects in 15-30%

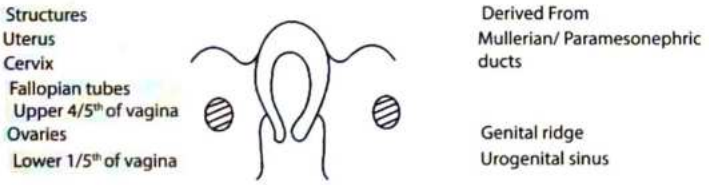
Presentation 00:01:00

- Infertility
- Recurrent pregnancy loss
- Abnormal menstrual cycles
- Amenorrhea

Formation of Internal Genitalia 00:02:17

- Female internal genitalia derived from Mullerian/ Para Mesonephric Duct
- Male internal genitalia derived from Wolffian/ Mesonephric/ Gartner Duct

1. Mullerian Duct Derivatives 00:03:00



- Uterus
- Cervix
- Fallopian tubes
- 4/5th vagina
  - Lower 1/5th derived from Urogenital Sinus (or split as 2/3rd and 1/3rd)
  - Ovaries are derived from Genital Ridge
- Renal pelvis and ureter

2. Wolffian Duct Derivatives 00:04:25

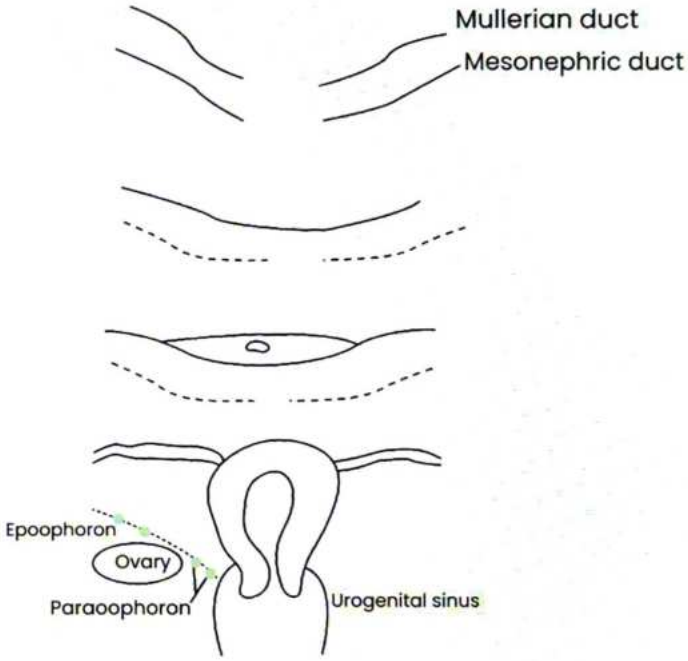
- Epididymis
- Vas deferens
- Seminal vesicles
- Renal pelvis and ureter

FEMALE GENITAL TRACT DEVELOPMENT

00:05:23

- The obliterated mesonephric duct fuses lateral vaginal wall.
- Gives remnants above & on sides of ovary
  - Epoophoron
  - Paraoophoron

Formation of Female Internal Genitalia



- Gartner Duct and cyst
  - Wolffian duct obliterated at lower end, called Gartner's duct
  - collection in upper lateral vaginal wall: Gartner cyst
  - Gartner duct cyst: mostly asymptomatic, simple cyst
  - Rx: simple excision
- Bartholin's gland and cyst
  - Bartholin's gland/ greater vestibular gland
  - cyst located at anterior 2/3rd and posterior 1/3rd junction of vulva
  - Bartholin's gland functions to keep vagina moist during intercourse
  - epithelium of gland: columnar
  - epithelium of duct: stratified squamous
  - epithelium of terminal part of duct: transitional

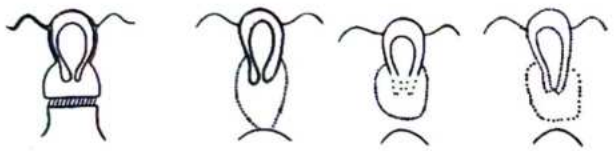
- Bartholin's abscess
  - blocked duct→mixed infections of aerobic and anaerobic (MC Staph aureus)
  - very painful
  - Rx: Marsupilization under GA: Incise and evert edges/ exteriorization of cavity → keeps dry
  - Preferable do not excise Bartholins gland/cyst

MULLERIAN DUCT ANOMALIES 00:15:30

- Arrested development
- Fusion defects: vertical/ lateral
- Failure of resorption of septum

1. Vertical Fusion Defects 00:16:32

Vertical Fusion Defects



Transverse vaginal Septum | Vaginal Atresia | Cervical vaginal Atresia | Complete mullerian Agenesis

Presentation

- Cryptomenorrhea 00:18:50
  - Menstruation present but menstrual blood not coming out
    - → Transverse vaginal septum
    - → Vaginal atresia
    - → Cervical vaginal atresia
    - → Imperforate hymen

IMPERFORATE HYMEN

- Imperforate Hymen
  - Not a mullerian anomaly: all Mullerian structures are normal
  - It is a cannulation defect of vaginal opening
  - Hidden blood aka cryptomenorrhea
  - Hematometra-blood in uterus; Hematocolpos - blood in vagina
  - Cyclical pain every months with primary amenorrhea
  - Treatment
    1. Cruciate incision given
    2. Cut along the edges of incision
- Can rarely present with urinary retention: hematocolpos compresses urethra against pubic symphysis
- Classical presentation: young girl with primary amenorrhea with acute retention of urine
- Retrograde menstruation: endometriosis

Previous Year's Questions

Q. 17 yr old girl came with complain of primary amenorrhea & cyclical abdominal pain. On a per abdominal examination a midline abdominal swelling seen with some side to side mobility. Per rectal examination reveals bulging mass in vagina. (NEET 2020)

Diagnosis likely is?

A. Imperforate hymen
B. Transverse vaginal septum
C. Complete Mullerain agenesis
D. Vaginal agenesis

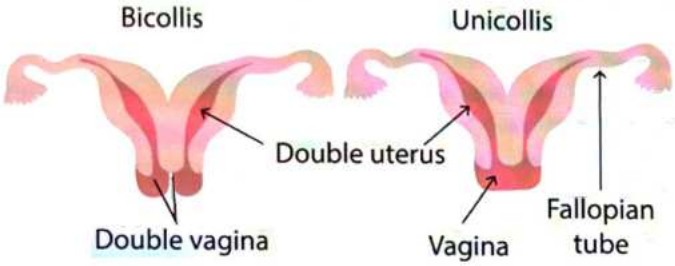
Previous Year's Questions

Q. 16-year-old girl presents with cyclical abdominal pain. She has not menstruated so far. What is your diagnosis? (FMGE 2020)

A. Bartholin cyst
B. Sub-urethral polyp
C. Sebaceous cyst
D. Imperforate hymen

Lateral Fusion Defects 00:24:40

1. Didelphys
- Usually good reproductive outcome
- Requires no treatment
- A/w breech presentation
- A/w preterm labour
- Retrograde menstruation: Endometriosis



Previous Year's Questions

Q. Which of the following is the least common in didelphys uterus? (NEET 2021)
A. Preterm labour
B. Transverse lie
C. Endometriosis
D. Abortions

2. Unicornuate uterus
- Worst pregnancy outcome
- Abortion
- Preterm labour
- Non communicating rudimentary horn: retrograde menstruation: endometriosis

3. Septate uterus
- Septum remains, require surgery more commonly than bicornuate
- Infertility
- Abortion

- Transverse lie

4. Bicornuate uterus
- Two horns
- Recurrent abortions: require unification surgery
- Breech/transverse lie
- Preterm albour

Septate Vs Bicornuate Uterus 00:30:25

Important Information

Septate uterus is the most common Mullerian anomaly
- On Hysterosalpingography, both septate & bicornuate uterus looks similar
- USG and MRI to aid in differentiation

Septate	Bicornuate
• Angle < 75 deg: acute	• Angle > 105 deg: obtuse
• Fundus flat	• Fundus concave
• Distance b/w horns < 4cm	• Distance b/w horns > 4cm
• Endometrium to fundus > 5mm	• Endometrium to fundus < 5mm

Important Information

Best way to distinguish b/w septate & bicornuate uterus

- Diagnostic Laparoscopy + Hysteroscopy
- MRI [Best imaging method]

- Treatment
  - Septate uterus → hysteroscopic septal resection
  - Bicornuate→Unification surgery [Strassman's or Jone's Metroplasty]

Important Information

- Only indication of unifying the uterus in bicornuate uterus → Recurrent Abortions

Previous Year's Questions

Q. 24 yr old with married life of 4 yrs visits infertility clinic with h/o recurrent abortion. On further workup. she found to be having septate uterus. Which surgery has better reproductive outcome? (NEET 2020)

A. Straussmann metroplasty
B. Tomkins metroplasty
C. Transcervical hysteroscopic resection of septum
D. Jones metroplasty

Previous Year's Questions

Q. 25-year-old woman presents with midline septum in the uterus. Which of the following is the management? (NEET 2021)

A. laparoscopic metroplasty
B. Hysteroscopic septoplasty
C. Uterine metroplasty
D. Laparoscopic septoplasty

Previous Year's Questions

Q. Unicornuate uterus can be diagnosed by? (INICET 2021)

A. x ray pelvis and laparoscopy
B. X ray pelvis and HSG
C. Falloposcopy and HSG
D. Laparoscopy and HSG

Previous Year's Questions

Q. 25 year old female with primary infertility came to hospital with USG finding of uterine anomaly. Which of the following is used for confirming diagnosis? (NEET 2021)

A. TVS
B. Hysteroscopy + laparoscopy
C. Laparoscopy
D. HSG

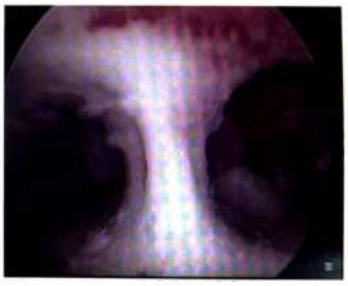
IMAGE DISCUSSION

00:38:55

Uterus Didelphys

HSG of unicornuate uterus

Imperforate hymen

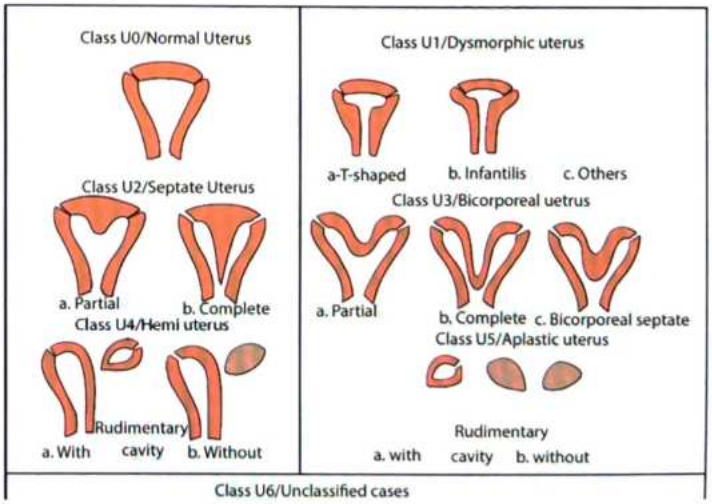


Hysteroscopic view of septate uterus

ESHERE CLASSIFICATION

00:42:55

- European society for Human Reproduction & Embryology

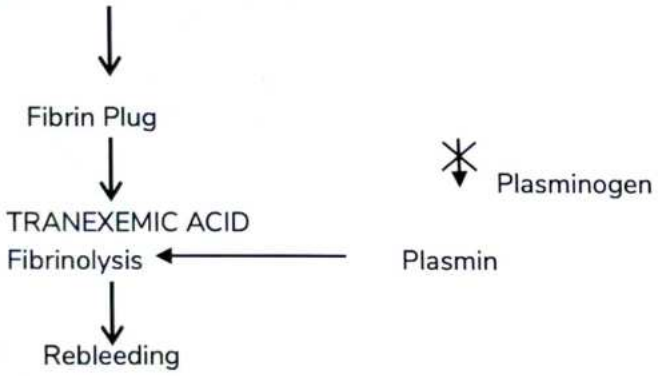


15 ABNORMAL UTERINE BLEEDING

ABNORMAL UTERINE BLEEDING 00:00:30

1. Non-Hormonal Management 00:00:51

- NSAIDS: ibuprofen, mefenamic acid
  - Inhibits vasodilator prostaglandins
  - ↓ Pain
  - ↓ bleeding in uterine blood vessels
  - 1st Line drug
- Tranexemic Acid
  - Bleeding



  - 1st Line drug

2. Hormonal Management 00:03:57

- Progesterone: Stabilizes the Endometrium
- Estrogen: Forms new endometrial glands: better for acute severe menorrhagia. Estrogen Withdrawal heavier than Progesterone Withdrawal
- Combined Oral Contraceptive Pills
- Danazol/Androgens: Leads to Endometrial atrophy
- GnRH Analogues: down regulation of Pituitary
- IUCD Levonorgestrol [MIRENA]

3. Surgical Management 00:08:26

- Therapeutic Curettage/ Hemostatic Curettage/ Dilatation & Curettage [DNC]
- B/L Uterine Artery Embolization by PVA [poly vinyl Alcohol] Particles
- Endometrial ablative procedures: preferred in older women, causes amenorrhea. These are alternative to hysterectomy and can be done as OPD procedure
  - Trans cervical Resection of Endometrium [TCRE]: Roller ball
  - Micro Wave Method
  - Thermal Method: 87° C x 8 min
- Hysterectomy

CAUSES 00:18:53

1. **T** - **T**umors: benign and malignant
2. **I** - **I**nfections
3. **P** - **P**regnancy related causes: threatened/ missed/ incomplete abortion or ectopic pregnancy

Previous Year's Questions

Q. Which of the following is the first line management for Abnormal uterine bleeding in adolescent age group? (JIPMER 2019)

A. Oral contraceptives
B. Tranexamic acid
C. Progesterone
D. Endometrial Biopsy

Understand with an example

- Patient presents with bleeding on 30 Aug with LMP of 28 July. Could have been an ectopic pregnancy. which occurred as follows

- 28th July : Last menstrual Period
  - ↓
- 11th August : Ovulated (Intercourse)
  - ↓
- Embryo implanted on fallopian tube on 17th August
  - ↓
- 28th August missed her period
  - ↓
- 30th August bleeding occurred

Important Information

- MC Fate of ectopic pregnancy → Vascular inefficiency embryo degeneration drop in progesterone shedding of decidua (cause of vaginal bleeding in ectopic)
- Other outcomes of ectopic pregnancy
  - Tubal abortion
  - Rupture: Much rare

4. Systemic Disorder
- Hypothyroidism
- Liver disorder
5. **C** - Coagulation defects: Von villebrands disease, ITP
6. **D** - Drugs: Heparin, Warfarin, COCP, IUCD
7. **D** - Dysfunctional Uterine bleeding: Diagnosis of exclusion

How to remember

TIPS CD : TIPS company makes CD

TIPS CD : Absent in DUB

Previous Year's Questions

Q. 35 yr old female attends gynae OPD with excessive bleeding since 6 months, not controlled with non-hormonal drugs. USG and clinical examination reveals no abnormality. Next step is? (NEET 2020)

A. Endometrial ablation
B. Endometrial sampling
C. Hysterectomy
D. Hormonal therapy

Previous Year's Questions

Q. 45 year old female with 3 months menorrhagia. USG showing 2 cm submucosal fibroid. First line of management is (NEET 2019)

A. OCP for 3 months
B. Progesterone for 3 months
C. Endometrial sampling
D. Hysterectomy

DUB [DYSFUNCTIONAL UTERINE BLEEDING]

00:33:58

- TIPSCD: Absent in DUB

Conditions 00:37:00

ANOVULATORY DUB

- Pubertal Girls
- Peri menopausal women
- Metropathia Haemorrhagica: Bleeding in 2.5 – 3 months with heavy bleeding, usually in women > 45 years. Dilatation and curettage is both diagnostic and therapeutic

- Anovulatory DUB: MC DUB
  - In 65% with anovulatory DUB, the Endometrium is Hyperplastic

OVULATORY DUB 00:40:34

1. Corpus Luteal ↓ed Function
   ↓
   Irregular ripening
   ↓
   Premenstrual spotting/ Bleeding
2. Corpus Luteum ↑ed Function (Persistence of CL of previous cycle)
   ↓
   Irregular shedding
   ↓
   Post menstrual spotting/ Bleeding

16 GAMETOGENESIS

GAMETOGENESIS

00:00:30

- SPERMATOGONIA $\xrightarrow{74\text{-}75 \text{ days}}$ SPERMATOZOA (4 no)
- SPERMATID $\xrightarrow[(21\text{-}22 \text{ days})]{\text{Spermiogenesis}}$ SPERMATOZOA
- Spermiation: Release of sperms from Sertoli cells into Lumen of semeniferous tubules

IN TESTIS

LH $\xrightarrow{\text{acts on}}$ Leydig cells $\xrightarrow{\text{Produce}}$ Testosterone

Testosterone acts on sertoli cells [l ining the seminiferous tubules] → Spermatocytes

FSH → sertoli cells [l ining the seminiferous tubules]

SPERM PATHWAY

Testis [250-290 lobules present]

↓

Seminiferous Tubules (70% of testes)

↓

Rete Testis

↓

Epididymis [sperms are stored]

↓2-6 days (attain motility)

VAS Deferens [more motile sperms]

↓

Ejaculatory Duct

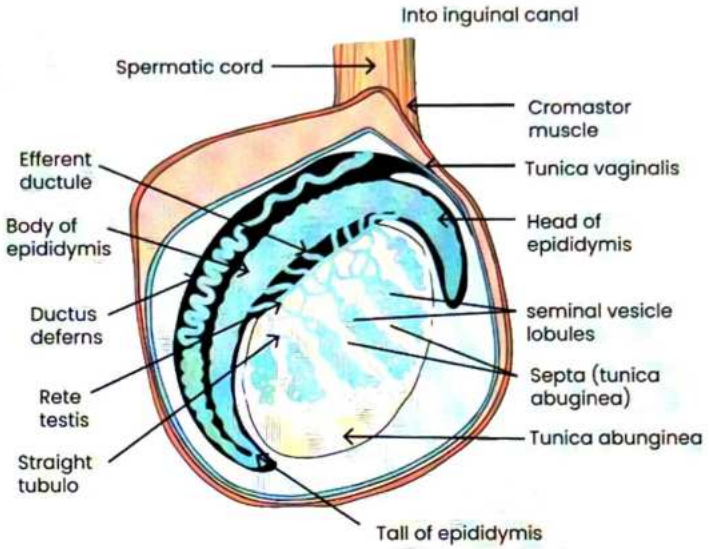
↓

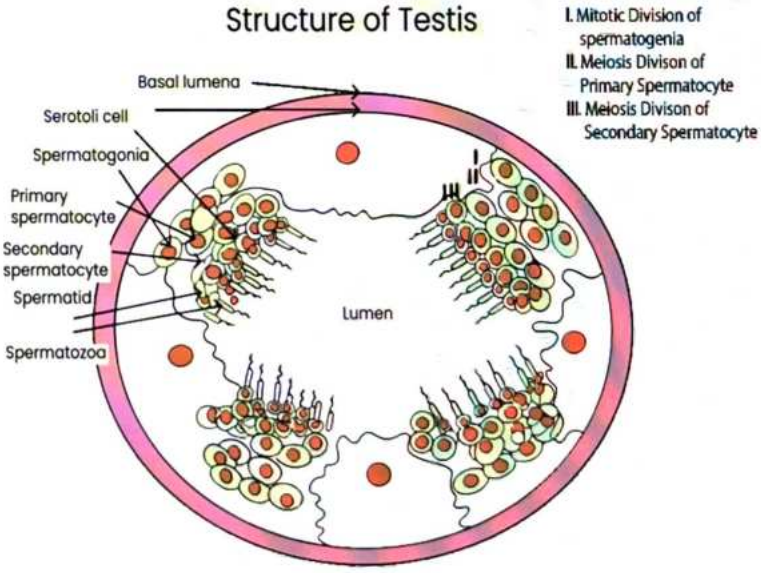
Urethra

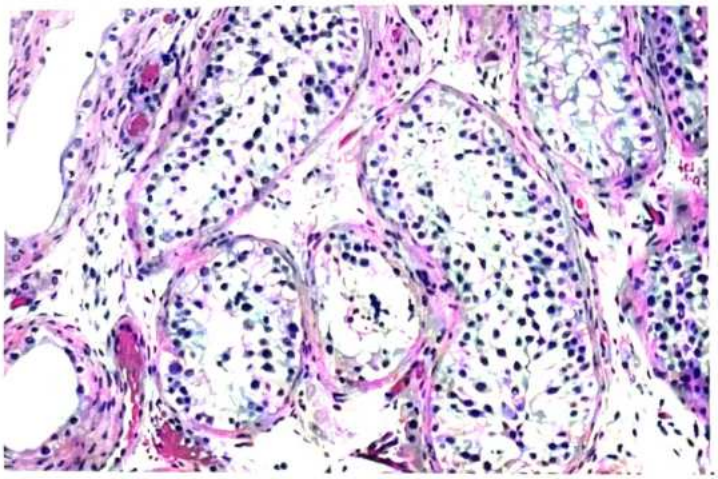
↓

Penis

- Alkaline secretions from seminal vesicles along with acidic secretions from prostate, enter ejaculatory duct which ultimately makes semen slightly alkaline. This counters vaginal acidity.





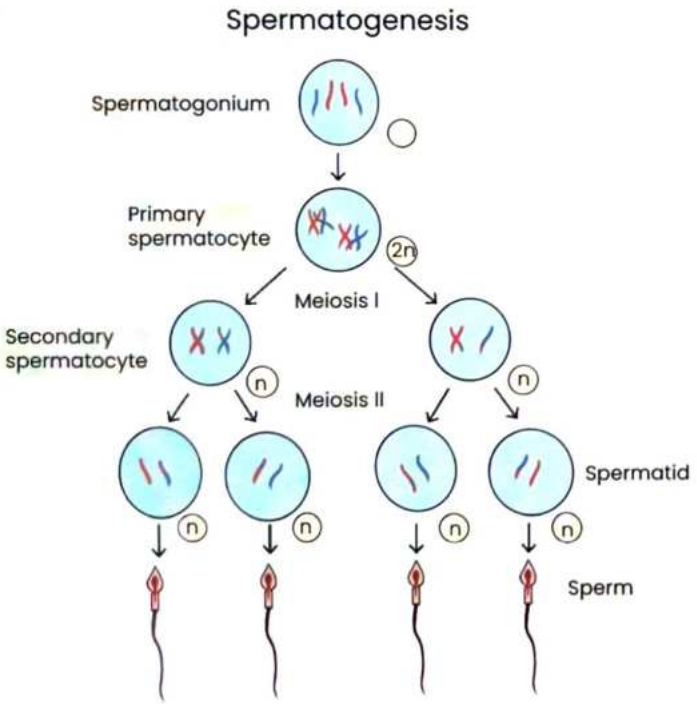


HPE Examination of Seminiferous Tubule

- Sertoli cells are tightly packed to keep blood away from lumen of semeniferous tubules, this forms the Blood-Testes-Barrier

SPERMATOGENESIS

00:09:28



- 1 spermatogonia gives rise to 4 sperms
- Formation of spermatozoa from spermatid include:
  - Condensation of nucleus occur
  - Formation of tail occur
  - Motility
  - Acrosomal cap [Golgi apparatus]

Previous Year's Questions

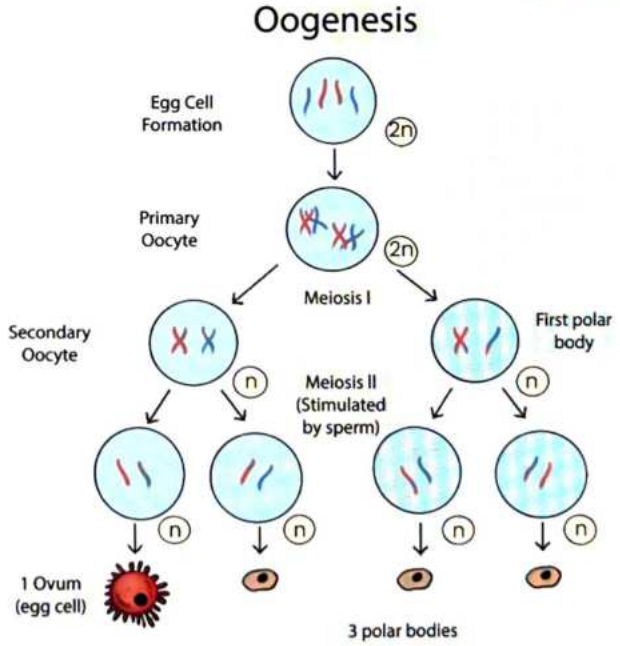
Q. Testosterone is secreted by? (FMGE 2019)
A. Leydig cell
B Sertoli cells
C. theca lutein cells
D. Granulosa cell

Previous Year's Questions

Q. Sequential order of sperm formation is? (AIIMS 2019)
A. Spermatocyte, spermatid, spermatogonia, spermatozoa
B. Spermatid, spermatocyte, spermatogonia, spaermatozoa
C. Spermatid, spermatogonia, spermatocyte, spermatozoa
D. Speramatogonia, spermatocyte, spermatid, spermatozoa

OOGENESIS

00:11:40



- 1 oogonium gives rise to 1 ovum & 3 polar bodies [extra genetic material]
- Oogonia starts forming from 8wks of IUL

↓

Primordial follicle

↓

6-7 million at 20 wks

1-2 million at Birth

3-4 lakh at puberty

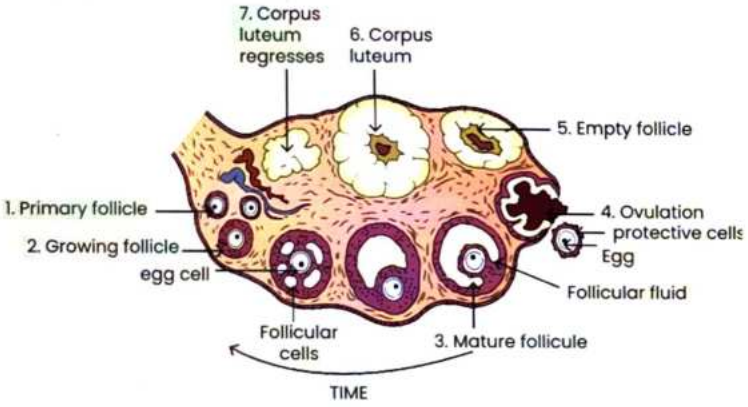
↓

1 Oocyte released every month

- Oocyte is resting in prophase I [1st Meiotic division] at the time of birth
- Meiosis I completed at the time of ovulation [puberty]
- Secondary oocyte & 1 polar body released [at the time of ovulation]
- Secondary oocyte is arrested in Metaphase II [meiosis II] till fertilization
- After fertilization, 2nd polar body & ovum are released
- Oocytes are protected by granulosa cells and those not protected undergoes atresia

STAGES OF DEVELOPMENT OF OOCYTE

00:18:20



- After ejaculation, Sperms reach posterior fornix of vagina $\xrightarrow{2\ min}$ ampulla

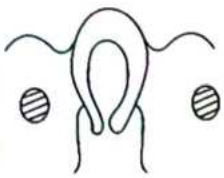
CAPACITATION OF SPERMS

00:20:30

- The potential to fertilize oocyte
- Takes place in cervical mucus and proximal F. Tube (Differently given in books: single best answer: Fallopian tube)
- Steps responsible for capacitation
  - Influx of Ca+ ions
  - Tyrosine phosphorylation
  - Removal of inhibitory mediator [cholesterol]

Acrosomal reaction	Cortical reaction
Acrosomal cap [Golgi apparatus] ↓ Acrosome breakdown Release acrosin to fertilize oocyte (Penetrate zona pellucida of oocyte) ↓ Acrosin (Hyaluronidase) will soften the zona pellucida (Acrosome reaction)	One sperm gets inside ↓ Cortical granules released in perivitelline space of oocyte ↓ This reaction makes the oocyte impermeable again

17 INTERSEX



Structures
Uterus
Cervix
Fallopian tubes
Upper 4/5th of vagina
Ovaries
Lower 1/5th of vagina

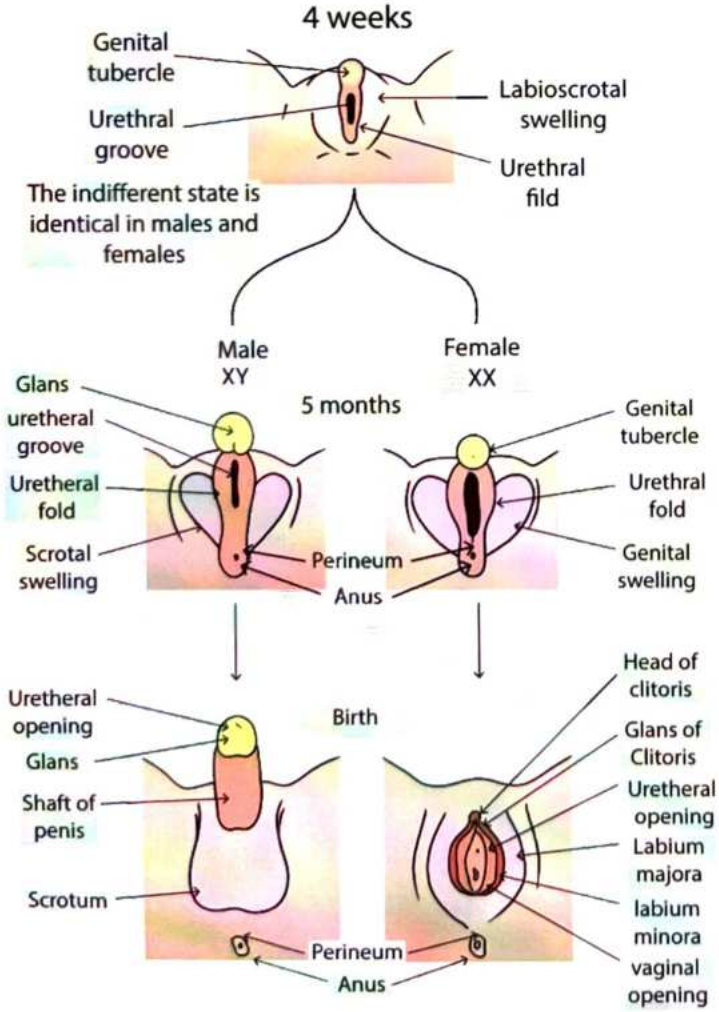
Derived From
Mullerian/ Paramesonephric ducts

Genital ridge
Urogenital sinus

FORMATION OF EXTERNAL GENITALIA

00:01:29

- After 6 wks of intra uterine life, Sexual differentiation begins in the genital tubercle and two genital swellings
- Sexual distinction is based on
  - Genetic Sex [46 XX or 46 XY]
  - Gonadal Sex [Ovary or testes]
  - Phenotype [vulva or Phallus]
- Y chromosome has
  - Sex determining Region Y [SRY]
  - Testes Determining Factor [TDF]



- Ext. genital formation is under the influence of Androgens

> 6 Wks	> 6 Wks
↓	↓
Male	Female
↓	↓
Testes	Ovaries
↓	↓
Androgens	No Androgens
↓	↓
Descent of testes Formation of scrotum Formation of Penis	Labia majora Labia minora Clitoris Lower 1/5th of vagina by urogenital sinus

Default/Basic Human Sexuality → Female 00:08:32

	Mullerian agenesis	**Testicular feminization syndrome/ androgen insensitivity syndrome**
Karyotype	46 XX	46 XY
gonad	Ovary	Testes
Uterus, tubes	Absent	Absent (MIF from testes)
Vagina	Shallow Blind	Shallow Blind.
Vulva	Normal	Normal
Breast	Feminine	Large Feminine
Periods	Absent	Absent
Androgens	20-80 ng/dl	200-800 ng/dl
Public / Axillary hair	Present	Absent

In Testicular Feminization syndrome,
- In periphery, Androgens $\xrightarrow{\text{Aromatase}}$ Estrogens
- Estrogens
  → Large feminine breasts
  → Pubic & axillary hair absent
  → perfect feminine features

- TFS is distinguished from Mullerian Agenesis by
  - Absent axillary & pubic hair [clinical suspicion]
  - Karyotyping: 46 XY
  - USG reveals undescended testes (mostly in abdomen occasionally in inguinal canal)
- Undescended testes to be removed in TFS at the time of puberty to prevent development of cancer

Previous Year's Questions

Q. A 19 yr old girl with amenorrhea with normal Pubic hair & normal breast development. Likely diagnosis?

(INICET 2021)

A. Mullerian agenesis
B. Turners syndrome
C. Gonadal agenesis
D. XYY

ADRENAL STEROIDOGENESIS

00:25:46

Refer Flow chart 17.1

- 21 Hydroxylase Deficiency
  ↓
  ↓ Steroid Hormones
  ↓
  x Negative feedback to Hypothalamus
  ↓
  ↑ ACTH
  ↓
  ↑ Sex Hormones

CONGENITAL ADRENAL HYPERPLASIA (CAH)

00:32:09

- Due to deficiency of 21 Hydroxylase enzyme

1. **Classical variety**
- Boy → Precocious puberty
- In Girl
  - Penis & scrotum present } Ambiguous
  - No testes } Genitalia

2. **In salt losing variety**
- ↓ Na^+
  ↓ H_2O
  ↑ K^+
- Fatal to the baby [boy or girl]

3. **Late onset/ Adult onset Adrenal Hyperplasia**
- Rx by long term steroids: at puberty there is androgen spurt and the girl presents with amenorrhea, masculine features, even clitoromegaly

Important Information

- MC cause of CAH: 21 hydroxylase deficiency
- 2nd mc cause of CAH: 11β hydroxylase deficiency

Previous Year's Questions

Q. 13 yr old child visits OPD with complains of not attaining menarche with karotype 46XX. O/E there is clitromegaly. Which enzyme is likely deficient? (NEET 2020)

A. 17 alpha hydroxylase
B. 21 alpha hydroxylase
C. 11 beta hydroxylase
D. 3 beta hydroxysteroid dehydrogenase

- **Prevention**
  - Start the steroid at the time of D[illegible] pregnancy

HERMAPHRODITISM

00:40:15

- Pseudohermaphrodite
  - Genetic male & phenotypic female: male pseudo hermaphrodite
  - Genetic female & phenotypic male: female pseudo hermaphrodite

Understand with an example

- Example of male pseudo hermaphrodite: TFS
- Example of female pseudo hermaphrodite: CAH

- True Hermaphrodite
  - Male + Female karyotype

- Male + Female gonads: ovotestis
- Male + Female external genitalia

GONADAL DYSGENESIS

00:44:21

Swyer Syndrome 00:46:34

- 46 XY female
- No testes: no androgen → external feminization
- No testes: no MIF (Mullerian Inhibiting Factor) : Mullerian [illegible] formed

Turner Syndrome

- Streak gonads
- ↓ Estrogens
- Small uterus
- Primary amenorrhea

Mixed Gonadal Dysgenesis 00:50:09

- Male + female karyotype
  Male + female gonads
  - U/L undescended testes: Not working
  - Contralateral streak ovary: Not working
- External genitalia: Female
- 1/3rd of mixed gonadal dysgenesis have Turner phenotype

Important Information

- In gonadal dysgenesis, the external genitalia is always of female

Important Information

- MC cause of I Amenorrhea: Gonadal dysgenesis
- Mc type of gonadal dysgenesis: Turner syndrome

- A patient present with Short stature, Primary amenorrhea, Streak gonad, On USG: hypoplastic uterus is Turner Syndrome
- 46 XX: 1 BARR body [normal female]
- 45XO: No Barr body → Turner Syndrome
  - Short stature
  - Shield chest
  - Low set hair line
  - Lymphedema
  - Cubitus valgus
  - Normal intelligence
  - Streak gonad
  - Reduced estrogen
  - Uterus small
  - Primary amenorrhea
- 46 XY: No BARR body [normal male]
- 47XXY: Klinefelter Syndrome
  - Tall stature
  - Gynecomastia
  - Obesity
  - Azoospermia
  - Infertility
  - Mental retardation

Important Information

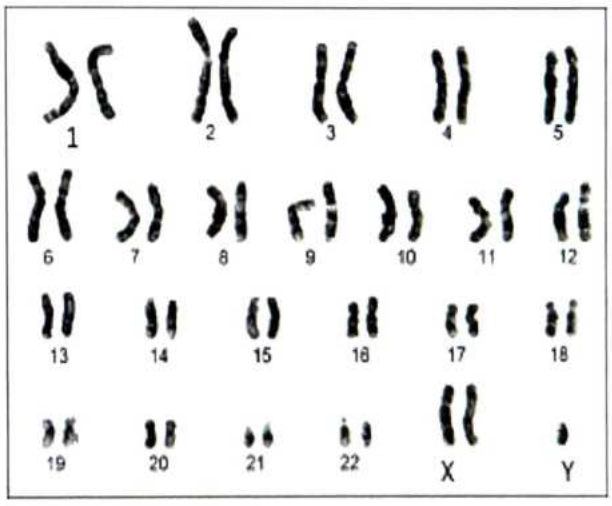
- Intelligence is normal in turner syndrome
- Mental retardation is seen in Klienefelter syndrome

How to remember

- More the number of X in genotype : more feminine
- XO (turner) : female with one less X : less feminine female
- XXY (Klienefelter) : male with one extra X : more feminine male (gynaecomastia)

Previous Year's Questions

Q. Additional features seen in a patient with following karyotype is? (INI CET 2021)



A. Short limb and webbed neck
B. Tall and gynecomastia
C. Polydactyl and sandal foot
D. Hypocalcemia and cleft palates

Example

Q. Which one has the best clinical prognosis?

A. CAH

B. TFS

C. Mixed Gonadal Dysgenesis

D. True Hermaphrodites

Previous Year's Questions

Q. Match the following

A. Swyer syndrome	I: 46 XY
B. turner syndrome	II: 45 XO
C. Androgen insensitivity syndrome	III: 46XY
D. MRKH	IV : 46XX

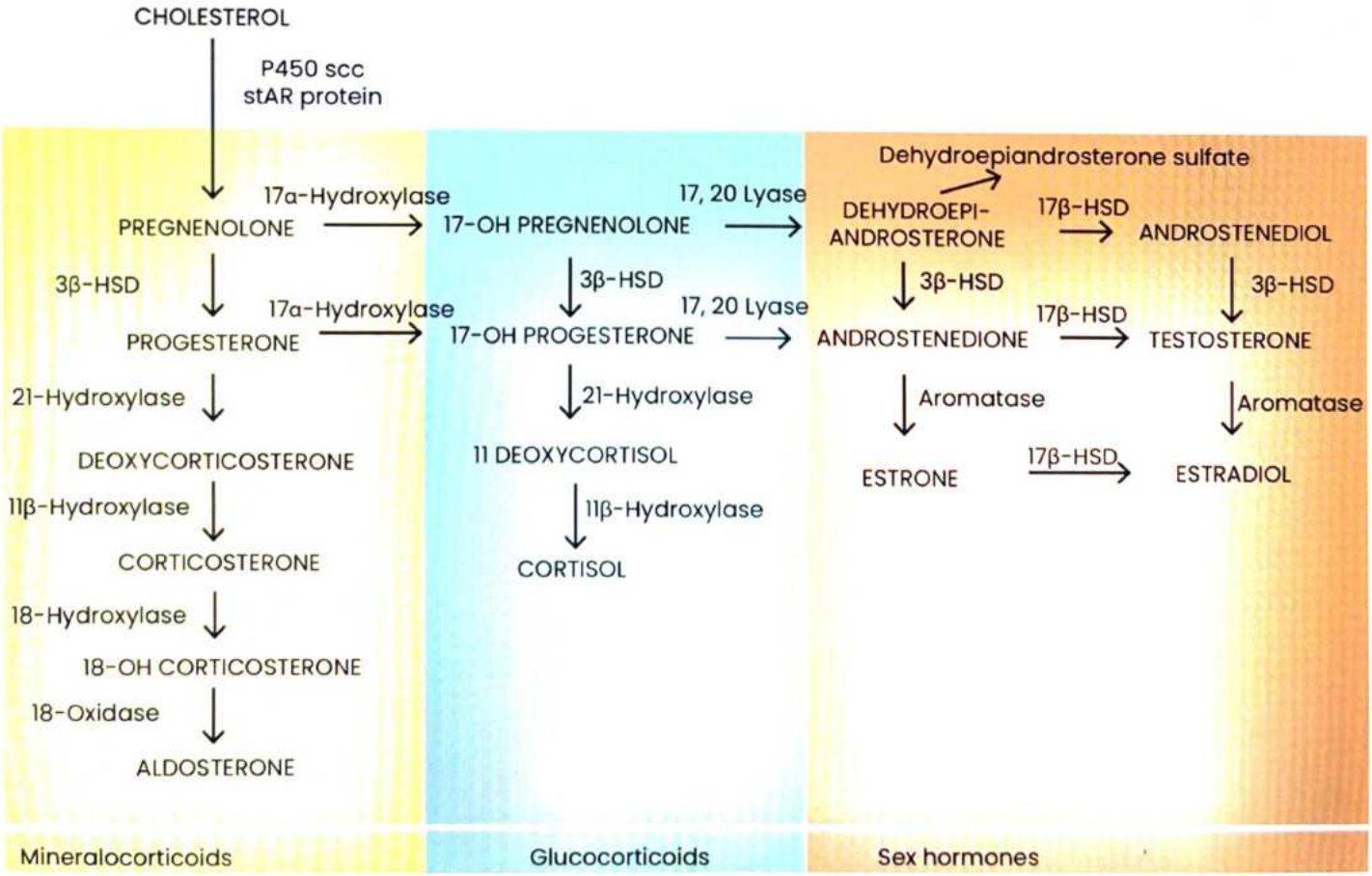
A. A I, B II, C III, D IV

B. A II, B I, C IV, D III

C. A III, B I, C II, D IV

D. A IV, B III, C I, D II

Flow chart 17.1



18 PUBERTAL CHANGES

PUBERTAL CHANGES

⏱ 0:00:14

- First event of puberty: Growth spurt

SPECIFIC EVENTS OF PUBERTY IN GIRLS

- Breast: Thelarche [T]
- Pubic axillary hair: Pubarche [P]
- Height: Linear growth spurt or peak growth velocity
- Periods: Menarche
- Time taken for the above specific events: 4.5 yrs

Important Information

- First event of puberty: growth spurt
- First specific event of puberty: thelarche

Normal Timing

⏱ 00:03:31

- Start of periods: 10-12 yrs
- If periods starts at 9-10 yrs: Early Periods

Precocious Puberty

⏱ 00:03:55

- If periods start at <8 yrs: Precocious Puberty
- MC cause of precocious puberty: Idiopathic
- Rx of precocious puberty: GnRH analogues

Delayed Puberty

⏱ 00:04:59

- No periods till 13 yrs of age
- Pubarche present, no periods till 15 yrs

TANNER STAGING

⏱ 00:06:27

[For breast & pubic hair development]

Stage I	• No growth, no mound, no development of breast
Stage II	• Significant mound of growth present
Stage III	• Much developed breast • Nipple is above the midplane of breast mound
STAGE IV	• Much more developed breast • Secondary mound present (nipple and areola)
Stage V	• Bigger breast [mature breast] • No secondary mound • Nipple is below the midplane

- Girls starts development of puberty: 10-12 yrs [10.5 yrs]
- Boys starts his puberty develop: 11.5 yrs

SPECIFIC EVENTS OF PUBERTY IN BOYS

⏱ 00:08:40

- Testicular size [T]
- Penile length [P]
- Pubic hair
- Growth spurt

- In girls, growth stops after menarche, boys have growth spurt after all events, hence have greater final height

INFLUENCES ON PUBERTY

- Influence on puberty: genetic, nutrition, environment, racial; determine time of onset, final height
- Onset of puberty: Obese girls (early) → Normal girls → Low weight → Anorexic Girls (last)
- (Obesity is related to increased ER production)
- After attaining 23.5% fat, girl period starts
- Estrogen mostly responsible for events of puberty in girls like breast development, uterine development, periods
- For Boys androgens mostly responsible for pubertal development

Previous Year's Questions

Q. Which of the following is not an estrogen dependent pubertal change in girls? (NEET 2020)

A. Hair growth
B. Vaginal cornification
C. Menstruation
D. Cervical mucous changes

19 INFERTILITY

INFERTILITY

00:00:45

- 15-20% couples are infertile
- Infertile: After 1 yr of Unprotected Intercourse (Primary/ Secondary)
  - Primary: never been pregnant
  - Secondary: previous child/ abortion
- Subfertility: conceives after trying for almost a year/ delayed fertility
- Chance of Conception with Unprotected Intercourse
  - 90% couple : Within 1 year
  - 80% couple : Within 1st 6 months
- 1 Act of intercourse at 14th day, chance of conception: 4-8%
- Chance of conception with multiple acts in one month: 25%
- Fecundability: probability of having a pregnancy in one cycle/ number of cycles taken to conceive
- Fecundity: ability to have a live birth

Causes

00:06:20

- % of distribution of cases responsible for infertility
  - Male →20-30%
  - Female →30-40%
  - Male + Female →10-40%
  - Unexplained →10-20%

Male Causes

- Oligospermia
- Azoospermia
- Psychiatric disorders: erectile dysfunction, premature ejaculation

Female Causes

- Anovulatory factors (MC)> Tubal factors

Important Information

- Most common and most treatable cause of infertility: anovulation

WHO CLASSIFICATION OF ANOVULATION

00:08:52

- **Type I:** Hypogonadotropic Hypogonadism: (10%)
  - Low LH, FSH
  - Central cause
  - Sheehan syndrome, Kallman's syndrome
- **Type II:** Normogonadotropic Hypogonadism (MC: 85%)
  - Most common
  - Normal LH, FSH (ratios may be abnormal)
  - PCOD
- **Type III:** Hypergondotropic Hypogonadism
  - High LH, FSH
  - Premature ovarian failure→low estrogen→no feedback to brain → High LH, FSH
- **Type IV:** Hyperprolactinemia)

HISTORY TAKING

Male specific history

00:11:42

- Age: after 40 years, more chances of sperm DNA fragmentation
- Act of intercourse: knowledge, couple counselling
- Infections: Epididymo-orchitis: mumps, TB, filariasis
- Previous Sx
  - Orchidopexy for undescended testes
  - Hernia Sx, Hydrocele Sx, injury
- Alcoholic: 180 ml/week is upper limit of alcohol
- Smoking effects: sperm production, quality, transport, fertilization

Female specific history

00:16:45

- Age
  - > 35 years: Declining ovarian reserve,
  - > 40 years: Very low chances of conception, 40% would abort
- Infections → Recurrent PID, Endometriosis, TB pelvis
- MTP/Abortions → endometritis and peri-ostial infections → blocked tubes
- Alcohol, smoking

INVESTIGATIONS

00:20:35

1. **Male**

- Semen Analysis
  - 1st investigation to be done
  - 2010 WHO Semen Analysis
    - → PH → >7.2 (prostatic sec: acidic, seminal ves: alk)
    - → Volume → > 1.5 ml
    - → Concentration → > 15 million/ml
    - → Count → > 39 million [36-42 million]
    - → Motility → > 40% [>32% must be actively motile]
    - → Morphology → > 4% should be Ⓝ [Kruger's strict criteria]
    - → Vitality → > 58% should be live
    - → Leucocyte Count → < 1 x 10^6/ml

Important Information

- **Single most important parameter: morphology**

Previous Year's Questions

Q. In a normal semen analysis, what is the percentage of morphologically normal sperms? (INICET 2021)

A. 10%
B. 14%
C. 40%
D. 4%

Previous Year's Questions

Q. Minimum sperm count for normal semen analysis according to WHO? (FMGE 2019)

A. 2 million/ mL
B. 5 million/ mL
C. 15 million/ mL
D. 20 million/ mL

2. **Female** 00:30:20

- Examination
- TVS
- Ovulation tests
  - Basal body temperature [>0.5° F]: progesterone is thermogenic
  - Sr. Progesterone: > 3ng/ml on day 21
  - LH: > 15 IU
  - Serial USG - Follicular Monitoring, day 9 onwards: MC method used
  - Direct evidence: laparoscopy: yellow puncta on ovary
  - Cervical mucous studies: LOSS of spinnbarkeit and ferning due to progesterone
  - Premenstrual Endometrial biopsy (day 20-26)
    - → Secretory changes
    - → Endometrial changes should correspond to day of biopsy
    - → When the difference b/w observed & expected changes is > 2 days, it implies Luteal Phase Defects, which is an important cause of infertility.
  - Mittleshmerz: Mid-cycle pain: not very reliable

- Hysterosalpingography 00:35:33
  - Radio-opaque dye pushed into uterus with Leech canula → fluoroscopy
  - Tells about uterine cavity
  - Tells about tubal patency
  - Does not tell about outer adhesions/ endometriosis

Previous Year's Questions

Q. A 35 year old woman presented with infertility. h/o previous PID. USG and hormonal profile is normal. Next best investigation? (FMGE 2019)

A. Repeat USG
B. Hysterosalpingography
C. Endometrial biopsy
D. Urine c/s

- Sonosalpingography
  - Fluid pushed into cavity seen on USG

- Laparohysteroscopy 00:38:29
  - Better investigation to know anatomy, adhesions, endometriosis
  - Put dye through cervix: can see dye coming out of tube
  - Same sitting: do a hysteroscopy
  - HSG showing blocked tubes: do a laparoscopy to confirm

TREATMENT

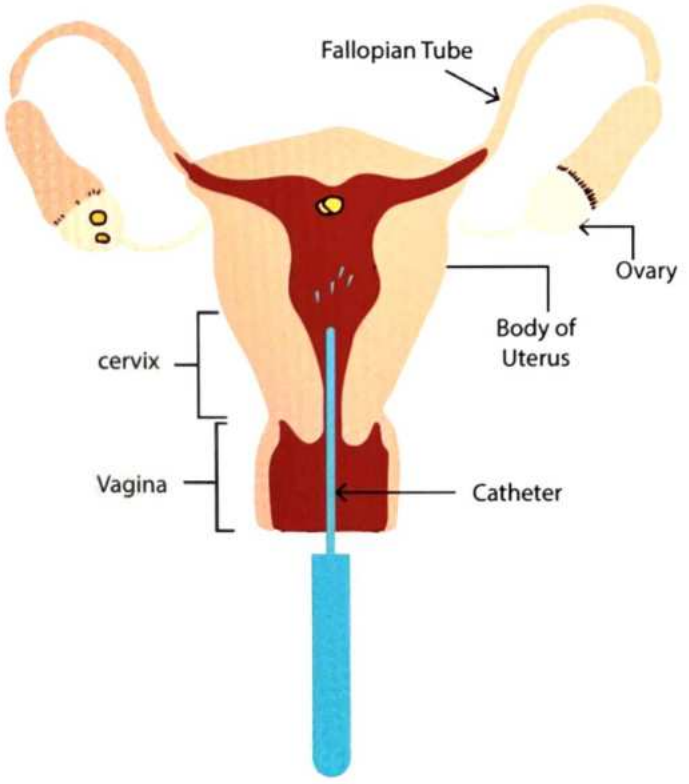
00:40:10

1. **Ovulation Induction**

- Indicated for anovulation
- Also for timed coitus in ovulating women
- Inhibition of negative feedback on hypothalamus to make Gn
- In PCOS → high estrogen from multiple small follicles → Inhibits hypothalamus
- Clomiphene citrate
  - Blocks hypothalamic estrogen receptor→increase FSH
  - 50-250 mg/day from day 2-6 + follicle monitoring
  - 80% women will ovulate, 40% will conceive
- Letrozole
  - Aromatase inhibitor → inhibits peripheral conversion of androgens to estrogens → less estrogen → increase FSH
  - 2-5-5 mg/day
  - Day 2-6
  - Drug of choice for ovulation induction
- Inj FSH
- Inj HMG (human menopausal gonadotropin: LH + FSH)

2. Intra Uterine Insemination

⏱ 00:47:28

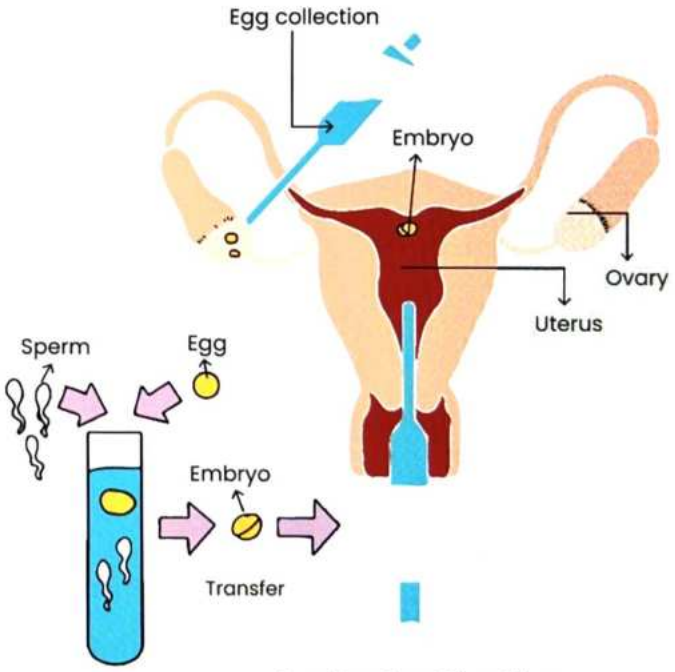


- Indication
  - Cervical factor: stenosis, anti-sperm antibodies
  - Endometriosis
  - Low sperm counts: 5-10 million
- Procedure
  - Prepare egg
  - Put washed sperms (NOT SEMEN) in uterine cavity
  - Success 20-25%

3. In Vitro Fertilization

⏱ 00:50:10

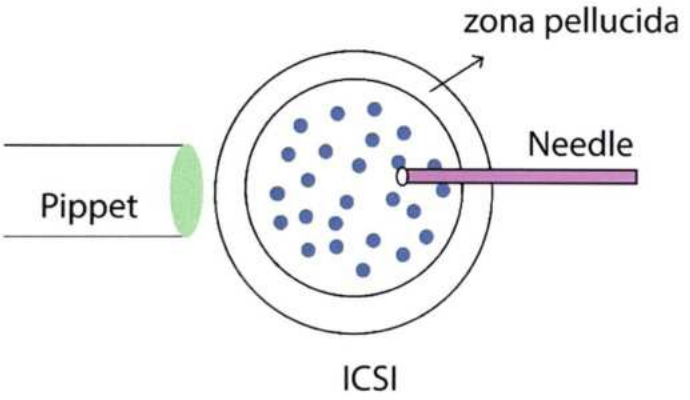
- High dose ovulation induction → superovulation → 6-15 eggs
- Retrieve oocytes by transvaginal aspiration
- Fertilize in test tubes
- 2 or 3 Day 3 (8 cell) embryos are transferred or 1 or 2 Day 5 (Blastocysts) embryos are transferred: better implantation rates
- Indications
  - All indications of IUI +
  - Tubal blockage
- Sperms required: at least 3-5 million
- Success rate: 45%



Invitro Fertilization

- In normal intercourse
  - most sperms die due to vaginal acidity
  - much lesser reach progressively up till oocyte
  - 1/5th of semen will reach the site of fertilization
  - 1 lakh sperms collide with ovum & release Acrosin (like hyaluronidase)
  - Acrosin softens the Zona Pellucida→Acrosome Reaction

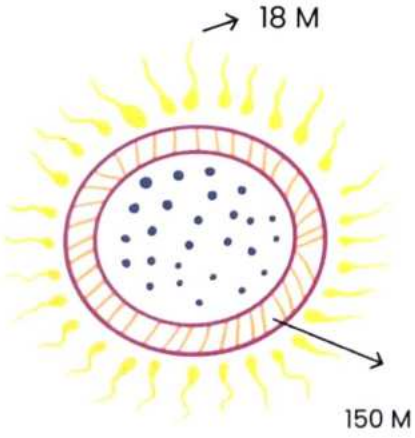
- One sperm enters and fertilization occurs
- Followed by Cortical Reaction, which hardness zona again→ prevents Polyspermy
- Capacitation: loss of cholesterol/ Ca influx/ tyrosine phosphorylation: becomes capable to fertilize: occurs in Cervical Mucous/ Proximal Fallopian Tube (better answer Proximal Fallopian Tube)



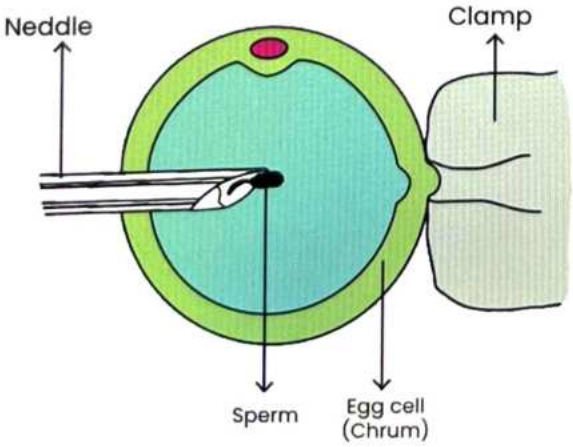
ICSI

4. **Intra Cytoplasmic Sperm Injection** 01:05:00

- Indicated for very low sperm count< 1 million



Intra Cytoplasmic Sperm Injection (ICSI)



AZOOSPERMIA 01:07:45

- Brain → FSH → testes → spermatogenesis + androgens
- Androgens → negative feedback → regulates FSH
- Central cause (pretesticular): hypothalamic/ kallmans
  - Low FSH, LH
- Testicular cause: mumps orchitis etc
  - No androgen production from testes
  - High FSH, LH
- Post testicular (Obstructive) azoospermia: vas obstruction
  - Normal LH, FSH, Androgens
  - Normal FSH & azoospermia→obstructive azoospermia

Previous Year's Questions

Q. 25 year old married man came to infertility clinic, having azoospermia. Normal sized testis. FSH and testosterone levels also normal. What is the probable cause? (FMGE 2020)

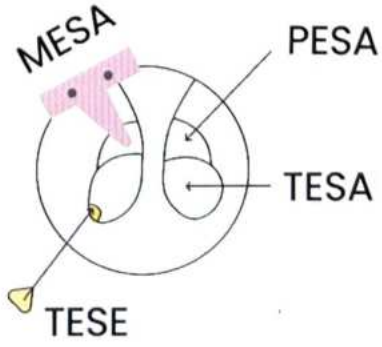
A. Obstructed vas
B. Kallman syndrome
C. Kleinefelter syndrome
D. Noonans syndrome

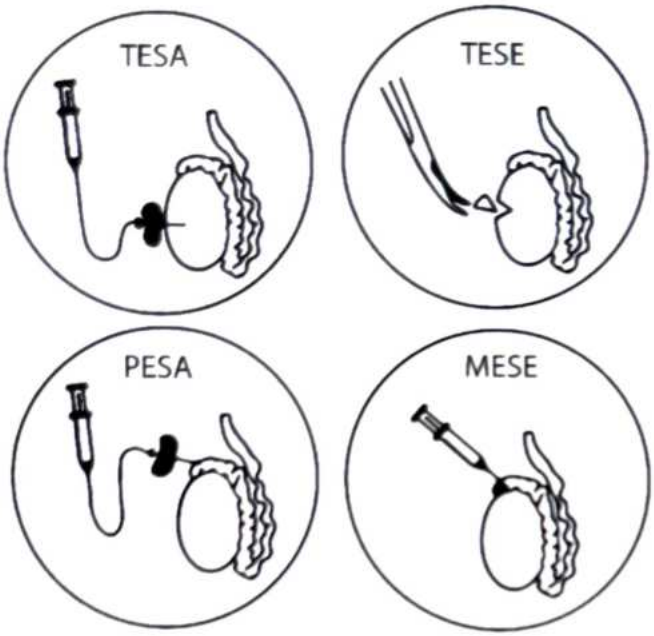
SPERM EXTRACTION TECHNIQUE 01:12:00

- For obstructive azoospermia
  - PESA [percutaneous epididymal sperm aspiration]
  - TESA [Testicular sperm aspiration]
  - MESA [Micro surgical epididymal sperm aspiration]
  - TESE [Testicular sper...on]

Important Information

- Single best technique for sperm extraction: MESA

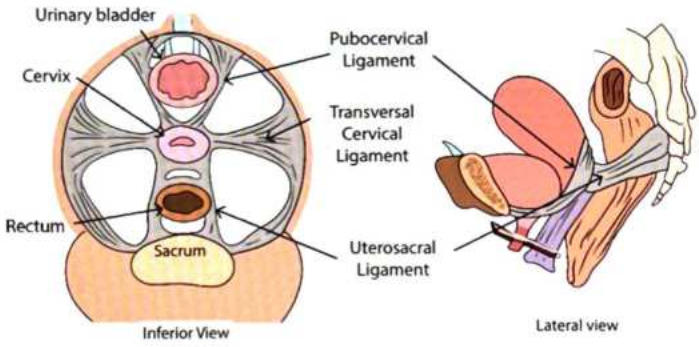



TESA
TESE
PESA
MESE

20 GENITAL PROLAPSE

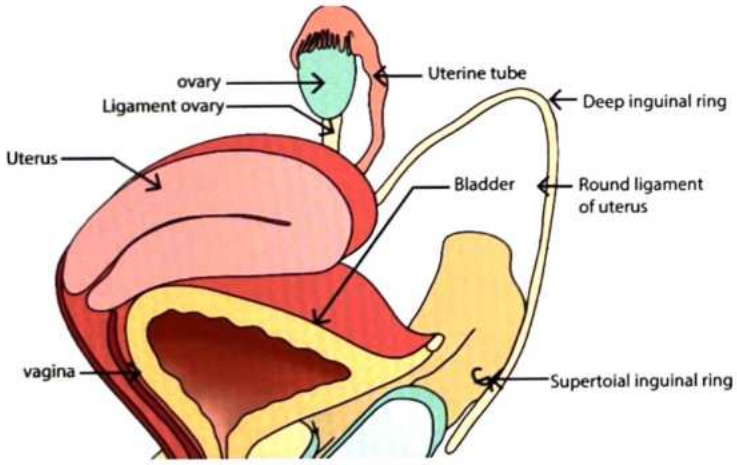
SUPPORTS OF UTERUS

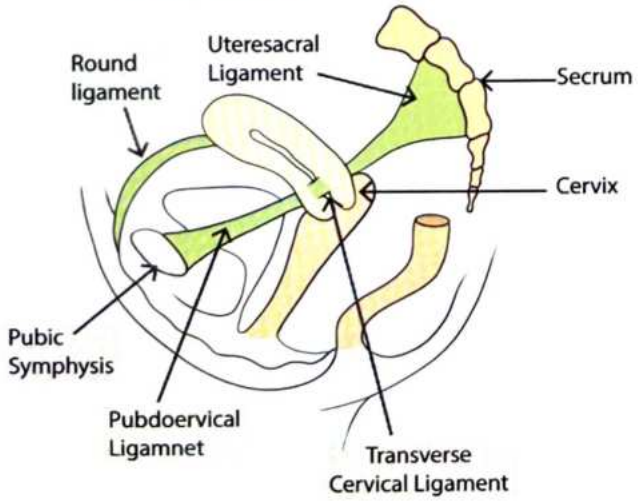
00:00:28



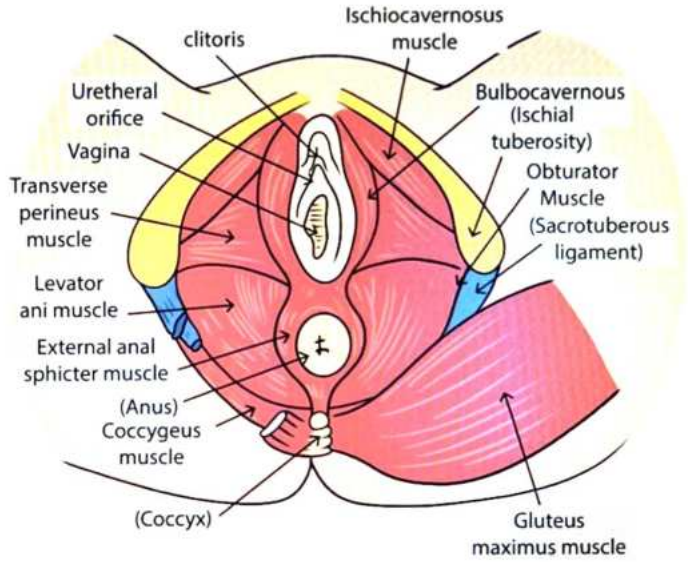
1. Ligament Support

- Round ligament: maintains anteversion
- Pubocervical ligament
- Transverse cervical ligament: Best ligamentous support
- Uterosacral ligaments





2. Muscular Support



- Best support: Muscular (Levator ani)
- Levator ani is composed of
  - Pubococcygeous
  - Puborectalis
  - Ilio-coccygeous

CAUSES OF PROLAPSE

00:04:30

- Abnormal conduct of labour → most important cause
  - Early bearing down
  - Prolonged 2nd stage
  - Faulty instructions
  - Early resumption of work
  - Multiparity
- Connective tissue disorder
- Spina bifida
- ↑ Abdominal pressure
  - Ascites
  - Chronic cough
  - Abdominal mass

Early Bearing Down [Against the partly dilated (3cm or 5cm) cervix]

- Leads to cervical stretching /e longation & cervical descent: stretching of ligamentous support
- In parous prolapse, usually cervical elongation is present

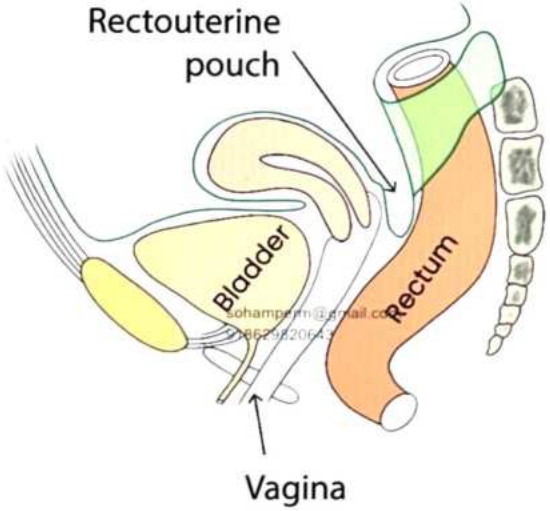
Prolonged 2ND Stage of Labour

- In primi: ≈ 1 hr ; upper limit is 2hr
- In multi: ≈ $^1/_2$ hr ; upper limit is 1hr
- Ischemic damage of nerves (supplying levator ani) causing Neuronal injury
  - single most important injury predisposing to prolapse

Faulty Instrumentation

> **Important Information**
>
> - Good instrumentation prevents prolapse
> - Faulty instrumentation causes prolapse

Early resumption of work: < 6wks of purperium



Previous Year's Questions

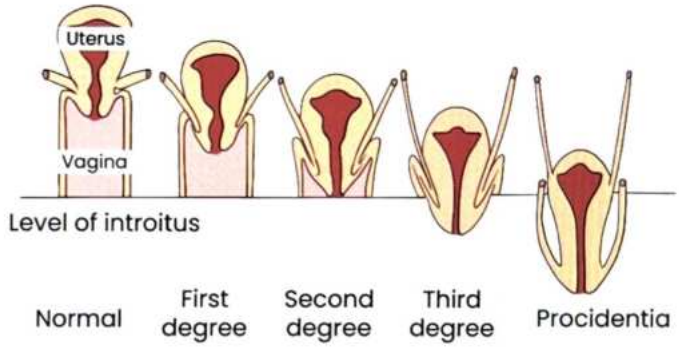
Q. What is the condition this P4L3A1 woman likely suffering from (INI CET 2021)

A. Uterine inversion
B. Uterocervical prolapse
C. Cervical polyp
D. Vaginal cyst

SHAW'S CLASSIFICATION

00:19:46

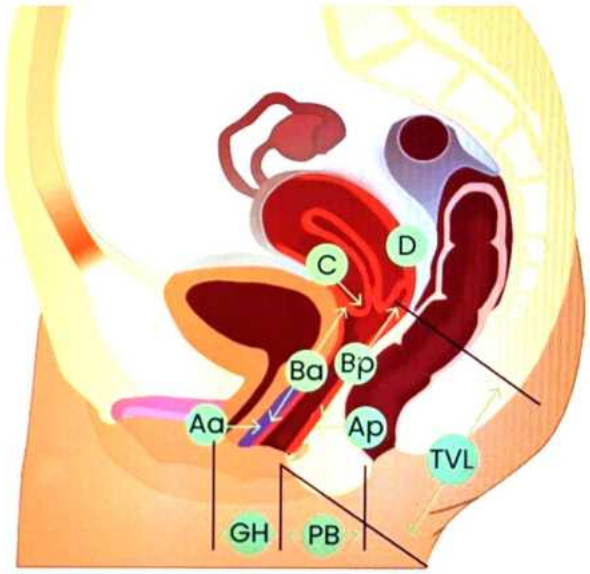
- **Stage I:** Cervix is just below the normal level
- **Stage II:** Cervix is at introitus
- **Stage III:** Cervix is outside
- **Stage IV:** Procidentia [full uterus has prolapsed]



POP Q SYSTEM

00:21:02

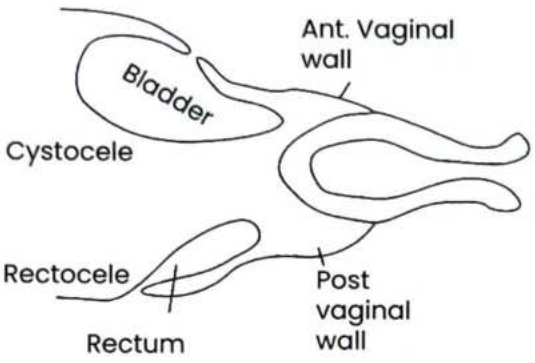
POP Q SYSTEM



- Pelvic organ prolapse Quantification system
- Reproducibility is good & good for comparision

Parts of prolapse when you go from anterior to posterior

- Anterior vaginal wall 00:24:47
  - Urethrocele
  - Cystocele
  - Uterus
  - Rectocele
  - Posterior vaginal wall

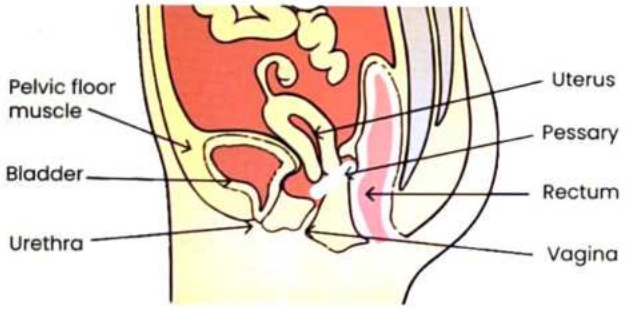


Cystocele - Complications 00:26:16

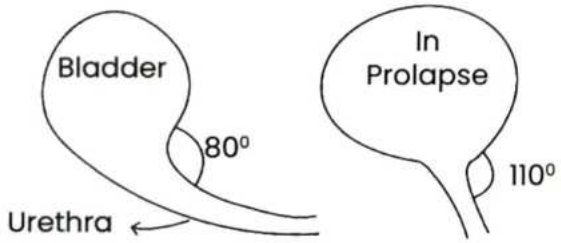
- Difficult in initiation of micturition : needs to reposit first
- Retention of urine
- Infection
- Stone formation

Rectocele – Complications 00:26:48

- Difficult initiation
- Fecolith formation



Other Complications 00:28:47



- Venous congestion due to vaginal band-Deoxygenated Uterus
- Decubitous / Dependent Ulcer [due to venous congestion]
- Repositioning with pessary : appropriate size is checked when pessary does not come out with Valsalva
- Stress Urinary Incontinence : pubococcygeus constricts urethra during coughing/ sneezing at UV angle. Straightening of this UV angle (becomes >110 degree, normal 80 degree) causes SUI

- Dragging sensation
- Something coming out of vagina
- Sense of insecurity in the vagina / perineum

} MC Presentation

PREVENTION OF PROLAPSE 00:35:11

- Physiotherapy
  - Antenatal
  - Post natal: kiegel's exercises
- Prevent other causes

TREATMENT 00:37:22

1. Vaginal Hysterectomy with Pelvic Floor Repair

- Treatment of choice for elderly women (MC age group)
- Aka Ward & Mayo's Operation
- Hysterectomy done
- Repositioned bladder & rectum
- Vault closure done
- Anterior colporrhaphy done with Posterior colpo perineorrhaphy (repair of perineal body) done. Both these together are called Pelvic Floor Repair (repair of levator ani)
- Vault Prolapse
  - Present in 3-4 months of surgery of WARD & MAYO'S OPERATION
  - Due to pressure by enterocele through peritoneal defects
  - MC cause: Neglected enterocele
  - Prevented by High ligation or closure of peritoneal defect
  - Rx by Sacrospinopexy / Sacropexy
    - → Reposition the vault physically
    - → Tie the vault to ischial spines or uterosacral ligament
- Stress Urinary Incontinence
  - Present by 2-3 weeks of Sx [hysterectomy]

Important Information

- **Stress incontinence may occur after hysterectomy due to improper anterior wall repair causing urethral prolapse leading to straightening of UV angle**

Previous Year's Questions

Q. 55 year old ultigravida with h/o frequently micturating during coughing, laughing, sneezing. Diagnosis? (NEET 2021)

A. Urge incontinence
B. Stress incontinence
C. Neurogenic bladder
D. Urinary tract infection

Previous Year's Questions

Q. A 60 year old woman comes with 3rd degree uterine prolapse. What will be the management?
(NEET 2019)

A. Vaginal hysterectomy with pelvic floor repair
B. Pelvic floor repair
C. Sacrospinous fixation
D. Pessary

2. Fothergil Repair/ Manchester Repair 00:55:55

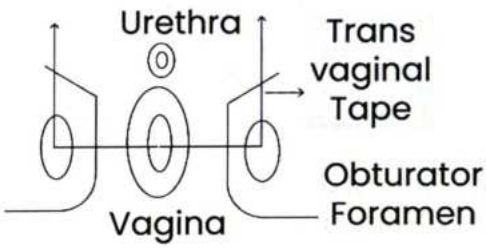
- Treatment for younger women
- Reposit the uterus
- DNC [Dilatation & currettage] to be done
- Do cervical amputation for the lax/ elongated cervix
- Fothergill stitch : B/L mackenrodt' ligaments ligated to uterus anteriorly
- Reposit the bladder & rectum
- Anterior colporrhaphy + post colpoperineorrhaphy (pelvic floor repair)
- Pioneered by DONALD in Manchester city hospital

3. Sling Surgeries

- Rx for nulliparous prolapse of very young women
- Tie a sling to the posterior part of cervix & pull in & tie inside
- Shirodkar Sling
  - Tie to anterior longitudinal ligament
  - Tie to anterior superior iliac spine
- Khanna's Sling
  - Rectus shealth
- Purandare's Sling

STRESS URINARY INCONTINENCE 01:04:04

- Due to improper anterior colporrhaphy
- Can be a complication in 2-3 weeks after hysterectomy
- **Surgical management** 01:08:19
  - Peyrera's- } Needle suspension procedure
  - Stamey's- } Uplifting of urethra
  - MMK's Colposuspension } Uplifting of ant. vaginal wall
  - Burch Colposuspension
  - Trans Vaginal Tape



  - Kelly's Stitch
- Plicate the paravesicle tissues under the bladder neck

Important Information

- Earlier: Best long lasting results given by colposuspension [upto 95%]. but now it is said that best results are given by TVT

21 URINARY FISTULA IN OBSTETRICS

OBSTRUCTED LABOR

00:01:00

- **Definition:** No progress of labor inspite of good Uterine contractions (i.e. there is no descent of the Presenting Part)

> **Important Information**
> - In case of ischemic injury to Vagina & Bladder in obstructed labour
> - Vesico Vaginal Fistula presents 5-7 days later
> - VVF can prevented by Urinary catheterization for 14-21 days

Management

- Mx of Obstructed labor: C-section
- Obstructed labor with dead baby: C-section
- No role of destructive operation

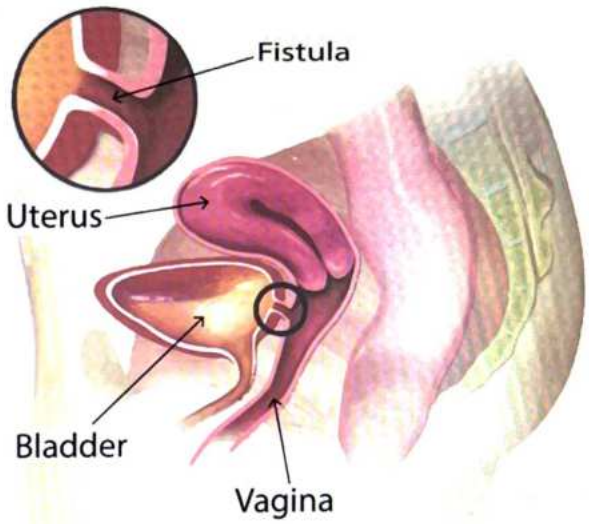
URINARY FISTULAS IN OBSTETRICS

Cause of Vesico Vaginal Fistula 00:06:04

1. Obstetric Causes
   - Obstructed labour
   - Faulty instrumentation
   - Destructive operations
2. Gyneocological Causes
   - Hysterectomy
   - Wertheim: Ureteric dissection
3. Radiation Injuries
   - Painful fistula

Presentation 00:08:06

- Constant dribling of urine
- vulva & thighs are excoriated
- Splash dysuria: burning over excoriations
- UTI



Vesicovaginal Fistula

Treatment 00:10:34

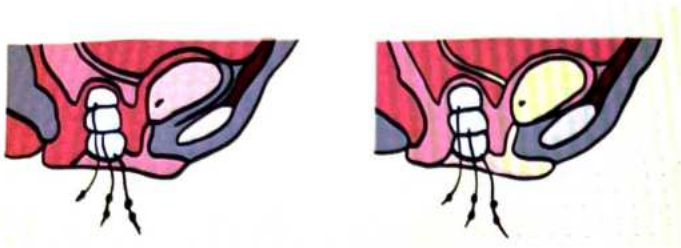
- Immediate
  - Divert the stream→with catheter, may heal smaller fistulas
  - Zinc cream on thigh → works as emollient
  - Antibiotics
- Repair
  - Do not repair immediately
  - Wait for scarring to happen
  - Wait for 2 1/2 - 3 months

> **Important Information**
> - If patient presents 5-7 days after injury, an immediate repair should not be done as ischemic area cannot hold sutures.
> - Repair after 3 months

Diagnosis 00:15:00

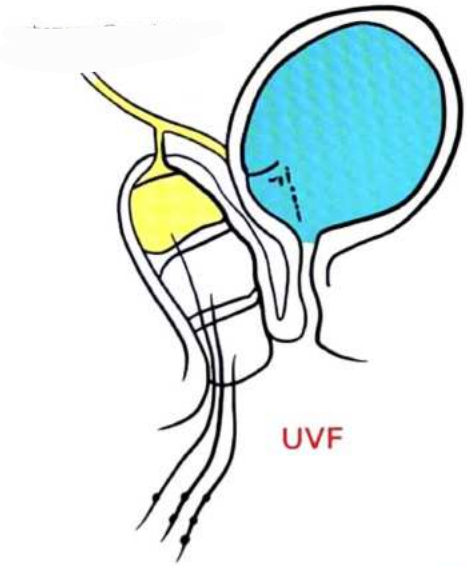
1. 3 Swab Test

- Methylene blue is injected into the bladder
  - Mid Vaginal Fistula
    → MC in our country
    → Due to obstructed labour



3 Swab Test

- High Vaginal Fistula
  - → d/t Forceps
  - → Vaginal hysterectomy
- Low Vaginal Fistula
  - → d/t Urethro vaginal Fistula or
  - → Low vaginal Fistula d/t radiation injury
- Destructive operations can cause any type of fistula



Important Information

Case: Top most cotton ball is not blue in color but it is colourless but Wet

- Urinary source is not bladder
- Source is Ureter → Uretero Vaginal Fistula
  - Leaking + continence +nt (Other ureter is draining normally)

2. Double Dye Test

- Colon balls in vagina
- Methylene blue in the bladder
- Pyridium rablets given Orally→Impact RED colour to urine
- Helps to Dx Ureterovaginal Fistula: top swab is orange red, none is blue

3. Best diagnostic test for vesico vaginal Fistula: Cystoscopy

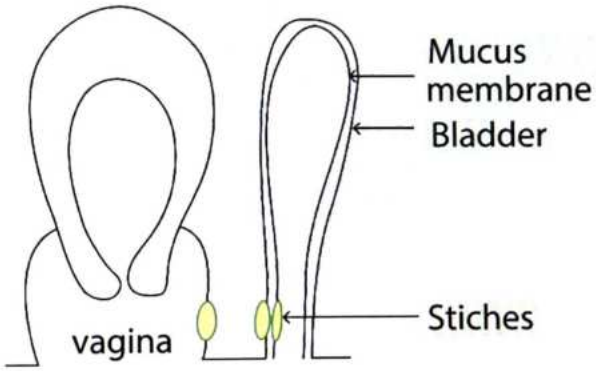
- Best diagnostic test for uretero Vaginal Fistula: Intravenous Urography

Yussuf's Syndrome 00:21:29

- Vesico Uterine Fistula
- Presents with menouria : hematuria during periods

Repair 00:23:10

1. Sims Saucerization for VVF



Sims Saucerization

- done under General anesthesia
- 3 Circular stiches on
  - Mucus membrane of bladder
  - Bladder serosa
  - Vagina
- Done in Knee Chest Position

2. Low Recto Vaginal Fistula Repair

- Make it a complete Perineal Tear & repair
- Wait for 3 months

3. High Recto Vaginal Fistula Repair

- Divert the bowel: Colostomy
- Repair in layers

PERINEAL TEARS 00:28:20

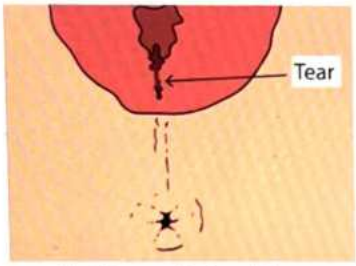
- Mucosal layer tear of vagina - Type I
- Mucosa + muscle tear - Type II
- Mucosa + muscle + Anal tear - Type III
  - < 50% External anal Sphincter tear - III a
  - > 50 % External anal sphincter tear - III b
  - Internal anal Sphincter tear - III c
- Mucosa + muscle + Anus + Rectal tear - Type IV

Previous Year's Questions

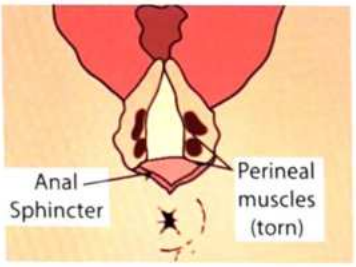
Q. During instrumental vaginal delivery, there was extension of episiotomy downwards to involve the anal sphincter, but ana mucosa was intact. Which grade of perineal tear does this belong to?

(JIPMER 2019)

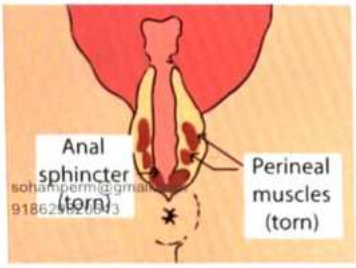
A. 1st degree
B. 2nd degree
C. 3rd degree
D. 4th degree



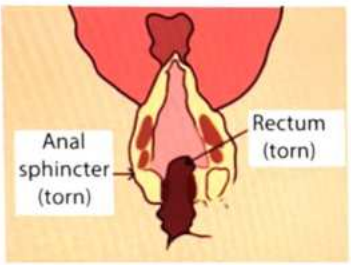
First Degree Perineal Tear



Second Degree Perineal Tear



Third Degree Perineal Tear



Fourth Degree Perineal Tear

Complete Perineal Tear

- Type III, Type IV } Complete Perineal Tear (if diagnosed at time of delivery) → Repair immediately
- After 24 hrs in a complete tear, there is colonization of cut ends
- Will breakdown if repaired
- Wait For $2^{1}/_{2}$ - 3 months [at least 6 wks]

Previous Year's Questions

Q. 24 year old woman who had home delivery 2 weeks back, now presents with complete perineal tear. What is the next line of m/m?

(NEET 2020)

A. Repair immediately
B. Repair after 3 weeks
C. Repair after 6 months
D. Repair after 3 months

22 EMERGENCY CONTRACEPTIVES

INTERCEPTION / EMERGENCY CONTRACEPTION / POST COITAL CONTRACEPTION

00:00:20

- Contraception within 72 hrs of unprotected intercourse
- Implantation of embryo takes place during 6th day after intercourse. So, abortion cannot be done for these cases. Emergency contraceptives are preferred
- Abortion is not a method of emergency contraception

DRUGS USED IN EMERGENCY CONTRACEPTION

00:03:03

1. LEVONORGESTREL

- Contains: Progesterone
- dosage
  - 0.75 mg x 2 tablets
  - 1.5 mg of 1 tablet available now

Mechanism of action

I. ↓ LH → ↓ Ovulation → No pregnancy

Understand with an example

- Intercourse on day 11, sperm can live up to day 14 (3 days life span), you give progesterone. ↓ LH → ↓ Ovulation → No pregnancy

II. Progesterone → ↑ ↑ Endometrial secretion → Out of phase Endometrium → Difficult for embryo implantation

Understand with an example

- Intercourse on day 14, embryo is formed, now give progesterone → ↑ ↑ Endometrial secretion → Too Fluffy/ out of phase Endometrium → Difficult for embryo implantation

III. Progesterone → ↓ tubal motility → Late arrival of embryo into Uterus → No Implantation

Important Information

- Thickening of cervical mucus : This mechanism cannot be used for emergency contraception as the sperms have already crossed the cervix after intercourse

2. YUZPEE REGIME [COCP]

- 2 pills given at morning, another 2 pills are given after 12 hours
- MOA
  - COCP reduces ovulation
  - COCP reduces chances of implantation by altering endometrium
- S/E
  - ↑ Vomiting

3. MIFEPRISTONE / RU 486 / ANTI PROGESTIN

- MOA: Reduces implantation
- Dosage: 10-50 mg for emergency contraception

Important Information

- Dose of mifepristone for abortion is 100-600 mg, dose for emergency contraception is 10-50 mg

4. ULIPRISTAL ACETATE

- Selective progesterone receptor modulator [SPRM]
- Dosage: 30 mg, 1 tablet
- ELLA: Brand name
- Better than Levonorgestrel [as it is effective upto 5 days]
- Not the DOC of emergency contraception dlt non regular availability in India

Previous Year's Questions

Q. A woman with h/o unprotected intercourse 2 days ago desires protection from pregnancy. What is the dose of ulipristal acetate, when used for this purpose? (NEET 2019)

A. 300 mg
B. 30 mg
C. 300 mcg
D. 30 mcg

5. **INTRAUTERINE CONTRACEPTIVE DEVICE [IUCD]**

- IUCD reduces implantation
- Useful Upto 5 Days [uniformly effective throughout 5 days]

Important Information

- IUCD is most effective method among emergency contraceptives. but not the best method as it requires insertion of device [not a comfortable procedure]. Best is LNG

Previous Year's Questions

Q. A woman comes 96 hours post coitus. Best emergency contraceptive is? (FMGE 2019)

A. OCP
B. IUCD
C. Mifepristone
D. Progesterone only pills

CRITERIA FOR DRUG OF CHOICE FOR EMERGENCY CONTRACEPTIVES

- Over the counter available drug
- no prescription required
- Easy to use

Important Information

- Best method of emergency contraception: Levonorgestrel
- DOC of emergency contraception: Levonorgestrel
- Brand name of Levonorgestrel: i-PILL

Previous Year's Questions

Q. Which of the following s not used as an emergency of contraception? (NEET 2020)

A. Danozol
B. Copper T
C. RU 486
D. High dose estrogen

Previous Year's Questions

Q. Recommended emergency contraceptive in India? (INICET 2021)

A. Levonorgestrel 1.5mg
B. Estrogen 30 microgram
C. Ullipristal 30 mg
D. Misoprost 200 microgram

Previous Year's Questions

Q. Q. A 22 year female presents 8 hours after sexual assault. It is the 13th day of her menstrual cycle. Which emergency contraceptive should be prescribed to her? (FMGE 2020)

A. Levonorgestrel 1.5 mg single tablet
B. Inj DMPA
C. OCP from day 1 of next cycle
D. Misoprostol

23 CONTRACEPTION

- FSH → Ovary → Estrogen → Endometrial Proliferation
- LH → Follicle → Progesterone → Endometrium Secretory (Corpus Leuteum)

HORMONAL CONTRACEPTION

00:01:00

Combined Oral Contraceptive Pills (C-OCP)

- **Mechanism Of Action**

Estrogen tablet / Progesterone tablet $\xrightarrow[\text{feedback}]{\text{negative}} \ominus$ {FSH Release, LH Release}

No follicle development & rupture → Anovulatory cycle

- **Patient on C.OCP have**
  - Anovulatory cycle
  - Less Dysmenorrhea
  - Pill period / Artificial period
    - → Have menstruation d/t e/p pill (not d/t natural E/P)
    - → Have monthly periods d/t exogenous estrogen & progesterone which causes endometrial proliferation & secretion respectively.
  - Regular periods : C.OCPs are given for 21 days and patient will have period by 28th day
  - Less bleeding & less anemia
    - → d/t low dose estrogen (Ethinylestradiol 0.03 mg or 30 µg), causes minimal endometrial proliferation
    - → low dose pills → 10 µg, 20 µg

Previous Year's Questions

Q. Which of the following is not a mechanism of action of OCPills? (AIIMS 2020)
A. prevents ovulation
B. Prevents Implantation
C. Thickens cervical mucous
D. Increase Gn sectetion

- **Benefits of low dose er pills**
  - ↓ Endometrial cancer
  - ↓ Ovarian cancer
  - ↓ colon cancer
  - ↓ Benign Breast Disease
  - ↓ Fibroid
  - ↓ ovarian cyst
  - ↓ PID

- **Adverse Effects**
  - ↑ Adeno Carcinoma Cervix [not squamous cell cancer (mc type of cervical cancer)]
  - ↑ Smooth Type Gallstones, not a/w GB cancer [mixed, pigment stones a/w GB cancer]
  - ↑ Hepatic Adenoma [not HCC]
  - ↑ Chlamydial PID [Indolent]

Important Information

- COC pills have no effect on breast cancer incidence

- **Usage**
  - Started on day 1-5 of menstrual cycle
  - Quick start protocol
    - → Start anytime of menstrual cycle
    - → Mainly for low socioeconomic & teenage patient
  - Missed Pill
    - → Missed 1: take 2 on next day
    - → Missed 2: take pill on the day + next 7 days use another method along with usual pack

Previous Year's Questions

Q. Patient on OCP missed 4 pills. What is the best advice to her? (NEET 2021)
A. Take the next pill as soon as possible and consider alternate contraception (condom)/ emergency contraception if had intercourse within 72 hours
B. Take 4 pills as soon as possible and consider alternate contraception (condom)/ emergency contraception if had intercourse within 72 hours
C. Stop regime and adopt another method of contraception
D. Discard pack and start new pack of pills

- **Contraindications**

00:20:05

- Pregnancy
- Breast feeding
- Deep venous thrombosis/ pulmonary embolism
- Liver Disease : Cirrhosis, hepatitis, cancer
- HTN > 160/100 mm Hg
- Age 35 years + smoker
- Active breast cancer
- Diabetics with neuropathy or nephropathy
- Ischemic heart disease / stroke
- Migraine with aura

Important Information

- Not a Contraindication for use of COC pills: STD/PID/HIV

Previous Year's Questions

Q. Which of the following is an absolute contraindication to OCP use? (NEET 2019)
A. Chronic renal disease
B. DVT
C. Diabetes mellitus
D. History of amenorrhea

- **Types of OCPs** 00:24:00
  - Type I - High Dose
  - Type II - Low Dose
  - Type III - Newer Progestins [↓↓ androgenic action]
    - → Desogestrel
    - → Norgestinate
    - → Gestodene
  - Type IV: Drospirenone
    - → Actions of Drospirenone
      - Progestational action
      - Anti – androgenic
      - Anti mineralocorticoid
    - → Good for those with pre menstrual dysphoria & acne
    - → Combination
      - 3 mg drosperenone & 20 mg Ethenylestradiol
      - This combination will give regular cycle & good antiandrogenic action
      - Use in PCOD patients with acne
      - Given via 24/4 protocol, 24 days of pill and 4 days gap

Previous Year's Questions

Q. The oral contraceptive pill 'Mala N' contains which of the following type of progesterone component? (JIPMER 2019)
A. Levonorgestrol
B. Etonorgestrel
C. Desogestrel
D. Drosperinone

MINIPILL / PROGESTERONE ONLY PILL (POP)

- Should maintain same time consumption / within 3 hours the next day

- **DESOGESTREL**
  - Newer Minipill
  - Can miss up to 10-12 hours
  - S/E: Irregular spotting
  - Excellent for lactating women

Saheli (Centchroman)

- Developed by CDRI (Lucknow)
  - Ormiloxifene → Makes endometrium out of phase & implantation is ↓ed
- Usage: Twice/ week for 3 months, then once / week till the contraception is desired.
- S/E: Delayed cycles

Ways to give OCP'S

- Monophasic
  - Estrogen – up to 50µg/day
  - Progesterone – up to 1 mg/day
- Biphasic
  - Estrogen: constant
  - Progesterone: eg 11 days @ 50, 10 @ 125 µg
- Triphasic
  - Estrogen 30/40/30
  - Progesterone 50/75/125

PERMANENT METHODS 00:35:06

Important Information

Q. When to do: Sound advice (not a guide line)
Ans. For those with 2 children at least & last child preferably > 3 years

Female Sterilization

Important Information

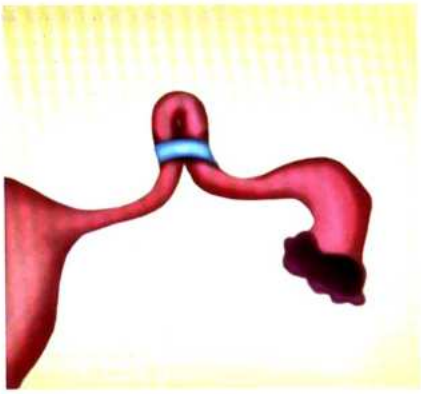
Site of ligation on Fallopian Tube: Isthemic Sterilization

- Isthmus has uniform diameter
- Isthemo isthemic reanastamosis has up to 80% success: thus prefer to ligate at isthemic area

TUBECTOMY

00:39:55

- MC time in India → Post partum (puerperal)
  - Immediately after delivery, uterus is at the level of umbilicus, as uterus is an abdominal organ, it is easy surgery.



Tubal Ligation

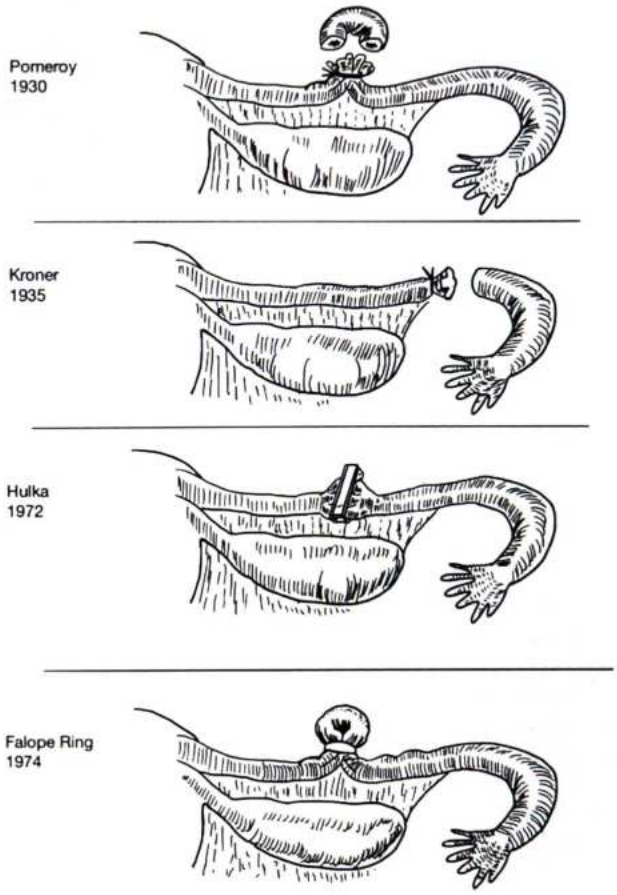
Tubal Ligation Resection

- Puerperal Sterilization
  - Best done within 2-3 days after delivery
  - Upper limit is 7-10 days (not 6 weeks)
  - Uterus becomes pelvic organ in: 10-14 days
  - Becomes normal organ in: 4-6 weeks
- Interval Sterilization
  - Done after 6 weeks of delivery
  - Done by Laparoscopic methods
- Concurrent Sterilization
  - Done along with MTPs or cesarean section

Entry into abdomen is by

00:45:20

- Laparotomy [Minilap (1.5 to 2 inch incision, MC)]
- Laparoscopy
  - Mostly for interval sterilization
  - Never do in puerperium
  - Can cause injury
  - Failure chances are more
    (As the tube is edematous & the ring may slip from the tube)

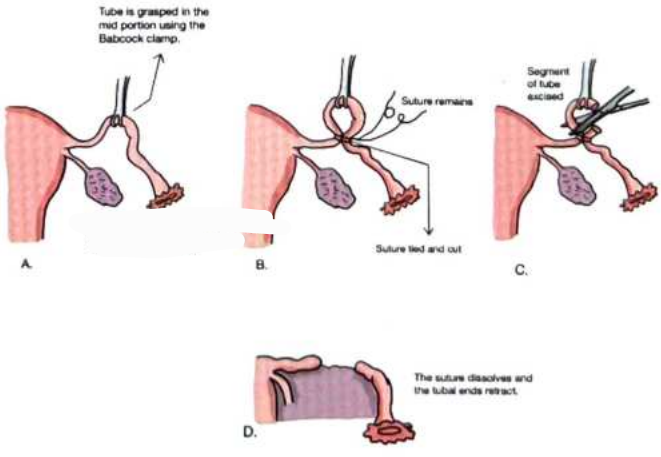


Techniques

Techniques of Tubectomy

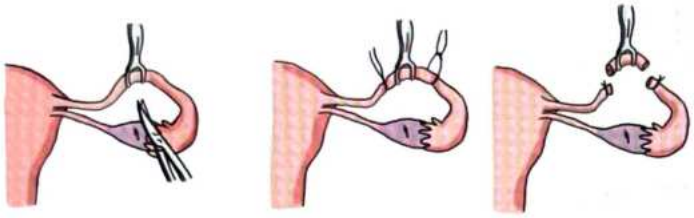
00:48:30

- Pomeroy Techniques
  - Most commonly done
  - Single ligature is used
  - Tube cut end are together → Can lead to fistula formation failure



Pomeroy Procedure

- Parkland Technique
  - Double ligature is used
  - Tubes are ligated separately

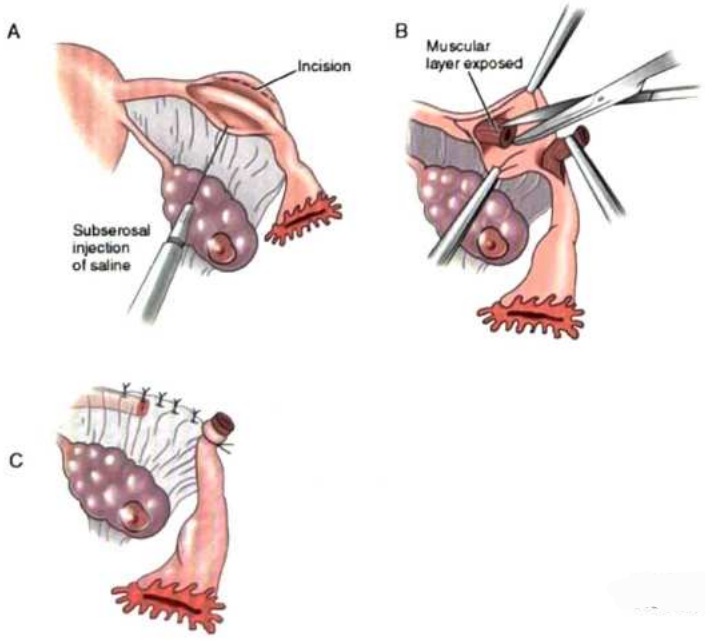


Parkland

- Irwing Procedure
  - One end of tube is buried into uterine musculature
  - Other end of tube is anastamosed into mesosalpinx

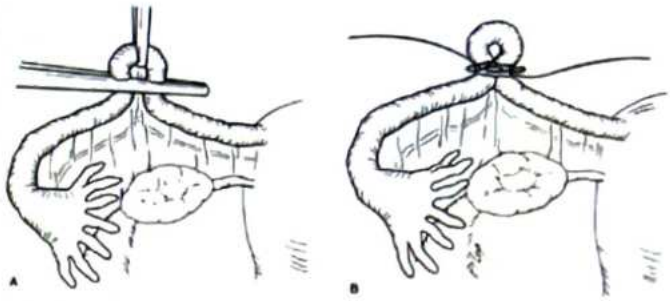
Irwing

- Sub Serosal Dissection of Tube (UCHIDA'S Procedure)
  - Serosa is lifted by needle & saline is injected
  - Then serosa is incised and tube is resected
  - Serosa is sutured again
  - Fibrosis & adhesions are very less, as cut ends are within the serosa.



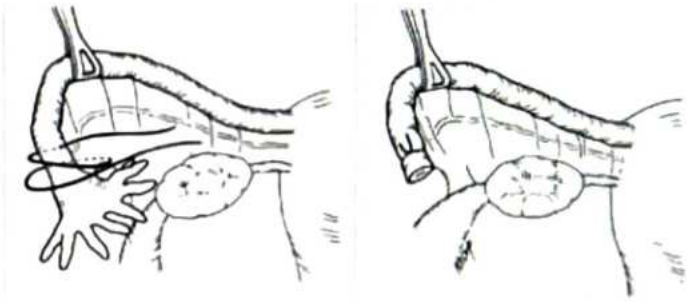
UCHIDA'S

- Madlener's Method
  - Tubes are crushed, not resected.
  - High failure rates, not done these days.



Madlener

- Kroner's Fimbriectomy
  - No reversal is possible
  - Not done these days



Kroner

Important Information

- Basic Steps To Follow To Avoid Ligating Other Structures:
- After pulling out the structures with Babcock's Forcep (atraumatic grip), always look for fimbriae and then ligate

Babcock's Forcep

- Structures Ligated by mistake
  - Round ligament (MC)
  - Small bowel
  - Ovarian ligament
  - Appendix
  - Ureter
  - Urine artery

  } Can't be ligated by mistake as they are retroperitoneal

VASECTOMY

00:59:27

- Failure rate lesser than tubectomies
- Non scalpel vasectomy can be done : stabilize with ring forceps, pull out the vas deferens with sharp artery forceps and ligate it.
- T. Bandage for scrotal support
- Avoid heavy weight lifting

Ring Forcep

- side effects
  - Dragging pain
  - Hematoma
  - Infections → Epidydimytis
  - Sperm build up
  - Antisperm antibody can be form

Important Information

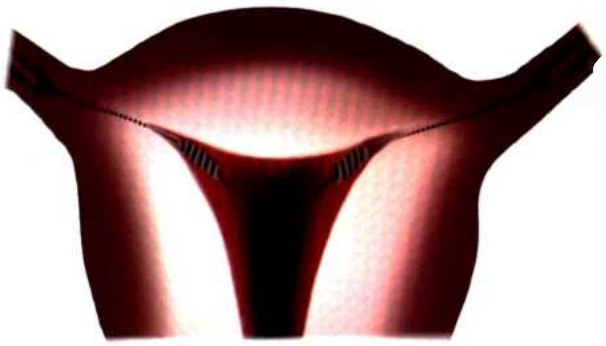
Sperm present in part distal to ligation can still cause pregnancy

- For 3 months or 20 ejaculations, whichever is later → use barriers or other contraceptives
- After 3 months, sterilization should be confirmed by semen analysis. It should show azoospermia.

ESSURE RING

01:08:23

- Hysteroscopic implant of Essure Ring
- Made up of Nitinol (Alloy of Nickel & Titanium)
- Causes Fibrosis & blockage of tube
- Can be done under LA & GA
- Takes 3 months to completely block the tube
- Hysterosalpingography done to confirm blockage



Essure Ring

LAPAROSCOPIC STERILIZATION

01:11:49

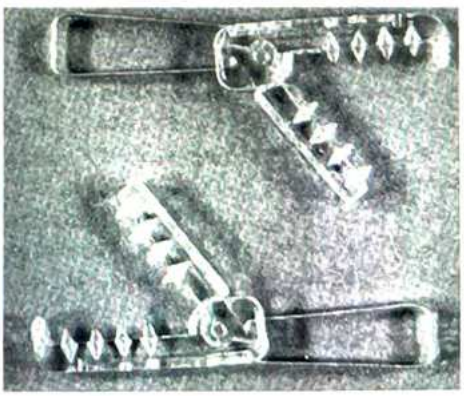
Important Information

- Laparoscopic sterilization is done for Interval procedures
- Site: Isthemic

Laparoscopic sterilization done by using

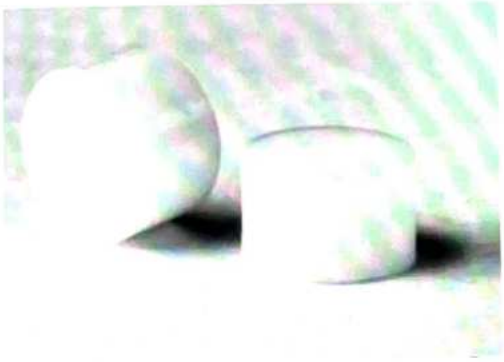
1. Laparoscopic Clips

Filsche Clips (Clips without serration)



Hulka Clemens Clips (Clips with serrations)

2. Laproscopic Rings



Fallope Rings

- FALLOPE RINGS are silastic rings that are forced over the tube using Laprocator
- Isthmus of Fallopian tube is the area to be ligated For sterilization
- A loop is made at the Fallopian tube [near isthmus] & Fallope ring are Forced at the base of the loop. They provide tight grip & cause ischemic necrosis of Fallopian tube instantaneously & the loop falls off eventually

Previous Year's Questions

Q. The depicted instrument is used in which procedure?
(NEET 2020)

A. Punch Biopsy
B. Tubectomy (Female sterlisation)
C. Bone marrow biopy set
D. Trocar and cannula for laparoscopy

3. Cauterization

- Types of Cautery
  - Bipolar Cautery
    - → Current goes from one prongs to the fallopian tube & goes to the other prong & goes back to machine [generating to current]
  - Monopolar Cautery
    - → Current flows through the instrument into the fallopian tube & into the earthling attached to patient
    - → Damages tube more than Bipolar cautery
- Current dissipation is more in monopolar cautery
  - Fallopian tube is held b/w the prongs of cautery & high voltage current is passed which burns the tube at isthmus & also lateral side of tube [which makes it the last priority]
  - not recommended now - a – days
  - It has worst chances of reversibility

Re-Anastomosis

- Laparoscopic Clips
  - Hulka, filsche (BEST)
  - Ring: fallope
- Cautery: Lap/ open (pomeroy) (WORST)

IUCDS [INTRA UTERINE CONTRACEPTIVE DEVICES]

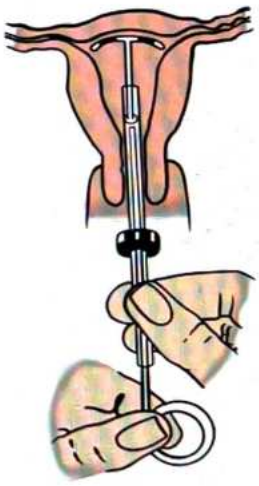
01:21:02

Function

- To induce Foreign body action : common to all
- Uterus will contract to expel the FB [IUCD], thus the FB action will expel the embryo
- 1st Generation IUCD: Lippes Loop [Inert]
- 2nd Generation IUCD: Copper Devices [Multiload] : MC used
- 3rd Generation IUCD: Progesterone Containing IUCDS

Copper Devices / 2nd Generation IUCDS / CU 380 A

CU 380 A



Insertion of CU-T

- A: Arms [contain copper]
- 380: Amount of CU in CU 380 A → 380 mm2
- Gold / Silver is impregnated with copper
- can be used upto 10 yrs

MOA

- Foreign body action
- Aseptic Inflammation of endometrium causing reduced chance of implantation
- Reduction of sperms motility
- Fertilization ↓↓
- Sperm destruction

Hormone Containing IUCDS / 3rd Generation IUCDs

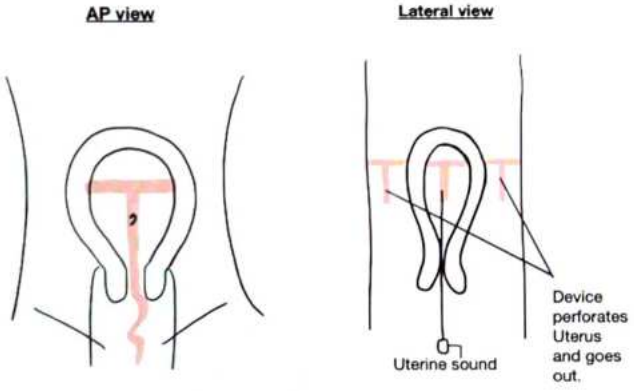
- PROGESTASERT
  - contains 38 mg Progesterone
  - 65 µg of progesterone is released per day

- can be used for 18 months
- Mechanism
  - → Foreign Body action to prevent pregnancy
  - → Cervical mucus thickening [major action]
  - → Non receptive endometrium [↑ progesterone causes atrophic endometrium]
  - → Anovulation [40% of patients only]

- LEVONORGESTREL CONTAINING IUC DEVICES [MIRENA]
  - contains 52 mg of progesterone
  - 20 µg of progesterone is released per day
  - can be used 5 years
  - uses
    - → contraception
    - → ↑ bleeding control/ menorrhagia control
  - Mechanism
    - → Foreign Body action to prevent pregnancy
    - → Cervical mucus thickening
    - → Non receptive endometrium [major action]
    - → Anovulation

Side effect of IUCD

- Bleeding
- MC side effect [3 times more common than pain]
- Tranexamic acid & NSAIDs are given for 1st 3 cycles during periods
- Best time of insertion of IUCD → within last days of periods
- Pain [2nd mc S/E]
- Infection
- PIDs [Should be ruled out before inserting IUCDs]
- Perforation [rare]



Copper device perforating uterus

Ectopic Pregnancy & IUCDS

- Chance of Ectopic Pregnancy if a Normal Women Conceives →1-2%
- % of Type of Pregnancy if a Women With IUCD Conceives
- Intra uterine pregnancy: 95-96 %
- Ectopic pregnancy: 4-5 %

Important Information

Incidence of pregnancy is less for women with IUCD when compared with normal women

- Therefore, incidence of ectopic pregnancy is also for women with IUCD when compared to normal women without IUCD
- If a women with IUCD is pregnant → Rule out Ectopic pregnancy

Management of IUCD with pregnancy

- Remove IUCD: IUCD + Pregnancy → > 50 % chances of abortion
- Manage As Patients Wish

Wants to continue pregnancy	Does not wants to continue pregnancy
↓	↓
Continue pregnancy	Offer medical termination of pregnancy

- If Thread Not Seen i.e IUCD Can Not Be Removed

Wants to continue pregnancy	Does not wants to continue pregnancy
↓	↓
Continue pregnancy with IUCD with advise of risk of abortion being 50 % & risk of premature rupture of membranes Anomalies can not happen with IUCD	Offer medical termination of pregnancy

Previous Year's Questions

Q. A patient who was using Copper T for contraception, presented with a 20 weeks pregnancy. The IUCD is placed at fundus, tail visible at os and she wants to continue pregnancy. What is the management? (FMGE 2019)

A. Leave IUCD in situ and continue pregnancy
B. Medical termination of pregnancy
C. Remove IUCD and continue pregnancy
D. Remove IUCD and do MTP

Missing IUCD

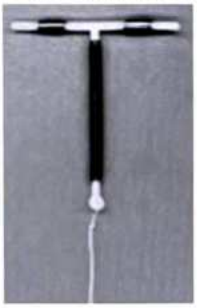
- Advise patient that IUCD will expel spontaneously & ask them to feel for IUCD thread over vagina for the 1st 3 cycles
- If she cannot feel for thread, in OPD, IUCD is removed with the help of IUCD hook
- Even if IUCD can not be removed using hook, use ultrasound/ x-Ray of Pelvis to locate IUCD
- Sometimes, If IUCD is perforated,
  - First AP view of X-Ray is preferred to check whether IUCD is inside the body of the patient
  - If IUCD present, then do lateral view of x-ray, with dilator or sound in cavity to see whether IUCD is inside the uterus/outside the uterus

Contraindications of IUCDS

- Pregnancy
- Puerperal Sepsis
- STD/PID
- Undiagnosed Vaginal bleeding
- Uterine anomalies
- Cancer of cervix
- Cancer of uterus

Previous Year's Questions

Q. Which of the following is a contraindication to use of contraceptive shown in the image? (FMGE 2020)



A. PID
B. Hypertension
C. Post partum
D. Diabetes

01:42:12

IMPLANTS

- Progesterone containing devices
- Sub Dermal Implants
  - inserted into arm of women
  - very good control as contraceptive
  - Failure rate of implants is very low even when compared to vasectomy & tubectomy

Norplant

- Contains 36 mg of Progesterone & 6 rods [total → 216 mgs of Progesterone]
- Can be used For 5 years

Norplant II/ Jadelle

- Contains only 2 rods → lesser discomfort For patients
- Contains 75 mg x 2 → 150 mg of Progesterone
- Can be removed for 3 years
- Should be removed after 3 years surgically under LA

Implanon

- Contains 68 mg of Etonogestrel
- Etonogestrel is biological metabolic of Desogestrel
- Can be used For 3 years
- Has only one rod [less discomfort]
- Easy insertion & easy removal

Nexplanon

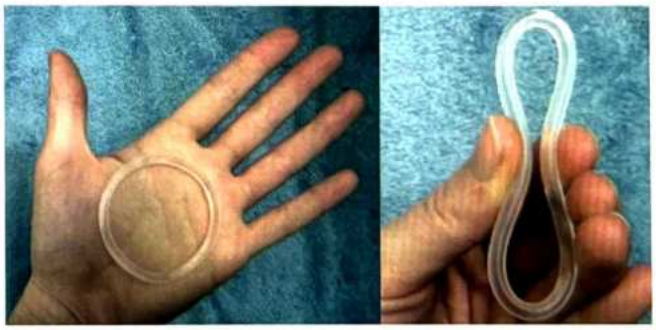
- Advancement of implanon
- has Barium Sulphate coated arm: Localization can be easier

Common S/E of Implants

- Headache
- Weight gain
- Vaginitis
- Irregular bleeding
- Breast pain
- Abdominal Fullness, pain

NUVA RING/VAGINAL RING

01:47:39

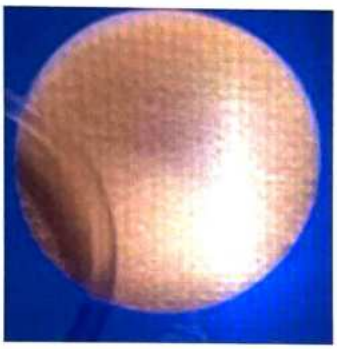


- Contain Etonogestrel + Ethynyl Estradiol
- Can be inserted just before intercourse
- Etonogestrel: 0.120 mg/day
- Ethynyl Estradiol: 0.015 mg/day
- Work for 3 weeks

- After removal, within a gap of 1 week, women will get her periods & then reinsertion can be done
- Conveniently used as they don't have to remember

SPONGE / TODAY

01:50:50



- can be inserted Just before intercourse into vagina
- Works For 24 hrs
- contain Nonoxynol - 9 [Spermicidal]
- has band attached to it which makes it easy for removal

INJECTABLE PROGESTERONE

01:52:04

Used as Hormones

- **DMPA [Depot Meoroxyprogesterone Acetate]**
  - contains 150 mg of progesterone
  - Given once in 3 months
- **NET-EN [Nor Ethisterone Enanthate]**
  - Contains 200 mg of progesterone
  - given once in 2 months

MOA of DMPA & NET-EN

Continuous injection of DMPA & NET-EN
↓
Endometrium becomes atrophic
↓
Reduces implantation increased cervical mucus thickening causes anovulation

EVRA PATCH

01:53:56

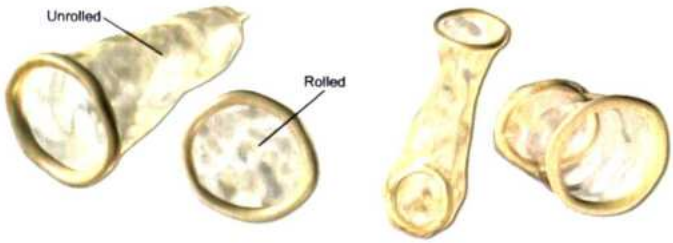
- Size of 4 cm approx. applied over the arm, abdomen
- Contains E. Estradiol & Norelgestromin
- E. Estradiol of 20 µg & Norelgestromin of 150 µg per day are released
- has to be changed every week & the 4th week is given as break & patient will have periods

BARRIER CONTRACEPTIVES

01:56:03

- most convenient contraceptives
- E.g. condoms, Diaphragms

Condoms



Male Condom Female Condom

- not used as ideal method all the time
- Conveniently used for people having multiple partners
- Interferes with pleasures
- high failure rate

Diaphragm / Dutch Cap

- Convex part is facing outside; hollow part fixes into the cervix
- Always used with spermicidal cream/jelly [nonoxynol-9]
- Can be used during intercourse
- For best effectivity: Insert atleast 4 hrs prior to intercourse
- Should be removed within 6 hrs of intercourse
- If not removed →Toxic shock syndrome d/t staph. aureus (mc), strepto- coccus [rarely] may occur

NATURAL METHODS OF PREVENTING PREGNANCIES

02:00:00

- Failure rate is very high

1. Abstinence [no sex]
2. Withdrawal Technique
   - Pulling out before ejaculation
   - **Disadvantages**
     → pre-ejaculate can have sperms that can lead to pregnancy
     → high failure rate
3. Rhythm Method / Fertile Period Method / Safe Period Method/ Calendar Method
4. Cervical Mucus Method/Billing's Method

- Thin cervical mucus / wet days: Avoid intercourse
- Cervical mucus thick/ Dry days: Can have intercourse

5. Based on Basal Body Temperature
   - Progesterone is a thermogenic hormone
   - After ovulation, Progesterone cause rise in temperature by 0.5 F
   - This alarms when to avoid intercourse with partner

- ↑ Failure rates: Require Lot of commitment & accuracy is less
- Pearl index: 60/100 women years

FAILURE RATES

02:06:3

- Described by Pearl Index
- Pearl Index = $\frac{\text{Total no.of accidental pregnancies}}{\text{Total months of exposure}} \times 1200$

Methods of contraception	Pearl index
Vasectomy	0.1
Tubectomy	0.2
IUCD	0.5
Levonorgestrel	0.2
COCP	0.5-0.6
POP	1-2
Barriers [condoms]	
Ideal usage	9
Typical usage	14-21
Implants	0.05

Long Acting Reversible Contraceptives [LARC]

- Levonorgestrel
- Implant
- Now - a - days, these are preferred over permanent sterilization procedures

Barriers

- For making barriers more effective , spermicidal jellies are used
- proper condom usage
  - Should be used on Fully erect penis
  - Reservoir not be pushed over the glans & not to be checked for patency
  - After intercourse, withdraw penis is fully erect stage

CONTRACEPTION IN SPECIAL SITUATIONS

02:14:35

In follow up of molar pregnancy

- Should not conceive for next 6 months atleast, as HCG ↑ES
- HCG from pregnancy & HCG From trophoblastic disease will be hard to differentiate. So, contraceptive are given for 6 months
- Contraceptive of choice
  - combined oral contraceptives
  - IUCD's not used as they can cause perforation of soft uterus due to molar pregnancy

For patientswith heart disease

- IUCDS are used [Shorter threads]
  - Monofilaments are used now
  - Polyfilaments used earlier [↑risk of ascending infection]
- COCP, POP, are not given [cause water retention]

For diabetic patients

- COCP } good
- IUCDS }

In uncontrolled diabetics

- Hormonal contraceptives can't be used
  - Both Estrogen & sugar are metabolized in liver
  - Increased Sugar levels can disturb contraceptives usage
- Barriers with spermicidal jellies are preferred

In STDS / HIV patients

- Barriers with spermicidal jellies are preferred
- double barrier: Both partner to wear condoms

For newly married couple

- COCP

For couples staying in different cities

- Barriers, emergency contraceptives, COC pills are not preferred
- IUCD are most preferred

for Post Natal/ Lactational Amenorrhea (within 6 weeks of delivery)

- COCPs are not preferred as they can cause Lactational failure
- Estrogen will cause glandular proliferation → block lactiferous ducts]
- Progesterone only pills are preferred
- Patients after 6 wks of delivery → IUCD is preferred over POP
- Unsafe Belief
  - Lactation Itself Is Protection Against Pregnancy
  - Prolactin → inhibit GnRH → FSH & LH not released → no ovulation
  - But only continuous breast feeding can prevent ovulation, which is not possible, as there may be lot of escape ovulation

POST PLACENTAL IUCD

- IUCD inserted in uterus after removal of placenta during delivery
- During uterus contraction after delivery [Uterus involution], it may expel copper out
- But the expulsion rate is not found to be > 12% [WHO] & atleast 88% women retains IUCD

Previous Year's Questions

Q. A woman who is lactating presents to OPD after 6 weeks of delivery. Which is not adviced for contraception? (FMGE 2020)

A. Combined OCP
B. POP
C. IUCD
D. Mini Pill
E. Norplant

CLINICAL QUESTIONS

Q. A 37 yr old desires to start COCPs. She is P3L3 with three vaginal deliveries. Her cycle are regular with normal flow. She is a well-controlled diabetic. She smokes one pack (of 20) cigarettes daily. She is also a known hypertensive and her blood pressure is 140/90 on drugs. Total serum cholesterol is 275 mg/dL. Her physician advices her against use of OCP. COCPs are contraindicated in her & more strongly due to which of the following factors?

A. Diabetes
B. Hypercholesterolemia
C. Smoking with advanced age
D. Hypertension

Answer: C

Solution

Absolute contraindications

- < 6 wks postpartum
- smoker over the age of 35 (>15 cigarettes per day)
- hypertension (systolic > 160mmHg or diastolic > 100mmHg)
- current or past history of venous thromboembolism (VTE)
- ischemic heart disease
- history of cerebrovascular accident
- complicated valvular heart disease (pulmonary hypertension, atrial fibrillation, history of subacute bacterial endocarditis)
- migraine headache with focal n[illegible]al symptoms
- breast cancer (current)
- diabetes with retinopathy/nephropathy/neuropathy
- liver tumour (adenoma or hepatoma)

Relative contraindications

- smoker over the age of 35 (< 15 cigarettes per day)
- adequately controlled hypertension
- hypertension (systolic 140 - 159mmHg or diastolic 90 - 99mmHg)
- migraine headache over the age of 35
- currently symptomatic gallbladder disease
- history of combined OCP-related cholestasis

24 GENITAL TRACT INFECTIONS

ASHERMAN SYNDROME

Etiology 00:02:14

- Overzealous Currettage done For
  - AUB (Abnormal Uterine bleeding)
  - MTP
  - Secondary PPH [d/t retained bits of Placenta]
  - Such curettage injures basal lamina
  - Causes scarring & Fibrosis of endometrium [no further gland development]
  - Leads to secondary amenorrhea: Asherman Syndrome
- Endometrial TB also causes Asherman Syndrome

Important Information

- Max chances of occurrence of Asherman's syndrome is when currettage was done for : secondary PPH

Previous Year's Questions

Q. A HSG is suggestive of Asherman syndrome. The woman suffering from this syndrome is likely to have which of the following presentations? (INI CET 2021)

A. Hypomenorrhea
B. Oligomenorrhea
C. Menorrhagia
D. Dysmenorrhea

Previous Year's Questions

Q. A woman presents with secondary amenorrhea since 3 months since she had a curettage for missed abortion. FSH is 7 IU/L. A UPT is negative. What is the most likely diagnosis? (FMGE 2020)

A. Pituitary failure
B. Ovarian failure
C. Uterine synechiae
D. Pregnancy

Treatment

- Hysteroscopic Adhesiolysis
- Followed with High dose Estrogens & Progesterone: for cyclical withdrawal

TUBERCULAR PID 00:07:24

- Incidence→20-25% of women in India

Pathogenesis

- Endometritis Menorrhagia [Initially]

↓

Endometrial destruction

↓

ASHERMAN SYNDROME→ Oligomenorrhea
Hypomenorrhea
Amenorrhea [mc]

- Fallopian Tube
  - Calcific, beaded, rigid tube
  - Hydrosalpinx: Tobacco Pouch Hydrosalpinx
  - Retort Shaped Hydrosalpinx

Previous Year's Questions

Q. A 28 year old woman was suspected to have genital tuberculosis. What is the percentage that fallopian tube would be involved in this case? (JIPMER 2019)

A. 100
B. 80
C. 60
D. 50

Previous Year's Questions

Q. 18 year old girl comes to gynae OPD presenting with 6 months of amenorrhea, with h/o low grade fever, weight loss, pain abdomen, generalized weakness. On examination pelvic mass felt on left side with features of ascites. Diagnosis? (NEET 2020)

A. TB pelvis with tubo ovarian mass
B. Ectopic pregnancy
C. Granulosa cell tumour
D. Fibroid degeneration

Treatment 00:13:30

- 4 Drugs for 2 months & 3 Drugs for 4 months
- Do not stop the Rx in 1st trimester

PELVIC INFLAMMATORY DISEASE

Causes 00:15:16

- Chamydia: Most prevalent; Indolent
- Gonorrhea: Most common in OPD
- Mycoplasma
- TB
- Ureaplasma
- Bacteroids
- Pepto streptococcus
- Bacterial vaginosis [important cause]
- Streptococcus

> **Important Information**
> - MC cause if PID in India is Chlamydia, and not TB

Clinical Features

Symptoms 00:20:57

- Pain abdomen
- Congestive dysmenorrhea
- Dysparunia
- Fever

Signs 00:23:30

- Fever
  - Admit IF
    - → Temp > 38°C/ 100.4°F
    - → Severe Symptoms
    - → Suspicious Pelvic Abscess
    - → Unreliable/ Non Compliant Patient
    - → Uncertain Diagnosis
- ↑ CRP
- Leucocytosis
- On P/v
  - cervical motion tenderness
  - Uterine tenderness
  - Adnexal tenderness

} Clinical Triad Helps in Diagnosis

> **Important Information**
> - Cervical motion Tenderness is seen In Ruptured Ectopic Pregnancy as well as PID

Additional Criteria 00:26:44

- Culture & Sensitivity Of
  - Endometrial Biopsy
  - Vaginal swab
  - Cervical Swab
  - Culture Medias For
    - → Gonorrhea: Thayer martin media
    - → Chlamydia: Mc coy cell lines [PCR Preferred]
- ↑ ESR/ CRP
- ↑ TLC
- Fever > 100.4°F [38°C]

Elaborate Criteria 00:29:30

- Diagnostic Laparoscopy
  - Gives direct evidence
  - Laparoscopy "IF DONE" is the best way to diagnose PID
- USG: Documents pelvic/tubo ovarian abscess

Discharge Criteria: Temperature < 99.5°F

Treatment

- Centre for disease control of atlanta 00:32:55
  - In patient regimes
  - Out patient regimes
- Broad Spectrum Antibiotics 00:33:56

OPD Regime

- Cefoxitine 2gm iv or Cefotaxime 1gm iv } 1 shot For gonorrhea
- Doxycline 100 mg BD x 14 Days: For chlamydia
- Metronidazole 500 mg BD x 14 Days
  - For anaerobes
  - For bacterial vaginosis
- Azithromycin can be given instead of Doxycycline
- Clindamycin can be given instead of Metronidazole

> **Important Information**
> - It is very important to treat Bacterial Vaginosis : metro is always given in all regimes. Untreated BV is important cause of relapse

VAGINITIS 00:38:44

Ph of Vagina

- Candidiasis → can occur in acidic ph of 4.5
- Bacterial vaginosis } can occur in Alkaline PH
- Trichomoniasis } Alkalinity Shift also predisposes [5.5 or 6...]

Amsel's Criteria

- Useful in Dx of Bacterial vaginosis
- 3 out of 4 are required
  - Creamy discharge
  - Whiff Test ⊕
  - Fishy odour
  - Clue Cells

Refer Table 24.1

00:40:05

Important Information

- MC Vaginitis: Bacterial Vaginosis

Bacterial Vaginosis can cause

- PID
- Relapse of PID
- Chorioaminionitis [PID in pregnancy]
  - Abortion
  - IU Death
  - Puerperal sepsis
- Vault cellulitis

Previous Year's Questions

Q. Which of the following is the drug of choice for bacterial vaginosis in pregnancy? (AIIMS 2019)

A. Metronidazole
B. Clindamycin
C. Erythromycin
D. Rovamycin

- Whiff test can also be positive in trichomoniasis
  - As both Bacterial vaginosis & Trichomoniasis CO-Exists
  - Classical For Bacterial vaginosis
- Rx the male partner also in Trichomoniasis
- Rx the male partner also in candidiasis
- Rx only women in B Vaginosis (as not STTD)

Previous Year's Questions

Q. A sexually active lady came with profuse yellowish frothy discharge with intense itching. On local examination of the vagina a 'strawberry' like cervix is revealed. What condition she is likely suffering from? (NEET 2020)

A. Candidiasis
B. Trichomonas vaginitis
C. Bacterial vaginosis
D. Gonorrhea

Previous Year's Questions

Q. Green frothy discharge is seen in? (NEET 2019)

A. Herpes simplex
B. Candida albicans
C. Trichomonas vaginalis
D. Normal vaginal flora

Previous Year's Questions

Q. Identify the image? (FMGE 2020)

A. Trichomonas
B. Listeria
C. Pseudomonas
D. Candida

Table 24.1

Acidic ph	Alkaline ph > 7	
Candidiasis	**Bacterial vaginosis**	**Trichomoniasis**
• Dimorphic Fungi Blastospores [Spreads] Mycelia [Invasion & adherence] • Curdy white discharge plaque on vaginal wall on removal causes Petechiae • Out of proportion Pruritus • Complicated / uncomplicated Uncomplicated • Seen in Ⓝ women • Good prognosis • a/w albicans Complicated • In immunocompromised [in DM, TB, pregnancy etc] • Recurrent, Severe • a/w non-albicans	• Hemphilus vaginalis aka Gardenella vaginalis **AMSEL'S >/= 3 out of 4** • Creamy discharge • Whift Test: +ve ○ Secretion + 10% KOH → amines • Fishy odour • Clue Cells: vaginal epithelium with embeded bacteria  Clue Cells • No Pruritis	• by Trichomonas vaginalis Flagellate protozoan Motile organism cause severe irritation & severe pruritis • Colpitis Macularis [Strawberry Vagina] • Greenish yellow, Froathy discharge
• Treatment ○ Azoles ○ Oral ○ Fluconazole ○ Rx both male & female	• Treatment ○ METRONIDAZOLE ○ Rx the Women [no sexual transmission]	• Treatment ○ METRONIDAZOLE ○ Rx both man & women

25 AMENORRHEA

AMENORRHEA

00:00:30

Definitions

- Primary Amenorrhea: No periods ever
- Secondary Amenorrhea: No periods x 3 cycles (3 months)/ 6 months

Puberty: Normal 10-12 yrs

Delayed Puberty 00:02:00

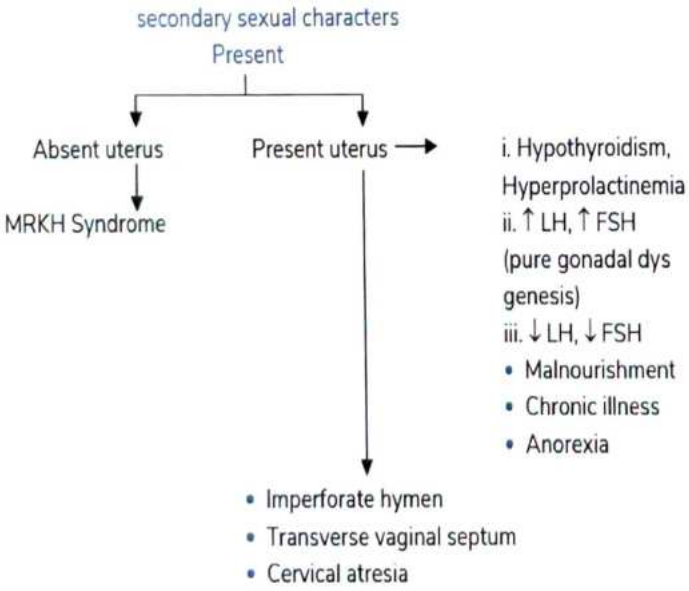
- No periods till 13 yrs
  - Secondary sexual characters absent
- Secondary sexual characters present
  - No periods till 15 yrs

Investigations 00:03:46

- Pregnancy test negative
- O/E
  - Breast examination
  - Axillary, pubic hair
  - Vagina
- P/V: Uterus examination
- Tests including: LH, FSH, TSH, PRL, karyotype

PRIMARY AMENORRHEA

00:06:00



Secondary sexual characters
Asynchronous
↓
Androgen Insensitivity syndrome

Secondary Sexual characters
Absent
↓
(LH/ FSH)

↑LH, FSH	↓LH, FSH
• Primary ovarian failure	• Physiological delay
• Gonadal dysgenesis (eg. Turners)	• Kallman syndrome
• FSH, LH receptor defect	• CNS Tumors
• Galactossemia LH, FSH	

Previous Year's Questions

Q. 14-year-old girl presented with primary amenorrhea. on examination, secondary sexual characters are seen. Uterus and ovaries were seen to be normal on USG. What is the next step in management? (FMGE 2020)

A. Reassurance
B. UPT
C. Karyotyping
D. LH, FSH, TSH

Previous Year's Questions

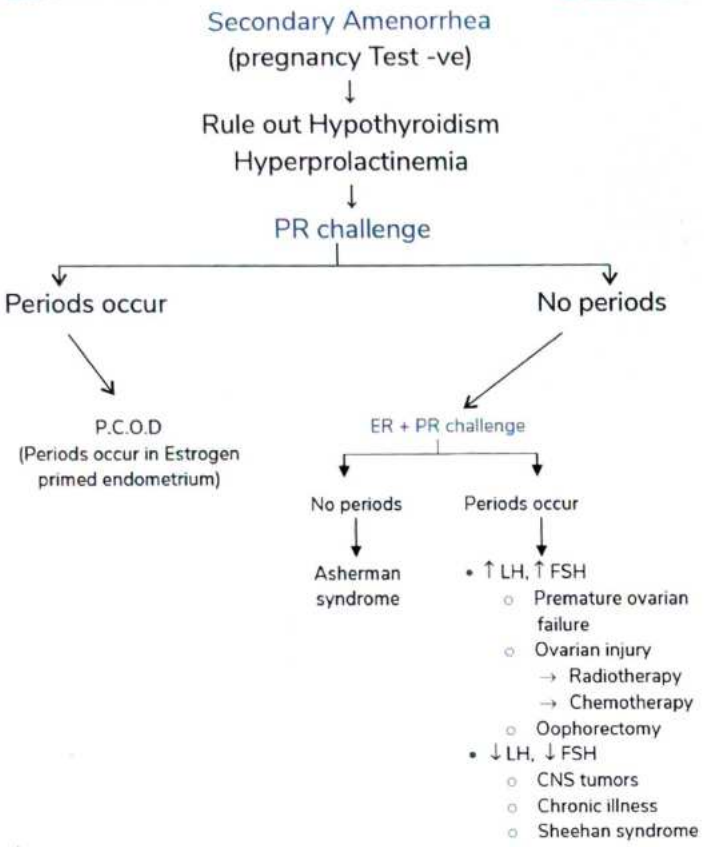
Q. 19 year old girl presents with primary amenorrhea with normal secondary sexual characteristics. What is the next investigation to be done?

(FMGE 2020, 2019)

A. USG
B. LH and FSH
C. Estradiol estimation
D. Karyotyping

SECONDARY AMENORRHEA

00:13:21



Previous Year's Questions

Q. 32 year old unmarried woman came with secondary amenorrhea. she was having regular normal flow periods until now. No other associated complains. pelvic examination was normal. Nest step is? (FMGE 2020)

A. LH/ FSH testing
B. Estrogen level
C. USG
D. Urine HCG

COMMON ETIOLOGY

00:21:30

- Pregnancy
- Hypothyroid/ Pituitary tumors
- Chronic illness
- Hyperprolactinemia
- Empty sella syndrome
- Thyroid disease
- PCOS/C CAH
- POI
- Cushing syndrome

Previous Year's Questions

Q. 19 year old girl presented with weight loss. secondary amenorrhea and a constant fear of gaining weight. Alteration in which of the following is responsible for such presentation? (FMGE 2020)

A. GnRH
B. HCG
C. Estrogen
D. Progesterone

Previous Year's Questions

Q. A 52 year old woman came with 16 months of amenorrhea. The test results that you would expect are? (FMGE 2020)

A. High LH and High FSH
B. Low FSH and High LH
C. Low FSH and normal LH
D. High FSH and low LH

Previous Year's Questions

Q. Match the following (INI CET 2021)

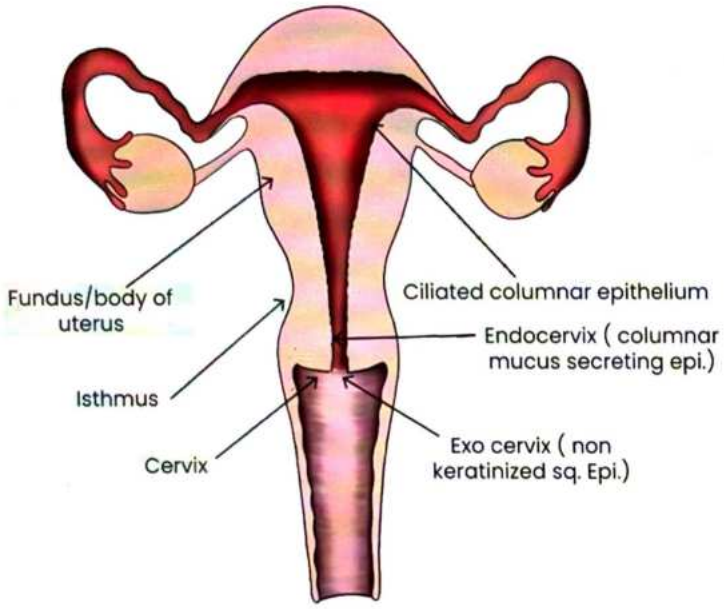
A. Premature ovarian failure	I. Low FSH, low LH, low estradiol
B. Sheehan's syndrome.	II. Normal FSH and LH, normal estradiol
C. Asherman syndrome	III. Low FSH , high LH and normal estradiol
D. PCOS	IV. High FSH , high LH , low estradiol

1. A II, B III, C IV, D I
2. A III, B IV, C I, D II
3. A IV, B I, C II, D III
4. A I, B II, C III, D IV

26 CLINICAL ANATOMY FEMALE REPRODUCTIVE TRACT

UTERUS & CERVIX

00:00:34



Parameters of the uterus

- 7.5 x 5 x 2.5 cm
- Weight: 60 gms
- Fundus & body - 3.5 cm
- Isthmus – 0.5 cm
- Cervix – 2.5 cm

Shape of Cervix

- Nulliparous: Circular
- Parous/ Multiparous: Transverse slit

Epithelium of uterus

- Ciliated columnar epithelium
  - S. Basalis
  - S. Functionalis
  - Decidua, in pregnancy

Endocervix: Columnar Epithelium (Mucus Secreting)

↓ Transformation Zone: HPV effects here

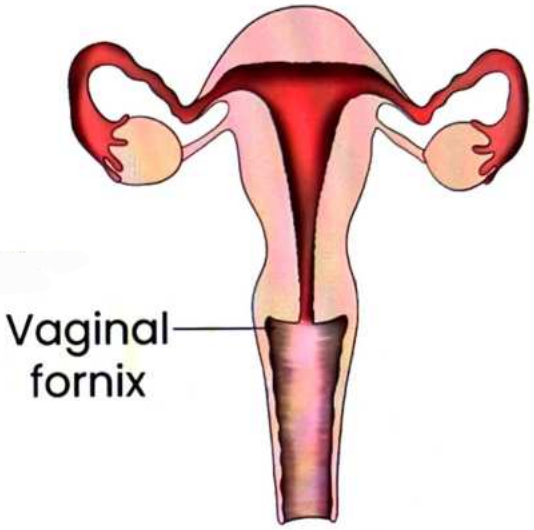
Exocervix: Non- Keratinized Squamous Epithelium

Isthmus

- Area b/w Anatomical internal Os & Histological internal Os
- 0.5 cm, becomes 10 cm (in pregnancy)
- Becomes lower segment at the end of pregnancy

Vaginal fornices

00:06:52



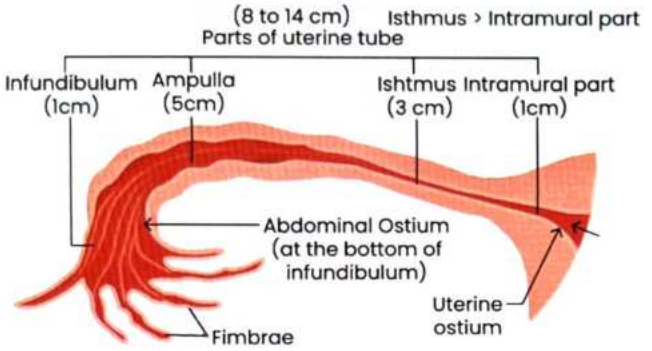
- Anterior Fornix
- Posterior Fornix
- Cervix is downwards & forwards, the semen is laid in the posterior Fornix of vagina & sperms easily swim up into the cervix
- Post Coital Tear
  - In the: Posterior Fornix (MC): posterior Vaginal wall
  - Button hole tear
- Pelvic Abscess: Drained by doing a Posterior Colpotomy: through posterior Vaginal fornix

Important Information

- At Birth: Uterus: Cervix: 1:1 (1:2)
- Adult: Uterus: cervix: 3:1

FALLOPIAN TUBE

00:12:07



Important Information

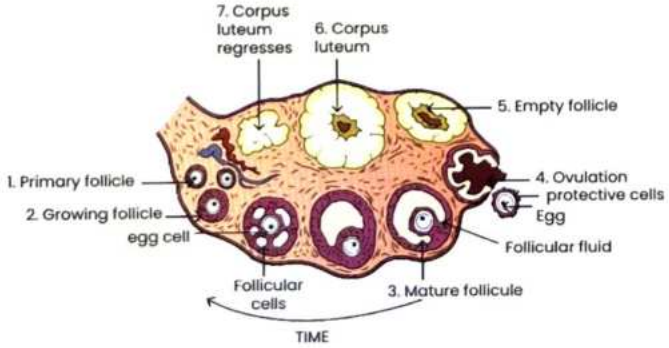
- Narrowest part: Interstitium
- Widest part: Ampulla (5cm)
- Site of fertilization: Ampulla
- Longest fimbrial strand: Fimbria Ovarica

Important Information

- MC site for Ectopic Pregnancy: Fallopian Tube [Ampulla (MC)]
- Time of Rupture Ectopic pregnancy
  - Ampulla in: 6-8 wks
  - Isthmus: 4-6 wks
- In Tubectomy
  - Tube is cut from isthmic area: Re-anastomosis: Better at isthmus, as the cut ends are even at isthmus
- Post Reanastomosis (Tuboplasty): Tube must be at least 5cm in size for fertilization post tuboplasty

OVARY

00:16:58

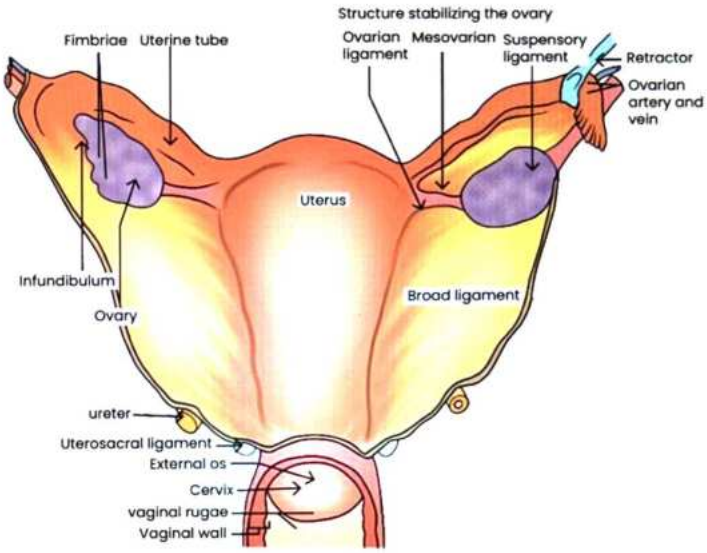


- Size: 5 x 3 x 3 cm (can vary)
- Epithelium: Flattened Cuboidal to Low Columnar Epithelium

Ovary

Cortex	Medulla
• Stroma	• Has Fibromuscular coat
• Follicles develop here	• Blood vessels are present here

- Ovarian Fossa of Waldeyer



Relations

- Superior: External iliac artery & vein
- Anterior: Broad ligament of uterus
- Posterior: Ureter, Internal iliac artery & vein
- Inferior: Obturator nerves, artery & vein

STRUCTURES STABILIZING THE OVARY

- Suspensory ligament/ Infundibulo-pelvic ligament (laterally)
- Ovarian ligament (medially)
- Mesovarium

EMBRYOLOGY

00:20:18

How is 'sex' decided in an embryo

- Genetic sex: 46XX or 46XY
- Gonadal sex: Ovary or Testes
- Phenotypic sex: Vulva or Phallus
- Sexual distinction is by presence or absence of 'Y' chromosome
- Y chr. has Sex Determining Region 'Y' (S.R.Y)

↓

Testes Determining Factor (T.D.F)

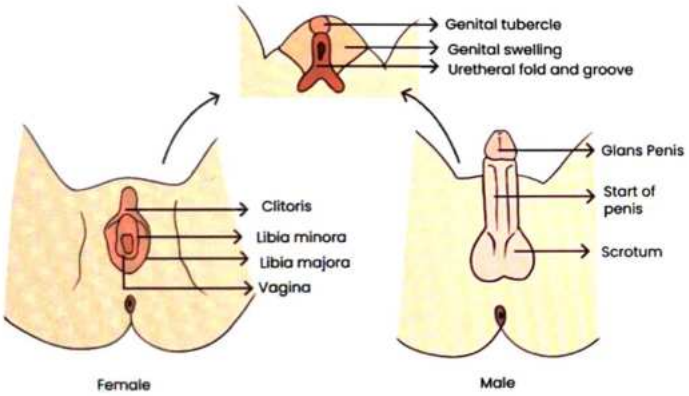
FORMATION OF EXTERNAL GENITALIA

FORMATION OF INTERNAL GENITALIA

One Genital Tubercle and 2 genital swellings

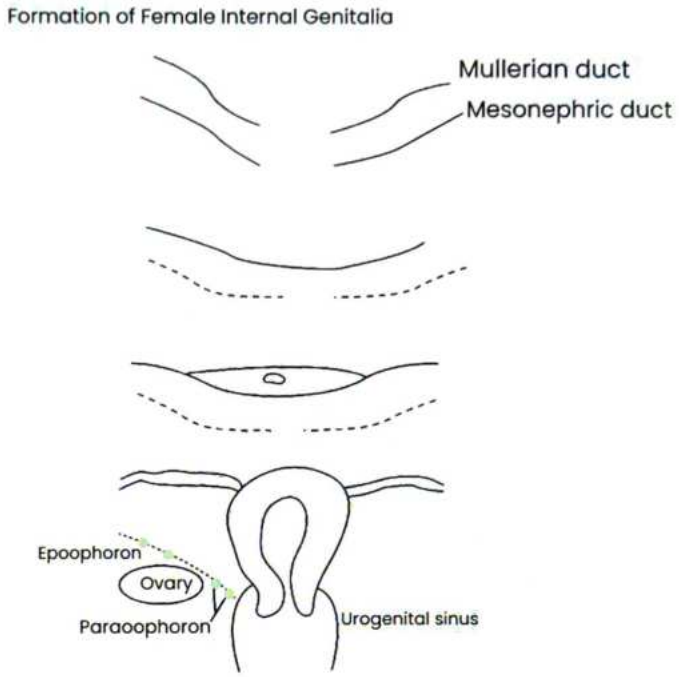
6 wks

Testes	Ovaries
Androgens	Absence of Androgens
Increases length of tubercle	Swelling do not fuse
Penis	• Labia majora
Descent of testes into the scrotal sac	Labia minora
Urogenital sinus fuses into base of scrotum makes, part of perineum, scrotal base & the rectum	Genital tubercle makes the clitoris
	Urogenital sinus invaginates between L. majora & L. minora & makes lower 1/5th of vagina



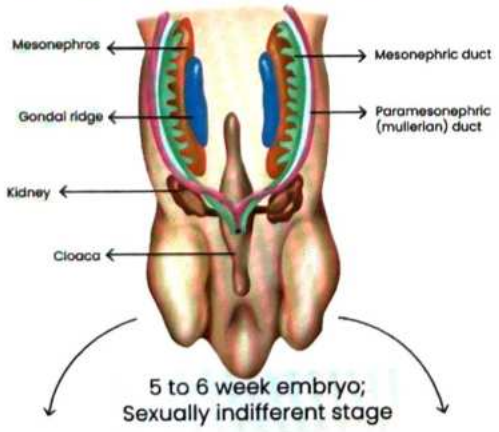
Formation of Female Internal Genitalia

00:27:24



- Upper 4/5th vagina by Mullerian duct
- Lower 1/5th of vagina by Urogenital sinus
- The obliterated mesonephric duct fuses on the upper lateral vaginal wall.
- Gives remnants above & on sides of ovary
  - Epoophoron
  - Paraoophoron
- Epoophoron & Paraoophoron can have their ducts blocked → Para Ovarian Cysts.

FORMATION OF INTERNAL GENITALIA

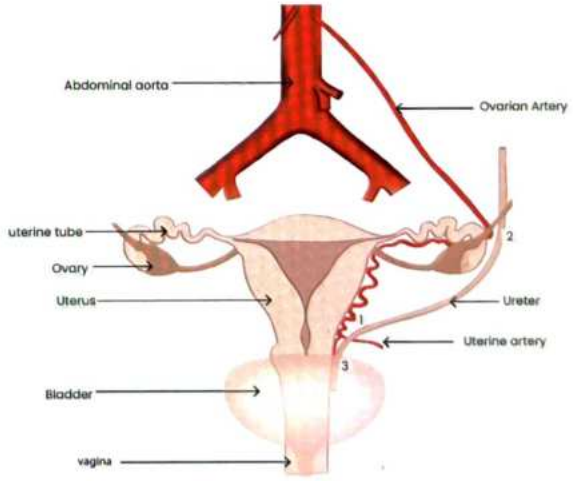


- In females Para Mesonephric duct (Mullerian duct)

In males: Mesonephric duct (Wolffian duct)

BLOOD SUPPLY OF PELVIC ORGANS

00:32:00

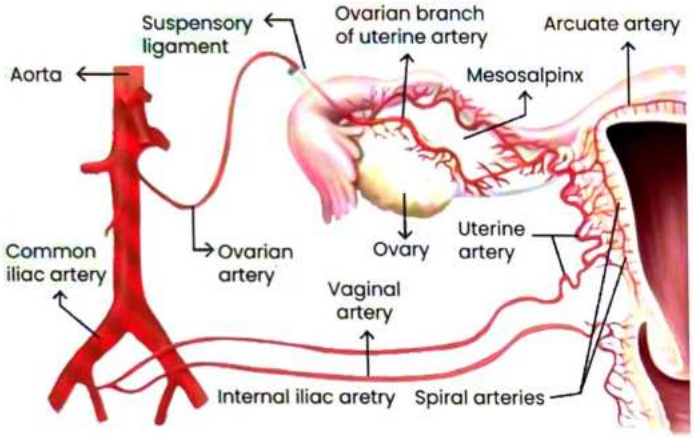


Anastomosis

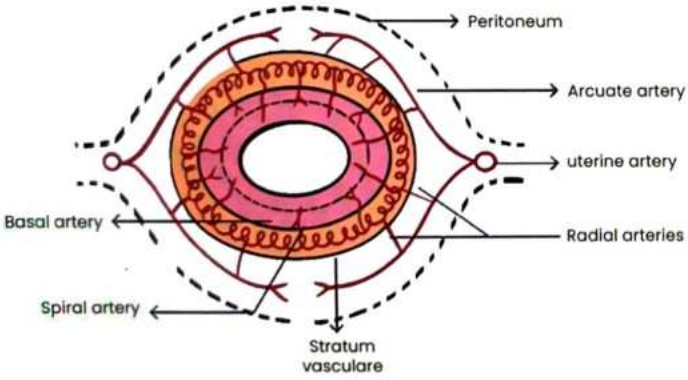
Refer Diagram 26.1

How to remember

Short GILLS
- SG : Superior Gluteal
- IL : Ilio-lumbar
- LS : Lateral Sacral

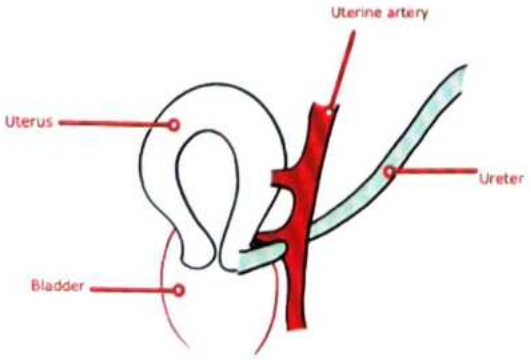


Anastomosis



Cross- Sectional Anatomy of Uterus

Importance of Uterine Artery & Relation to the Ureter

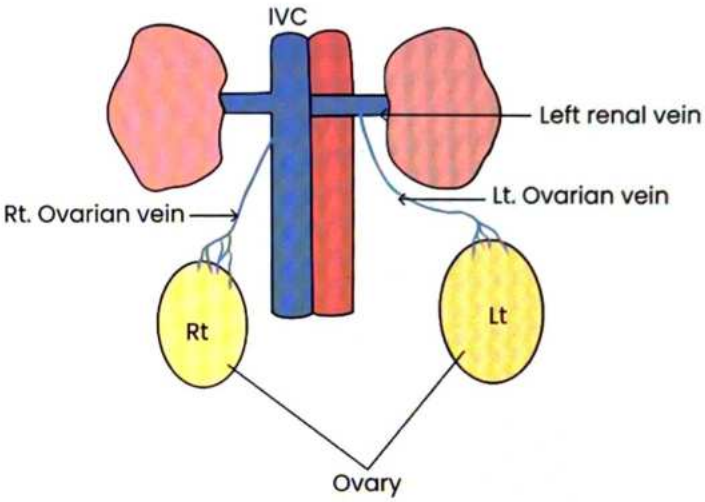


How to remember

- Uterine artery is above the ureter Water(urine) Under the Bridge

Venous Drainage of Ovaries

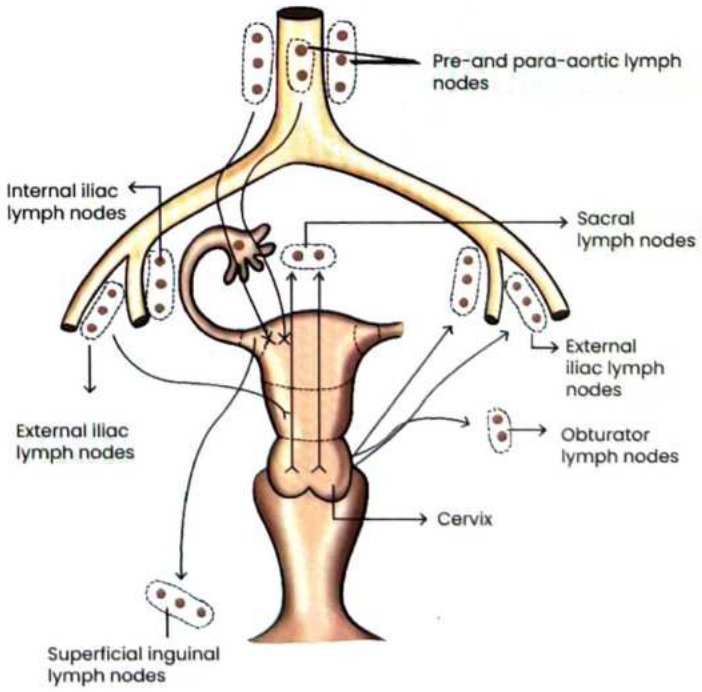
Venous Drainage of Ovaries



- Right ovarian vein directly drains into IVC
- Left ovarian vein drains into left renal vein.
  - Thus, Right ovary recovers fast from ovulation.
  - Right Ovary ovulates (60-65%) more than left ovary.

LYMPHATICS OF FEMALE REPRODUCTIVE TRACT

00:40:00



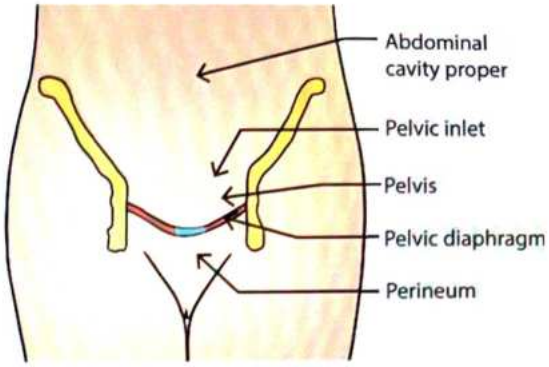
Important Information

- Cervix does not drain into inguinal L.N

Previous Year's Questions

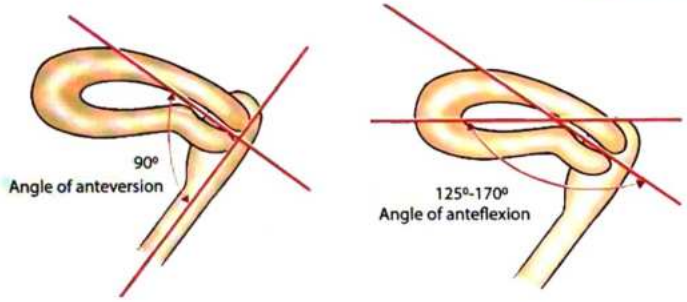
Q. Which group of L.N are Mcly involved in drainage of Cervix & Ca Cervix?

Ans. External iliac L.N > Obturator L.N

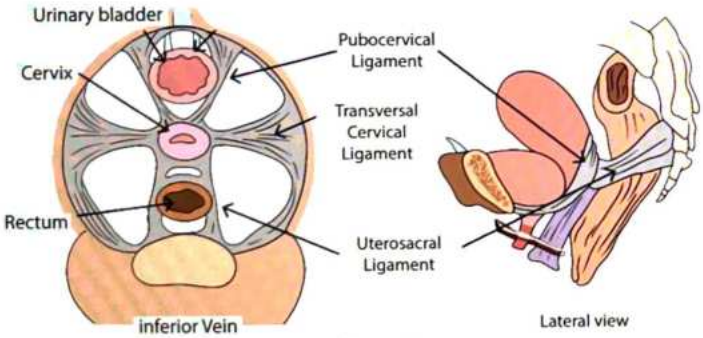


SUPPORTS OF UTERUS

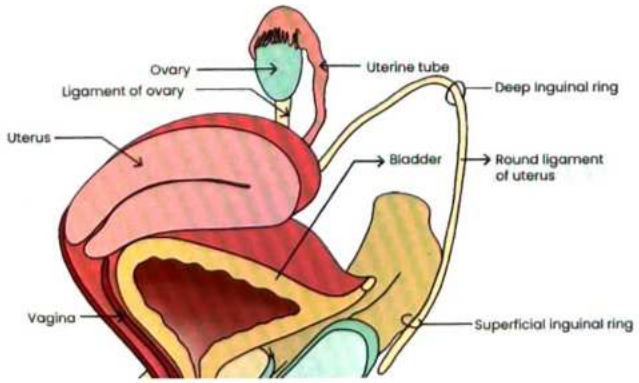
00:42:06

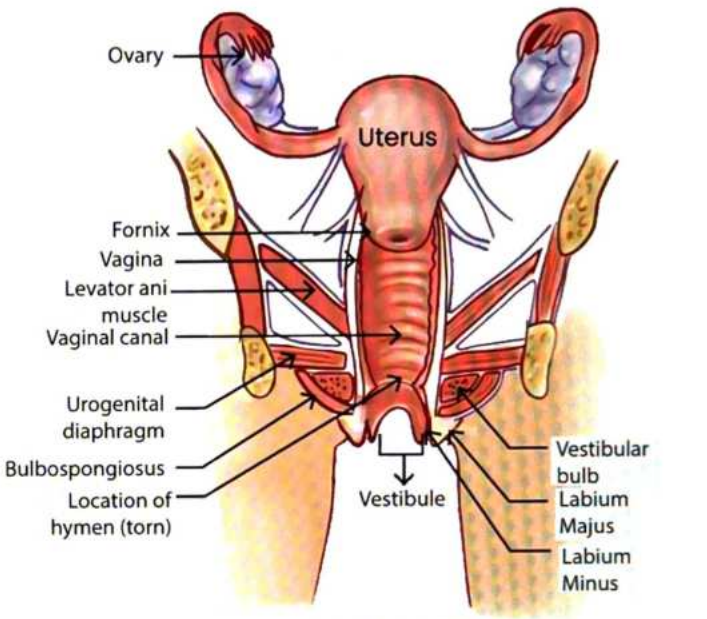


Axis of uterus: (is preventive)

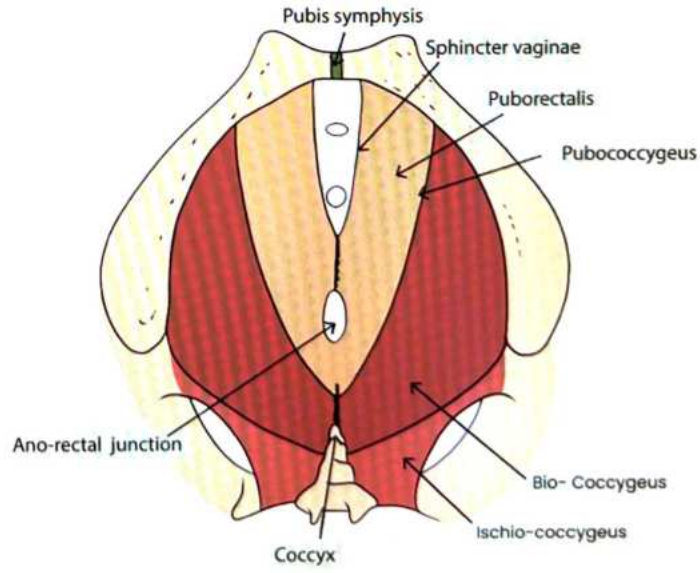


- Round ligament: maintains anteversion
- Transverse cervical/ cardinal ligament: Best ligamentous support
- Uterosacral ligaments
- Pubocervical ligaments





Coronal section of abdomen



Pelvic floor / Pelvic diaphragm / Levator ani (best support)

- Puborectalis
- Pubococcygeus

- Ilio-coccygeus
  - Weakness of these muscles are a/w PROLAPSE

> **Important Information**
> - **Best ligamentous support: Transverse cervical ligament**
> - **Best support overall: Levator ani**

DELANCY: 3 LEVELS OF SUPPORT

00:51:05

- Level 1: Uterosacral & Cardinal ligaments
- Level 2: Pubocervical & Recto vaginal fascia
- Level 3: Perineal body & Perineal membrane

STRUCTURES CUT IN AN EPISIOTOMY

00:51:35

- Posterior wall of vagina
- Transverse perineal muscles: superficial & deep
- Bulbospongiosus
- Perineal branches of pudendal vessels & nerves
- Skin & S/C tissues

PELVIC INNERVATION

00:52:01

Autonomic nerve supply

- Sympathetic: T10 to L2 nerves: Hypogastric plexus (Presacral nerve Pre-sacral neurectomy: for endometriosis pain relief)
- Parasympathetic: S2 to S4 nerves

Tubes & ovarian innervation

- Uterovaginal plexus (frankenhauser)
- Ovarian plexus

Uterus

- Inferior hypogastric plexus via T10 to L1 spinal nerves

Cervix

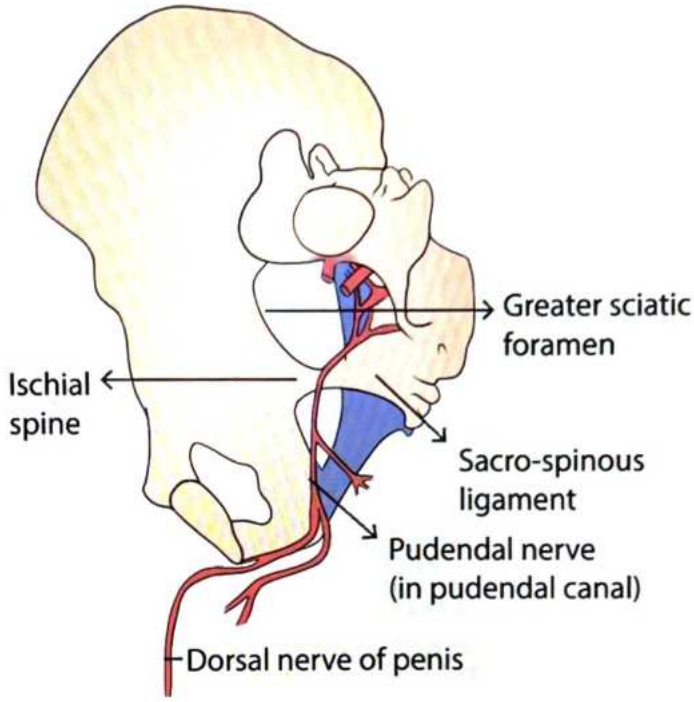
- Through pelvic splanchnic nerves via S2, S3 & S4

Lower portion of the birth canal:

- Through pudendal nerve
- Epidural analgesia: T10 – S4
- Caesarean Section: T4 and below

Pudendal nerve block

- Feel ischial spine through vagina just below ischial spine, give local anaesthetic



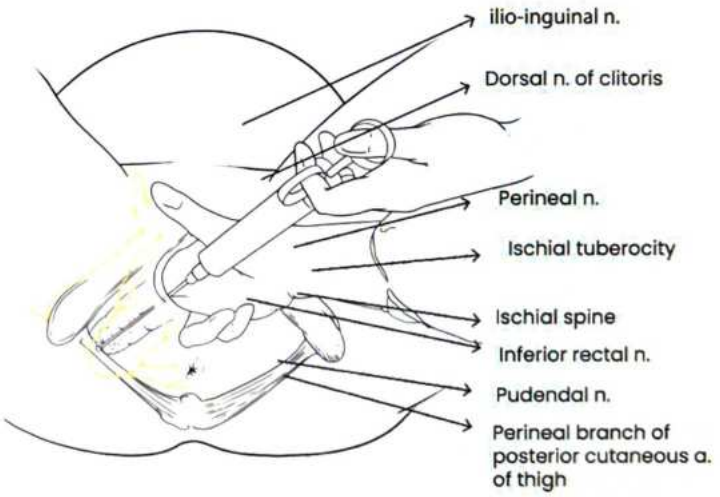
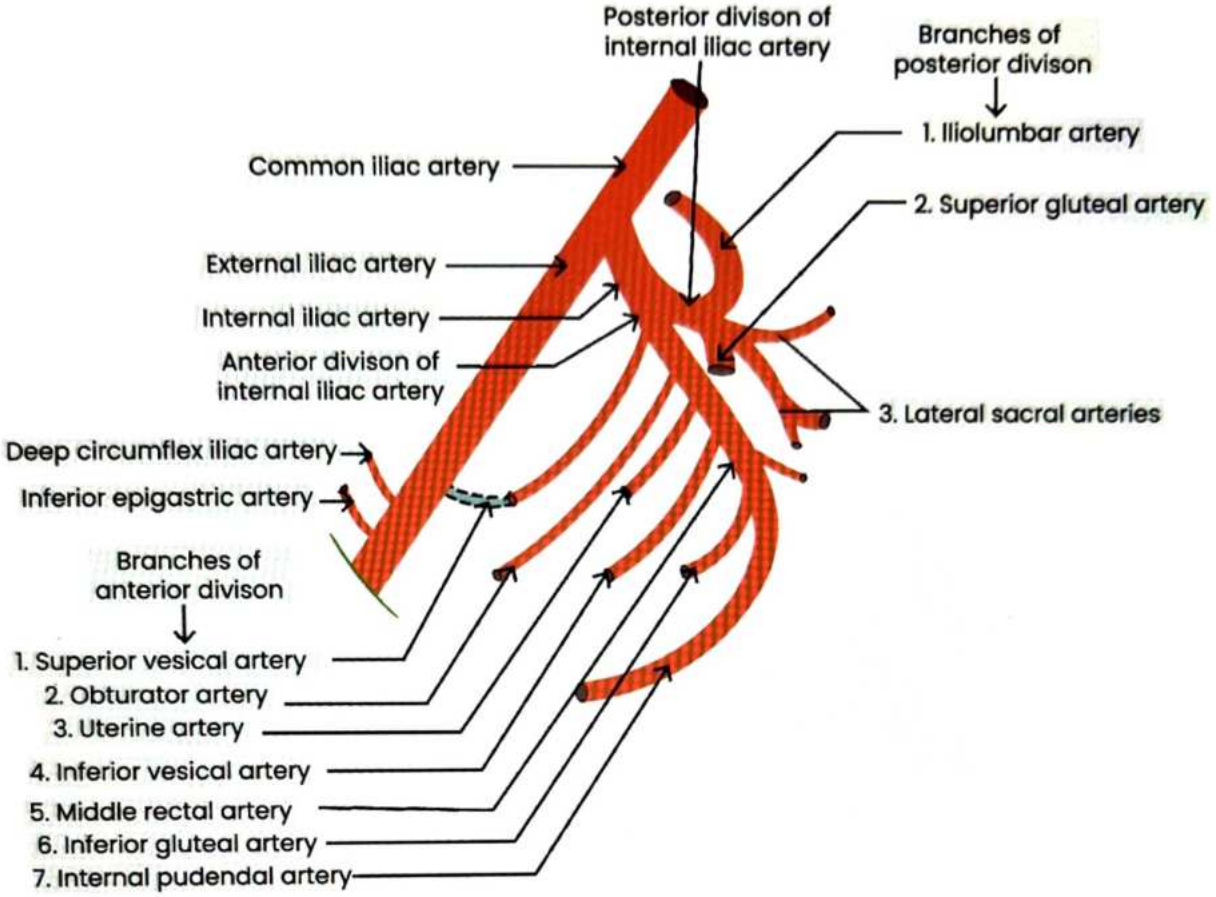


Diagram 26.1


Posterior divison of internal iliac artery
Branches of posterior divison
1. Iliolumbar artery
2. Superior gluteal artery
3. Lateral sacral arteries
Common iliac artery
External iliac artery
Internal iliac artery
Anterior divison of internal iliac artery
Deep circumflex iliac artery
Inferior epigastric artery
Branches of anterior divison
1. Superior vesical artery
2. Obturator artery
3. Uterine artery
4. Inferior vesical artery
5. Middle rectal artery
6. Inferior gluteal artery
7. Internal pudendal artery

27 MENSTRUATION PROBLEMS IN YOUNG AND SMALL GIRLS

PUBERTY

00:00:56

NORMAL PUBERTY

- Normal age : 10-12 years
- First sign of puberty : physical growth
- Specific events of puberty
  1. Thelarche : breast growth : first specific sign
  2. Pubarche/ adrenarche : Pubic and axillary hair
  3. Linear growth spurt :Height increases
  4. Menarche : Periods start

Important Information

- First sign of puberty : physical growth
- First specific sign of puberty : thelarche

DELAYED PUBERTY

00:03:00

- No periods till 13 years without pubic/ axillary hair
- Or : No periods till 15 years with normal axillary/ pubic hair

EARLY PUBERTY

- 9 years or earlier

PRECOCIOUS PUBERTY

- 8 years or earlier

00:03:52

PRE-PUBERTAL VAGINAL BLEEDING

00:04:12

- Neonatal vaginal bleeding
  - Withdrawal of maternal estrogens
  - Avoid anxiety
- Pre-pubertal vaginal bleeding
  - Severe UTI
  - Rectal bleeding because of constipation
  - Anal fissures
  - IBS
  - Physical abuse : especially with vulvo-vaginal symptoms or severe bleeding
  - Condyloma
  - Lichen sclerosus : can be seen in young girls also : due to less estrogens and dry vulva
  - Foreign body : purulent/ bloody, can do a PR and milk out FB

VAGINAL DISCHARGE IN A PRE-PUBERTAL GIRL

- Inflammation and irritation : causes vaginal d

00:09:50

- Primarily vulvitis, vaginitis is secondary

Important Information

In pre-pubertal girls vaginitis is always secondary to vulvitis, while in adolescent and adult women, vaginitis occurs primarily

- Sexual abuse : specially if there is a foreign body
- Mostly mixed organisms : Streptococcus, rarely Shigella
- Rx
  - Topical estrogens for around 4 weeks (short term) : makes vulva soft, reduce irritation
  - Antibiotics
  - Focus on hygiene

PRECOCIOUS PUBERTY

00:13:03

- Periods in the absence of secondary sexual characters, 8 years or before
- Pubic hair growth before 7 years
- Breast growth before 6 years (U/L or B/L)
- Precocious puberty leads to premature closure of epiphysis inadequate height
- Etiology
  - MC : idiopathic
  - CNS lesions like hypothalamic hematoma
- Raised LH/FSH > 1
- Rx
  - GnRH analogues (depot form) : desensitization/ down regulation of pituitary receptors
  - GH : controversial role

VAGINAL TUMORS

- MC in pre-pubertal age : Embryonal Rhabdomyosarcoma (grape like clusters)

TRAUMA

- Rule out : sexual abuse
- Accidents

PELVIC MASSES IN YOUNG GIRLS

00:18:33

- Germ cell tumors in pre-pubertal

- Dysgerminoma
- Dermoids
- Yolk sac tumors
- Embryonal
- Pregnancy
- Functional cysts
  - Follicular
  - Corpus luteal cyst

ADOLESCENT BLEEDING PATTERNS 00:20:00

- During first 2-5 years of periods : Anovulatory cycles:
  - Irregular : delayed 21-45 days cycles
  - Mean duration : 7 days
  - >80 ml is called excessive
  - Definition of abnormal bleeding in adolescents
    - → > 45 days
    - → < 21 days
    - → Bleed > 7 days
- Management of anovulatory bleeding
  - First line : tranexamic acid. NSAIDS
  - Hormones
    - → COC (artificial cycles)
    - → Progesterones : 10 days regime (for 10 days from day 14) or 5 day regime
  - No endometrial biopsy

Important Information

No endometrial biopsy for puberty menorrhagia

- Also rule out
  - Hematological abnormalities: Von villebrands
  - Infections : Chlamydia, STD
  - PCOS
  - Anatomical defects
    - → Transverse vaginal septum
    - → Didelphys
- Ask h/o sexual activity
  - Adolescents tend to hold back information about sex and avoid using contraception
  - Increased chances of unwanted pregnancies and unwanted abortions

LONG TERM MENSTRUAL SUPPRESSION 00:30:00

- Required for
  - Coagulopathy
  - Malignancy requiring chemotherapy
  - Developmental disabilities
- Progesterones
  - Norethindrone
  - Medroxyprogesterone
    - → S/E : metrorrhagia (mid cycle spotting)
- Long term COC : continuous/ give break once in 3-4 months
- DMPA : atrophy, bloating, mood swings
- GnRH analogues : downregulation of pituitary
- LNG-IUCD (MIRENA) : no systemic side effects, causes atrophy

LEARNING OBJECTIVES

- Fundamentals of pregnancy : Placenta, Diagnosis of pregnancy, Prenatal diagnosis : indications and techniques, Physiological changes in pregnancy
- Early pregnancy complications : vomiting, Abortions : types and presentation, causes, Molar and Ectopic pregnancy : presentation and management
- Obstetric complications: presentation, risk factors, diagnosis and management of Preterm labour, Diabetes, Pre-eclampsia, multiple pregnancy, Antepartum hemorrhage and Rh incompatibility
- Tools of assessment of fetal well being
- Systemic complications in pregnancy : medical complication, Drugs, Anemia, COVID, infections
- Labour and delivery : basics of labour, stages, management of normal and abnormal labour, basics of instrumental delivery, Induction of labour
- Cesarean section : indications and management of previous cesarean pregnancy
- Puerperium : normal and abnormal

1 PHYSIOLOGICAL CHANGES OF PREGNANCY

UTERUS

⏱ 00:00:50

Weight

- Non Pregnant Uterus → 60 grams
- Pregnant Uterus at term → 1100 grams
- Uterine Hypertrophy is d/t → Estrogens (mainly) ?Progesterone

Shape and growth

- Globular and almost spherical by 12 weeks
- Becomes abdominal after 12 weeks (if retroverted: doesn't grow into abdomen, gets fixed in pelvisurinary retention, can form sacculation)
- Level of umbilicus 24 weeks
- At xiphisternum 36 weeks
- Comes down with full flanks 40 weeks

Uteroplacental blood flow

- From 2 uterine arteries to placenta : 550-650 ml/min near term
- ↑ progressively
- Range → 450 - 650 ml/min near term
- Uterine artery flow/ min : 500 ml (each)

CERVIX

⏱ 00:06:30

- ESTRADIOL Stimulate growth of columnar epithelium on the cervical canal so it becomes violet & is called ECTROPION
- HEGAR SIGN: softening of isthmus, on a p/v, the abdominal & vaginal fingers seems to oppose below the body of Uterus, 6th week
- CHADWICK SIGN (JACQUEMIER'S SIGN) is bluish discoloration of vagina & Cervix, 6-8 weeks
- HARTMANS SIGN: Implantation bleeding
- PLACENTAL SIGN:
  - LMP-25/8, pregnant on 25/9
  - [illegible] P/V on expected date of periods 1 month later from LMP
- OSIANDER (VAGINAL SIGN), pulsatality in the lateral fornices, around 8th week
- PALMERS SIGN: Rhythmic uterine contractions felt in early pregnancy
- GOODELL SIGN, Softening of the cervix, 6-8 weeks
- BRAXTON HICKS contractions around 16-18 weeks (5-25 mmHg, once in 20 mins)

BREAST

⏱ 00:13:20

- Estrogen increase in no. of glandular ducts
- Progesterone proliferation of glandular epithelium of alveoli
- Prolactin leads to → Active secretion of milk after birth
- Within few months : thick, yellowish fluid is secreted : colostrum
- Breast tenderness & parasthesias increases
- Areola
  - Become broader
  - Glands of Montgomery
    - → No. of small elevations
    - → Hypertrophic sebaceous glands

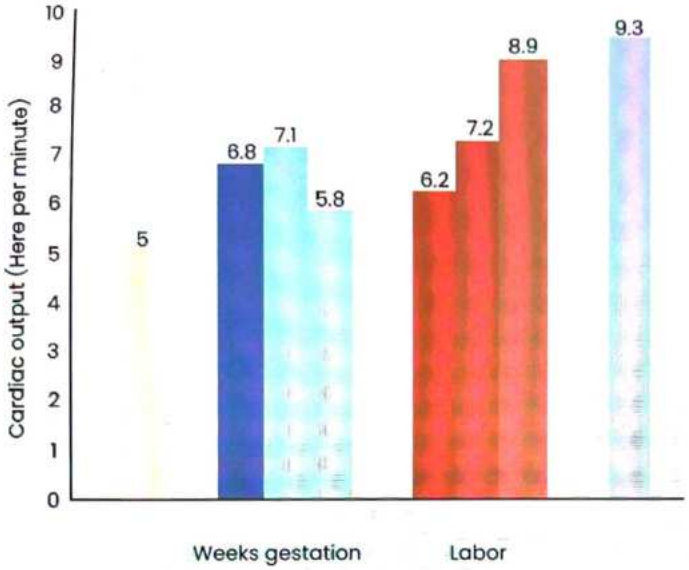
CARDIO VASCULAR SYSTEM

⏱ 00:14:39

Heart → Moves upwards & outwards
→ Hypertrophy of cardiac muscle

Cardiac output → Starts ↑ing by as early as 5th week
→ Increased by 30% (6 Ltr /min)
→ Reaches to peak at 32nd - 34th week (50% increase)

- Maximum : immediate postpartum (70% increase)
- Cardiac failure : max chances immediately after delivery



Blood pressure

- Early or mid pregnancy BP → ↓
- Late pregnancy BP → ↑(resumes to normal)
- Heart Rate → ↑(10-20%)
- Stroke volume → ↑(10%)
- Mean Arterial Blood Pressure → ↓(10%)
- (2 DBP + SBP)/3
- Peripheral Resistance → ↓(35%)
- Supine hypotension syndrome : In approx. 10%, Supine compression of great vessels by Uterus causes significant arterial hypotension.

Heart sounds

- 1st Heart Sound → Exaggerated splitting of 1st heart sound
- 3rd Heart Sound → Loud & easily heard
  → d/t rapid filling of Ventricles
- Systolic murmur after delivery → > 95% develop it, disappears
- Continuous murmur → 10% develops it, d/t ↑ in mammary blood flow

HEMATOLOGY

00:20:30

Blood volume

- ↑ by 30-45% at 32nd -34th wk (peak)
  RBC ↑ is only 20-30% , plasma volume ↑ is more (as compared to RBC ↑) , thus there is net hemodilution
- Contributing factors for increase in blood volume
  - ↑ Na retention
  - ↓ Thirst threshold
  - ↓ Plasma Oncotic pressure
- Effect of hemodilution : to prevent clogging of small vessels supplying placenta in early pregnancy

Red Cells

- Hb → reduces from 13 → 11 gm%
- HCT → form 38 → 31% (HCT/3 = Hb)
- Albumin → ↓ 35 g/L

Decrease in	Increase in
Red cell concentration	White cell count
Hb concentration	ESR
Hematocrit	Fibrinogen concentration
Plasma folate concentration	

Previous Year's Questions

Q. ESR in pregnancy increases due to an increase in? AIIMS 2020

A. Albumin
B. Fibrinogen
C. Platelets
D. Anti-thrombin

Clotting factors in pregnancy

- In pregnancy, there in increased concentrations of all clotting factors except factors XI & XIII.
- In Non-pregnant women : Plasma fibrinogen averages 300 mg/dL (200-400 mg/dL)
- In Ⓝ pregnancy:
  - Plasma fibrinogen concentration ↑ 50%
  - In late pregnancy, it averages 450 mg/dL (300-600 mg/dL)
- Relevance : during PPH, amount of RBC lost is less, blood clots better so blood loss is less

RESPIRATORY SYSTEM

00:24:55

- Diaphragm → Rises about 4 cm
- The sub costal angle → ↑ from 68° to 104°
- Respiratory Rate → No Change
- Vital Capacity → No Change
- Tidal volume → ↑(40%)
- FRC → ↓(20% - 30%) (400 - 700 ml)
- Inspiratory Capacity → ↑(5-10%)
- Total lung capacity → Unchanged (FRC + Inspiratory capacity)

Previous Year's Questions

A woman at 12 weeks pregnancy presents with occasional shortness of breath and desire to breathe deeper. There is no associated symptom and vital parameters are all normal. Chest auscultation shows normal air entry. Which of the following is the best explanation for such presentation? NEET 2019

A. Increased residual volume and increased respiratory rate

B. Increased respiratory rate and vital capacity

C. Increased minute ventilation and decreased residual volume

D. decreased vital capacity and minute ventilation

URINARY SYSTEM 00:26:53

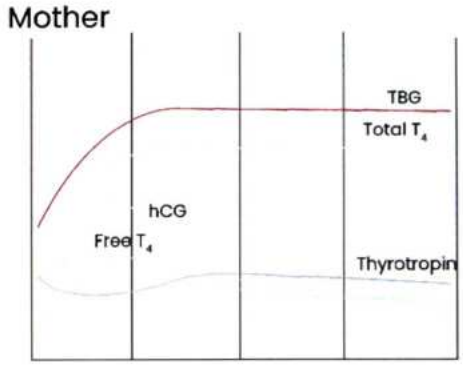
- Kidney size → ↑ by 1.5 cm
- GFR → ↑ (50%).
  - This Hyperfiltration is d/t Hemodilution
    - → Less Protein & ↓Oncotic pressure
    - → ↑ Renal plasma flow
- Glucosuria → may be seen as Renal glucose threshold ↓in pregnancy to 155-160 mg/dL (Ⓝ-180 mg/dL)
- Proteinuria → 300 mg/day or more in 24 hr urine (severe > 2gm and nephrotic range > 3gm/ 24 hours urine)
- Serum creatinine levels → ↓(0.7 to 0.5 mg/ dL)
- Creatinine clearance → ↑30%, from 100 to 115 ml/min
- Ureter → Dilated [d/t Gravid Uterus pressure & Progesterone (smooth muscle relaxant action)]
- Bladder → frequent micturition (↑ pressure & ↑Urethral length)

GASTRO INTESTINAL SYSTEM 00:29:42

- Pyrosis (Heart burn) → ↑
- Gastric emptying time → Unchanged
- The motility of large bowel → diminished resulting in constipation, ↑ Hemorrhoids
- Liver function → Alkaline Phosphatase doubled
  - → SGPT, SGOT, GGT all are reduced
- Gall Bladder Contractility → decreases
  - → Progesterone impairs GB contraction by inhibiting Cholecystokinin - mediated smooth muscle stimulation
  - → Intrahepatic Cholestasis & Pruritis gravidarum d/t [illegible] Bile Salts

ENDOCRINE SYSTEM 00:32:20

- Pituitary (Hypertrophy)
  - Enlarges by approximately 135%
  - Estrogen induced Hypertrophy and hyperplasia of Lactotrophs
- Serum PRL : increases during pregnancy, falls immediately after delivery, increases episodic rise during suckling which causes lactation
- Gonadotrophs decline in number
- Corticotrophs & Thyrotrophs remain constant
- Somatotrophs are generally suppressed : Because Placenta is making lots of GH (Placental GH) which causes feedback inhibition of Somatotrophs
- Thyroid
  - TSH reduces in 1st trimester : in 80% women because of ↑HCG levels (subunit of HCG subunit of TSH, HCG has intrinsic thyrotropic activity)
  - TBG increases, zenith at 20th week
  - FreeT_3, FreeT_4 unchanged



INVESTIGATIONS OF PREGNANCY 00:35:00

Pregnancy tests detect HCG in mother urine or serum

- **Urine pregnancy Test :** Day of missed period → 7 0 % sensitive
- **Serum b HCG by ELISA :** > 95% sensitive
- **Radio Immune Assay (RIA)**
  - 100% sensitive
  - Sensitivity to 5 mIU
  - Positive since day 7th of ovulation
- **USG**

G-SAC		CARDIAC ACTIVITY
TVS	4+Weeks	5+ weeks
TAS	5+ Weeks	6 + weeks

> 12 weeks FHS heard with fetal Doppler
> 24 weeks FHS heard with Stethoscope

- **Diagnosis of pregnancy**
  - Palpation of Fetal parts from 24th week
  - Fetal movement may be felt during palpation
  - Quickening : 16-18 weeks in multi, 20 weeks in primi
  - BRAXTON HICKS CONTRACTIONS → Irregular painless contraction palpable after 16-18th week

2 DIAGNOSIS OF PREGNANCY

CASE 1

00:00:30

- LMP 20th August & missed period on 20th September; Tests done for Dx of Pregnancy?

1. **Urine Pregnancy Test**: In 60-70% [sensitive to 150 mIU of HCG]
2. **Serum HCG by ELISA**: ` in > 95% [sensitive to 5 mIU of HCG]
3. **Radio Immune Assay:** in 100% [sensitive to 1-2 mIU of HCG], Can Dx pregnancy on 7th day of ovulation
4. **Immuno Radiometric Assay**: in 100% [sensitive to 0.5 mIU of HCG], Can Dx from 7th to 10th day of Ovulation

- LMP - 20th August & Missed period on 20th September; Period of Gestation on 16th September?
  - Period of gestation is calculated from 1ST day of lmp
  - Here it is : 4 weeks and 3 days of POG
  - Dx of Pregnancy on 4 weeks 3 days POG by
  - EDD is 27 May 2019 (add 9 months + 7 days from LMP)

Previous Year's Questions

Q. A 34 year old woman using OCP since 5 months presents with amenorrhea since 6 weeks. Which of the following is best to calculate gestational age in this case? (NEET 2021)

A. 280 days from LMP
B. 256 days from LMP
C. CRL by USG
D. Abdominal girth on USG

5. USG

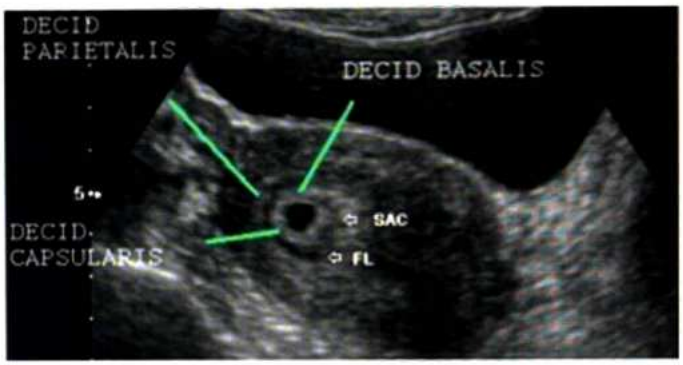
	Gestational Sac	Cardiac Activity
[Trans Vaginal sonography] (Preferred)	4 + weeks	5 + weeks
TAS [Trans abdominal sonography]	5 + weeks	6 + weeks

6. HCG

- Doubling in 48 Hrs: Intrauterine pregnancy
- Doubling in 5-7 days: Ectopic Pregnancy
- Discriminatory Zone
  - HCG level beyond which we must see a sac
  - TVS: > 1500 IU
  - TAS: > 6500 IU

Double decidual sac sign on usg

- Intrauterine sac (Eccentrically placed)
- Outer Layer : Decidua Parietalis
- Inner Layer: Decidua Capsularis
- Indicates: Intrauterine pregnancy



Previous Year's Questions

Q. Double decidual sac sign is seen in? (FMGE 2019)

A. Uterine gestational sac
B. Pseudo-gestational sac
C. Threatened abortion
D. Ectopic pregnancy

SYMPTOMS

00:13:44

- Bloating
- Morning Sickness
  - Nausea
  - Vomiting
- Increased urinary frequency
- Constipation

SIGNS

- **Breast Changes**
  - Breast size increases

- Areolar size increases
- Increase in Montgomery tubercles

- **In 2nd Trimester**
  - Quickening (22-24 wks in Primigravida); (20 wks in Multigravida)
  - Uterine souffle
  - Funic (umbilical) souffle } around 24 weeks
  - Internal Ballottement: Around 16-18 wks
  - External Ballottement: Around 22-24 wks

- **In 3rd Trimester** (> 28 wks)
  - Fetal Heart sound heard by Fetoscope / Stethoscope
  - Fetal parts can be felt
  - Fetal movements can be felt

DIAGNOSTIC SIGNS OF A NON - VIABLE PREGNANCY BY TVS

⏱ 00:20:00

1. Gestational Sac 25 mm size with no yolk sac or fetal node (Pole)
2. Crown rump length 7 mm with no cardiac activity
3. G. Sac Present 2 wks later → No embryo seen, no cardiac activity
4. G. Sac + Yolk Sac present → 11 days later → No embryo seen, no cardiac activity
5. Unusually large Yolk sac 7 mm (Fetal node is either not formed & if formed then doesn't survive)

3 PRENATAL DIAGNOSIS

USG

⏱ 00:01:51

1st Trimester [Up to 12 weeks]

- Can assess formation of normal fetus & presence of gross fetal structure
- Only NTDs can be detected are → Anencephaly & Acrania

2nd Trimester

- Targeted scanning for specific defects can be done
- Soft markers for Down syndrome
  - Brachycephaly
  - Nasal bone absence
  - Clinodactyly (short 5th digit)
  - Thick Nuchal fold
  - Short femur
  - Flat facies
  - Short humerus
  - Echogenic bowel
  - Echogenic focus in Ventricle
  - Sandal gap
  - Single Transverse Palmar crease (Simian crease)
- Markers for Spina Bifida
  - Scalloping of frontal bones: Lemon Sign
  - Forward curvature of Cerebellum: Banana Sign
- Nuchal translucency > 3 mm: Suggestive of Down syndrome
- Nuchal fold thickness > 6mm, after 14 weeks: Suggestive of Downs
- Absent Nasal bone: Suggestive of Down Syndrome

Previous Year's Questions

Q. Nuchal translucency in USG can be detected at ___ weeks of gestation?

(NEET 2019)

A. 11-13 weeks
B. 18-20 weeks
C. 8-10 weeks
D. 20-22 weeks

BIOCHEMICAL MARKERS FOR DOWN SYNDROME

- **Up to 12 weeks: Dual marker**
  - HCG - ↑
  - PAPP-A - ↓
- **From 16th week onwards**
  - Triple marker

	Median Values	Measured Values in Downs
HCG	x	High
UE_3	y	Low
α FP	z	Low

→ Expressed in MOM (Multiples of Median) units
→ 60-70% sensitive

- Quadruple marker
  → Triple marker + Inhibin A↑
  → 80% sensitive
- 1st Trimester screening (HCG, PAPP-A) + Nuchal translucency → 80% sensitive

Previous Year's Questions

Q. Quadruple marker consists of all, EXCEPT?

(INI CET 2021)

A. B HCG
B. Inhibin B
C. Unconjugated estriol
D. AFP

Integrated screening (1st + 2nd trimester screening)

- 94-96% sensitive
- Best screening test

Confirmatory test 00:15:34

- 1st Trimester: Chorionic Villus Sampling
- 2nd Trimester: Amniocentesis

Previous Year's Questions

Q. Woman with a h/o abortion due to Down's syndrome in her past pregnancy presents now at 11 weeks gestation. What is the best diagnostic modality for this child at this gestation to rule out Down's syndrome? (FMGE 2020)

A. Amniocentesis
B. Chorionic villous sampling
C. Double marker
D. Triple marker

CELL FREE FETAL DNA ASSESSMENT / NON - INVASIVE FETAL TRISOMY TESTING (NIFTY)/ NON INVASIVE PRE NATAL TESTING (NIPT) 00:16:15

- After 12 weeks → Fetal DNA may be seen in maternal circulation
  - 98% sensitive
  - It is not still diagnostic test
  - If –ve: Down syndrome can be ruled out
  - If +ve: Do confirmatory tests

CHORIONIC VILLUS SAMPLING

- Done at 1st trimester (10-13th week)

  Put a needle by Trans abdominal method
  Trans vaginal method (is MC used)
  ↓
  Take out fetal villi (Chorionic frondosum) and discard maternal villi
  ↓
  Run the karyotype on the fetal cells & genetic analysis done
  ↓
  Gives early diagnosis, but abortion chance is upto 2%
- If doing < 10 weeks can cause
  - Limb reduction defects
  - Oro mandibular defect

AMNIOCENTESIS 00:19:47

- Done at 16-18th weeks

  Put a needle by Transabdominal method
  ↓
  Take out Amniotic fluid around 20 ml, containing fetal skin cells
  ↓
  On fetal skin cells → Do Karyotype & genetic analysis
- Abortion Rate: < 1%
- But diagnosis gets delayed as compared to Chorionic villus sampling
- Karyotype results come after 7-10 days in both CVS & Amniocentesis

Early Amniocentesis

- done b/w 13-15 weeks
- Abortion rate Chorionic villus sampling

PER CUTANEOUS UMBILICAL BLOOD SAMPLING (PUBS)/ CORDOCENTESIS 00:25:54

- done after 18 weeks
- Usually done for
  - The assessment of Fetal anemia
  - Blood transfusion to the fetus
  - Diagnosis of fetal problems
- Invasive procedure

  Umbilical vein near insertion into into placenta
  ↓
  Karyotype can be done in blood lymphocytes
- Gives result in 24-48 hours

Important Information

- Assessment of Middle Cerebral Artery Velocity is better to assess fetal anemia

Previous Year's Questions

Q. In current obstetrics, what is the best test for monitoring sensitized Rh negative mother? (NEET 2020)

A. biophysical profile
B. middle cerebral artery doppler
C. Fetal blood sampling
D. amniotic fluid spectrophotometry

α FETO PROTEIN 00:30:09

- Glycoprotein
- Source: Yolk sac (Initially), Liver & Gut (later)
- ↑ till 13th [illegible] fetal circulation and then reduces

gradually

- In Maternal circulation FP starts ↑ after 12th week
- Earlier ↑ FP in amniocentesis is very sensitive for NTD (This is now replaced by USG)
- Confirmatory test for NTD
  - → Amniotic fluid Acetylcholinesterase

αFP is higher in 00:32:59	αFP is reduced in 00:33:56
• Duodenal atresia • Esophageal atresia • Osteogenesis imperfecta • NTD • Omphalocele • Gastroschisis • Cystic Hygroma	• Fetal death (IUD)/ Abortion • Trisomy • Over estimated maternal age • Obesity • Trophoblastic Diseases

PRE IMPLANTATION GENETIC DIAGNOSIS

00:35:35

Indications

- Previous genetic defects
- Recurrent abortion

Methods

- Blastomere Biopsy (MC Method)
- Trophoectoderm Biopsy
  - Trophoectoderm gives rise to placenta
  - Safer method
- Polar Body Biopsy
  - Only maternal component present
  - Not preferred

Pre implantation genetic screening 00:39:10

- Indicated for high risk cases
- But with no H/O previous abortions/ genetic defects in previous babies

Previous Year's Questions

Q. In antenatal screening for aneuploidy, which is/are TRUE statements? (AIIMS 2019)

A. Fetal cell DNA from maternal blood cannot be used

B. Nuchal translucency is seen at 11-14 weeks

C. Anomaly scan is done at 12-16 weeks

D. AFP is reduced in trisomy

E. Triple marker is done from 16 weeks onwards

4 FETAL CIRCULATION

ADULT CIRCULATION - A RECALL ⏱ 00:01:12

Right heart (De-oxygenated blood)
↓
Lungs
↓
Blood gets oxygenated
↓
Pulmonary Veins
↓
Left Atrium (Oxygenated blood)
↓
Left Ventricle
↓
Blood sent to all over the body via AORTA

FETAL CIRCULATION ⏱ 00:02:08

- Oxygen exchange occurs in placenta
- 2 Umbilical arteries carry deoxygenated blood : from fetus to placenta
- Umbilical vein carries oxygenated blood : from placenta to fetus

Important Information

- **Adult Heart: Works as series**
- **Fetal Heart: Works as Parallel**

Umbilical Cord

- Contains
  - 2 arteries
  - 1 Vein [Right vein obliterated, left vein persists;

How to remember

- **Left Vein Left Behind**

Refer Figure 4.1

Refer Flow Chart 4.1 ⏱ 00:03:33

EVENTS AFTER BIRTH ⏱ 00:09:48

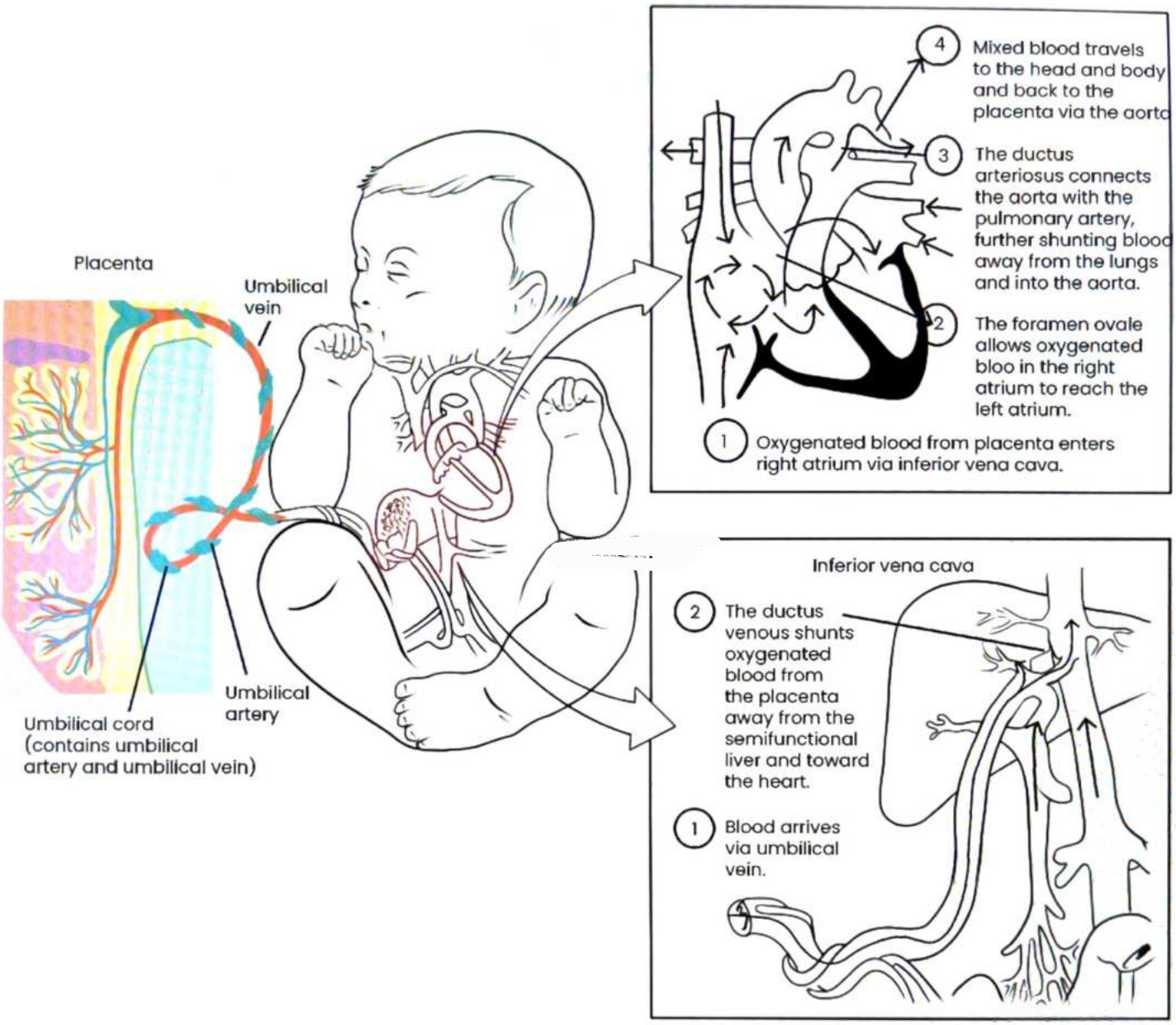
- First breath → lungs expand → resistance reduces → majority blood goes to pulmonary arteries and lungs for oxygenation → and very less blood goes to ductus arteriosus → closes at birth
- Oxygenated blood comes back to left atrium → pressure in left atrium increases → immediate physiological closure of foramen ovale (septum primum and secundum approximate) → all oxygenated blood goes to left ventricle → rest of the body
- No blood coming from placenta → closure of ductus venosus
- Functional closure of Ductus venosus, Ductus arteriosus and foramen ovale occurs immediately at birth

Structure	Physiological closure	Anatomical closure	Remnant
Ductus venosus	10-96 Hrs after birth	2-3 weeks of life	Ligamentum venosum
Ductus arteriosus	10-15 Hrs after birth	15-21 days (~3months also)	Ligamentum arteriosus
Foramen ovale	At birth	3 months (within 1st year)	Fossa ovalis

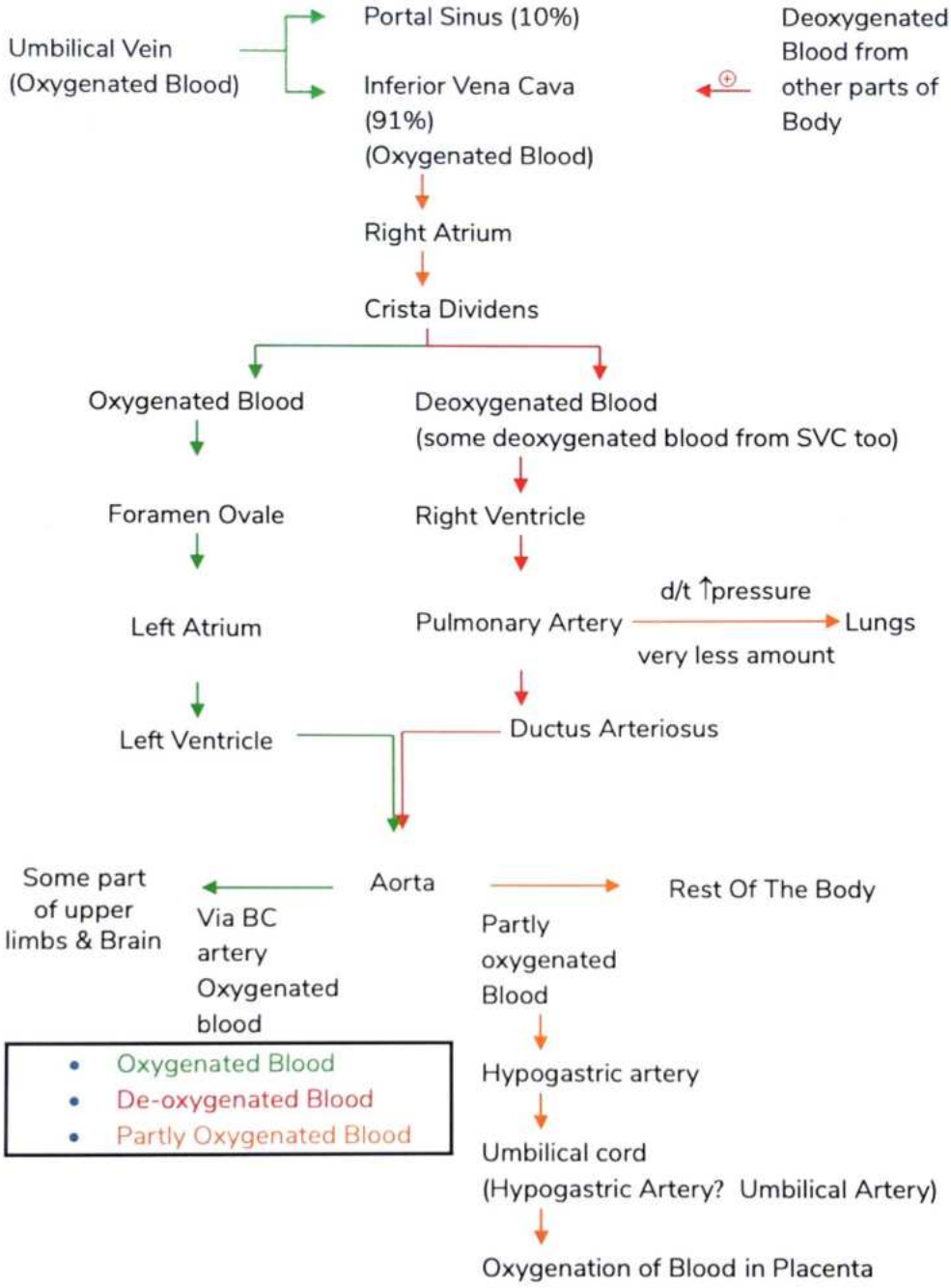
Fate of ⏱ 00:16:51

- Umbilical Vein: Ligamentum Teres (Round ligament of Liver)
- Umbilical Arteries/ Hypogastric artery: Umbilical Ligament

Figure 4.1


Placenta
Umbilical vein
Umbilical artery
Umbilical cord (contains umbilical artery and umbilical vein)
4 Mixed blood travels to the head and body and back to the placenta via the aorta
3 The ductus arteriosus connects the aorta with the pulmonary artery, further shunting blood away from the lungs and into the aorta.
2 The foramen ovale allows oxygenated bloo in the right atrium to reach the left atrium.
1 Oxygenated blood from placenta enters right atrium via inferior vena cava.
Inferior vena cava
2 The ductus venous shunts oxygenated blood from the placenta away from the semifunctional liver and toward the heart.
1 Blood arrives via umbilical vein.

Flow Chart 4.1



5 POSTPARTUM HEMORRHAGE

- MMR: Around 130/100,000 women
- MCC: Obstetric hemorrhage

OBSTETRIC HEMORRHAGE

00:01:20

Types

1. Ante-partum Hemorrhage: Any bleed in genital tract after 28 wks & before delivery
2. Postpartum Hemorrhage: Any bleed in genital tract after delivery, MCC of MMR in India

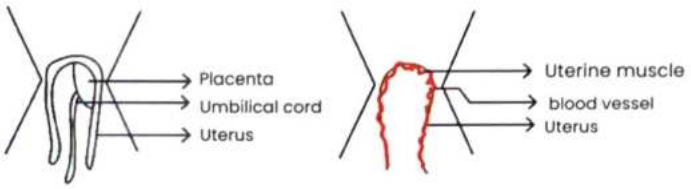
POST PARTUM HEMORRHAGE (PPH)

00:02:26

Definitions

- > 500ml in normal delivery
- > 1000 ml in a cesarean section
- Mild PPH → > 500 ml to 1000 ml
  Moderate PPH → > 1000 ml to 2000 ml
  Severe PPH → > 2000 ml
  Massive obstetric Hemorrhage → > 1500 ml
- Any hemorrhage which can reduce Hb by 1 gm% → PPH
- If Hb drops by > 4gm% → Massive obstetric Hemorrhage

Active Management of 3rd Stage of Labor 00:07:10



- Controlled cord traction
- Uterine massage
- Oxytocin
- Incidence of PPH: 5%

Important Information

- Not included in AMTSL (Active management of third stage of labour) is Early/ Delayed cord clamping. both are applicable in certain conditions only

Previous Year's Questions

Q. Which of the following is not done in active management of third stage of labour?
(INICET 2021)

A. Early Cord Clamping
B. uterine massage
C. controlled cord traction
D. uterotonic after delivery

Causes 00:09:53

- Atonic Uterus (80%)
  - Large uterus: Big baby/ Twins/ ↑ liquor (Polyhydramnios)
  - Infections: PROM / Chorioamnionitis
  - Prolonged labor
- Injuries (Trauma): Uterus, cervix, vagina
- Coagulopathies
  - Von Willebrands Disease (VWD)
  - Idiopathic Thrombocytic purpura (I.T.P)
- Retained Tissues: Secondary PPH (after 24 Hrs, uptill 12 wks)

How to remember

Causes: 4T's
- T - Poor Tone
- T - Trauma
- T - Thrombin Deficiency

T - Tissue (Retained)

- Primary PPH: Within 1st 24 Hrs (1st 1 Hr is MC time)
- Secondary PPH: > 24 hrs till 12 wks

Previous Year's Questions

Q. Identify this lesion. (INICET 2021)

A. Condyloma Acuminata
B. Vulvar Hematoma
C. Vulvar Cancer
D. Bartholin Cyst

Previous Year's Questions

Q. A multigravida woman in labour, after delivery and placenta removal, uncontrolled bleeding was seen. What is the most common cause of PPH in this woman? (FMGE 2019)

A. Atonic
B. Traumatic PPH
C. Clotting factor deficiency
D. Retained tissues

Management 00:16:53

- Prevention of PPH
  - Oxytocin is DOC
  - Prophylactic IM/
  - IV Oxytocin (5-10 units) after delivery of shoulders
- Treatment of PPH

1. IV Oxytocin [10-20 units drip] [DOC]

Important Information

- DOC for prevention and treatment of PPH is Oxytocin

2. IV Methyl Ergometrine 0.2 mg [peak action at 90 sec]
   - Can also be given IM (IV acts faster)
   - Contra indications
     → Heart disease
     → PIH [Pregnancy Induced HTN]
     → Rh Iso immunization
     → Before 2nd twin is delivered
3. Tab Misoprostol (PGE_1): 1000 µg per rectum
4. Inj. Carboprost ($PGF_2\alpha$)
   - IM only
   - Never given IV – causes sudden HTN
   - Can be given intra-myometrial

Previous Year's Questions

Q. The maximum dose of PGF2alfa that can be given for the management of PPH is ? (NEET 2019)

A. 250 mcg
B. 200 mcg
C. 2 mg
D. 20 mg

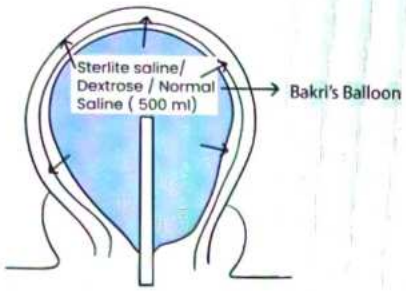
5. Recombinant VII: 90 mg/kg body wt. in 3-5 min IV infusion
6. Fibrinogen: Maintain > 1 gm/Ltr [>100 mg/dL]
   - Cryoprecipitate (3ml/kg) - > 10 times fibrinogen concentration vs FFP [30 ml/kg]
   - 10 units of Cryoprecipitate or
   - 1 litre of FFP
7. Uterine artery embolization
   - Prophylaxis for Placenta Previa, Placenta Accreta
   - for Rx in acute conditions
8. Intravascular AORTIC balloon compression – prophylactic

Previous Year's Questions

Q. All of the following are used for prevention of PPH, EXCEPT? (AIIMS 2019)

A. Misoprostol
B. Dinoprostone
C. PGF 2 alfa
D. Oxytocin

9. Balloon Tamponade 00:31:02
   - Bakri's balloon [Now-a-days]
   - Bakri's balloon is distended by 500 ml fluids
   - S[illegible]be
   - Foley's catheter [can hold up to 100 ml of fluids]
   - Condoms

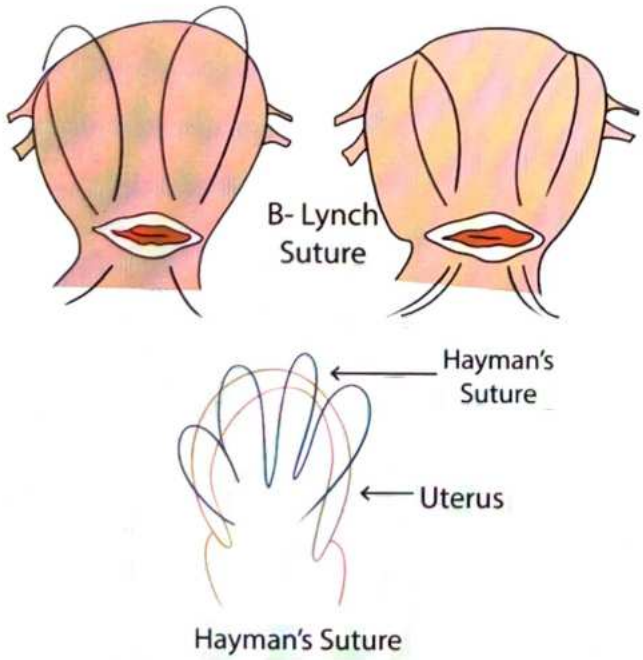


10. Surgical Methods 00:34:01
    - Compression / Brace sutures: Christopher B lynch in 1997
    - Hayman's sutures
    - Uterine artery ligation
    - Ovarian artery ligation
    - Internal Iliac artery ligation
    - Hysterectomy

Previous Year's Questions

Q. 25 year old primigravida, after giving birth to her child had continuous bleeding from the uterus. The patient was taken to OT and planned for uterine devascularization. Which of the following is the correct order of uterine devascularization?
(NEET 2021)

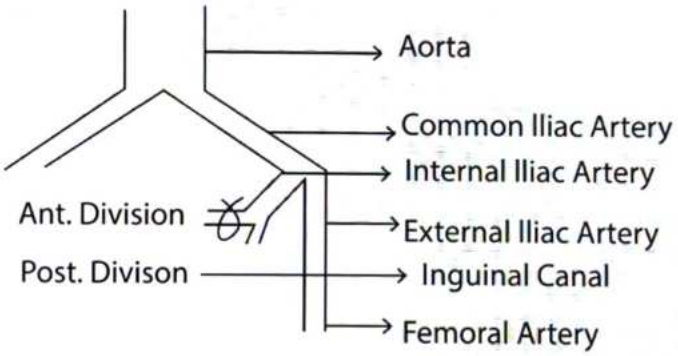
A. Uterine artery, pudendal artery, vaginal artery
B. Uterine artery, Internal iliac artery, obturator artery
C. Uterine artery, ovarian arter[illegible]tery
D. Uterine artery, ovarian artery, external iliac artery



Internal Iliac Artery Ligation 00:37:40

Branches of Ant. division of Internal Iliac Artery

- Uterine
- Obturator
- Superior vesical
- Inferior vesical
- Internal pudendal
- Middle rectal
- Inferior gluteal
- Vulval
- Clitoral



Posterior Division Internal Iliac Artery Branches

How to remember

- Short G - Superior Gluteal
- IL - IlioLumbar
- LS - Lateral Sacral

Previous Year's Questions

Q. Branches of the anterior division on Internal Iliac artery include?
(INICET 2021)

A. Lateral sacral
B. Superior vesical
C. Inferior vesical
D. Middle vesical
E. Inferior gluteal
F. Vaginal

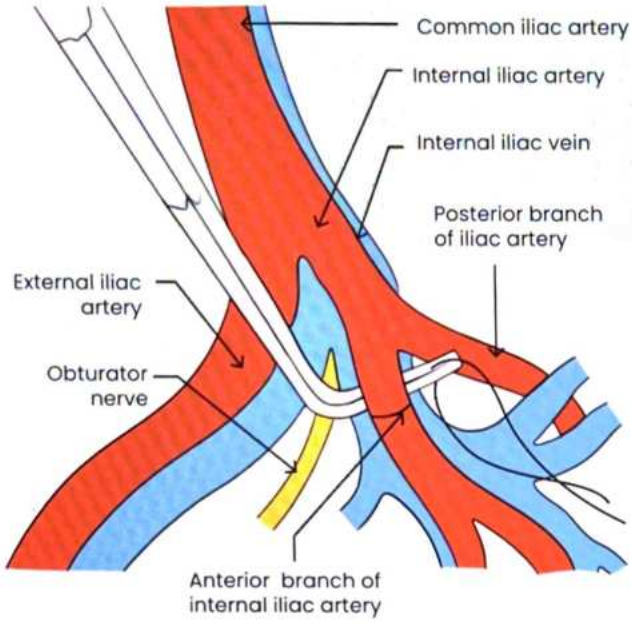
Principle

- Using a snug ligature we reduce the pulse pressure (therefore pressure of Artery reduces and becomes appx. Equal to vein → sluggish flow → Induces Thrombosis

Previous Year's Questions

Q. What is the common obstetric/ gynaecological condition. where this procedure is done?

(FMGE 2020)



A. Dysfunctional bleed after hysterectomy
B. Atonic PPH
C. Recurrent bleed from Ca cervix
D. Bleed from vulva

Therapeutical Goals

00:42:21

- Hb → > 8 gm/dl
- Fibrinogen → > 100 mg/dl
- Prothrombin Time → < 1.5 times of Ⓝ
- Activated Partial Thromboplastin Time → < 1.5 times of Ⓝ
- Platelet count → > 75000
- Immediate O -ve Blood Transfusion can be given
- 4 units of group matched through ② 14 gauge IV cannulas.

Previous Year's Questions

Q. Atonic PPH management. which one is incorrect?

(AIIMS 2019)

A. Uterine massage is the first step in management
B. Oxytocics are given to all patients
C. Manual removal of placenta is done
D. B-lynch is put if medical management fails

CLINICAL QUESTIONS

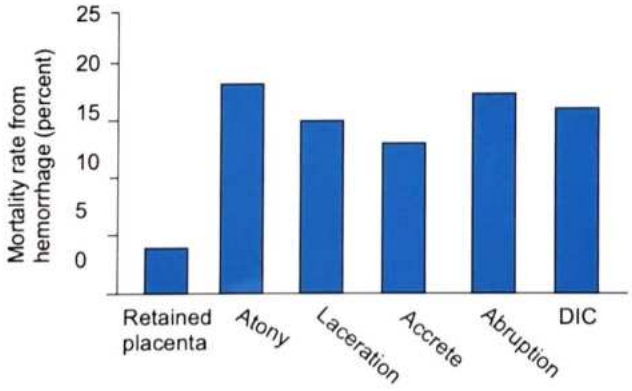
Q1. A woman is brought by her relatives in an unconscious state. She has just had a vaginal delivery of a full term healthy infant at home one hour back. The baby is doing well. On examination, the patient is pale, has a pulse rate of 124/min with an unrecordable BP. Which of the following is the most likely associated finding that should be looked for next?

A. Vaginal bleeding
B. Urine albumin
C. Abdominal distension
D. Amniotic fluid embolism

Answer: A

Solution

- The woman has presented in shock in postpartum period. The most frequent cause of shock in the postpartum period is Post partum hemorrhage, the cause of which most likely is failure of the uterus to contract sufficiently after delivery and to arrest bleeding from vessels at the placental implantation site



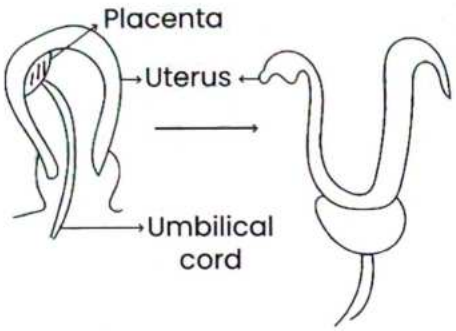
- Urine albumin is raised in Pre-eclapmsia which would most likely present as eclampsia/ seizures and not shock.
- Amniotic fluid embolism (AFE) it as a syndrome of sudden peripartum shock, however is much rarer. This is a catastrophic obstetric emergency that can present as sudden, profound, and unexpected maternal collapse associated with hypotension, hypoxaemia, and disseminated intravascular coagulation (DIC). It occurs when amniotic fluid, fetal cells, hair, or other debris enter the maternal circulation.

6 PLACENTA : SEPARATION AND COMPLICATIONS

UTERINE INVERSION

00:01:21

- Pulling the cord without placental separation causes acute uterine inversion
- Definition - defined as turning inside out of the fundus into uterine cavity following child birth



INVERSION OF UTERUS

- Inversion complications → Neurogenic shock (pain)
  → Hemorrhagic shock

Important Information

MCC of death d/t Inversion → Hemorrhagic shock

Causes 00:02:37

- Fundal Implantation of Placenta
- Uterine atony
- Badly adhered placenta
- Sudden cord traction

Management 00:03:49

- Get IV Access
- Give rapid infusion of fluids, arrange Blood
- Try & Reposit ASAP

1) Manual Reposition : part which came out last, goes in first
2) Hydrostatic Reposition → O' Sullivan's method
   - Give Inj Terbutaline → Relaxes Uterus

↓

Reposit uterus

By filling fluid in uterus, keeping one hand in vagina, so that water dose not come out (hydrostatic) or manually

↓

Give Inj. Oxytocin

Inj. Methylergometrine

3) Surgical Methods
   - Huntington's Method → Atraumatic clamps
   - Haultian Method → Resection of the constricting Bands

SEPARATION OF PLACENTA

00:09:41

Methods

- Controlled Cord Traction (BRANDT & ANDREW's Method) : gentle traction on cord with one hand with other hand on uterus for counter-traction
- CREDES METHOD (Obsolete now)
  - Squeeze uterus and pull the cord
  - Causes RETAINED PLACENTAL BITS
  - Gives early separation of Placenta

Signs 00:11:34

- Lengthening of Cord
- Fresh bleeding
- Supra pubic bulge (Most specific sign)

RETAINED PLACENTA

- Separation of Placenta (Third stage of Labor) → >30 min
- Management
  - Manual Removal of Placenta under General Anesthesia in OT

Retained Placental Bits 00:13:00

- causes 2° PPH (after 24 hours up to 12 weeks)
- Mx by Curettage
- Complication → Asherman's Syndrome

MODE OF SEPARATION

00:18:40

Central Separation/ Shultze Separation → SHINY

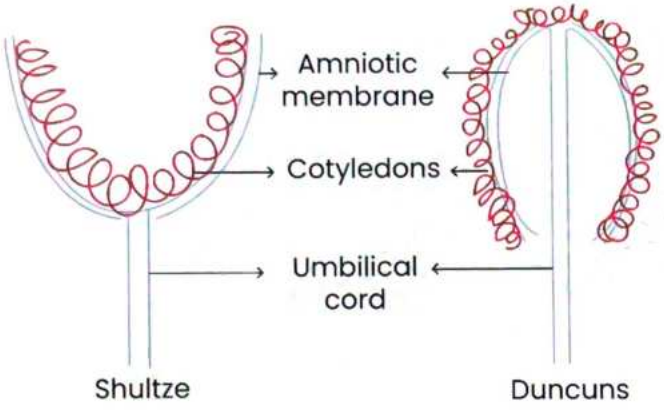
- Placenta folds on itself and comes out
- Membranes come first
- More Common
- In Controlled cord traction

Marginal Separation / Duncan's Separation → DIRTY

- Placenta everts and comes out
- Cotyledons (outer surface) comes first and membranes come out

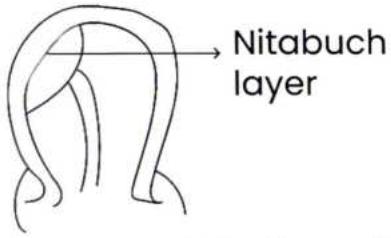
How to remember

Shultze : Shiny
Duncan : Dirty

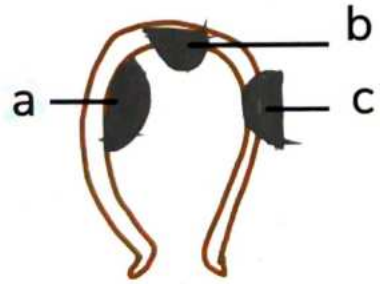


MORBIDLY ADHERANT PLACENTA

- Nitabuch's layer : Fibrinoid layer at which Placental separation happens



- Absence of layer → Morbidly adherent placenta
- Types :
  a. PLACENTA ACCRETA : stuck to wall
  b. PLACENTA INCRETA : adhered to muscle layer
  c. PLACENTA PERCRETA : up to serosa



Previous Year's Questions

A G2P1L1 lady underwent LSCS in previous pregnancy for fetal distress. This time she had an uneventful vaginal birth after cesarean but the placenta could not be removed completely. The cord snapped on traction but the placenta did not deliver. She also started to bleed more profusely now. What could be the reason? FMGE 2020

A. Succenturiate lobe
B. Inversion of uterus
C. Placenta accrete
D. Placenta previa

Management

- Laparotomy + Obstetric Hysterectomy
- If able to save the Uterus with compression sutures

↓

Give Post Op → Methotrexate, Actinomycin } to prevent the persistence of Trophoblastic tissues

Predisposing Conditions 00:29:31

- Previous Cesarean Section
- Previous Curettage
- Placenta Previa (low Lying Placenta) – MC
- Chronic Infections

Important Information

Most common cause of Placenta accrete is Placenta previa (Not previous cesarean)

7 PLACENTA AND CORD- TYPES AND COMPLICATIONS

NORMAL CORD

- Attached in the center of placenta
- Has two arteries and 1 vein
- Left vein is left behind (Right is obliterated)
- Vein takes oxygenated blood from placenta to fetus and arteries take deoxygenated blood from fetus to placenta

CORD ABNORMALITIES

00:01:35

Single umbilical artery

- 1% in singleton, around 5% in twins
- MC pathology of umbilical cord
- Reason : developmental defect
- Associations
  - Congenital abnormalities in 20% cases: renal and genital
  - Cytogenetic abnormalities : Trisomy 18
  - IUGR
  - 80% are normal
- Diagnosis : USG in a transverse section of cord in a free loop : shows 2 vessel cord

Battledore Placenta/ Marginal Insertion 00:03:53

- Peripheral Insertion instead of centre
- Can get detached in delivery of placenta
- If associated with low lying placenta, can cause cord compression

Velamentous Cord 00:05:30

- Splitting of cord before insertion
- VASA PREVIA → Velamentous Cord at internal Os
  - Can have fetal bleeding (50% fatal)
  - Painless bleeding
  - Diagnosis
    → Doppler (Best)
    → APT TEST (Alkaline denaturation test)
  - Addition of NaOH to vaginal blood in a test tube →causes Alkaline Denaturation
    Colorless → Maternal blood (alkaline denaturation)
    Stays red → Fetal RBC (resists alkaline denaturation)
  - Helps to distinguish between maternal & Fetal RBC's
  - Qualitative test

Battledore/ Marginal Insertion

Important Information

KLIEHAUER BETKE TEST (different from APT test)

- Quantitative test : amount of fetal blood contamination in maternal blood
- Done in Rh iso immunization

True And False Cord Knots 00:10:55

- False knots: Lumps of Wharton's jelly
- True knot: knots in cord : mostly safe

Long And Short Cord 00:12:40

- Normal length : 50-60 cm
- Long cord : Upto 300 cm
- Short cord: 20 cm

Circumvallate

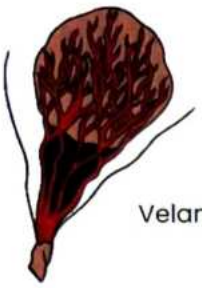
PLACENTAL ABNORMALITIES

00:13:09

Placenta extrachorialis

- Smaller chorionic plate than basal plate
- CIRCUMVALLATE PLACENTA
  - Fetal surface has a central depressed area, surrounding thick plate membrane with double fold of amnion and chorion
  - May be a/w Abruption, PROM, preterm labor, IUGR
- CIRCUMMARGINATE PLACENTA
  - Thin fibrous ring present at the chorionic plate margin
  - Transition from membranous to villous chorionic is flat

- No clinical significance



Velamentous Insertion

Bilobed placenta

- Two equal sized lobes separated by a membrane
- Occurs in 2-8% of placentas
- Cord is attached in the middle like a velamentous insertion
- Presentation
  - First trimester bleeding
  - Polyhydramnios
  - Abruption
  - Retained placenta
  - No fetal anomalies

Placenta fenestrata

- May rarely be a placenta with a true hole
- Or, more commonly, the villi are absent but the chorionic plate is intact

Accessory / succenturiate lobe

- Must always examine placenta for completion
- Form Placental retained bit
- Retained bit can lead to secondary PPH
- Mx: curettage
- Can also present as a placental polyp
- Subinvolution of placenta
- Sepsis

8 RH INCOMPATIBILITY

RH ISOIMMUNIZATION

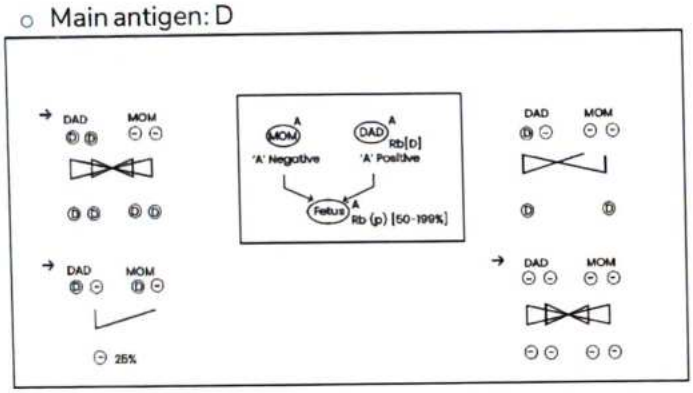
00:00:16

- ≅ Rh Allo immunization: Antibodies made in one human body acts against Red cells of another human body (mother fetus)

Rh factor

00:01:14

- Present on Chromosome 1
- Antigens in Rh factor
  - RHD / RHCE
    ↓ ↓
    D CcEe
  - Main antigen: D



Mother's blood gets mixed with fetal blood at the time of

- Delivery (5-30 ml) (MC): Do not give methergine as it causes sudden contraction of uterus→increased risk of contamination
- Abortion
- Molar Pregnancy
- Ectopic pregnancy
- Abruption
- Injury of abdomen
- Amniocentesis
- Chorionic Villi Sampling

Previous Year's Questions

Q. Anti D is to be given in all cases EXCEPT? (AIIMS 2019)
A. Abortion at 63 days
B. Manual removal of placents
C. Amniocentesis at 16 weeks
D. Intrauterine transfusion at 28 weeks

1. **Rh Negative Mother+Rh Positive Baby (first pregnancy)**
- Sensitization of Mother→ lysis of fetal RBCs in maternal circulation
- 1st Baby will be safe

2. **Rh Sensitized mother + Rh Positive Baby**
- Rh Incompatibility occurs →she already has anti D→ lysis of fetal RBCs in fetus
- Baby is not safe

Antigen / Antibody reaction on Fetal RBCs

00:14:00

- Hemolysis
- Anemia
- ↑ Bilirubin → Jaundice, Kernicterus (> 20mg/dl)
- ↑3rd Space collections → Ascites, Pleural effusion, Pericardial effusion, Edema } Hydrops Fetalis
- Erythroblastosis Fetalis

*Increased Hemolysis
↓
Compensated by Bone Marrow Hyperplasia
↓
Increased Red cell production
↓
Erythroblastosis fetalis

Prevention

00:16:38

- Mortality: 20-30%
- Anti-D 300 µg within 72 hrs
  - Will neutralize 30 ml blood (15 m RBCs) →does not allow maternal anti D to form
  - Can be given upto 4 wks

Another Situation

- 1st Pregnancy → Rh Negative mother & Rh positive Baby
  ↓
  ANTI – D Given within 72 hrs
  ↓
- 2nd Pregnancy → Baby dies d/t Hydrops fetalis
  ↓

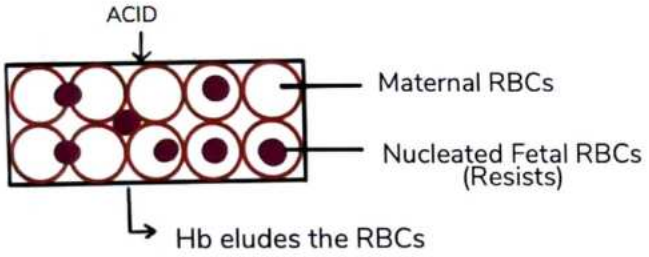
Probable Causes

00:22:40

1. Non Immune Hydrops Fetalis
- MCC of Hydrops Fetalis
- Causes
  - Cardiac (MC) - Congenital Heart Block
  - Infectious - Parvo Virus B – 19
  - GI Causes
  - Haematological - αThalassemia
  - Renal - Polycystic Kidney disease
  - Genito Urinary - Posterior Urethral Valve
  - Cystic Hygroma
2. Abortion
3. Mixed – Matched Blood Transfusion
4. Inadequate Anti – D

Kliehauer Betke Test (Acid Elution Technique) 00:30:50

- Measures Feto-maternal Hemorrhage
- Quantitative Test



- FMH = % Contamination x Maternal Blood Volume x $\frac{\text{Maternal Hematocrit}}{\text{Fetal Hematocrit}}$
- % Contamination = $\frac{\text{Fetal RBCs}}{\text{Maternal RBCs}}$,Eg = $\frac{3}{300}$ = 1 %

Understand with an example

Q. Mother wt. = 60 kg; % contamination = 1 %, calculate dose of Anti-D ?

Ans. Maternal blood volume = 60 x 100 = 6000 ml

FMH = $\frac{1}{100}$ x 6000 = 60 ml

- 30 ml blood is neutralized by 300 µg Anti-D
- Therefore 60 ml blood will be neutralized by 600 µg Anti-D

* Maternal blood volume at term = 100 ml/ kg body wt.

Important Information

- Case 1
- Rh Negative & 1st Visit
- Indirect Coomb's Test
  - 1st Visit: Negative
  - 20 weeks: Negative
  - 24 weeks: Negative
  - 28 weeks: Negative
  - 32 weeks: Negative
  - 36 weeks: Negative
  - 40 weeks: Delivered (Give anti D acc to baby blood group

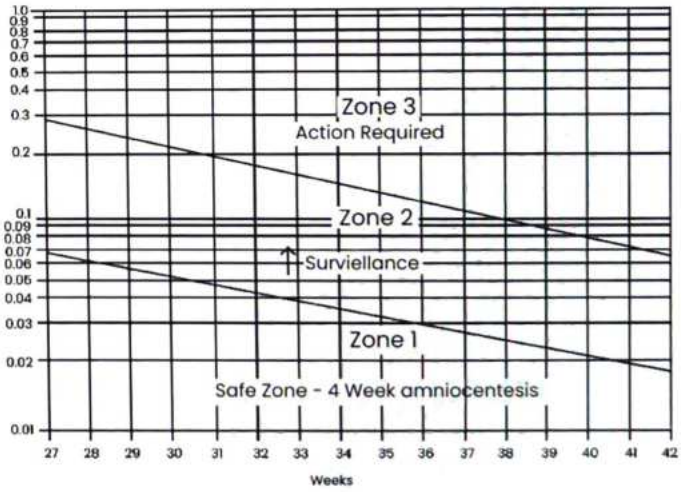
Case 2

- Rh Negative & 1st Visit
- Indirect Coomb's Test
  - 1st Visit: Negative
  - 20 weeks: Negative
  - 24 Weeks: Positive (1:16 +ve is safe) do ICT weekly
  - 25 Weeks: 1:16 Positive
  - 26 Weeks: 1:16 Positive
  - 27 Weeks: 1:16 Positive
  - 28 Weeks: 1:1024 Positive

- Do Amniocentesis & Do Spectrophotometry with the Amniotic Fluid (Bilirubin) & plot following graphs

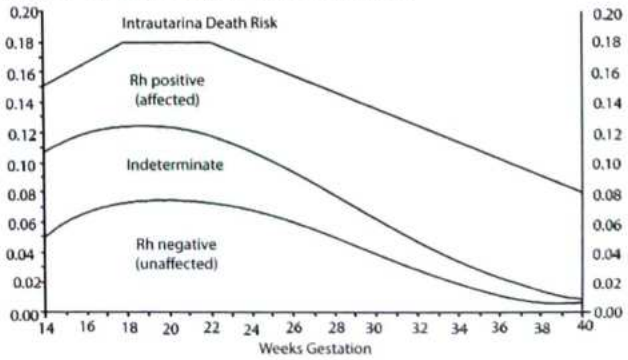
Lilley's Graph

- Can be charted from 27 weeks onwards only



Queenan's Chart (More Sensitivity)

- Can be charted from 14 wks onwards



Understand with an example

Q. Optical Density at 28 weeks increased from 0.5 to 0.8 (Upper 3rd Zone). management should be?

Ans. Intra Uterine Blood Transfusion into the cord or Intra Peritoneal transfusion

Preventive Measures

- (Prophylaxis while the woman is pregnant for first time)
- Rh Negative & 1st Visit: Indirect Coomb's Test
  - 1st Visit: Negative
  - 20 weeks: Negative
  - 24 weeks: Negative
  - 28 weeks: Negative → Inj. ANTI – D 300 µg (work for 6 wks)
  - 34 weeks: Negative → Inj. ANTI – D 300 µg
  - At Delivery: baby's ABORh Positive→ Inj. ANTI – D 300 µg→baby's ABORh Negative→Nothing to be done→ Prophylactic Anti – D now is given at 28 wks & then at delivery if Baby is Rh +ve

Previous Year's Questions

Q. In current obstetrics. what is the best test for monitoring sensitized Rh negative mother?

(NEET 2020)

A. biophysical profile
B. Middle Cerebral Artery Doppler
C. Fetal blood sampling
D. amniotic fluid spectrophotometry

9 ANTE PARTUM HAEMORRHAGE

- Any bleeding in the genital tract after >28 Weeks (Viability) of gestation (any bleeding before 28 weeks is related to abortion

Causes 00:01:24

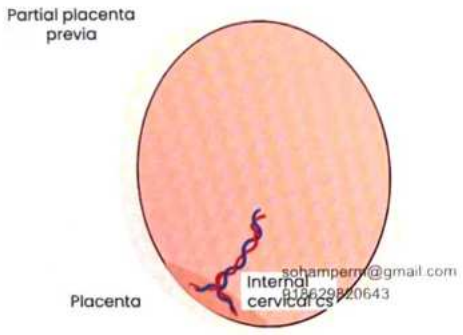
- Vasa previa
- Placenta Previa
- Abruptio Placentae

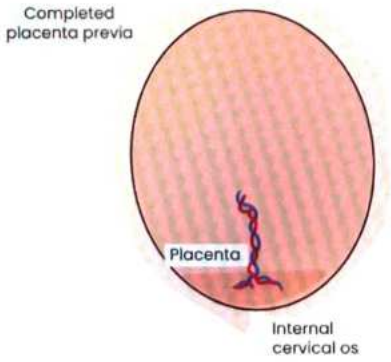
PLACENTA PREVIA (PP) 00:02:16

- 1 in 300-400 pregnancy
- Associated with
  - Multiparous
  - Twins, triplets (due to big or multiple placentas)
  - Previous C.S (scar predisposes to nidation)
  - Previous Hysterotomy (cesarean before 28 weeks)
  - Myomectomy

Classification 00:05:16

- Placenta previa
  - Partly
  - Completely
- Low lying placenta within 2 cm of the OS





Presentation

- Placental migration: migrates and becomes in upper segment in later months
- Asymptomatic: mostly just a finding on USG
- Only presentation is → Painless bleeding P/V (Not for all)

Diagnosis

- 3D USG (in full bladder, Doppler assisted)

Management 00:12:20

- PP Bleeding at term (37 to 42 wks) → resuscitation + C.S
  - No P/V examination: ↑↑Bleeding
- PP at Term 37-42 wks (Not Bleeding)
  - PP = $\frac{\text{Partly}}{\text{Totally}}$ } CS
  - Partly Covering: Double set-up examination (cervix gets effaced, so placenta moves away from os). PV is done in OT, move 5cm in all direction cannot feel placenta allow vaginal delivery
- At term: Low lying placenta → Trial of normal delivery
  - If posterior low lying (Type IIb of earlier classification) → Look out for fetal HR with contractions
- PP Bleeding at 32 wks
  - Resuscitation + Rest (High Risk Ward) + Steroids (Fetal Lung Maturation)
  - Conservative Mx: Mc affee Jhonson Regime
  - In 90% cases bleeding then stops. (First episode of bleeding mostly stops)
  - If bleeding continues → C.S
- Bleeding at 32 wks, PP
  - + IU Fetal death
  - Fetal anomalies
  - Maternal instability

  } Contra Indication to conservative Mx
- PP with Transverse Lie at 32 weeks → Not a contra indication to conservative Mx)

Important Information

- Tocolysis is contraindicated in bleeding placenta previa
- Tocolysis for preterm labour, is NOT contraindicated in PP which is not bleeding

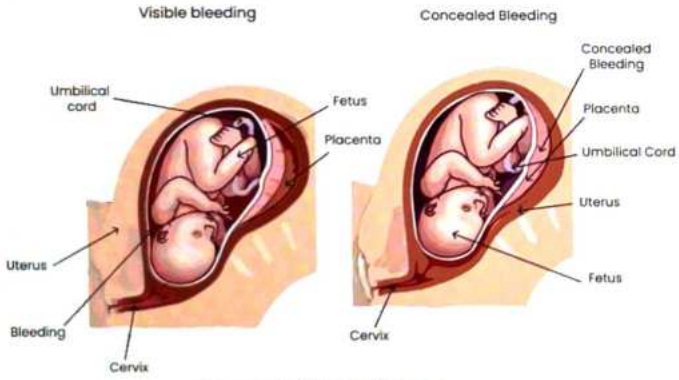
ABRUPTIO PLACENTA/ ACCIDENTAL HAEMORRHAGE

⏱ 00:40:41

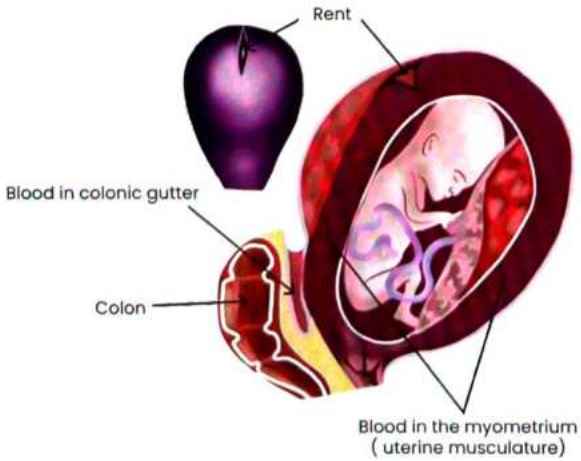
- 1 in 200 Pregnancies

Associated with

- Hypertension, Pre eclamptic toxemia
- Smokers
- Elderly Gravida
- Multiparous women
- Pre Mature Rupture of Membranes
- Chorioamnionitis
- Previous abruption
- Thrombophilias
- Twins



Couvelaire/ Bruised Uterus



Presentation

- Painful bleeding: bruised uterine muscle
- Protracted labour: poor uterine contraction of bruised muscle
- PPH: poor uterine contraction of bruised muscle (Indication of obstetric hysterectomy/ surgical compression suture)

Previous Year's Questions

Q. A hypertensive pregnant lady presents with abdominal pain, vaginal bleeding and loss of fetal movements. What is the probable diagnosis?
(AIIMS 2020, FMGE 2019)

A. Preterm labour
B. Abruption
C. Hydramnios
D. Placenta previa

Previous Year's Questions

Q. A patient presented with bleeding per vaginum, regular uterine contractions and a tense tender abdomen on palpation. Her BP is 150/100, cervical dilatation is 5 cm and full effacement, fetal heart rate is 144/min with adequate beat to beat variability. What is the likely diagnosis?
(FMGE 2020)

A. Abruptio placentae
B. Placenta accrete
C. Placenta previa
D. Vasa previa

Management

1. At term
- Resuscitation
- If fetal distress +nt
  - Cesarean Section

Important Information

- Abruption per se is not an indication for cesarean section → Normal delivery.
- If associated with fetal distress (FHR <110 on doppler/ Fetal Scalp blood PH is <7.2 do LSCS

Normal delivery in abruption: A.R.M

- By artificial rupture of membranes
  - Local prostaglandins are released → Induce labour
  - The compression of placenta against fetus → stops the bleeding

Important Information

Not indications for LSCS

- Abruption with
  - Loss of fetal movements (Not equal to fetal distress)
  - Inability to localize FH sounds → not equal to fetal distress) → may be unable to locate due to huge clot inside → localize with doppler

2. At 32 weeks →deliver (no conservative m/m)

- Resuscitation, High Risk Vigillance
- Steroids to Mother
- Sedation, Rest
- No C.S
- Do ARM, give oxytocin & Deliver the Baby

- No Tocolysis

Blood Clot
↓ (wait is too long)
Tissue Thromboplastin
↓
Extrinsic coagulation cascade
↓
Consumptive coagulopathy
↓
DIC
↓
Death

Important Information

- Abruption >34 weeks deliver
- Abruption before 34 weeks steroids and deliver
- No role of conservative management

Important Information

- Conservative m/m in APH
  - X abruption
  - X vasa previa
  - Only for PP < 34 weeks

Important Information

No Tocolysis in APH

- Placenta previa
- Abruptio placenta
- Vasa previa

SHER & PAGE CLASSIFICATION

Grade	Vaginal Bleeding	Uterine Tetany	Fetal Distress	Maternal Shock	USG
0	-	-	-	-	RPC: Small
1	+	+/-	-	-	+/-
2 (MC)	+/-	+/-	+	-	+/-
3	+/-	+	Fetal Demise	+ With possible DIC	+/-

CLINICAL QUESTIONS

Q1. 28-year-old G3P2 woman at 35 weeks' gestation presents with pain abdomen and dark, altered coloured vaginal bleeding. On examination, uterus is tender, BP is 160/100, PR 100/min, and P/V shows altered blood, with 2 cm vaginal dilatation. Which of the following describes the most likely etiology of her bleeding?

A. Placenta previa
B. Placental abruption
C. Vasa previa
D. Show

Answer: B

Solution

- **This is a case of Pre eclampsia complicated by abruption as her BP is high, uterus is tender and altered blood is seen per vaginum**
- Placenta previa and vasa previa usually present with painless bleeding.
- Show is cervical mucous plug that is released prior to or at the time of onset of labour. It is mucoid in consistency and is usually blood mixed. It is a normal finding in labour.

Q2. A patient at 30 weeks gestation presents with complaints of vaginal spotting. She is admitted to a labor room for evaluation. Fetal heart rate is 130 bpm with no accelerations or decelerations. Ultrasonography reveals a placenta covering a portion of the internal cervical os. She currently shows no active vaginal bleeding. The best management of this patient involves which of the following?

A. Cesarean section
B. Resuscitation and observation in high risk ward
C. Amniocenetesis to assess fetal lung maturity and plan delivery
D. Per vaginal examination for cervical assessment

Answer: B

Solution

This is a case of placenta previa with spotting, with a healthy fetus presenting at 30 weeks

- For the management, we follow McAfee Johnson Regime, the aim is to continue pregnancy for fetal maturity without compromising the maternal health.
- If the duration of pregnancy is <37 weeks, active vaginal bleeding is absent, mother and fetal well being is assured then resuscitation and observation in high risk ward is expected.
- Steroid therapy is indicated when the duration of pregnancy is less than 34 weeks.

Mcafee and Johnson Regimen- It is a regimen used for placenta previa when pregnancy is <34 weeks(lungs are not maturated) and there is not active bleeding.

In it, following is done:

1. Resuscitation
2. Steroids for fetal lung maturity
3. Sedation
4. Maternal and fetal monitoring

10 PREGNANCY INDUCED HYPERTENSION

HYPERTENSION IN PREGNANCY 00:00:39

- After 20 weeks of gestation in a previously Normotensive woman, BP > 140/90 mmHg, in > 2 occasions > 6 hrs apart

PRE ECLAMPTIC TOXEMIA (PIH - EARLIER NAME) 00:01:28

- Hypertension with
  - Proteinuria > 300 mg/ 24 hr urine or 1+ in dipstick
  - Protein: creatinine Ratio 0.3

Previous Year's Questions

Q. A 26 weeks pregnant female presented with HTN for the first time. There is no proteinuria. Diagnosis of such condition? (FMGE 2019)

A. Chronic hypertension
B. Eclampsia
C. Gestational hypertension
D. Pre-eclampsia

ECLAMPSIA

- Pre Eclamptic Toxemia with Generalized Tonic Clonic convulsions
- Signs of severe HTN or Imminent Eclampsia
  - Headache
  - Nausea/ Vomiting
  - Blurring of vision 00:03:40
  - ↑ Knee jerks
  - Epigastric pain
  - Proteinuria: > 2 gms/ 24 hrs urine (> 3.5 gm/24 hrs - Nephrotic range)
  - BP: > 160/110 mm Hg

Previous Year's Questions

Q. A 26 year old primi at 37 weeks came to the hospital with c/o high BP and proteinuria 3+. Signs of impending eclampsia are? (multiple correct answers) (INI CET 2021)

A. headache
B. vision blurring
C. persistent pedal edema
D. epigastric tenderness

PRE EXISTING HTN 00:05:25

- **Essential HTN**
- **Chronic HTN**
  - Renal Artery Stenosis
  - Pheochromocytoma
- **Acute on chronic HTN** 00:07:21
  - Platelets: < 100,000
  - Creatinine: > 1.1
  - New onset Proteinuria
  - Liver Transaminases > 2 times
- **Delta HTN** 00:09:40
  - BP is normal throughout the pregnancy and it reaches high normal values in the later stage pregnancy.
  - Can be associated with convulsions

ECLAMPSIA MANAGEMENT 00:11:35

- DOC: $MgSo_4.7\ H_2O$
  - IM + IV (PRITCHARD'S REGIMEN- Method of Choice)
  - IV only (ZUSPAN REGIMEN)
    - → Pritchard's Regimen
      - IV $MgSo_4$: 4 gms
      - IM $MgSo_4$: 10 gms (5gms in each buttock)
      - IV Mg So_4: 2 gms added if no relief
      - Follow up with
  - IM $MgSo_4$ for 24 hrs after the last convulsion or delivery, whichever is later. Given 4 hourly.
  - Monitor
    - → Knee jerks → +
    - → Respiratory rate → > 14/min
    - → Urine output → > 100 ml/4 hrs

Previous Year's Questions

Q. First sign of MgSO4 toxicity is? (FMGE 2020)

A. Decrease in BP
B. Loss of deep tendon reflexes
C. Breathing difficulty
D. Asystole

Previous Year's Questions

Q. 35 weeks multigravida presents with epigastric pain, headache, visual disturbance, proteinuria 3+. What is the immediate next step in management? (AIIMS 2019)

A. Immediate cesarean
B. Betamethasone
C. Induction of labour
D. MgSO4 therapy

Previous Year's Questions

Q. Loading dose of MgSO4 (IV) is to be prepared as? (AIIMS 2019)

A. 4 mL 50% w/v plus 16 mL NS
B. 8 mL 50% w/v plus 12 mL NS
C. 12 mL 50% w/v plus 8 mL NS
D. 16 mL 50% w/v plus 4 mL NS

Important Information

- Delivery is the most important step in the Mx of Eclampsia. Delivery can be done vaginally or by cesarean.
- 90% or more are Normotensive within one week of delivery

- Add IV Labetalol: DOC for Hypertensive emergencies in pregnancy
  - 20 mg iv over 10 min
    ↓
    Another 20/40 mg over 10 min
    ↓
    80 mg in 10 min
    ↓
    upto 220 mg (Max.)
  - α+β Blocker (Labetalol)

- IV Hydralazine
  - 5 to 10 mg IV Bolus
  - Alternative to Labetalol
- Guedel's Airway
  - Prevents the tongue bite
  - Maintains the oxygenation
  - Do not use mouth gags etc.

Previous Year's Questions

Q. A 36 weeks primigravida was admitted in view of a single seizure episode. On examination her BP is 170/100 mm Hg. PR is 90/min, fetal heart rate is present. Immediate next step in management is? (AIIMS 2019)

A. Inj MgSO4
B. Inj Ca Gluconate
C. Inj Phenetoin
D. MRI Brain

Previous Year's Questions

Q. MgSO4 has no role in the prevention of? (NEET 2019)
A. Seizures in severe pre-eclampsia
B. Recurrent seizures in eclampsia
C. RDS in premature baby
D. Neuroprotection

HYPERTENSION MANAGEMENT 00:27:03

- **Tab. LABETELOL**
  - 1st Line drug
  - 100 - 200 mg TID
  - α + β blocker

- **Tab METHYL DOPA**
  - Prodrug : Active form → Methyl Norepinephrine
  - 250 - 500 mg QID

- **Tab. HYDRALAZINE**
  - 25-50 mg BD or OD
  - Arteriolar dilator

- **TAB NIFEDEPINE**
  - S/L Nifedepine is C/I (can cause sudden Hypotension when taken sub lingually)
  - 10 mg TID (upto 80 mg/ day can be given)

- **Tab PRAZOSIN**
  - α Blocker
  - 2.5 - 5 mg/ day

Previous Year's Questions

Q. A 35 year old with 36 weeks pregnancy comes with a h/o 5 convulsions at home and a diagnosis of eclampsia is made. Next step in management is? (FMGE 2019)

A. Only labetalol
B. Only MgSO4
C. MgSO4 + Labetalol
D. Clonidine

Contra Indicated Drugs 00:29:56

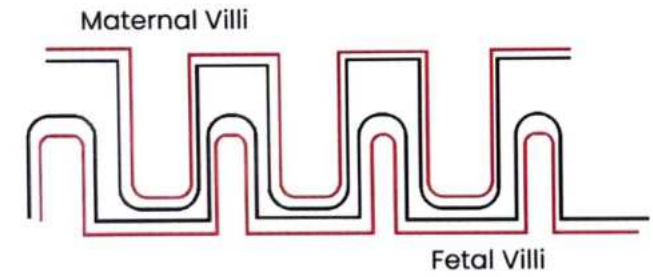
- Furosemide, β Blockers, ACE Inhibitors } cause Intra Uterine Growth Restriction
- ACE inhibitors can cause
  - Hypocalvaria
  - Renal Agenesis
  - Oligohydramnios

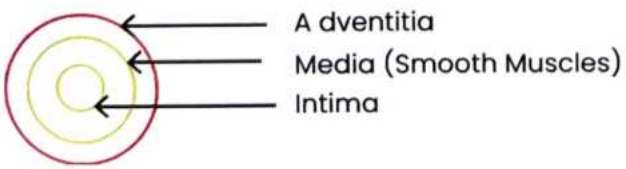
Previous Year's Questions

Q. A woman on antihypertensive drugs comes for pre-conceptional counselling. Which of the following drugs will you advice to stop? (NEET 2021)

A. Methyl dopa
B. Atenolol
C. Lisinopril
D. Nifedipine

ETIOLOGY OF HTN IN PREGNANCY 00:31:50





- In normal pregnancy, > 20 wks, trophoblastic invasion and replacement of smooth muscle layer of spiral arterioles occurs vasodilatation
- Persistence of smooth muscle layer or inadequate Trophoblastic invasion vasospasm
- Vasospasm (Pathology) → HTN (PIH)
- As Furosemide → ↑Vasospasm → Contraindicated
- Normal SALT DIET
- Pathology of PIH is Vasospasm mother increases her BP to overcome vasospasm do not give anti-HTN drugs too soon
- Anti hypertensive drugs have to be started → >/= 150/100 mmHg

Other Associates of PIH 00:43:38

- 1st exposure to Villi (Primigravida)
- More exposure to Villi (Twins, Molar pregnancy)
- Pre existing endothelial damage
  - Renal Disease
  - DM
- Genetic Predisposition
  - Altered function of Methyl Tetra Hydrofolate Reductase (MTHR) gene
  - Factor V leiden abnormal function
- ↓ Nitric Oxide production from endothelium by L. Asparginase

PREDICTION OF HTN 00:46:56

- Roll over Test → > 10 mm Hg increase
- Isometric exercises eg Persistent Hand grip
- ↑ Uric Acid
- ↓ Calcium
- ↑ Homocysteine
- Micro albuminuria

PREVENTION 00:49:20

- Calcium supplementation
- Fish oil capsules
- Low dose Aspirin (75-150 mg)
- Antioxidants (Vit C/D/E)

CLINICAL QUESTIONS

Q1. A 35-year-old primigravida at 38 weeks of gestational age has a blood pressure reading of 150/100 mm Hg obtained during a routine visit. Her baseline blood pressure during the pregnancy was 120/70 mm Hg. The patient denies any headache, visual changes, nausea, vomiting, or abdominal pain. Her repeat BP is 160/90 mm Hg, and urinalysis is negative for protein. Which of the following is the most likely diagnosis?

A. Pre-eclampsia
B. Chronic hypertension with superimposed pre-eclapmsia
C. Eclampsia
D. Gestational hypertension

Answer: D

Solution

- Hypertension in pregnancy is defined as blood pressure of 140/90 mmHg or greater on at least two separate occasions that are 6 h or more apart.
- **Gestational hypertension:- Maternal blood pressure reaches 140/90 mm Hg or greater for the first time during pregnancy, after 20 weeks and proteinuria is not present.**
- **Preeclampsia**- blood pressure increases to 140/90 mm Hg after 20 weeks of gestation and proteinuria is present (300 mg in 24 h or 1+ protein or greater on dipstick).
- **Eclampsia**- is present when women with preeclampsia develop seizures.
- **Chronic hypertension** is defined as BP >140/90 mm Hg before pregnancy or diagnosed before 20 weeks of gestation, or hypertension first diagnosed after 20 weeks of gestation and persistent after 12 weeks postpartum.

11 GESTATIONAL DIABETES MELLITUS

PRISCILLA WHITE'S CLASSIFICATION 00:01:19

Gestational DM (A)

- Category A_1: Sugar controlled with Diet
- Category A_2: Sugar controlled with Insulation

Pre Gestational DM/ Pre-existing DM/ Overt DM

- Category B: < 10 years of duration
- Category C: 10-19 years of duration
- Category D: >20 years of duration
- Category F: Associated with nephropathy
- Category R: Associated with Retinopathy
- Category H: Associated with Heart disease

American Diabetic association (ADA) Classification

2 Types

1. Type 1
- Destruction of Pancreatic Islets
- Reduced Insulin available

2. Type 2
- Insulin is available but there is insulin resistance

> **Important Information**
>
> - IDDM & NIDDM are not used now

GESTATIONAL DM

- Presents around 24 wks so screening done 24 wks
- At 24 wks, Human Placental lactogen made from placenta

↑HPL Production
↓
Insulinase Action ←↑Estrogen
↓ ↑ GH
↓↓ Insulin ↑ Cortisol
↓
↑↑ Sugars
+
Insulin resistance

SCREENING OF GDM 00:06:17

- Done after 24 wks
- Glucose challenge test with 50 gms of sugar in a non fasting woman → screening test (obsolete now)
  - Values after 1 hour should be < 140 mg/dL
  - If values > 140 mg/dL → ? GDM
    ↓
    Do confirmatory test → GTT with 100 gm glucose
  - If values > 200 mg/dL → Diagnostic of GDM

- Glucose tolerance test (GTT) with 100 gms of sugar in a fasting woman → Diagnostic test (Obsolete now)
  - Fasting value → < 105 mg/dL
    ↓
    Give 100 gm of sugar/ Glucose to patient

1 hr value < 190
2 hr value < 165
3 hr value < 145
} Any 2 or more abnormal values ↓ Diagnostic of GDM

One Step Test: Glucose tolerance test with 75 gms of sugar in a fasting woman (Screening & Diagnostic test now)

- Fasting → < 92
- At 1 hr → < 180
- At 2 hrs → < 153

} Any one abnormal valve is Dx of GDM

Diabetes in pregnancy study group of India (DIPSI) guidelines

- Non- fasting woman
  ↓
  Given 75 gm of Glucose load
  ↓
  After 2 hrs, sugar values are estimated

Sugar value	Interpretation
> 140	GDM
> 120	DGGT (Deranged Gestational Glucose Tolerance)
> 200	DM

PRE GESTATIONAL DM/ OVERT DM 00:15:06

1st trimester = period of organogenesis

- 1st trimester ↑sugars is directly proportional to Anomalies

- Therefore screening of DM is must in 1st trimester

Important Information

- No anomalies occur in GDM as it occurs after 24 weeks, when organogenesis is over

Previous Year's Questions

Q. A primigravida at 24 weeks has OGTT of 93/191/150. All of the following conditions may be seen in the mother or her newborn, EXCEPT? (AIIMS 2019)

A. Polyhydramnios
B. Congenital abnormalities
C. Fetal macrosomia
D. Hypocalcemia in newborn

Previous Year's Questions

Q. Which of the following antenatal complications could have occurred in the mother of the first baby shown in the picture (second baby given as normal newborn reference) (NEET 2020)

A. Intake of phenetoin
B. Gestational diabetes
C. Intake of ACE inhibitors
D. Intake of sodium valproate

Screening for overt DM is done by

- Glycosylated Hb (HbA_1C): < 6.5 %
- Serum fructosamine: 258-288 µmol (done in case of abnormal RBC's conditions like Sickle cell Anemia)

MATERNAL COMPLICATIONS

00:20:31

- Large baby
  - ↑ cesarean section
  - ↑ Instrumentation (forceps and vacuum)
  - ↑ Birth canal injuries
  - Shoulder dystocia
  - PPH

- Polyhydramnios → PROM → Chorioamnionitis
- Preterm labour
- Associated with Pregnancy induced Hypertension (PIH): 25% cases
- Abruption
- Sudden intra uterine death at term

↓

Due to

1. Poor glycemic control
2. Fetal lactic acidosis

} Secondary to villous edema ↓ Compromises blood supply of fetus leading to sudden death

3. Maternal ketoacidosis
4. Diabetic vasculopathy

NEWBORN COMPLICATIONS

00:24:46

- Hypoglycemia

↑Sugar in mother
↓
Reach fetus
↓
Fetus has healthy pancreas which makes increased insulin to metabolize sugars (also there is increased IGF which leads to Macrosomia)
↓
When baby is born → Increased insulin in baby
↓
Leads to Hypoglycemia

- There is β-cell pancreatic Hyperplasia in the fetus, not hypoglycemia)
- Hypomagnesemia
- Hypocalcemia
- Polycythemia
- Hyper bilirubinemia
- Anomalies
- Cataract in newborn

- Cardiac (MC group of anomalies)
  - Transposition of great vessels (MC & most specific)
  - VSD
  - PDA

- Neural tube defects
  - Anencephaly
  - Spinal Bifida
  - Facial defects: Cleft palate, cleft lip
- Structural defects: Sacral Agenesis / caudal regression syndrome (Most specific but very rare)

Important Information

- MC group of anomalies: cardiac
- MC common anomaly: TGA
- Most specific anomaly: sacral agenesis but is much rarer than TGA

MANAGEMENT

Refer Table 11.1

00:35:40

Previous Year's Questions

Q. A pregnant woman at 26 weeks gestation underwent OGTT her fasting sugar was 130 mg/dL and 2 hours post glucose load were 200 mg/dL. Which of the following is the next best step in management? (FMGE 2020)

A. Repeat the test
B. Admission, blood sugar monitoring and start Insulin
C. Start insulin on OPD basis and follow up
D. Repeat OGTT at 34 weeks

Table 11.1

Diet	• 25-30 K. cal. /kg/D • [Normal requirement: 35-40 K. cal/kg. D]
Monitor Sugars	• Fasting /2 hrs Post break-fast / 2 hrs Post Lunch / 2hrs Post Dinner on a daily basis in the hospital • Once sugar values are settled →Patient is discharged • After discharge, sugar profile is done once a week • Targets of proper Glycaemic control • Fasting sugar value < 95 • Post prandial sugar value < 120

Monitor Fetus	• Antepartum surveillance
	  ○ DFMC (Daily Fetal Movement Count)
	  ○ NST
	  ○ BPP (Biophysical profile)
	  ○ Umbilical Artery Doppler
	• Fetal lung maturity is delayed in DM pregnancy
	  ○ Steroids are given for lung maturity
	  ○ Steroids increase maternal sugar so are given after admission to hospital

DOC	• Insulin
OHA (Oral Hypoglycemics)	Glyburide (Glibenclamide) Metformin
Fundus Examination (to look for retinopathy)	Background Retinopathy (80%) → can deliver normally Proliferative Retinopathy(20%) (Neovascularization) ↓ In labor (↑IOP) ↓ Can lead to Retinal detachment ↓ Therefore labor is C/I in Proliferative Retinopathy
Timing of delivery	• GDM well controlled on diet alone: 40-41 wks • GDM requiring medication: 38-39 wks (< 39 wks) • Overt DM (Type 1 or 2) → well controlled: > 37 wks (Max. 39 wks) • Overt DM not well controlled: >34 wks (< 37 wks

12 MEDICAL ILLNESS COMPLICATING PREGNANCY

HEART DISEASES

Rheumatic Heart Disease (RHD) 00:00:58

- MC Heart Disease in India
- Mitral stenosis (MC presentation)
  - Timing of Failure
    - → Antenatal (around 30-32 wks) [MC] : CO ↑by 50%
    - → Postnatal: 1st 24 hrs (max chances in whole of preg and postpartum): CO ↑ by 70-75%
- Mx
  - Antenatal failure is managed by Balloon Mitral Valvotomy (Non invasive Sx) in 2nd trimester
  - Postnatal failure Mx
    - → Keep in High risk ward/ ICU for observation [for 1st 24 hrs]
    - → Inj. Lasix: ↓ Preload

Important Information

- **Observation Period Required Postnatally For Heart Disease**
  - **I st 24 hrs**
- **Observation Period Required Postnatally For PPH**
  - **I st Hour**

Important Information

- **Labor induction is safe in most of the heart diseases**
- **Normal delivery can be done**
- **LSCS only for obstetric indications or for following indications**

Cesarean Section Indications 00:06:38

- Obstetric indications
- AORTIC root dilatation: > 4 cm
- AORTIC Aneurysms
- Severe AORTIC stenosis
- Recent MI
- Congestive Heart Failure
- Warfarin Rx within previous 2 weeks

Labour Management 00:07:58

- ↓ IV Fluids
- Position: Semi Recumbent
- Pain Relief
  - Opioids
  - Epidural Analgesia
- Avoid straining in 2nd stage
  - Cut it short by forceps / Vacuum
- Inj. Furosemide: ↓ Preload
  IV/IM Oxytocin: DOC for prevention of PPH
  } Given immediately after labor
- Methyl Ergometrine: Contraindicated
- Observation in High Risk ward for 24 hrs.
  - Do not discharge for 5 – 7 days

Delayed Complications 00:11:25

- Arrythmias
- Cardiac rupture
- Infective Endocarditis
- Thromboembolic Phenomenon
- Mitral Valve Prolapse

Contra Indications to Pregnancy 00:13:01

- Eisenmenger syndrome
- Severe AORTIC stenosis
- Primary Pulmonary HTN
- Marfan syndrome involving AORTIC Root

Important Information

- **Coarctation of AORTA is not a contra indication for pregnancy**
- **However C-Section is indicated in Coarctation of AORTA**

Previous Year's Questions

Q. A pregnant lady with RHD at 32 weeks gestation, develops sudden dyspnea. All of the following are management options, EXCEPT? (JIPMER 2019)

A. involve a cardiologist
B. ICU observation
C. reassure its normal to have some dyspnea in pregnancy
D. keep in propped up position

HYPOTHYROIDISM

00:15:03

- Values
  - TSH → < 2.5 (Normally), Value [> 2.5 - < 4.0] → Check Anti thyroid peroxidase
    ↓
    If +ive → Start Eltroxin

Maternal Complications	Neonatal Complications
• Abortion	• ↑Morbidity & Mortality
• Preterm labor	• Cretinism
• Pre-eclamptic toxemia	• ↓ IQ
• Abruption	• Neuro Psychiatric Illness
• PPH	• Poor cognitive development
	• Deafness & growth restriction

- Screening must be done in first trimester

HYPERTHYROIDISM

00:18:37

Maternal Complications

- Pre Eclamptic Toxemia
- Thyroid Storm
- Preterm labor
- High output Cardiac failure
- Intra Uterine Growth Restriction
- Intra Uterine Death

Management 00:19:15

- DOC: Propylthiouracil ; Dose = 100 - 150 mg TID
- Methimazole [2nd Trimester onwards]

Previous Year's Questions

Q. Patient who was known to have Grave's disease and on anti-thyroid medication, delivered a baby with aplasia cutis. Which medication could she have been taking in antenatal period?

A. Carbimazole
B. Thyroxine
C. Thiouracil
D. Methyl-thiouracil

EPILEPSY

00:20:02

- 30% have ↑ convulsions
- 20% have ↓ convulsions
- 50% have unchanged convulsions

Management

- Phenobarbitone: Not given
- Phenytoin, Carbamazepine } Given, but category D Drugs so can cause Fetal Hydantoin Syndrome
- Lamotrigine (DOC), Levetiracetam } Category C Drugs

FDA drug categories in pregnancy

A	• Safe	• Thyroxine, multivitamins
B	• Safe in humans, teratogenic in animals	• Didanosine, metronidazole
C	• Teratogenic in animals, safe in limited human studies	• Majority drugs, acyclovir, chloroquin
D	• Known human teratogens (benefit>risk)	• Phenetoin
X	• Teratogens, contraindicated	• Androgens, alcohol, vit A, lithium, warfarin

Situation 1

- If any female is on Phenytoin/ Carbamazepine (Category D Drugs) & is planning to Conceive
  ↓
  Change the Anti-epileptics from category D to category C i.e. Lamotrigine atleast 3 months prior to pregnancy

- Preferably don't give category D drugs to young women who are planning pregnancy in next 2-3 yrs

Situation 2

- A female is 9 weeks pregnant & is taking Phenytoin for epilepsy

↓

  - Continue the drug (Phenytoin) for rest of pregnancy
  - No benefit of changing drug as most of organogenesis has occurred & effects of Phenytoin have already taken place

MALARIA

00:27:58

- Poor Prognosis
- ↑ Risk for Fulminant Hepatic Failure & Intra Uterine Death
- DOC: Chloroquine
- Complicated Malaria
  - Artesunate (DOC)
  - Quinine
  - Mefloquine (> 12 wks)

OTHER DISEASES

- **Rheumatoid Arthritis**: Better prognosis (pregnancy is immunocompromised state)
- **Sarcoid:** Better prognosis
- **Ulcerative Colitis:** Unchanged (If patient already has disease) 00:29:45
  Worse prognosis (If 1st time presentation in pregnancy)
- **Appendicitis**
  - Poor Prognosis
  - ↑ed Abortion, Sepsis, Preterm Labor & IUD
  - Early surgery advised
- **Tuberculosis:** Worse prognosis 00:31:34
  - Worst in PUERPERIUM as compared to 1st, 2nd & 3rd trimester because of
    → ↑ed demand
    → ↓ed supply
    → Ongoing Immuno suppression
    → Low socio economic status
    → Over crowding, Poor Ventilation
    → Heat, Humidity

13 ANEMIA IN PREGNANCY

Important Information

- MC cause of Anemia in pregnancy in India: Nutritional Anemia

C[illegible]ia 00:01:10

1. ↓ Production
- Iron Deficiency Anemia
- Megaloblastic Anemia
- Folic Acid Deficiency Anemia

2. ↑ Lysis
- Hemolytic Anemia
- Chronic Blood Loss

Definitions 00:01:50

- WHO → Hb → < 11 gm%
- CDC → Hb → < 11 gm% or Hb → < 10.5 gm% in 3rd trimester
- Mild → Hb → 10 - 11 gm%
  Moderate → Hb → 7 - 10 gm%
  Severe → Hb → < 4 gm %

IRON DEFICIENCY ANEMIA 00:03:47

Iron Requirement in Pregnancy

- 1000 mg elemental Iron [4-6 mg/ day x 280 = 1120 mg]: cannot be met with diet alone
  - 500 mg - for Hb expansion
  - 300 mg - for fetus, placenta
  - 200 mg - Wasted

Management

- 100 mg / day elemental Iron Tab in Ⓝ pregnancy
- 200 mg / day elemental Iron in mild to moderate anemia
- Oral Iron supplementation forms
  - Fe Sulphate
  - Fe Ascorbate } Better Absorbable forms
  - Carbonyl Iron
- Deworm the patient with MEBENDAZOLE (100 mg Tab BD x 3 Days)
- Injectable Preparations
  - Rate of increase of Hb with oral and injectable is same
  - Only indication: Intolerance or Malabsorption
  - Stop oral Iron at the time of giving injectables: Both use same gut receptors for absorption
  - Injectable Forms
    1. Fe Dextran (IM/IV)
    2. Fe Sorbitol [IM]
    3. Fe Sucrose (iv): No anaphylaxis (no test dose is given)
- Rate of rise of Hb with Oral & Injectable preparation is same [1 gm% Hb rise over 2 ½ - 3 wks]

Important Information

Requirement of Iron

- 2.21 x wt in kg x (Targeted Hb – Pt Hb) • 1000 mg (for stores)
- ≅ 200 mg / gm% Hb deficiency

- Requirement of Blood for Rx of Anemia in pregnancy
  - Indications
    - Hb: <7 gm% or patient is severely anemic later in pregnancy
  - Whole blood ↑ Hb by 0.8 - 0.9 gm%
  - Packed cells ↑ Hb by 0.8 - 0.9 gm % [lesser volume load] [so better]
- **Indices in Fe deficiency**
  1. Serum Ferritin
     - 1st parameter to change
     - Ⓝ: 40-160 ng/ml
     - IDA: < 20 ng/ml
  2. Hb: ↓
  3. MCV: ↓
  4. MCH: ↓
  5. Serum total Iron: < 50 µg/dl
  6. Total Iron binding capacity: > 400 µg/dl
  7. Red cell distribution width (RDW): ↑
- **Thalassemia Indices**
  1. RDW: Normal
  2. MCH: < 27 pg [Normal – 29 pg]
  3. Hb: Normal
  4. MCV/RBC: < 13 [Mentzer Index]
  5. On HPLC: HbA2 levels > 3.5
     - Do not overload patient with iron

- Peripheral smear of both IDA Thalassemia shows: Microcytic, Hypochromic, Anemia

MEGALOBLASTIC ANEMIA

Causes

1. Folic Acid deficiency
- ↑ demand
- ↓ Supply
- Malabsorption
- Intestinal Sx or resection

2. Vit B_{12} Deficiency
- ↓ Absorption: malabsorption syndromes
- ↓ Intrinsic factor
- Achlorhydria

Features

- Slow onset
- Hb ↓
- MCV: > 100 fL
- Requirement of folic acid: 0.4 to 0.5 mg/day
- Supplementation of Folic acid: 5 mg / day in Megaloblastic anemia
- Vitamin B_{12} (Cobalamin) requirement is only met by non veg diet so Inj. cynocobalamin can be given in vegetarian females

NUTRITIONAL ANEMIA/ DIMORPHIC ANEMIA

- IDA (Microcytic hypochromic RBCs) + Megaloblastic Anemia (Hypersegmented neutrophils) (MC type in India)

14 INFECTIONS IN PREGNANCY

Vertical Transmission 00:00:46

- Refers to passage of an infectious agent from mother to her fetus through
  - The Placenta
  - During labor or delivery or
  - Breast feeding
- Risk Factors
  - Preterm rupture of membranes (PROM)
  - Prolonged labor
  - Obstetrical manipulations (Like Internal Podalic Version (IPV), Forceps, Vacuum may enhance the risk of Neonatal Infections)

Horizontal Transmission

- Spread of an infectious agent from one individual to other

Secondary Attack Rate

- Probability that infection develops in a susceptible individual following contact with an infectious person.

VIRAL INFECTIONS
CYTOMEGALO VIRUS 00:01:50

- DNA Herpes virus
- MC perinatal infection in the developing world
- Upto 85% of poor and 50% of higher classes are seropositive by the time of pregnancy.
- Women who develop primary CMV infection during pregnancy [were seronegative before pregnancy], are at greatest risk to have an infected Fetus.

Maternal Infection Features 00:03:17

10-15% of infected adults have	Features of Immuno Compromised
• Mononucleosis - like syndrome • Fever, Pharyngitis • Lymphadenopathy • Polyarthritis	• Myocarditis, Pneumonitis • Hepatitis, Retinitis • Gastroenteritis or • Meningoencephalitis

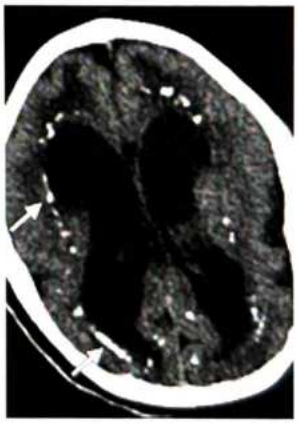
Transmission Rates

- 30-36% in 1st Trimester
- 30-40% in 2nd Trimester
- 40-72% in 3rd Trimester

Fetal Infection 00:04:07
(Only 5-10% neonates demonstrate this syndrome)

Features	Complications
• Growth restriction, Microcephaly • Intracranial calcifications • Chorioretinitis • Mental retardation, deficits • Hepatosplenomegaly • Jaundice, Hemolytic anemia • Thrombocytopenic purpura	• Hearing loss • Neurological deficits • Chorioretinitis • Psychomotor retardation • Learning disabilities

Periventricular Calcification 00:05:45



Diagnosis

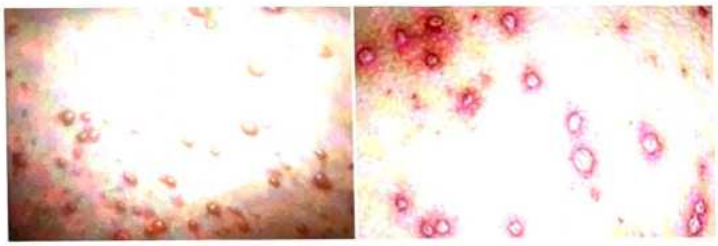
- Nucleic Acid Amplification Testing (NAAT) of Amniotic Fluid
- Gold standard for Dx of Fetal infection

Management

- Despite the high infection rate with primary infection in the 1st half of pregnancy, most Fetuses develop normally.
- If recent infection is confirmed→ Offer Amniotic fluid CMV
- Pregnancy termination may be an option for some
  - Oral Valacyclovir 8gm daily is tried on mother
  - No Vaccine for CMV is available

VARICELLA ZOSTER INFECTIONS 00:07:35

- 90% of adults have serological evidence of immunity
- Primary infection → Varicella or Chickenpox
- Transmitted by direct contact with an infected individual
- Incubation period → 10 to 21 days
- 1 to 2 days flu like prodrome followed by Pruritic Vesicular lesion that crust after 3 to 7 days
- Period of communicability → 1 day before the onset of rash until lesions become crusted



Maternal Mortality

- Predominantly d/t VZV (Pneumonia) in pregnancy
  - Risk Factors - Smoking, > 100 cutaneous lesions point towards poor prognosis
- If there is reactivation of primary Varicella years later, it leads to Herpes Zoster or Shingles
  - U/L dermatomal Vesicular eruption
  - a/w severe pain
  - not more frequent or severe in pregnant women
  - Congenital Varicella syndrome rarely develops in cases of Maternal Herpes Zoster

Fetal & Neonatal Infection : Congenital Varicella Syndrome

- The highest risk is b/w 13-20 weeks
- Clinical Features
  - Chorioretinitis
  - Microphthalmia
  - Cerebral Cortical atrophy
  - Hydronephrosis
  - Limb hypoplasia
  - Cicatricial Skin Lesions
- After 20 weeks of gestation, no clinical evidence of Congenital infection

Around Delivery

- Active infection just before or during delivery (before Maternal antibody formed) is a serious threat.
  - Neonatal mortality rate is 30%
  - Disseminated Visceral & CNS disease is commonly fatal.

Important Information

- **Varicella Zoster Immunoglobulin (VZIG) should be administered to neonates born to mothers who have clinical evidence of Varicella - 5 days before & up to 2 days after delivery.**

Diagnosis OF Varicella

Maternal

- Clinical diagnosis
- Confirmed by NAAT of vesicular fluid
- Scraping the Vesicle base & go for Tzanck smear, Tissue culture or Direct Fluorescent antibody testing

Fetal

- Congenital Varicella Dx with NAAT of Amniotic fluid

Management

Maternal Exposure

- Exposed pregnant women who are seronegative should be given VZIG
  - Best given with in 96 hrs of exposure
  - Can given up to 10 days

Established Maternal Infection

- IV ACYCLOVIR therapy (at 10-15 mg/kg every 8 hrs) with hospitalization.

Previous Year's Questions

Q. A 28 year old pregnant woman at 36 weeks presents with painful reddish vesicular lesions on the vulva. What is the management? (NEET 2021)

A. Acyclovir and Elective LSCS
B. Induction of labour
C. Acyclovir and continue pregnancy
D. Antibiotics and pain medication

INFLUENZA

00:13:44

- Pregnant women more susceptible to serious complications especially d/t Pulmonary Involvement.
- Orthomyxoviridae → RNA virus → both Influenza A & B cause Epidemics
- Influenza A is not related with congenital malformations
- Viremia is infrequent
- Transplacental passage is rare
- Abortion, Preterm labor, Still birth - all reported, but more d/t severity of maternal infection.
- Naso Pharyngeal Swabs
  - Reverse transcriptase PCR → Most sensitive & specific test
  - Rapid Influenza Diagnostic Test (RIDT) → Least sensitive & least indicative
- Treatment
  - Neuraminidase Inhibitors
    - → Oral Oseltamivir for prophylaxis
    - → Zanamivir inhalation for treatment

MEASLES & MUMPS

- Not Teratogenic

RUBELLA/ GERMAN MEASLES

00:16:52

- RNA Togavirus

Maternal Infection

- Mild febrile illness
- Generalized maculo - papular rash on face & trunk
- 25-50% are asymptomatic

Diagnosis

- **ELISA**
  - IgM antibody detected within 4-5 days of onset of infection
  - IgG peaks 1-2 weeks after rash
  - High avidity IgG antibodies indicates infection was at least 2 months prior to tests done.
  - Most complete Teratogen
  - Worse during Organogenesis (1-12 wks of pregnancy)
  - Mother to child transmission
    - → 1st trimester: MTCT → 90%
    - → 2nd trimester: MTCT → 50%
    - → End of 2nd trimester: MTCT → 25%

High Avidity IgG Antibodies

- Avidity is the strength of bond of Antibody with Host Cell. i.e. how much strong is the bond
  - Loose bond = Low Avidity = Recent infection
  - Strong bond = High Avidity = Remote infection
    - → Done to differentiate Recent positive IgG from Remote positive IgG
    - → If IgG is positive for long time (Remote positive IgG)

↓

  - Mother is immune to Rubella & problems in fetus are not likely to happen
- Recent positive IgG (Both IgG & IgM positive)

↓

Baby may be affected

Congenital rubella syndrome

Features

- Cardiac septal defects
- Pulmonary stenosis
- Microcephaly
- Cataract
- Hepatosplenomegaly
- Sensorineural deafness
- Intellectual disability
- Neonatal purpura
- Radiolucent bone disease
- Neonates with congenital rubella may shed the virus for many months (threat to others)
- Delayed Morbidities a/w Congenital Rubella Syndrome (CRS)
  - Progressive Pan Encephalitis
  - IDDM
  - Thyroid disorders
- Prevention
  - Droplet precaution for 7 days after rash
  - Can try Passive immunization within 5 days of exposure
  - MMR vaccine to all non pregnant women
  - Avoid vaccine within 1 month of planning the pregnancy or during pregnancy (as it contains live attenuated virus which can cause defects in fetus)

VACCINES IN PREGNANCY

00:25:33

Refer Table 14.1

ZIKA VIRUS

00:26:31

- 1st mosquito borne teratogen

- Daytime Aedes mosquito bites
- Family = Flaviviridae
- May have sexual transmission

Maternal Infection
- Rash, Fever, Headache, Arthralgia, Conjunctivitis
- Neurological complications
- Guillian - Barre syndrome, Neuropathy & Myelitis

Fetal Infection (Fetus can be severely affected)
- Birth defects (5-15%)
- Neonatal Deaths (5-7%)

Congenital Zika Syndrome
- Microcephaly
- Lissencephaly
- Ventriculomegaly
- Intra cranial calcifications
- Ocular abnormalities
- Congenital contractures

Diagnosis in pregnant women

ZIKA virus in blood & urine
- Do Serological testing & confirm by PCR
- No specific treatment or vaccine of ZIKA so far

PROTOZOAL INFECTIONS
TOXOPLASMOSIS

⏱ 00:28:53

- Feline stage in cats
- Non feline stage in Humans
- Infection is with cat faces or infected meat ingestion

MTCT of Toxoplasmosis
- Rises with increasing gestational age 1
  - 1st trimester : 15%
  - 2nd trimester: 44%
  - 3rd trimester: 70%

Clinically Affected Fetuses have
- Low birth weight
- Hepatosplenomegaly, Jaundice, Anemia
- Neurological diseases with Intracranial calcification, Hydrocephalus, Microcephaly often accompanied by convulsions

- Classical Triad
  - Chorioretinitis
  - Intracranial calcifications
  - Hydrocephalus

Diagnosis
- IgG before pregnancy → No risk
- IgM: appear by 10 days of infection
- Best results are obtained with the Toxoplasma serological profile
- Toxoplasma IgG avidity increases with time
- If high - avidity IgG result is found, infection in the preceding 3-5 months is excluded

Treatment
- Goal of Rx is reduction in rates of serious Neurological sequelae & Neonatal demise
  - Spiramycin alone (does not cross placenta)
  - Pyrimethamine - Sulfonamide with Folinic Acid (If Fetal Infection is suspected)

Prevention
1. Cooking meat to safe temperatures
2. Peeling or thoroughly washing fruits & vegetables
3. Cleaning all food preparation surfaces
4. Wearing gloves when changing cat litter
5. Avoiding feeding cats raw or undercooked meat & keeping cats indoors

MALARIA IN PREGNANCY

⏱ 00:34:00

- Pregnant women have increased susceptibility
- VAR2CSA antigen leads to Antibody formation, which causes accumulation of infected erythrocytes in the placenta, leading to Pregnancy specific Antimalarial immunity
- Higher rates of Maternal Morbidity & Mortality
- Worse in pregnancy

Fetal Infection
- Abortions
- Still birth
- Pre-term birth
- Low birth weight
- Congenital malaria (< 5% incidence)

Diagnosis
- Thin & Thick films (Best method)
- Malaria -specific antigens are used for Rapid diagnostic testing but their sensitivity in pregnancy is still an issue
- Anemia is usually same in pregnant women with Malaria d/t significant amount of Hemolysis

Treatment
- Uncomplicated malaria by P. vivax, P. malariae, P. ovale, Chloroquine sensitive Falciparum malaria
  - Chloroquine or Hydroxychloroquine
- Complicated P falciparum malaria - Artemisinin based regimens
- Chloroquine resistant P. Vivax - Mefloquine

HIV IN PREGNANCY

00:38:00

- Mostly by HIV – 1 infection
- Transmitted by
  - Sexual intercourse
  - Blood transfusion/ Infected needles
  - During labor & delivery
  - Breast milk
- Primary determinant of transmission →Plasma HIV - 1 viral load
- CD_4 site serves as a receptor for virus
- Once infected, CD_4 lymphocytes may die
- Illness with AIDS is d/t profound immunodeficiency that gives rise to various opportunities infections and neoplasms

According to CDC, 'AIDS' is

- CD_4 T cell count < 200 cells/µl
- CD_4 T cell count comprising < 14% of all lymphocytes or
- One of several AIDS - defining illness

Screening

- HIV screening using an OPT-OUT approach
- Repeat testing during 3rd trimester is considered for all pregnant women
- Antigen / Antibody combination immuno-assay (Screening Test)
- Detects antibodies against HIV-1 & HIV-2 & HIV-1 p24 Ag.
- If screening test is positive

  ↓

  Do HIV-1 NAAT for confirmation

Vertical Transmission (MTCT Rate → 25-40% overall)

- 1% with < 400 viral copies/ml
- No cases of vertical transmission with maternal viral load <50 copies/ml at delivery

Timing of transmission

- 20% of vertical transmission occurs before 36 weeks
- 50% in the days just before delivery (i.e. 38-39 wks)
- 30% Intra-partum
- Breast feeding MTCT may be as high as 30-40%

Caution

- Didanosine, Stavudine & full dose of Ritonavir are avoided in pregnancy as they are Toxic to mother (not Teratogenic)
- Anti-retro viral naive patients are given ART regardless of trimester
- In general, the starting regimen comprises
  - 2 Nucleoside Reverse transcriptase inhibitors

    Plus
  - Either a Ritonavir boosted protease inhibitor or an Integrase inhibitor
- Full dose of Ritonavir is C/I in pregnancy due to its toxicity but Ritonavir boosted protease inhibitors can be given

Recommendations

- Taking ART & pregnant → Continue current drugs
- All women get ART ASAP → Monitor CD_4 count at initial and then 3 monthly visits
- ART Naive
- 2 NRTI
  - Abacavir / Lamivudine
  - Tenofovir Disoproxil Fumarate / Emtricitabine
- And a Protease Inhibitor
  - Atazanavir / Ritonavir
- Or an Integrase Inhibitor
  - Raltegravir
- Oral ART during pregnancy + IV Zidovudine during labor can reduce MTCT to < 2 %

Intrapartum Care

- As per NACO & WHO guidelines, there is no benefit of Cesarean section over NVD (Normal Vaginal Delivery)
- C-section is done only in Obstetric indications in an HIV pregnancy

Important Information

- HIV RNA > 1000 copies / ml: C-section at 38 weeks
- HIV RNA < 1000 copies / ml: Vaginal delivery can be done

Important Information

- For HIV RNA > 1000 copies / ml, we can reduce MTCT by giving 2 mg / kg ZDV IV as loading dose then 1 mg/kg hourly till delivery
- For C-section, start IV dose 3 hours prior

- For HIV RNA > 1000 copies / ml, we can reduce MTCT by giving 2 mg / kg ZDV IV as loading dose then 1 mg/kg hourly till delivery
- For C-section, start IV dose 3 hours prior

Antiretroviral Therapy

- Ideal strategy to suppress viral load & minimize Vertical transmission includes
  - Preconceptional ART
  - Ante-partum ART
  - Intra-partum continuation of Ante-partum Oral ART regimen plus IV Zidovudine
  - New born ART prophylaxis

PPH in HIV women

- Best managed with Oxytocin and Prostaglandin analogues
- Methyl ergonovine (Methergine) and other ergot alkaloids adversely interact with Reverse transcriptase inhibitors and Protease inhibitors to cause severe vasoconstriction.

Table 14.1

Contraindicated	Safe
• Measles	• Tetanus & Diphtheria toxoids (Tds)
• Mumps	• Hepatitis B
• Rubella	• Influenza
• Varicella	• Meningococcal
• BCG	• Rabies

Anthrax, Hepatitis A, Japanese Encephalitis, Polio IPV, Yellow Fever are given on special recommendation

15 COVID IN PREGNANCY

PROBLEMS EXPECTED AND SEEN IN PREGNANT WOMEN

- Cough, Fever and shortness of breath.
- Severe symptoms such as
  - Pneumonia and
  - Marked hypoxia

Seen in the

- Immuno-suppressed
- Long term conditions such as diabetes, cancer and chronic lung disease.

So far.... Till 9th march 2020

- One pregnant woman with Covid 19
- Required mechanical ventilation at 30 weeks gestation
- Following which she had an emergency caesarean section and made a good recovery

Important Information

Pregnant women do not appear to be more susceptible to the consequences of infection with COVID-19 than the general population.

VERTICAL TRANSMISSION

- Only one case of possible vertical transmission
- Expert opinion is that the Fetus is unlikely to be exposed during pregnancy.
- Amniotic fluid, cord blood, neonatal throat swabs and breast milk samples From COVID-19 infected mothers were tested
  - And all samples tested negative For the virus
  - Transmission is therefore most likely to be as a Neonate.

INTRA-NATAL TRANSMISSION

- Currently no evidence concerning transmission through genital fluids.

EFFECT ON THE FETUS

- No data suggesting
  - Increased risk of miscarriage
  - Early pregnancy loss in relation to COV1D-19.
  - As there is no evidence a intrauterine fetal infection with COVID-19, it is therefore currently considered unlikely that there will be congenital effects of the virus on fetal development.

ADVICE FOR ANTENATAL WOMAN

- Antenatal women: Be advised to self-isolate. should stay indoors and avoid contact with other for 14 days
- For these women the guidance currently recommends:
  - Not go to work or public areas
  - Not use public transport
  - Stay at home and not allow visitors
  - Ventilate the rooms by opening a window
  - Separate themselves from other members of their household as Car as possible
  - Using their own towels, crockery and utensils and eating at different times
  - Use friends, family or delivery services to run errands, but advise them to leave items outside.

IN LABOUR: ELECTRONIC FETAL MONITORING USING CARDIOTOCOGRAPH (CTG)

- In two Chinese case series, including a total of 18 pregnant women infected with COVID-19 and 19 babies (one set of twins), there were 8 reported cases of fetal compromise.
- Hence
  - Continuous electronic Fetal monitoring in labour is currently recommended for all women with COVID-19.

MODE OF DELIVERY

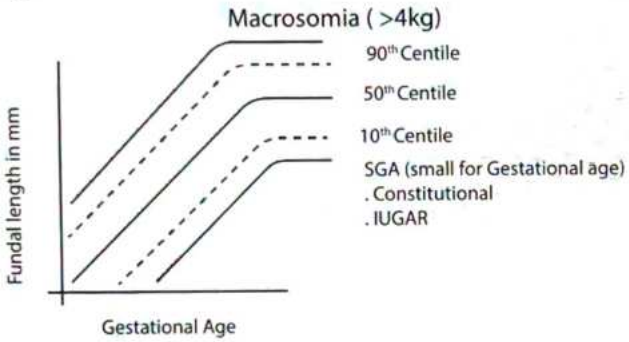
- Should not be influenced by the presence of COVID-19, unless the woman's respiratory condition demands urgent delivery.
- Decision to do operative delivery is based on the obstetric requirements.
- Delayed cord clamping is still recommended following birth, provided there are no other contraindications.

NEONATE

- All babies of women with suspected or confirmed COVID-19 need to be tested for COVID-19
- Literature from china has advised separate isolation of the infected mother and her baby For 14 days.
  Hence, even if breast feed does not transmit the virus, it is best avoided as the baby is to be isolated from the mother. However the mother may be given an option of rooming in and breast feeding the baby if she wishes, more so in developing countries like ours, where expressed feeding by another care taker or formula feeding may not always be possible.
  She should be explained the risk of transmission and be able to make an informed choice

16 INTRA UTERINE GROWTH RESTRICTION

- Clinical lag of 2-3 weeks fundal height from gestational age



- Weight < 2.25 kg (2.3 kg)
- FL: AC Ratio ≅ 22 after 21 weeks (Ⓝ)
  - > 23.5: S/O IUGR

FL = Femoral length; AC = Abdominal circumference

Important Information

- 1st Parameter affected in IUGR : Abdominal circumference
- 2nd Parameter affected in IUGR : Upper & lower limbs (Femur length)
- Last parameter affected during growth restriction: Brain (d/t preferential circulation)

Symmetrical vs Asymmetrical IUGR 00:09:05

Symmetrical IUGR / Type 1	Asymmetrical IUGR / Type 2
• Early onset	• Late onset
• Causes	• Causes
○ [illegible]	○ HTN
○ Chromosomal disorders	○ Renal Disease
○ Congenital anomalies	
• Ponderel Index (PI)	• Ponderel Index: < 7
PI = Estimated fetal weight/FL^3	
(FL- Femur Length)	
Normal value = 8.3	
• HC/AC: 1 Ⓝ	• HC/AC: > 1
• Poor Prognosis	• Better Prognosis

Etiology 00:12:23

- Idiopathic (65%)

Maternal causes

- Chronic kidney disease, HTN, Infections, Connective tissue disorders, Heart disease (NYHA type III & IV), Smoking, Drugs, Alcohol, Burnt out DM (with Microangiopathy/ Vasculopathy)

Important Information

- Diabetes causes macrosomia and not IUGR. Only burnt out DM causes IUGR

Placental causes

- Placental infarcts, Abnormal placentas, Abnormal placentation

Fetal Causes

- Inborn Errors of metabolism, Chromosomal anomalies, Infections

Fetal Complications 00:17:06

- Antepartum
  - Oligohydramnios
  - Hypoxia
  - Still birth
- Intra Partum
  - Hypoxia
  - Acidosis

Neonatal Complications 00:18:42

- Limp, Loose skinned, Thin, Poor Tone
- Respiratory Distress Syndrome
- Intra Ventricular hemorrhage
- Neonatal death
- Persistence of primitive circulation

Management 00:21:49

- Not the treatment 00:25:44
  - Diet
  - Protein powders
  - Stopping to smoke

- Stopping to Drink
- Stop using drugs

- Treatment
  - Resting in a lateral position (Only proven method, which ↑ the weight): decreases vena caval compressionincreases fetal blood perfusion
  - ↑ Surveillance
  - Adequate diet required for woman
    - → Calories → 35-40 Kcal/day
    - → Carbohydrates → 50%
    - → Proteins → 30%
    - → Fats → 20%

ANTEPARTUM FETAL SURVIELLANCE IN HIGH RISK PREGNANCY

00:32:30

Examples of High Risk Pregnancy

- IUGR
- PIH
- APLA
- GDM
- Epilepsy in pregnancy
- Twin pregnancy
- SLE
- Heart disease
- Malaria etc.

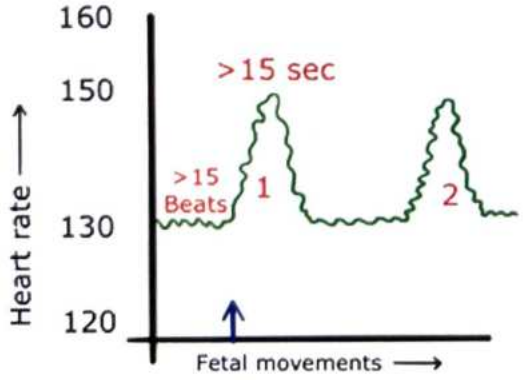
Tools

Daily Fetal Movement Count (DFMC)

- > 10 movements/12 waking hours (Normal)

Non-Stress Test

- Sympathetic Vs Para sympathetic system well being
  - Established at 28 wks
  - Test should be done 32 wks onwards
  - Increase in fetal heart rate with movements
- Reactive Non stress Test
  - >/=2 accelerations, > 15 Beats from baseline > 15 seconds in 20 minutes
  - Chance of IUD: <1%/next 1 week



Acceleration ≥2/20 min

- Frequency of NST
  - Weekly after 32 wks, for all pregnant female
  - Biweekly for high risk pregnancies
  - Once in 48 hrs for controlled DM & severe HTN
  - Daily for uncontrolled DM

Bio Physical Profile/ Manning Score 00:41:31

- Done by USG

Parameter	Points
Fetal movement	2
Fetal tone	2
Fetal breathing	2
Reactive NST	2
AFI	2

- Total Score = 10 (Good Biophysical Profile: 10/10)

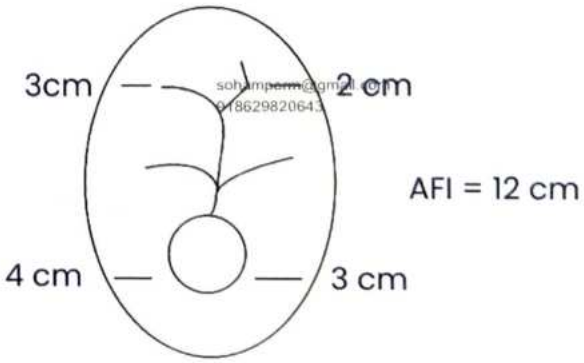
Previous Year's Questions

Q. Not included in Biophysical profile? (AIIMS 2020)
A. Non stress test
B. Fetal body movement
C. Fetal breath
D. Contraction stress test

Amniotic Fluid Index 00:43:51

- Arithmetic sum of 4 cord free pockets
- Normal → 10-15 cm
- Oligohydramnios → < 5 cm
- Polyhydramnios → > 24 cm

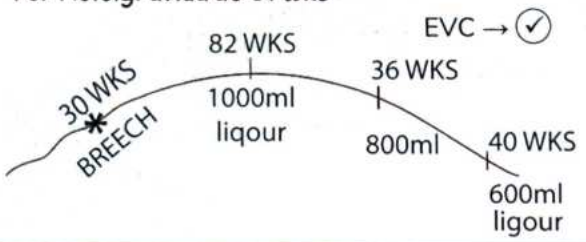
Understand with an example



Absolute Amount of Liquor	Single Pocket
• Normal: 1000 ml cm • Oligoamnios: <500 ml • Polyhydramnios: > 2000 ml	• Oligoamnios: < 2 cm • Polyhydramnios: > 8 cm

Important Information

- External Cephalic Version Done At
- For Primigravida at: 36 wks
- For Multigravida at: 37 wks



Modified Bio Physical Profile 00:51:51

- Includes AFI & NST

Vibro Acoustic Stimulation Test

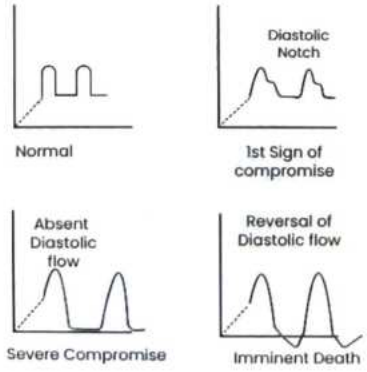
- Definition: It is a simple, non-invasive technique where a device is placed on the maternal abdomen over the region of the fetal head and sound is emitted at a pre-determined level for several seconds

  ↓

  This results in Startle reflex in fetus resulting in subsequent FHR acceleration which is a marker of reassurance of fetal wellbeing
- Not a part of BPP or Modified BPP
- It is also a test of fetal assessment

Doppler Of Blood Vessels 00:54:06

- Umbilical arteries
  - Uterine Arteries
  - Ductus venosus
- Most important Doppler for assessment of uteroplacental flow : Umbilical artery doppler
- Flow should always be forward



Important Information

Q. Which of the following flow patterns done by Doppler assessment will best signify perfusion to the baby?

Ans. Ductus Venosus Flow Patterns > Umbilical Artery Doppler

*Single best measure to assess the Uteroplacental flow → Doppler of Ductus Venosus

Contraction Stress Test / Oxytocin Stimulation Test 01:00:52

- Tells us the plausibility of doing a normal vaginal delivery
- Give IV oxytocin: if heart rate drops with each contraction less likely to tolerate labour

INTRAPARTUM SURVEILLANCE 01:02:34

Fetal Heart Rate

- By Stethoscope
- By Doppler

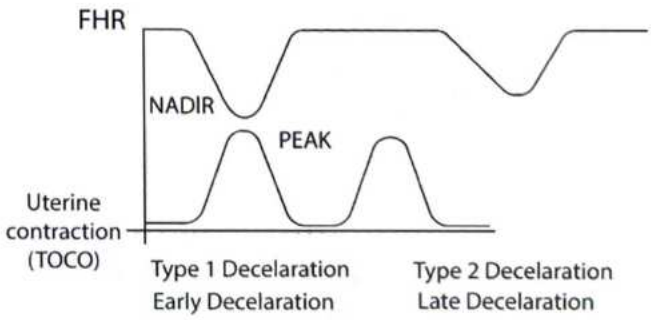
Fetal Scalp Blood PH: > 7.2

Fetal ECG

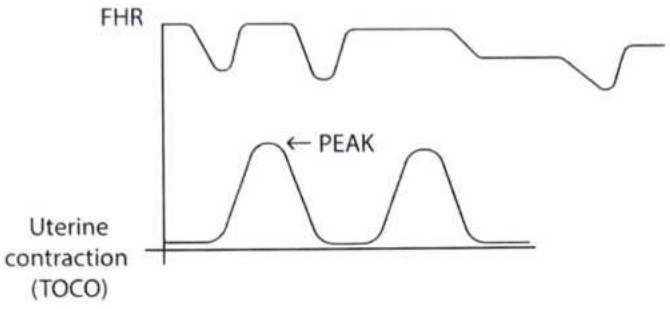
- 1 Probe ECG → ST wave analysis (STAN)
- 2 Probe ECG

Cardiotocography 01:05:09

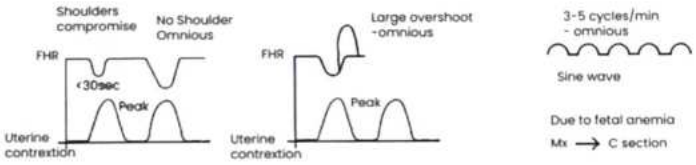
- Single best test for monitoring labor
- **Type 1 / Early Deceleration**
  - The Nadir of FHR & Peak of Uterine contraction coincide
  - Seen in Normal Pregnancies
  - Onset of deceleration & coming back to normal → > 30 sec



- **Type 2/ Late Deceleration**
  - The Nadir & Peak are away from each other
  - Seen in placental insufficiency
  - Onset of deceleration & coming back to normal → > 30 sec



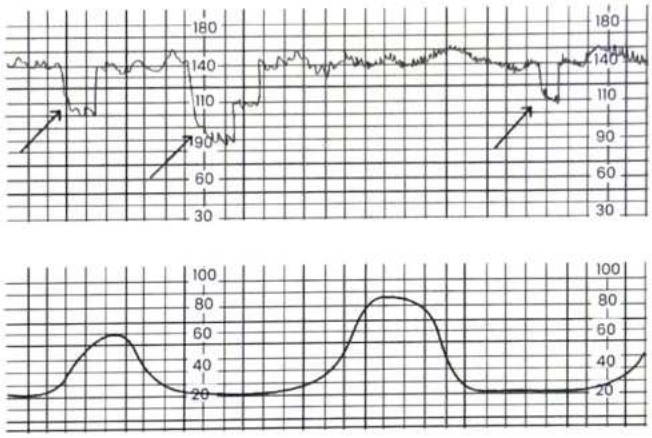
- **Variable Deceleration**
  - Most common deceleration
    - → d/t Umbilical cord compression
    - → More patterns



- **Sinusoidal Pattern**
  - Due to fetal anemia
    - → Immediate Mx: cesarean section
    - → Deceleration: Reduction of heart rate by > 15 beats from baseline lasting for 15 seconds

Previous Year's Questions

Q. Which of the following types of decelerations is seen in the CTG picture? (AIIMS 2019)



A. Early deceleration
B. Late decelerations
C. Variable deceleration
D. Normal CTG

17 TWIN PREGNANCY

HELLIN'S LAW

00:00:44

- Incidence
  - Twins: 1 in 80 Pregnancies
  - Triplets: 1 in $(80)^2$ Pregnancies
  - Quadruples: 1 in $(80)^3$ Pregnancies
- ↑ Incidence
  - ↑ Age
  - ↑ Parity
  - ↑ Maternal weight
  - Hereditary factor (Maternal > Paternal)
  - Blacks > Caucasians
  - Infertility Rx: Clomiphene Citrate, IVF
- Twins with Clomiphene Citrate: 8% (6-12%)
- Twins with IVF: 25-30%

COMPLICATIONS ASSOCIATED WITH TWIN PREGNANCY

00:03:48

Maternal complications	Fetal complications
• ↑ Abortions	• ↑IUGR
• ↑ Hyperemesis	• Discordant twins
• ↑ Preterm labou	• Single Fetal Demise
• ↑HTN / PET	• Congenital anomalies (12 folds ↑incidence)
• ↑GDM	• ↑Malpresentation
• ↑PPH	• Twin Twin Transfusion Syndrome

Important Information

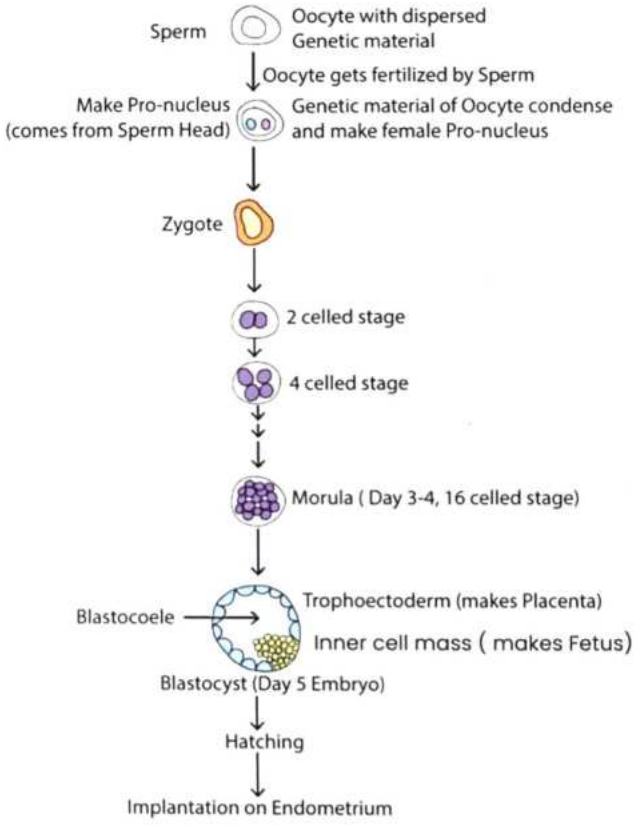
- Congenital anomalies are more in Monochorionic twins as compared to Dichorionic twins: most commonly cardiac anomalies

Placental Complications

- ↑ Placenta Previa
- ↑ Abruptions
- Cord Entanglement (seen in Monoamniotic twins as they share common sac)
- PROM

EVENTS OF ZYGOTE FORMATION

00:07:08

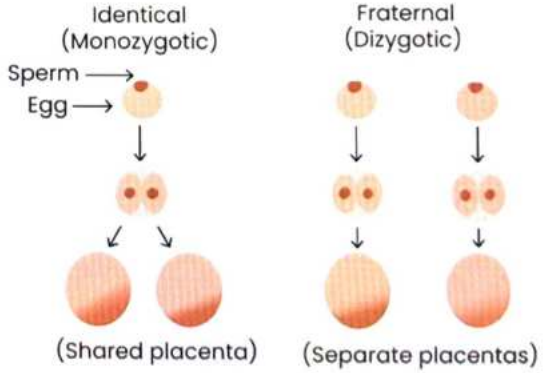


FORMATION OF TWINS

00:10:08

Dizygotic / Non Identical / Fraternal Twins

- 2 eggs get fertilized by 2 sperms
- Incidence: 1/60 – 1/80 Pregnancies



- Superfecundation
  - 2 Oocytes fertilized by 2 Sperms in 1 Cycle
  - Most common type of Dizygotic twins
- Super Fetation
  - 2 Oocytes fertilized by 2 Sperms in 2 Cycles
  - Rare in humans, common in cattle & horses

Previous Year's Questions

Q. A woman gave birth to twins. The husband says that the children do not belong to him. DNA analysis was done and it was found that one of the twins belongs to him. It is a case of? (NEET 2021)

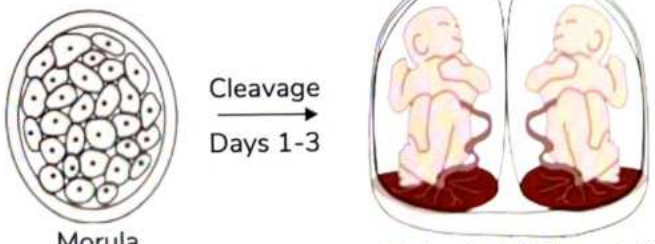
A. Superfecundation
B. Superfetation
C. Posthumous child
D. Suppositious child

Monozygotic/ Identical Twins

- formation of 2 fetuses from splitting of one embryo
- Incidence: 1/250 pregnancies: constant incidence across the world

Fate Of Monozygotic Twins

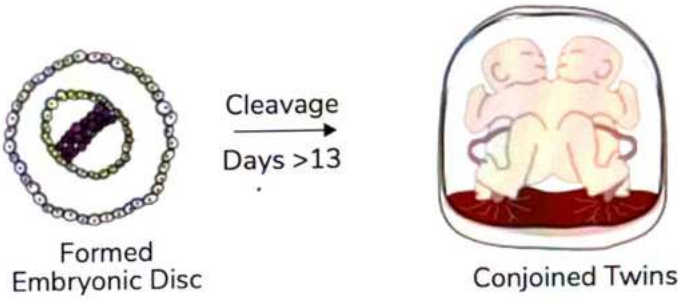
1. Dichorionic Diamniotic (30-35%)



2. Monochorionic Diamniotic (Mo-Di) (40-45%)

3. Monochorionic Monomniotic (Mo-Mo)

4. Conjoined/ Siamese



Important Information

- MC type of Monozygotic twins: Monochorionic Diamniotic
- MC Conjoined twins: Thoracopagus
- MC Dizygotic Twins: Dichorionic Diamniotic (DCDA)
- Best / Least Complicated Type of Twin Pregnancy: DCDA

Chorionicity Scan

- Done at around 12 weeks

00:23:40

1. Dichorionic Diaminiotic

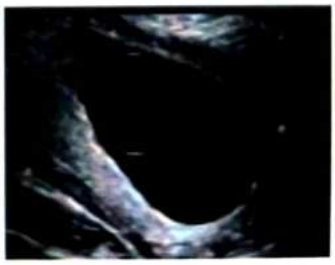
- 2 Placentas, 2 Sacs
- 2 different Sexes
- Twin Peak/Lambda Sign
- Inter twin membrane thickness:> 2 mm

2. Monochorionic Diamniotic

- T sign

Dichorionic Twins (80%)
(Two placentas)

lambda sign

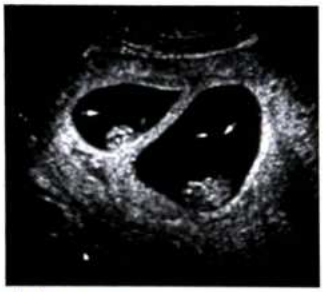


Monochronic Twins (20%)
(One Placenta)

T sign

Previous Year's Questions

Q. Which kind of twin pregnancy is shown in the representation below? (FMGE 2020)



A. Diamniotic dichorionic
B. Monochorionic diamniotic
C. Monochorionic monoamniotic
D. Siamese twins

MONOZYGOTIC TWINS COMPLICATIONS

00:29:25

1. Twin Twin Transfusion Syndrome (TTTS)

- d/t deep AV Anastomosis
- MC in MCDA > MCMA
  MCMA has protective Arterio – Arterial Anastomosis

↓

Reverse the chances of TTTS in MCMA Pregnancy

- Donor twin
  - Anemic
  - Low wt.
  - ↓ liquor (Oligohydramnios)
- Recipient twin
  - Plethoric, Polycythemic
  - Large size baby
  - Polyhydramnios
- TTTS Twins show "Poly-Oli" sequence

Dx OF TTTS

- MCDA picture on USG
- Doppler localization of A-V anastomosis
- Oligoamnios (<2cm pocket) in Donor
- Polyhydramnios (>8cm pocket) in Recipient
- Hb difference: 5gm %
- Wt. difference: > 20% (Larger twin taken as Index)

Mx of TTTS

- Mortality d/t TTTS, if present at 26 wks or before: 100%
- Dx is made by USG & Doppler localization of A-V anastomosis
- Rx
  - Laser Ablation of A-V anastomosis
  - Amnioreduction of larger baby (Poly hydramnios)
  - Single fetal reduction (donor)

Previous Year's Questions

Q. Which of the following is a specific complication of monochorionic twins? (INICET 2021)

A. Twin to twin transfusion
B. preterm labour
C. discordant growth
D. IUGR

2. Twin Anemia Polycythemia Sequence (TAPS)

- Hb difference: 5gm %
- No wt. difference
- No liquor difference
- Dx of TAPS
  - Donor twin: MCA PSV ↑ > 1.5 MoM
  - Recipient twin: MCA PSV < 1.0 MoM
- PSV = Peak Syst...

3. Twin Reverse Arterial Perfusion Syndrome (TRAP)

Donor Twin (Normal Healthy Baby) ⟶ Recipient Twin (Acardiac)

- Cardiac failure in Donor baby occurs as it is pumping blood to himself as well as Recipient baby
- The blood goes from Donor to Recipient via A-V anastomosis (AV anastomosis have deoxygenated blood)

↓

Deoxygenated blood going into Recipient twin keeps it alive

↓

However this deoxygenated blood goes only to lower limb of baby resulting in ↓

Mass of flesh with very small head & properly formed lower limbs

4. Cord entanglement

- Occurs in MCMA
- Much lesser chance 32 wks

5. Single Fetal Demise

- If happens in Early Pregnancy (1st trimester)

  ↓

  Baby gets totally absorbed

  ↓

  Vanishing twin (i.e. the Normal baby will we born & other baby won't be seen at delivery)
- If happens in late 2nd trimester or 3rd trimester
  - Both healthy and compromised baby are well formed so there are more complications likely to occur in this scenario
  - Dead baby can have necrotic tissues within body of Mother & can trigger Intrinsic coagulation cascade & can cause
    → DIC – coagulopathy
    → Neurological sequelae to Healthy baby
    → Preterm Labor
    → Death of Healthy baby
- Mx of single fetal demise in late 2nd trimester or 3rd trimester
  - Try & Deliver the pregnancy in next 3 wks under Steroid cover
  - Monitor Prothrombin Time, Partial Thromboplastin Time, D-Dimers, Coagulation profile

6. Discordant Twins

- Mono chorionic Twins: d/t Vascular Anomalies
- Dichorionic Twins
  - 2 different Placentas that can cause Nutritional differences
  - Genetic factors
- Criteria of Discordance
  - Abdominal circumference: > 20mm
  - Wt difference: > 20%

7. Abruption

8. PROM

9. Sepsis

CLINICAL DIAGNOSIS OF TWIN PREGNANCY

00:47:45

- Uterine height > POG
- Multiple fetal parts felt on Leopold maneuvers
- 2 fetal heads felt on Leopold maneuvers
- Diagnose with USG

PHYSIOLOGICAL CHANGES IN TWIN PREGNANCY

- ↑HCG: ↑ Hyperemesis
- ↑Fluid volume in body → ↑ Cardiac output → ↑ Chances of Cardiac failure
- Anemia more likely in twins as compared to Singleton pregnancy. (both fluid volume and RBC mass increase, but increase in RBC mass is less relative to fluid volume)
- ↑ Liqour→ Compression of Ureters→ Obstructive Uropathy

MX OF ANTENATAL CARE

00:51:22

- Diet: 40-45 Kcal/kg/day

Dietary factor	Twin pregnancy	Singleton pregnancy
Carbohydrates	40%	50%
Fats	40%	20%
Proteins	20%	30%

- USG
  - Monochorionic gestation: 2 weekly USG
- ↑ Fetal surveillance
  - Regular NST of both twins separately
  - Biophysical profile
  - Doppler (Decisions are based on Doppler of Smaller baby's readings)
- Timing of delivery 00:54:58
  - DCDA → 38 wks → deliver
  - Monochorionic Gestations→34 wks→deliver→(32 wks + Steroids → Deliver)
- Delivery requirements for Twins/ Multifetal Pregnancy
  - Tertiary care Hospital
  - Team of Obstetricians
  - Emergency Anaesthesist
  - 2 Patent large bore IV lines
  - Arrange Blood (for PPH)
  - Labor Analgesia should be given
  - Facility of Emergency C-section
  - 2 Neonatologists
  - Portable USG machine in Labor room for Antenatal & Intranatal monitoring

MODE OF PRESENTATION & DELIVERY

00:58:02

- Both Cephalic (> 60%)
- First Cephalic, 2nd breech/ transverse

} Normal vaginal delivery can be done

- First Breech, 2nd breech: Cesarean section
- First Breech, 2nd cephalic: Cesarean section

Important Information

- 1st twin in Breech → Complicated Breech : deliver by LSCS

- Interlocking of Twins 01:00:53
  - Happens when 1st Twin is in Breech, 2nd Twin is Cephalic
  - Very rarely seen
- Cord prolapse during twin delivery
  - 1st Twin Cephalic: Delivered
  - 2nd Twin Breech: High station → Cord Prolapse can happen : deliver immediately

Previous Year's Questions

Q. 35 year old primi conceived after IVF presents at 38 weeks pregnancy. USG reveals Dichorionic Diamniotic twin pregnancy with 1st twin as breech. Her BP was 140/90 on 2 occasions with proteinuria of 1+. How will you manage this case? (NEET 2020)

A. induction of labour
B. plan a cesarean for termination
C. watch for BP and induction at 40 weeks
D. wait for spontaneous onset of labour

Previous Year's Questions

Q. 32 year old lady with twin dichorionic diamniotic pregnancy, first baby breech presentation and second baby cephalic presentation. What is the management? (FMGE 2019)

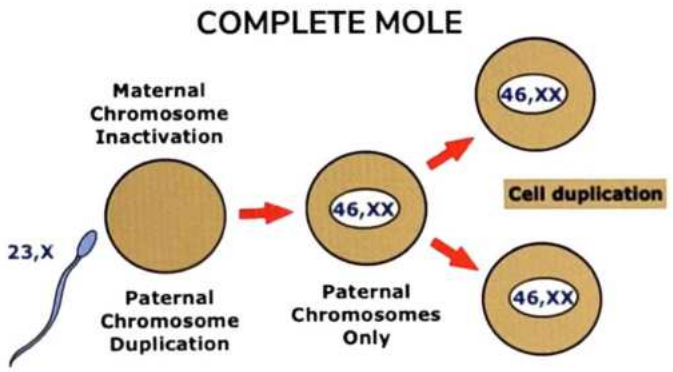
A. C-Section
B. Assisted breech
C. Instrumental delivery
D. Normal vaginal delivery

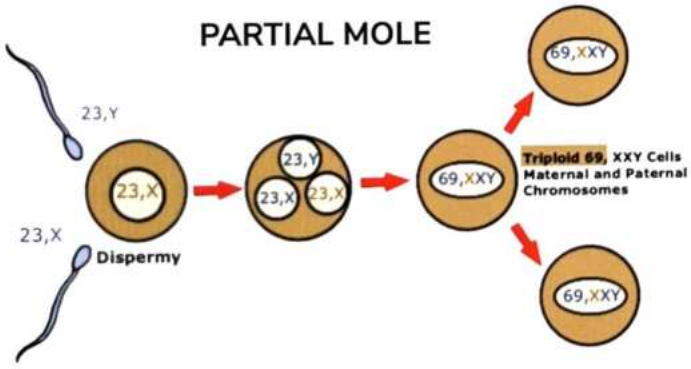
18 MOLAR PREGNANCY AND GESTATIONAL TROPHOBLASTIC DISEASE

PARTIAL MOLE

00:00:26

- 3 pronuclei/ triploidy/ 69XXX
- Fetus and placenta are present but placenta has vesicles
- Non Viable beyond 12-16wks
- Almost no chance or 2-4% chances of Choriocarcinoma
- Can be 69 XXX (MC), 69 XXY, 69 XYY, but never 69 YYY





COMPLETE MOLE

00:02:34

Type 1

- Empty oocyte fertilized by sperm of 23 X
- Endoduplication occurs : 46XX
- Both X chromosomes are of Paternal origin : abnormal villi
- Aka Vesicular mole → SNOW STORM APPEARANCE ON USG

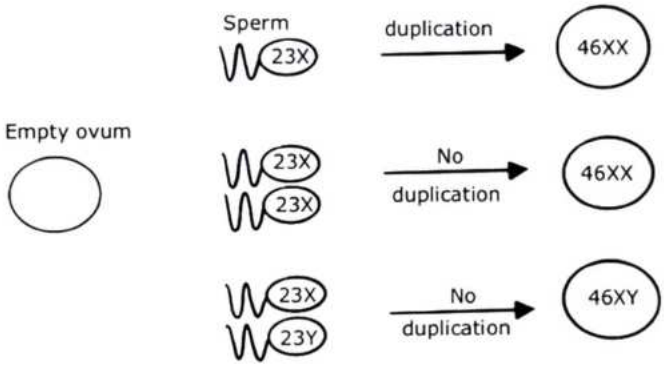
Type 2

- Empty ovum Fertilized by 2 sperms of 23 X each : 46XX
- No duplication occurs

Type 3

- Empty ovum fertilized by 2 Sperms of 23 X & 23 Y
- No duplication occurs : 46XY
- Can never be 23 YY

COMPLETE MOLE - TYPES



DIFFERENCES BETWEEN PARTIAL AND COMPLETE MOLE

00:06:27

Partial Mole	Complete Mole 00:38:05
• Fetus present	• No fetus
• Focal Trophoblastic hyperplasia	• Diffuse Trophoblastic hyperplas[illegible]
• Focal Chorionic villi swelling	• Diffuse chorionic villi swelling
• Scalloping of villi +nt	• Scalloping of villi absent
• Trophoblastic stromal Inclusion +nt	• Trophoblastic stromal inclusion -nt
• Chance of Choriocarcinoma is 2-4%	• Chance of Choriocarcinoma is 20%

Associated more with

- Asians/ south east asians (Rice eating population)
- Vit A deficiency
- Elderly Pregnancy

Diagnosis 00:08:36

1. USG
2. Flow Cytometry
3. Immuno Histochemistry } More specific tests

- IF P57 is –ve → Complete mole

Presentation 00:10:15

- Incomplete Mole: Missed Abortion like presentation
- Complete Mole
- High HCG
  - Thyrotoxicosis [During Evacuation, patient may suffer from Thyroid Storm (Pulse Rate, Temp, High Output Cardiac Failure)]
    → Keep β blocker ready while doing Evacuation
  - Hyperemesis
- Passage of grape like vesicles (Rare)
- Bleeding PV (MC Presentation)

Important Information

Most common presentation of complete mole is bleeding PV and not passage of grape like vesicles.

- Uterine size > POG
- Empty Uterus (Doughy)
- Patient may present with Trophoblastic Embolization (respiratory distress)
- Patient may have Theca Lutein cysts (due to high HCG, resolve by themselves after evacuation)
- Early onset HTN (d/t abnormal Trophoblastic proliferation)

Management of Vesicular Mole / Complete Mole 00:14:32

Important Information

- **m/m is always a suction evacuation, irrespective of size of uterus**

- Suction Evacuation (also do a Gentle curettage with a sharp curette)

↓

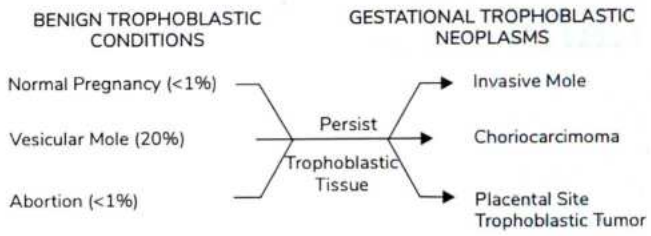
Do USG after a week to Rule out Retained Bits

- Do CXR to Rule out metastasis
  (MC site of metastasis →Lung)
- HCG follow up
  - Weekly HCG estimation till it is negative
  - (Vesicular mole takes 9 wks & Partial mole takes 7 wks to come to negative value)
  - Weekly HCG till 3 more wks after it comes negative
  - Once in a month for 6 months (No pregnancy at this time)
    (Woman should use contraception at time of follow up)

Previous Year's Questions

Q. **Patient with 10 weeks amenorrhea, with uterine size of 12-14 weeks presents with severe nausea and vomiting, snow storm appearance on USG. Management is?** (AIIMS 2020)

A. Follow up with HCG levels
B. Continue pregnancy
C. Suction and evacuation
D. Diagnostic laparoscopy



Important Information

- Exception: **Invasive mole does not follow a normal pregnancy**

INVASIVE MOLE/ CHORIOADENOMA DESTRUENS

- Does not follow a normal pregnancy
- Produces HCG
- Locally invasive (Does not give Systemic secondaries)
- Villi are preserved
- Surgery is preferred Rx

CHORIOCARCINOMA

- Produces HCG
- Local + Systemic Invasion
- No villi seen
- Chemotherapy is mainstay of Rx
- Sx Treatment if age of patient is > 40 yrs

PLACENTAL SITE TROPHOBLASTIC TUMOR (PSTT)

- Made by Intermediate Trophoblasts (Derivative of Cytotrophoblast) → Produces HPL
- Rx: Surgery
- Human Placental Lactogen follow up is done

CHORIOCARCINOMA

00:25:40

- HCG at Dx (> 10^5)
- Uterine Size → Big
- 6cm Theca Lutein Cyst

} ↑↑chance of Choriocarcinoma

- 20% of Vesicular moles will become Choriocarcinoma
- < 1% of Normal pregnancy will become Choriocarcinoma
- < 1% of Abortions will become Choriocarcinoma
- 50% of Choriocarcinoma follow Vesicular mole
- 25% of Choriocarcinoma follow Normal Pregnancy (Worst Prognosis)
- 25% of Choriocarcinoma follow Abortion

00:30:05

WHO prognostic scoring system	Bad prognosis
Antecedent Pregnancy	Normal Pregnancy
HCG	10^5 or more
Size of Tumor	> 5cm
Chemotherapy (No. of Drugs)	2 Drugs given
Age	> 39 years
Metastasis	Present at time of Diagnosis
Metastasis	In Liver or Brain
Time Interval of appearance of Choriocarcinoma after Mx of Vesicular mole	Longer
Blood Group	B

- Score 7 → Poor Prognosis

Management

- < 7 Score
- Single Agent (Methotrexate / Actinomycin)
- Combo (MTX + Actinomycin + Cyclophosphomide)
- ≥7 Score [(High Risk Patient) (High Risk Patient with Metastasis)] : EMACO
  - ETOPOSIDE
  - MAC (MTX + Actinomycin + Cyclophosphomide)
  - Oncovin

Previous Year's Questions

Q. A 32 year old woman presents to the hospital with cannon ball appearance on the chest X ray. Patient had h/o molar evacuation. Which of the following is the best management? (NEET 2021)

A. Hysterectomy
B. EMACO Regimen
C. Single agent chemotherapy like Methotrexate
D. Radiotherapy

STAGING OF MOLAR DISORDERS

00:36:10

- Stage I: Within Uterus
- Stage II: In Pelvis, Vagina (may look like a suburethral nodule : Do not take biopsy until HCG done)
- Stage III: Lung
- Stage IV: Distant Metastasis

CLINICAL QUESTIONS

Q1. A 35-year old lady G4 P3 presents to the emergency dept. with amenorrhea of 12 weeks with excessive vomiting and bleeding per vaginum. She has not had any prior scan in this pregnancy. On examination her pulse is 90/min., BP is 150/110 mm Hg, on PA examination uterus is of 20 wks size. Your most possible diagnosis is:-

A. gestational hypertension
B. Molar pregnancy
C. Polyhydramnios
D. Antepartum hemorrhage

Answer: B

Solution:

The above given history is suggestive of molar pregnancy as:

- uterine growth that is more rapid than expected.(uterine size>POG)
- excessive nausea and vomiting
- vaginal bleeding
- early onset pre-eclampsia (raised BP of 150/110)

Other features that may be present

- Passage of grape like vesicles
- Features of hyperthyroidism

Other options are ruled out as

- Gestational hypertension is characterized by hypertension after 20 weeks of pregnancy.
- Poly Hydramnios does not present at 12 weeks
- APH is Bleeding in the genital tract after 28 weeks

19 VOMITING IN PREGNANCY

- Aka Morning Sickness ⏱ 00:01:05
- can happen anytime

REASON OF EXCESSIVE VOMITING

- ↑ HCG
- ↑ Estrog[illegible]
- ↑ Progesterone
- ↑ Leptins
- ↑ Ghrelin
- Placental growth hormone

HYPEREMESIS GRAVIDARUM ⏱ 00:02:25

- Severe vomiting
- Unrelenting nausea
- Almost no intake of food and fluids
- Environmental and Psychological factors also associated

Symptoms

- Dehydration
- Weight loss
- ↓ HCl [Alkalosis]
- Hypokalemia
- Starvation ketosis
- Mild liver dysfunction [in severe cases]

Disorders to be ruled out

- Gastroenteritis
- Acute cholecystitis
- Hepatitis
- Pyelonephritis
- Pancreatitis
- Peptic Ulcer Disease

Late pregnancy vomiting to be ruled out

1. Pre Eclamptic Toxemia
2. Fatty Liver

Problems in mother due to excessive vomiting ⏱ 00:08:10

- Esophageal tear - Boerhaave Syndrome
- Mallory Weiss Tears
- Diaphragmatic Tears
- Acute Kidney Injury
- Depression
- Vitamin K Deficiency [Hypoprothrombinemia]
- Vitamin B_1 [Thiamine] Deficiency [Wernicke Encephalopathy]
  - Triad of
    - → Ophthalmoplegia
    - → Confusion
    - → Ataxia

Obstetric Outcome

- Pre-term labour
- Abruption
- Pre Eclamptic toxemia

TREATMENT ⏱ 00:11:21

1. Mild Vomiting

A. Diet Modification
- Frequent small feeds
- Dry biscuits in the morning (empty stomach)
- Stop short of satiety

B. Medication: Tablet Doxylamine + B_6 (Pyridoxine)

2. Moderate Vomiting

A. Medication
- Prochlorperazine } Oral
- Promethazine } Oral
- Metoclopramide } Oral
- Ondansetron: Rectal / Oral

3. Severe Vomiting

A. IV Hydration
- Normal saline
- Ringer lactate
- ??Dextrose (Serum/Urine Ketones to be monitored)]

B. Anti-emetics
- IV Promethazine (Phenergan)
- IV Prochlorperazine
- IV Ondansetron
- IV Metoclopramide

C. Add 100 mg Thiamine

4. Intractable Vomiting

A. Parentral Nutrition
B. Enteral Nutrition

- From the onset of pregnancy until 16 weeks the vomiting continues, after that it will subside.

20 ECTOPIC PREGNANCY

LOCATION

00:00:30

- 1-2% of all pregnancies are ectopic
- MC site of ectopic: fallopian tube
  - Intramural/ insterstitial : narrowest part
  - Ampulla: MC site of tubal ectopic
  - Isthmus
  - Infundibulum

Mounted specimen of tubal ectopic

- MC non-tubal ectopic: ovarian
- Abdominal
- Cervical
- Cesarean scar ectopic

ABDOMINAL ECTOPIC

00:02:53

- Primary abdominal pregnancy: Studdiford Criteria
  - Tube and ovary normal
  - No utero-placental fistula : No evidence of any attachment to the tube or Uterus
  - Pregnancy is related exclusively to peritoneal surface
- Secondary abdominal pregnancy: pregnancy moved out of uterus into abdomen through a scar : more common
- The only ectopic pregnancy that can rarely go to term
- Delivery is by laparotomy (not cesarean)
- Placenta may be adherent : may be left behind and later on made to degenerate by giving Methotrexate

Abdominal ectopic pregnancy (secondary)

OVARIAN ECTOPIC PREGNANCY

00:06:14

- MC non tubal ectopic : 3% of all ectopics
- Primary ovarian ectopic : Spiegelberg's criteria
  - Tube intact
  - Sac occupies position of ovary
  - This is connected to the uterus with ovarian ligament
  - Ovarian tissues should be seen in the wall of the sac
- Secondary ovarian ectopic : more common
- Rx : wedge resection of ovary

Important Information

- MC ectopic : tubal
- MC site of tubal ectopic : ampulla
- MC non-tubal ectopic : ovarian
- Primary Ovarian & Abdominal ectopic are much rarer as compared to secondary Ovarian & Abdominal ectopic
- Rarest : cervical

Previous Year's Questions

What is the criteria for diagnosis of abdominal pregnancy? (AIIMS 2020)

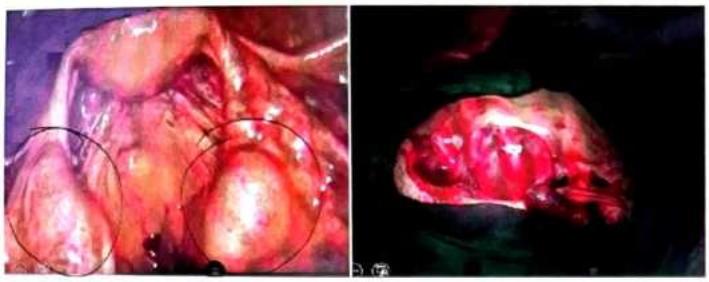
A. Studdiford
B. Palman's
C. Speilberg's
D. Rubin's

Heterotropic Ectopic Pregnancy

- Pregnancy in uterus and also in tube/ abdomen (Intrauterine+ extrauterine)
- 1 in 30,000
- Due to ART : incidence has increased to 1 in 3000-6000 pregnancies

Multiple Ectopic Pregnancy

- Multiple extrauterine pregnancies



MULTIPLE ECTOPIC PREGNANCIES

TIME OF RUPTURE

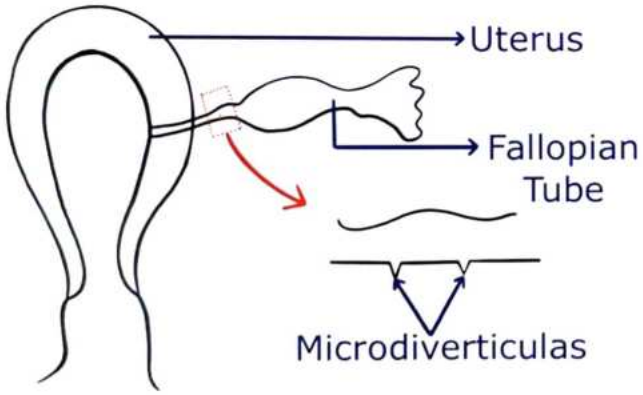
00:13:10

- Ampullary Ectopic: 6-8 wks
- Isthmic Ectopic : 4-6 wks (earliest to rupture)
- Interstitial / Cornual Ectopic: 12-16 wks (narrowest part of tube)

CAUSES

00:16:40

1. Pelvic Inflammatory Diseases: Salpingitis Isthmica Nodosa
- MC Cause
- Microdiverticulas are present : nidus for embryo to lodge



Important Information

- MC cause of ectopic : PID not previous ectopic
- Previous ectopic : most important risk factor
- One ectopic : next time she has 15% chance of ectopic again
- Two ectopics : next time has 30% chance of ectopic again

2. previous ectopic
3. Tubal Surgeries
- Tubectomy
- Re-anastomosis Sx
- Tuboplasty
4. Endometriosis
5. Tuberculosis
6. Infertility Treatment : very important to rule out ectopic pregnancy
7. Use of IUCD

Important Information

IUCDs do not increase risk of ectopic pregnancy

- Normal woman conceives : 99% intrauterine, 1% ectopic pregnancy
- IUCD user conceives (IUCD failure) : 95% intrauterine, 5% ectopic
- IUCD : reduces pregnancies reduces ectopic pregnancy
- If at all she conceives rule out ectopic

- Pregnancy with IUCD in situ
  - 50% will abort
  - Remove IUCD
  - Counsel : she can continue with 25% risk of abortion or do a MTP

8. Use of POP : same as IUCD use, same management

Previous Year's Questions

Q. Which of the following is not an important risk factor for ectopic pregnancy? (FMGE 2020)
A. H/O tubal ectopic
B. IUCD use
C. In utero DES exposure
D. H/O PID

Previous Year's Questions

Q. A patient was using IUCD as contraceptive, after 2 months of usage, she presented with amenorrhea and repeated episodes of black-out (syncopal attack). What is the likely cause? (FMGE 2020)
A. Ectopic pregnancy
B. Recurrent abortion
C. Sepsis
D. Coagulation abnormality

PRESENTATION OF RUPTURED ECTOPIC

00:28:33

- Amenorrhea followed by pain abdomen
- Bleeding PV :
  - Placenta HCG maintains corpus luteum of pregnancy makes progesterone maintains pregnancy

- Ectopic pregnancy placenta in tube
- MC Fate of Ectopic : Vascular insufficiency (MC) : embryo degenerates

Vascular insufficiency
↓
Death of Fetus
↓
HCG production
↓
Progesterone by Corpus luteum
↓
Shedding of Decidua
↓
Bleeding from Vagina

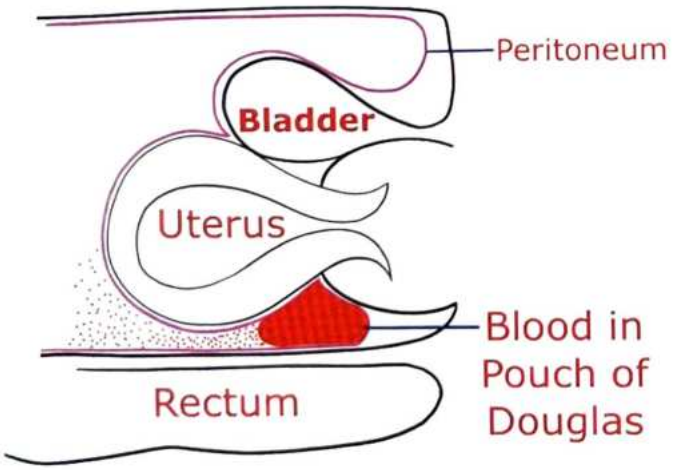
- Other fate of ectopic : tubal abortion or rupture

- Triad :pain + bleeding + amenorrhea
- Syncopal attacks
- Pain abdomen with distension

SIGNS

00:24:10

- Shock
- Abdominal distension
- Evidence of hemoperitoneum
  - Cullen's Sign: Bruising around the umbilicus
  - Turner's Sign: Bruising at Flanks
- On P/v Examination
  - Cervical motion tenderness
  - Adnexal tenderness
  - Fullness in Pouch of Douglas : Aspiration of POD shows → Non clotting blood d/t Peritoneal Fibrinolysins



MANAGEMENT

00:40:00

RUPTURED ECTOPIC

1. Resuscitation
- 2 IV line of 14 Gauge
- Crystalloids and Colloids
- Arrange for Blood (Think of O -ve)

2. Surgical Management
- Can be done by
  - Laparascopy (not done in shock)
  - Laparotomy
- Procedure
  - No repair/ resection-anastomosis
  - Total Salpingectomy (No partial salpingectomy : can lead to another ectopic)

UNRUPTURED ECTOPIC

00:46:25

1. **Medical Management**
- Methotrexate (local/systemic)
- KCL : directly in the sac
- Mifepristone
- Prostaglandins

2. **Surgical Management**
- Linear Salpingostomy
  - Incision is given on the anti-mesentric border (linear) & take out ectopic & leave the tube open i.e. no sutures applied
  - Reperitonization occurs
  - Best surgical procedure
- Linear Salpingotomy
  - Incision is given & take out ectopic
  - Sutures are applied to close tube
  - Outdated procedure
- Resection Anastomosis
- Milking of Tube [increases Risk of Ectopic Pregnancy - Outdated)

CRITERIA FOR MEDICAL/ SURGICAL MANAGEMENT IN UNRUPTURED ECTOPIC

Medical Mx	Factor	Surgical Mx
• < 4cm	• Size of Ectopic	• 4cm
• < 5000 IU	• HCG	• 5000 IU
• Absent	• Cardiac Activity	• Present

- Either medical/ surgical management in unruptured ectopic aims to save the tube

Previous Year's Questions

Q. A lady presents with a pregnancy of 6 weeks. On USG a left adnexal mass of 3 cm size is noted. The mass has a small gestational sac and fetal node but no fetal cardiac activity. What is the management? (NEET 2021)

A. Wait and watch
B. Salpingectomy
C. Medical management
D. Salpingostomy

EARLY DIAGNOSIS OF ECTOPIC

00:56:25

- TVS > TAS
- MRI: Trouble shooter
- Laparoscopy: best
- HCG: if woman is pregnant, cannot see a sac on TVS and HCG is less than discriminatory zone: then see doubling titre
  - Doubling in 48 Hrs.: Intrauterine Pregnancy (uterus has better blood supply)
  - Doubling in 5-7 days: Ectopic Pregnancy (more vascular insufficiency)
  - Discriminatory Zone: HCG level beyond which we must see a sac
    - → TVS: > 1500 IU
    - → TAS: > 6500 IU
- Serum Progesterone
  - > 25 ng/ml: Ⓝ Intra uterine Pregnancy
  - < 25 ng/ml: ? Ectopic Pregnancy or ? Missed abortion

CLINICAL QUESTIONS

Q1. A 30 year old primigravida presents with a history of 6 weeks amenorrhea with a positive urine pregnancy test. She has some pain and associated spotting per vaginum. Examination reveals stable vitals, lower abdomen tenderness and a closed cervical os with altered bleeding. USG reveals an adnexal mass of 2.5 x 3 cms and beta hCG titre of 1500 mIU /ml, with no intrauterine gestational sac. What modality of treatment is suitable for her?

A. Methotrexate
B. Laparotomy with salpingectomy
C. Progesterone therapy
D. wait and watch

Answer: A

Solution:

- The history of early pregnancy with pain and spotting along with an adnexal mass with no IU gestational sac is suggestive of Ectopic pregnancy. Since there is no free fluid and patient is hemodynamically stable, it is most likely unruptured ectopic.

Management of Ectopic pregnancy

	Medical management	**Surgical management**
β-HCG levels	<5000 mIU	>5000 mIU
Size of G-sac	<4 cm	>4 cm
Cardiac activity	-ve	+ve
Evidence of rupture	none	+
Hemodynamics	stable	unstable

Medical management of ectopic pregnancy

- **Methotrexate**: 50 mg/sq. m (IM) given as single dose, two dose or multiple dose regimens. Patient is followed up for adequate fall in beta HCG levels and for evidence of rutpure. If beta HCG levels do not fall, or there is any evidence of rupture surgical management is done
- Other drugs used are: Actinomycin D and KCL

Conservative management may be done for patients with falling B Hcg levels. However tubal rupture can occur even with falling beta hcg levels. Patients with low initial levels of beta hcg are generally the best candidates for expectant management, and there is a reported 88% success rate of spontaneous remission with an initial beta hcg levels of less than 200 mIU/mL.

21 SPONTANEOUS ABORTIONS

- 50% of all human pregnancies

Types
- Embryonic (50%)
- Anembryonic [aka Blighted ovum (50%)]

Embryonic abortions

Causes 00:01:50

1. Chromosomal: Usually present during 1st trimester
- Trisomies 16/18/21
- Monosomy 45 X0

> **Important Information**
> - MCC of Embryonic abortions: Chromosomal
> - MC chromosomal cause of abortion: Trisomies
> - MC cause of abortion in Trisomies: Trisomy 16
> - MC chromosomal defect in pregnancies: Monosomy 45 X0

2. Anatomical: Usually present during 2nd Trimester
- Septate Uterus
- Bicornuate Uterus
- Incompetent OS (Short Cervix)

3. Maternal: Can present during any of the trimester
- Syphilis
- SLE
- APLA Syndrome
- DM
- TORCH infections
- TB
- Cancers
- Celiac Disease
- Hypothyroidism

RECURRENT PREGNANCY LOSS 00:06:08

- Loss of >/=3 pregnancy Losses

Causes
- Chromosomal (MC)
  - If Cardiac activity is present on USG → chance of RPL is 4.5%
  - If Cardiac activity is absent on USG → chance of RPL is 13-20%
- Anatomical
- Maternal
  - DM
  - SLE
  - APLA
  - Hypothyroidism
  - Celiac disease

> **Important Information**
> - TORCH infections do not cause Recurrent abortions

ANATOMICAL CAUSES 00:09:32

1. **Septate Uterus**
- MC Mullerian defect
- Causes 2nd trimester abortion
- Mx: Hysteroscopic resection

2. **Bicornuate Uterus**
- Strassman's Metroplasty
  - Unification Sx
  - Only indicated in Recurrent Pregnancy Loss

> **Important Information**
> - The only indication of a unifying surgery for a bicornuate uterus is a recurrent pregnancy loss

3. **Incompetent OS (Short Cervix [<2.5 cm])**
- Short Cervix efface early & predisposes to both Preterm Labor & Abortion
- Mx by Encerclage
  - Applied > 12 weeks, removed 37 weeks
  - MC → MC Donald's cerclage

THROMBOPHILIAS 00:13:00

- Tendency to form a Thrombus is Thrombophilia

1. **Inherited Thrombophilias**
- Factor V leiden mutation
- Methyl Tetra Hydro folate Reductase Gene Mutation
- Prothrombin Gene Mutation
- Protein C, S deficiency
- Antithrombin III deficiency

2. **Acquired Thrombophilias**
- Anti Phospholipid Antibody Syndrome: APL Anti-bodies
  - Lupus Anticoagulants
  - Anti cardiolipin Antibodies
  - Anti β2 Glycoprotein Antibodies
  - **Clinical criteria**
    - → 1: Venous / Arterial Thrombosis
    - → 1: Morphologically normal baby lost after 10 wks
    - → 1: Morphologically normal baby lost before 34 completed wks
    - → 3: Abortions before 10 weeks
  - **Lab criteria direct visualization of**
    - → Anticardiolipin Antibodies (IgG & IgM)
    - → Lupus anticoagulant
  - Management
    - → LMW Heparin
    - → Anti Platelet Drugs
- Hyperhomocysteinemia

Previous Year's Questions

Q. A woman presents with recurrent abortions. Which of the following is false? (JIPMER 2019)
A. Rule out hypothyroidism
B. APLA assessment
C. USG scan
D. Only m/m is early intervention in next pregnancy

Previous Year's Questions

Q. Patient with h/o 3 consecutive spontaneous miscarriages presents for evaluation. She tests positive for LAC (Lupus anticoagulant) and ACL (Anti-cardiolipin antibody). Which of the following pharamacotherapy is most appropriate for this patient in her subsequent pregnancies? (NEET 2019)
A. Aspirin only
B. Aspirin + Low molecular weight heparin
C. Aspirin + Low molecular weight heparin + prednisolone
D. Prednisolone + high dose progesterone

Previous Year's Questions

Q. A lady presents with history of recurrent abortions at 8 weeks, 11 weeks and 22 weeks. she also had pre-eclampsia in the last pregnancy. Cardiac activity in all three pregnancies were normal. Which of the following is the most probable cause? (NEET 2021)
A. Syphilis
B. Antiphospholipid antibody syndrome
C. TORCH
D. GDM

TORCH INFECTIONS

00:19:10

Cytomegalo Virus
- MC mother to child transmitted infection → CMV
- If CMV transmitted before 15 weeks → 5-6% babies are affected
  - Features
    - → Microcephaly
    - → Intra Ventricular Hemorrhage
    - → Mental Retardation
    - → Peri-ventricular calcification
- CMV is assessed by
  - Avidity Test (Best)
  - Viral culture of Amniotic Acid

Rubella
- MTCT in 1st trimester: Up to 80-85%
  MTCT in 2nd trimester: up to 60-65%
  MTCT at end of 2nd trimester: up to 25%
- If Rubella vaccine is given: Pregnancy should be avoided for atleast 1 month after vaccine administration

Toxoplasma
- MTCT in 1st trimester: up to 10% [↑↑ Anomalies]
  MTCT in 3rd trimester: up to 60% [Congenital Toxoplasmosis Syndrome]
- Congenital Toxoplasmosis Syndrome
  - Features
    - → Intracerebral calcification
    - → Chorioretinitis
    - → Microcephaly
  - Rx: Spiramycin 1gm, 2-3 times/ day, 3 wks on, 1 wk off (If we have to give Spiramycin for long duration)

Chicken Pox
- Congenital Varicella Syndrome
  - Max chance of transmission: 13-20 weeks
  - Features
    - → Microcephaly
    - → Cerebral calcification

→ IUGR
→ Limb Hypoplasia
→ Cortical atrophy

Important Information

Chicken pox
- If transmitted around delivery time
  - within 5 days before delivery or within 2 days after delivery } Neonatal mortality up to 30%
  - Rx with Varicella zoster immunoglobulin (VZIG)

- Diagnosed by
  - Tzank Smear
  - Direct flouroscent antibody
  - Nucleic Acid Amplification test (NAAT)

HIV
- MTCT Rate: 25-30%
  - If breast feeding : 10-15% more chance
  - Breast feeding contraindicated except in developing countries [NEVIRAPIN SYRUP RECOMMENDED]
- Management during pregnancy : at anytime of pregnancy, irrespective of stage or CD4 counts
  - Zidovudine or Tenofovir
  - Lamivudine (3 TC)
  - Nevirapine or Efavirenz
- Method of Delivery
  - Normal vaginal delivery
  - Cesarean section only in obstetric indication

HEPATITIS B
- MTCT Rate
  - Antigen : 90%
  - Antibody : 10%
  - Chronic Carrier State: 40%
  - At birth, both Active & Passive Immunization should be given to Neonate

Previous Year's Questions

Q. A patient with 37 weeks of gestation, came to hospital without antenatal check-up and presented with onset of labour. On examination, the mother is Hepatitis B positive, what management should be given to the neonate? (FMGE 2019)
A. Hepatitis B vaccine only
B. Hepatitis B vaccine + IVIG
C. First IVIG then Hepatitis B vaccine after 1 month
D. on IVIG

PRESENTATION OF ABORTION

00:33:32

- Pain abdomen
- Bleeding P/V
- PV Examination
  - OS closed, Uterine size = POG: Threatened Abortion
  - OS open, products are bulging: Inevitable abortion
  - OS open, Products are felt with H/O passage of some mass → Incomplete Abortion
  - OS closed, H/O passage of products, normal Uterine size → Complete Abortion

Previous Year's Questions

Q. A lady with 12 weeks pregnancy presents with bleeding. On examination, internal os is closed, fundal height is 12 weeks. USG shows live intrauterine pregnancy. Diagnosis is? (FMGE 2019)
A. Threatened abortion
B. Complete abortion
C. Incomplete abortion
D. Inevitable abortion

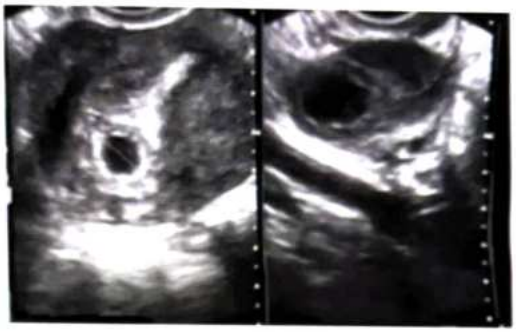
Previous Year's Questions

Q. A 19 year old primigravida presents with 8 weeks amenorrhea, light bleeding and pain. On examination uterine size corresponds to POG and os is closed. USG reveals intra-uterine pregnancy, what is the preferred management in this case? (FMGE 2019)
A. Estrogen + progesterone therapy
B. Dilatation and curettage
C. Bed rest and progesterone
D. Beta HCG

- On USG,
  - Cardiac activity + at 9 weeks
  - Crumpled sac with some fleshy mass inside 12 weeks: } Missed abortion
  - No pain & no bleeding
- Blighted Ovum / Anembryonic Gestation
  - Normally around 7 weeks of gestation, yolk sac is pinched out
  - Pregnancy not gone beyond the stage of sac → Blighted Ovum

Previous Year's Questions

Q. A pregnant lady 10 weeks POG presents with spotting. On USG there is a gestational sac seen but without a fetal pole. What is the likely diagnosis? (FMGE 2020)



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

CLINICAL QUESTIONS

Q15. A 19-year-old primigravida, presents with 8 weeks amenorrhea, along with light bleeding and pain. On examination , vitals are stable, per abdomen is soft , vaginal examination shows uterine size corresponding to POG and Os is closed. USG reveals a live intra uterine pregnancy of 7 weeks. What is preferred management in this case?

A. Bed rest and progesterone
B. Dilatation and curettage
C. Laparotomy
D. Beta HCG follow up

Answer: A

Solution

	presentation	P/V examination	USG
Threatened abortion	pain, bleeding	os closed	normal intrauterine pregnancy
Inevitable abortion	pain, bleeding	os open	intrauterine pregnancy with dilated cervix
Incomplete abortion	pain, bleeding, passage of mass	os open/ closed	retained products of conception
Complete abortion	passage of mass	os closed	empty uterus
Missed abortion	no complaints	os closed	absent cardiac activity

The above case history is suggestive of **Threatened abortion**.

Management -

1. Bed Rest
2. Avoid Coitus
3. Avoid Lifting weights
4. Progesterone is given to compliment the placental function

22 INDUCED ABORTION (MTP)

MTP ACT

- Passed in 1971
- Implemented in 1972
- Revised in 1975
- Amendment 2021
  - Can now be done till 24 weeks
  - reason for MTP must be approved by the board

Indications

- maternal risk : such as NYHA grade III, IV
- fetal risk : such as anencephaly
- humanitarian cause : pregnancy caused by rape
- contraceptive failure

Can be done by 00:03:55

- Gynecologist (MD/ DNB/ Diploma)
- Doctor who trained for 6 months in gynecology
- Doctor who performed at least 25 MTPs under supervision

Can be done where

- Govt approved centre
- Blood availability
- CMO approved

METHODS OF MTP 00:06:56

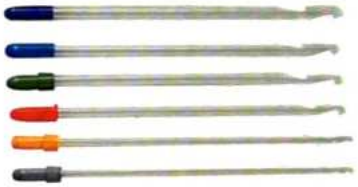
- In 1st Trimester(upto 12 weeks)
- In 2nd Trimester (12-24 weeks)
- Age of viability : 28 weeks : babies born before 28 weeks are not salvageable
- MEDICAL ABORTION
  - 99% successful → If done with in 1st 7 wks of pregnancy (approved in India)
  - 95% successful → If done within 1st 9 wks of pregnancy
  - Drugs

    Tab Mifepristone Orally
    → Antiprogestin
    → Kills the fetus
    → 200 - 600 mg

    ↓24-48 hrs later

    Tab Misoprostol (PGE1) Vaginally
    → PG uterine contractions expels products
    → 800 [illegible]
    → Expels the fetus
    → Vaginal route is best
  - Pre-requisites
    → USG to locate the fetus : rule out ectopic
    → Counsel regarding the drugs
    → Counsel regarding bleeding
    → Repeat USG to check for completion

- Suction Evacuation
  - Electrical vacuum aspirator attached to a Karman's canula
  - Can be done up to 8-10 wks of last periods



- Manual Vacuum Aspirator
  - Can be done up to 45 days of last periods
  - 60 mL syringe, vacuum is built manually
  - Cheaper/ does not require OT/ can be done in OPD
  - 610-660 mmHg pressure
  - Suitable from 5-12 weeks

- Dilatation & Curettage
  - Can be done up to 12 wks of last periods

AFTER 12 WEEKS

- Dilatation and evacuation
  - Dilate with Hegar dilator or laminaria tent
  - Evacuate with ovum forceps
- **Prostaglandins:** method of choice
  - Misoprostal [PGE 1]
    → Orally, Rectally or Vaginally
  - Dinoprostone [PGE 2]
    → Gel Form
    → Vaginally
    → Induces uterine contractions & causes expulsion of fetus
  - Carboprost [PGF_2]
    → IM only
- **Laminaria Tents**
  → Dried sea weeds

→ Imbibe fluids & swell up
→ Hygroscopic Action
→ After 12-24 hours : take out

- Dilapan
  → Works within 6 hours
  → Faster than laminaria tents

- **Surgical Method** → HYSTEROTOMY
  - In case of failure of above procedures
  - Isthmus : between anatomical and histological internal os: is 1 cm
  - Later in pregnancy forms lower uterine segment: 7 cm, here we do LSCS (lower segment cesarean section), uterine incision made any time other than term pregnancy is call hysterotomy
  - Hysterotomy scar, in the next pregnancy, becomes a scar in upper segment: No VBAC, Do cesarean section

Previous Year's Questions

Q. A 14 weeks pregnant woman came to the hospital for MTP. How much dose of misoprostol is to be given to the patient? (FMGE 2020)

A. 800 mcg vaginally
B. 400 mcg vaginally
C. 200 mcg vaginally
D. 100 mcg vaginally

COMPLICATIONS OF MTP

- Retained bits
  - Require repeat surgery
  - Infections blockage of tubes infertility
  - Prevent retained bits by doing procedure under USG guidance
- Lacerations : cervix, vagina
- Uterine perforation
  - Small : usually during sounding : can observe
  - Large : ovum forceps/ dilator/ sponge holder
    → Associated with bowel injury
    → Laparoscopy/ laparotomy
  - Small or large perforations are NOT a contraindication to complete the procedure

Previous Year's Questions

Q. A patient presents with bleeding PV after a curettage was done in a private hospital. Around 40 cc retained products of conception were detected on an USG. A repeat evacuation was attempted but the curette is found to go deep through the uterus without resistance. What should be your next step? (FMGE 2020)

A. Continue the procedure with skillful manouvering
B. Stop evacuation. wait and watch
C. Give mifepristone and misoprost to complete the abortion
D. Immediate laparoscopy/ laparotomy and manage

Important Information

Who can consent for MTP : Woman alone: husband's consent is not required

23 PRE CONCEPTION AND PRE NATAL DIAGNOSTIC TECHNIQUES (PCPNDT) ACT

- Previously known as PNDT Act
- Formulated in 1994
- In effect on 1st Jan 1996
- Amended in 2002 & 2003
- Intended to stop Female Feticide (Prohibition of Sex selection)
- Sex Ratio (Female : Male)
  - India → 943/1000
  - Haryana → 877/1000
  - Daman & Diu → 618/1000

BASIC PURPOSE

00:03:54

- Prohibition of preconception and pre natal diagnostic techniques for determination of sex of fetus, leading to female feticide
- Prohibition of advertisement of PNDT techniques for detection or determination of sex
- Permission & regulation of use of PNDT techniques for purpose of detection of specific genetic abnormalities or disorders
- Permitting use of such techniques only under certain conditions by registered institutions

Female Feticide

00:04:48

- Aborting a female fetus after sex determination
- Problem of Female feticide is
  - ↑ violence against women
  - Abortion due to family pressure
  - More men in society due to sex selective abortion

The tests which are in question

- Ultrasonography
- Fetoscopy
- Taking samples of Amniotic fluid
- Embryo, blood or any tissue or fluid of pregnant women assessed before or after conception
- Testing samples in genetic laboratory to detect genetic disorders, abnormalities or sex linked diseases.

Clinics, medical personnel & sale of machines: under the act

- Only registered genetic clinics can use prenatal diagnostic techniques
- Procedures can be done by a qualified medical practitioner
- Prohibition on sale of ultrasound machine to unregistered laboratories, clinics & persons

Advisor Committee

- **Consists Of**
  - 3 Medical experts
    - → Gynaecologists & Obstetricians
    - → Pediatricians
    - → Medical Geneticist
  - 1 Legal Expert
  - 1 Officer to represent the department dealing with information & publicity of State Government.
  - 3 Eminent social workers, at least one from the women's organizations

Appropriate Authorities

00:07:33

State Appropriate Authority

- Consists of 3 members
  1. Additional Director of Health Services (Chair Person)
  2. Officer from Law Department
  3. Other eminent women activist

(District & corporation authorities are also present)

Power of ap[illegible] authorities

- Registration of Institutions
- Seal & Seize
- Power of search & seize records
- Cancellation or suspension of registration of Clinic/ Hospital

PNDT can be used for detection of abnormalities like

- Chromosomal abnormalities
- Genetic metabolic diseases
- Hemoglobinopathies
- Sex linked genetic diseases
- Congenital abnormalities
- Only other abnormalities

PNDT Is Indicated When

00:11:44

- Age of pregnant women is above 35 years
- 2 or more spontaneous abortions
- Pregnant women has been exposed to drugs, radiation, infection or chemicals
- Family history of Mental retardation or physical deformities in previous offspring

Essential Communications

- Explanation of all known side/after effects & test procedures

- Written consent in prescribed form & its copy given to patient
- Not to disclose sex of fetus by Words, signs etc.
- Display prominently in local language that disclosure of sex of fetus prohibited under law
- Registration certificate to be displayed prominently in the clinic

An Undertaking

- That the genetic counselling center, genetic clinic & Genetic laboratory shall display prominently a notice that they do not conduct any techniques, test or procedure etc by whatever name called, for detection of sex of fetus or for selection of sex before or after conception.

- Husband & Relatives cannot ask or encourage pre - natal diagnostic techniques except for reason permitted under law

Form A

- Prescribed application form which is to be filled in duplicate affidavit assuring that the center will not indulge in sex determination.

Renewal of registration

- The certificate is valid for 5 years.
- Application for renewal has to be made 30 days before the date of expiry in the prescribed Form A

MAINTAINING PROPER DOCUMENTS

Form G & F

- Prescribed formats in which genetic & ultrasound clinics have to maintain records
- Every center has to maintain a register of forms F & G for every patient

Form G

- The pregnant lady gives an undertaking that she does not want to know the sex of fetus

The Sonologist

- Also sign a declaration that he has neither detected nor disclosed the sex of the fetus to anybody

Complete Report

- All pregnancy related procedures information to be sent to the authorities by the 5th day of following month
- All the records have to be preserved for a minimum period of 2 years or in the event of any legal proceeding, till the final disposal of the legal proceeding

Inform about the changes

- Genetic laboratory, Genetic clinic / Genetic counseling center shall intimate of Change
  - of employees
  - places or
  - equipment

  } within 30 days

VIOLATION OF THIS ACT

00:24:45

- Imprisonment of 3 years & Rs. 10,000 (50,000) fine, but subsequent conviction punishable with imprisonment for 5 years & Rs. 50,000 (1,00,000) fine.
- Offence to be Cognizable, Non-Bailable & Non-Compoundable
- Non-Compoundable means the parties involved cannot take the case back i.e. no out of court settlement of case

24 PRETERM LABOR

- Labor starting before 37 weeks
- 37-42 weeks: Term
- 40 wks: EDD [Expected date of delivery]
  4% of total deliveries
- 42 weeks: Post term
- 40-42 weeks: Past Dates
- < 37 weeks: Preterm Labor
- < 32 weeks: Severe PTL
- 32-34 weeks: Usual PTL
- > 34-36 [+6 D] weeks: Late pre term Labor

DIAGNOSIS

00:02:24

- **Uterine Contractions**
  - 4 times in 20 min
  - 8 times in an hour
- **On PV examination, if cervix**
  - 1 cm dilated, > 80% effaced: Preterm labour
  - > 3cm dilated, > 80% effaced: Advanced pre term Labor
  - < 3cm dilated, < 80% effaced: Early pre-term Labor
  - 1 cm dilated, < 80% effaced
    → Do Cervical examination
    - TVS Cx: > 2.5 cm → False Labor
    - TVS Cx: < 2.5 cm → Threatened PTL
- **Incidence of PTL**: 6-15% [~10%] of all pregnancies

CAUSES

00:05:30

1. **Infections [20-40%]**: Pelvic inflammatory disease, UTI
- Causative Organisms
  - Chlamydia: Bacterioids
  - Gonorrhea: Gardenella Vaginalis
  - Ureaplasma: E. Coli
  - Mycoplasma: Streptococcus
- Chorioamnionitis Diagnosis

00:07:00

  - Any 2 of following are present
    → ↑ Total Leucocyte count
    → ↑ C reactive protein → > 2.7 mg/dl
    → Uterine tenderness
    → [illegible]
    → Foul smelling discharge!
- If subclinical (CRP > 1.6): Do amniocentesis & culture sensitivity testing

2. **Uterine Over Distention**
- Polyhydramnios
- Twin pregnancy
- Large Baby

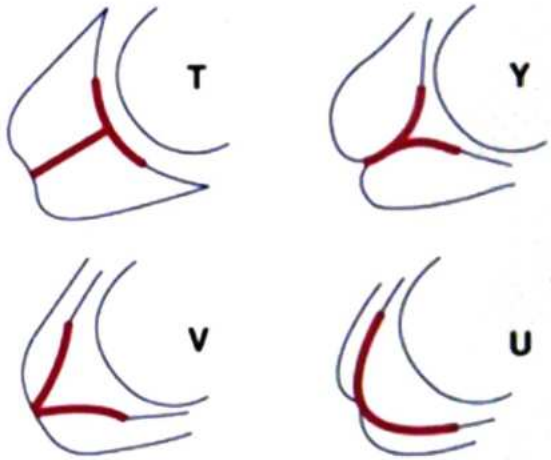
3. **Uterine Anomalies**
- Septate Uterus
- Bicornuate uterus

4. **Bleeding In Chorio-Decidual Space**
5. **Materno Fetal Stress**
6. **Cervical Abnormalities**
- Incompetent Cervix
- Cervical lacerations

PREDICTION OF PTL

00:10:30

1. **USG**
- at 12-13 wks → Short cervix → < 2.5 cm
- around 29 wks → Funneling of cervix



Funneling of cervix

2. **fetal fibronectin**
- Presence is normal → < 22 wks & > 37 wks
- If seen b/w 22-37 wks → Predictive of PTL
  - 30% PTL in 1 week
  - 41% PTL in 2 weeks

NEW BORN COMPLICATIONS

00:16:10

- Respiratory Distress Syndrome (Hyaline membrane Disease)
- Intra Ventricular Hemorrhage
- Bronchopulmonary Dysplasia
- Necrotizing Enterocolitis
- Neonatal deaths

MATERNAL COMPLICATIONS

- Endometritis

- Puerperal sepsis

MANAGEMENT

00:18:10

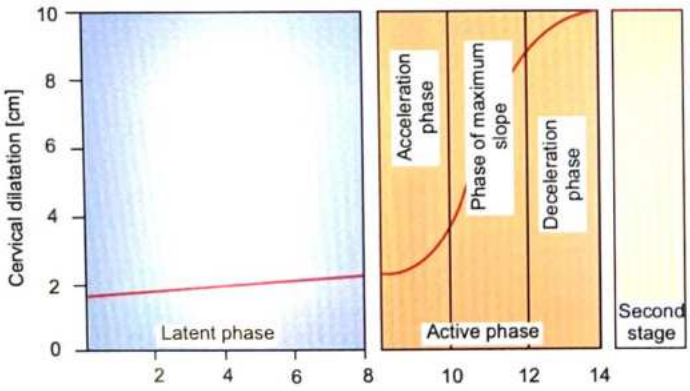
1. **For Lung Maturity**
   a. Steroids → can be given IV/IM
   - Dexamethasone: 6 mg/12 hourly/4 doses
   - Betamethasone 12 mg /24 hourly/2 doses
   - Both are equally effective

   b. Artificial Surfactants
   - Post natally & by Intra tracheal route
     - SURVANTA (Bovine) (Calf)
     - AXOSURF
     - ALEC

2. **Tocolysis**

Important Information

- **Tocolytics acts only on latent phase of labor**
- **Timing: < 3 cm & < 34 weeks**
- **Purpose: To get time for lung maturity**



Drugs

- β Agonists
  - Salbutamol
  - Ritodrine
  - Isoxsuprine
  - Terbutaline
  - Side Effects
    → Glycogenolysis
    → Lipolysis
    → Pulmonary edema
    } ↑ Sugar
- Calcium Channel Blockers: Nifedepine
  - First line & safest drug
  - Start 30 mg orally & maintain with 20 mg
- Calcium Antagonists: $MgSO_4$
  - Side effect: Neonatal hypotonia, Hypocalcemia
  - Benefits: Neuroprotective

Important Information

- **Above 3 classes of drugs can cause Pulmonary Edema. Safest among them is Nifedepine. It is the drug of choice**

- Oxytocin Antagonist: Atosiban
  - Neonatal morbidity & mortality of PTL shows No Benefit with it.
- Prostaglandin Synthetase Inhibitors
  - NSAIDS: Indomethacin
  - 25 - 50 mg, once or twice a day
  - Side Effects
    → Premature closure of Ductus Arteriosus
    → Do not give beyond 32 weeks
- Progesterone
  - Smooth muscle Relaxants
  - Used for prophylaxis, not very effective for treatment
  - Transvaginal route is preferred
- Nitric Oxide Donors: Nitroglycerine Patch
  - Smooth muscle dilator
  - Used in PTL & for prevention of IUGR
  - Dose = 0.2 mg/hr to 0.4 mg/hr
- Diazoxide
  - Smooth muscle relaxant
  - S/E
    → Hypotension in mother
    → Fetal distress
    → Prevented by pre loading mother with 500-1000 ml Ringer Lactate

Previous Year's Questions

Q. Which of the following drugs used for management of preterm labour, also has a neuroprotective role in the fetus? (AIIMS 2019)

A. MgSO4
B. Nifedipine
C. Ritodrine
D. Isoxsuprine

LUNG MATURITY ASSESSMENT ⏱ 00:39:20

- **Lung is Matured when**
  - Lecithin Sphingomyelin Ratio → > 2:1
  - Phosphatidyl Glycerol (PG) present in Amniotic fluid
  - Phosphatidyl choline present in Amniotic fluid
    - → Best part of surfactant
    - → ~ 70% of surfactant
    - → Starts forming at 24 wks
    - → Formed by Type II Alveolar Pneumocytes
    - → Present in amniotic fluid, maternal serum, fetal serum
  - PG is a storage form of surfactant fats so it starts forming only after adequate formation of Phosphatidyl choline

Important Information

- Phosphatidyl glycerol is the final indicator of Pulmonary maturity
- Phosphatidyl glycerol is present only in Amniotic fluid (better indicator than Phosphatidyl choline)

Important Information

- Not effected by a bloody tap :Phosphatidyl glycerol

- **Shake Test**: Do Amniocentesis & take out the Amniotic fluid in a test tube & add Saponifying agent

  ↓

  Fats in Amniotic fluid will convert into soaps

  ↓

  On shaking, Bubbles are formed
- **Tap Test:** Same as Shake test except that we tap test tube instead of shaking
  - Bubbles formed → Test is positive → Surfactant present
- **Nile Blue Sulfate Test**
  - Sediment of Amniotic fluid centrifuge is taken → contain skin cells
  - Skin cells are plated on a side

    ↓

    Add Nile Blue Agent
  - Skin cells with lipids → Orange colour, if > 50% are orange: Indicates Matured Lung

Important Information

Basic concept of shake test, tap test & nile blue phosphate test

- Amniotic fluid is assessed for skin fats
- If skin cells positive for skin fats, it also indicates the Lung fat production
- Both skin fat production & lung fat production are simultaneous processes.
- These are not tests for skin maturity

Important Information

- Nile Blue Test: Lung Maturity assessment
- Nitazine Paper Test: PROM Assessment

PREMATURE RUPTURE OF MEMBRANES ASSESSMENT ⏱ 00:55:00

- Rupture of membranes prior to onset of labour
- If rupture occurs < 37 weeks : PPROM (Preterm PROM)

a. **Nitrazine Paper Test**: Done for PROM (Pre mature Rupture of Membranes)
   - Blue If Amniotic Fluid (Alkaline) in Vagina
     - → There is leak of Amniotic fluid in vagina d/t PROM

     ↓

     Give Antibiotics to prevent infection & try to induce labor in 24-48 hrs
   - Red
     - → If Vaginitis (Acidic)
     - → No leak in Vagina
     - → Woman can continue pregnancy with antibiotics

b. **Fetal Fibronectin**: Presence of Fetal Fibronectin in Vaginal secretions indicate PROM

c. ↑ **Alpha Feto Protein** in vaginal secretions

d. **Ferning of the fluid from Vagina**

e. **Indigo Carmine Dye Test**
   - Inject dye into Amniotic sac & place a pad in maternal perineum

     ↓

     Tell the woman to move around for 10-15 mints

     ↓

     If there is leakage, dye would come out in secretions & stain the pad Indigo-bluish in color

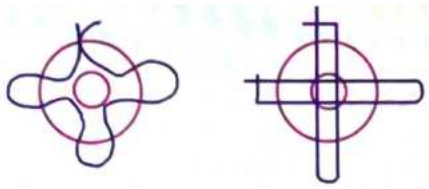
PREVENTION OF PRE TERM LABOR ⏱ 01:03:04

1. Prophylactic Antibiotics
2. Prophylactic Progesterones
3. Cerclage

- Applied when cervix is < 2.5 cm
- Applied anywhere after > 12 weeks
- Removed >/=37 weeks

Methods

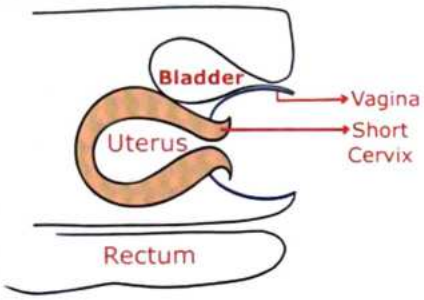
- Mc Donald's stitch
- Worm's stitch



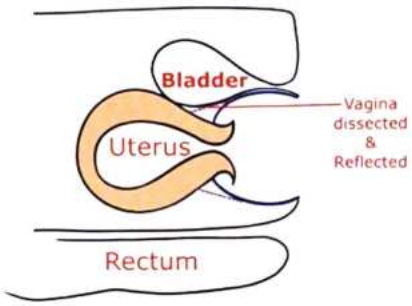
MC Donald's Cerclage [MC]

Worm's stich

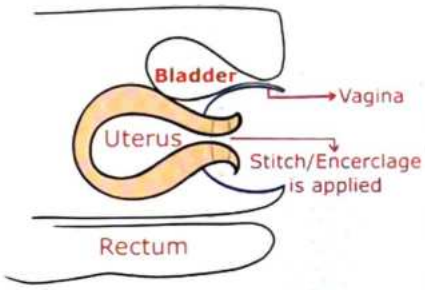
- Shirodkar stitch
  - For very short or mutilated Cervix
  - Dissect the vagina, apply the stitch & put vagina back to its place
  - Mode of delivery → Cesarean section mostly
  - Can be done Transvaginally or Trans-Abdominal



Short Cervix hardly have space to apply Cerclage



Dissect & Reflect the Vagina (from upwards as well as posteriorly)



Apply the stitch & put the Vagina back to its place

25 AMNIOTIC FLUID DYNAMICS

CONTRIBUTORS OF AMNIOTIC FLUID 00:00:27

- Maternal Contribution: In early pregnancy
- Fetal Contribution
  - Fetal Skin
  - Fetal Urine (since 18-20 weeks onwards)

1. Urine - 1000 ml (+)
2. Lung Secretion - 350 ml (+)
3. Fetal swallowing - 750 ml (-)
4. Intra membranous Fluid transport across fetal blood vessels on surface of placenta → 400 ml(-)

Previous Year's Questions

Q. A woman presents at 22 weeks. AFI is 11 cms. Which of the following is the major contributor of amniotic fluid at this gestation?

A. Ultra-filterate of maternal plasma
B. Fetal urine
C. Fetal lung fluid
D. Fetal skin

Amniotic Fluid Properties

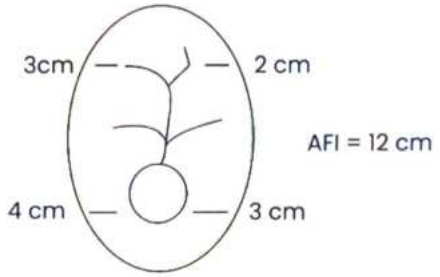
- pH - Alkaline [7.4 - 7.6]
- Specific Gravity - 1.008 - 1.010
- Color - Straw colored

Types of colors of Amniotic Fluid & Associated Conditions

1. Red: Ante-partum Hemorrhage (Abruption)
2. Green: Meconium stained liquor
3. Yellowish green: Post term pregnancy
4. Tobacco Juice: IUD
5. Golden Yellow: Rh isoimmunization

AMNIOTIC FLUID INDEX 00:05:47

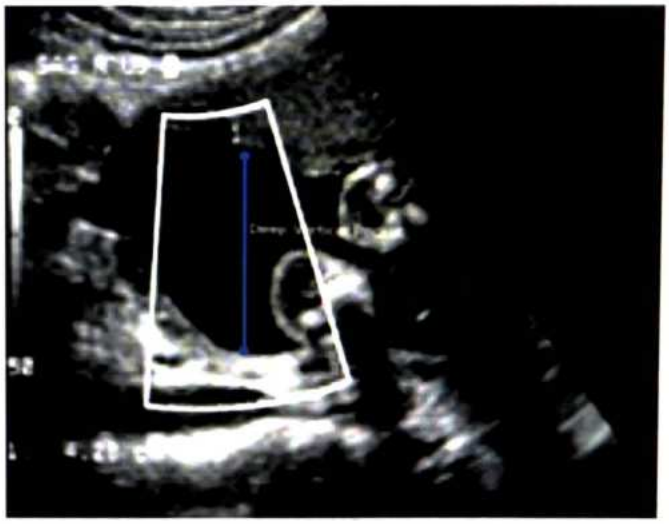
Understand with an example



- Normal Amniotic Fluid Index: 10-15 (range 5-24) (1000 ml)
- Oligohydramnios: < 5 (< 500 ml)
- Polyhydramnios: > 25 (> 2000 ml)

Single Pocket Criteria

- Cord free & limb free pocket is assessed



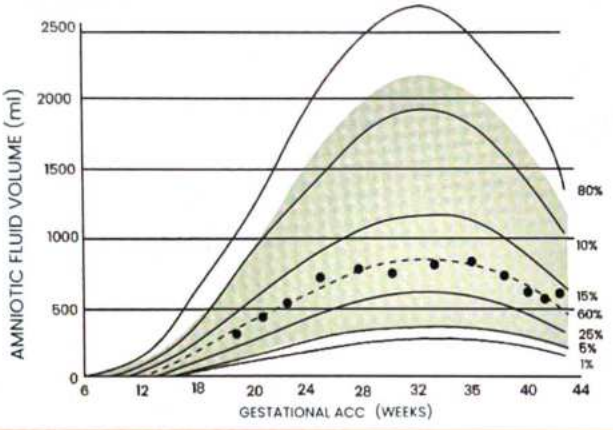
  - Oligohydramnios: < 2 cm
  - Polyhydramnios: > 8 cm

Amniotic Fluid Volume Vs. Gestational Age

- Maximum at → 32-34 weeks (1000 ml)
- At 36 weeks, AF is less than that at 32 weeks, can do External cephalic version
- Around 40 weeks: 600 ml

Important Information

- AFI is maximum at 32-34 weeks. Single best answer: 32 weeks



OLIGOHYDRAMNIOS

00:12:34

Causes

- Renal anomalies
- Amnion nodosum
- IUGR
- Post term pregnancy
- Preeclampsia
- NSAIDS
- Premature rupture of membranes
- Ace inhibitors
- Amniocentesis → Leak

Important Information

- <5 AFI Oligohydramnios
- No liquor: Anhydramnios
- 5-8 AFI - Mild Oligohydramnios

Management

- ↑ Fetal Surveillance
- Wait for lung maturity → Early delivery
- Amnio – infusion : does not take care of pathology

Potter's Triad

- Pulmonary hypoplasia
- Renal anomalies
- Contracted & malfigured limbs & flat / compressed face
- Seen in severe Oligohydramnios
- Cause of Oligohydramnios is Renal anomalies

Potter Sequence

- Pulmonary hypoplasia
- Contracted & malfigured limbs & flattening of Faces
- Renal anomalies absent
- Cause of Oligohydramnios is other than Renal anomalies

Previous Year's Questions

Q. A woman with 18 weeks pregnancy presented to OPD, on per abdomen uterine size was 16 weeks. On USG oligohydram found, which of the following is suspected? (NEET 2020, FMGE 2019)

A. Renal agenesis
B. Fetal anemia
C. Fetal jaundice
D. Anencephaly

POLYHYDRAMNIOS

00:19:30

- Liquor: >25 AFI or > 2 liters of Amniotic fluid
- Acute Polyhydramnios: Polyhydramnios seen < 24 weeks of gestation
- > 25-30 AFI: Mild Polyhydramnios (MC)
- > 30-35 AFI: Moderate Polyhydramnios
- > 35 AFI: Severe Polyhydramnios (mostly a/w anomalies)

Causes

- Diabetes
- Esophageal atresia
- Twin gestation
- Neural tube defects
- Cleft lip palate
- Gastroschisis
- Duodenal atresia
- Chorioangioma of Placenta

Signs & Symptoms (Maternal)

- Dyspnea
- Orthopnea
- Respiratory distress
- Sudden PROM: can cause abruption: fetal demise

Treatment

- Indomethacin (25 mg TID)
  - ↓ output of Urine from Fetus
  - Should not use beyond 32 weeks: causes premature closure of Ductus Arteriosus
- Therapeutic Amniocentesis
  - In a single setting, 1500 ml of Amniotic Fluid can be aspirated over 30 mins.

Management of labour and delivery

- Polyhydramnios is Not an indication for LSCS
- Controlled Artificial Rupture of Membranes In Labor

26 DRUGS IN PREGNANCY

FDA CATEGORIES - 5 CATEGORIES 00:00:40

Category A

- Safe in pregnancy
  - Thyroxine
  - Multi Vitamins
  - Folic Acid

Category B

- Have adverse effects in animals
- All studies in human are safe
  - Penicillin
  - Cephalosporins
  - Didanosine
  - Metronidazole
  - Nitrofurantoin

Category C

- Teratogenic in animals
- Inadequate human studies, safe in the few studies done
- Most commonly used drugs in Obstetrics
  - Mebendazole
  - Albendazole
  - Acyclovir
  - Chloroquine
  - **Lamotrigine** (Category C Anti-Epileptic drug; DOC for Epilepsy in pregnancy)

Category D 00:04:02

- Known human teratogens
- Given when Benefits > Risk
  - Antiepileptics (Phenytoin, Carbamazepine)
  - Quinine

Category X 00:06:13

- Known Teratogens
- Totally contraindicated (Risk > Benefits)
  - Alcohol
  - Androgens
  - Vitamin A
  - Lithium
  - Warfarin (in early pregnancy)
  - Radio Iodine
  - Cancer Chemotherapeutic Drugs
  - Tetracyclines

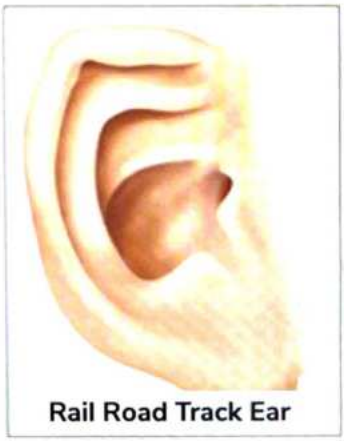
ALCOHOL IN PREGNANCY 00:07:39

Fetal Alcohol Syndrome

- All are required for diagnosis
  - Dysmorphic Facial features (all 3 required)
    - → Small palpebral fissures
    - → Thin vermilion border
    - → Smooth Philtrum
  - Prenatal and / or postnatal growth impairment
  - CNS abnormalities (1 required)
    - → Structural: Head size < 10th percentile, significant brain abnormality on imaging
    - → Global cognitive or intellectual deficits

Alcohol Related Birth Defects 00:09:35

- Cardiac: ASD or VSD
- Skeletal : Radio ulnar synostosis, joint contractures
- Renal: Aplastic or hypoplastic kidneys
- Eyes: Strabismus, Ptosis, Optic nerve hypoplasia
- Ears: Conductive or Neuro-sensory hearing loss
- Minor: Hypoplastic nails, Clinodactyly, Pectus carinatum or excavatum, Camptodactyly, Hockey stick Palmar crease, Rail Road Track Ears)



Rail Road Track Ear

WARFARIN EMBRYOPATHY 00:11:10

- Warfarin is a Vitamin K Antagonist & a potent anticoagulant
- Low molecular weight: Readily cross placenta
- Causes Embryotoxic & Fetotoxic effects
- 6-9 weeks exposure: Warfarin Embryopathy
- Features
  - Stippling of vertebrae & femoral epiphysis
  - Nasal hypoplasia
  - Depression of Nasal bridge

LEFLUNOMIDE

00:12:21

- A Pyrimidine synthesis inhibitor
- Used for Rx of Rheumatoid arthritis
- C/I in pregnancy because it is a/w multiple abnormalities like
  - Hydrocephalus
  - Eye abnormalities
  - Skeletal abnormalities
  - Embryo death
- Detectable in plasma for upto 2 years following it's discontinuation
- Cholestyramine Treatment / Washout
  - Cholestyramine binds with Leflunomide & helps in early excretion of drug
  - Cholestyramine Rx is F/b verification of serum levels of Leflunomide (Serium levels of Leflunomide should be undetectable on 2 tests performed 14 days apart)

FETAL HYDANTOIN SYNDROME

00:13:58

- D/t intake of Antiepileptics like Pheny[illegible] Carbamazepine
- Facial features include
  - Upturned nose
  - Mild mid facial hypoplasia
  - Long upper lip with thin Vermilion border
  - Distal digital hypoplasia

Important Information

- Atleast 3 months washout period for phenetoin is required before planning Pregnancy. If woman presents with pregnancy and is already on phenetoin → do not discontinue

Previous Year's Questions

Q. A pregnant woman was given indomethacin for treatment of pain. Which of the following can be likely outcome in the baby? (NEET 2021)

A. Patent ductus arteriosus
B. Premature Closure of ductus arteriosus
C. Patent ductus venosus
D. Premature closure of ductus venosus

27 PARTURITION, INTRODUCTION

PARTURITION: 4 PHASES

Phase I

- Quiescent / Dormant phase
- 95% of pregnancy is spent in this phase
- This phase is Prelude to labor
- Progressive softening of Cervix occurs

Phase II

- Activation phase / Preparation for delivery
- Cervical ripening occurs

Phase III

- Stimulation phase / Process of delivery : further divided into 4 stages of labour
- Stages of Labor
  - Stage 1: From onset of contractions to full dilation of Cervix
  - Stage 2: From full dilation of Cervix to delivery of Fetus
  - Stage 3: From delivery of Fetus to delivery of Placenta
  - Stage 4: Observation for 1 hour

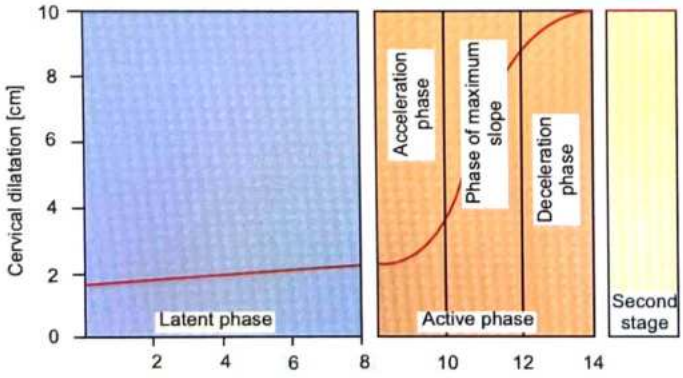
Phase IV

- Recovery phase / Involution phase / Puerperium
- Events occurring in phase IV
  - Uterine involution
  - Spontaneous repair of Cervix
  - Breast feeding

STAGES OF LABOR

00:04:49

- Stage I of labour is divided into FRIEDMAN'S CURVE
  - Latent Phase: around 8 hrs
  - Active Phase: around 4-6 hrs



→ This includes following phases
- Acceleration Phase
- Phase of maximum slope
- Deceleration phase

*Latent Phase + Acceleration Phase (of Active Phase)
↓
Constitutes Preparatory division of labor

* Phase of maximum slope → Dilatational division of labor

*Deceleration Phase + 2nd stage of labor
↓
Pelvic division of labor

Previous Year's Questions

Q. A primigravida presents with labour pains for 4 hours. On examination, cervix is 5 cm dilated and well effaced. She is now in which stage of labour? (NEET 2020)

A. Latent phase of first stage
B. Active phase of first stage
C. Second stage
D. Preparatory phase

Important Information

	Nullipara	Multipara
Prolonged latent phase	>20hrs	>14hrs
Active phase disorders		
Protracted dilatation	<1.2 cm/hr	<1.5 cm/hr
Protracted descent	<1 cm/hr	<2 cm/hr

- Arrest of dilatation: No dilatation for >2hrs
- Arrest of descent: No descent for >1hr

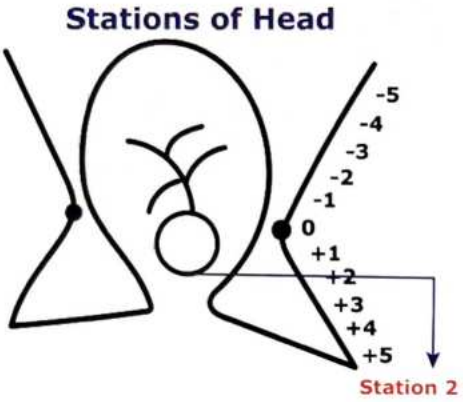
Maximum duration (Stage I & Stage II of labor combined):

Nulliparous	Mean - 9 Hours	Upper - limit 18.5hrs
Multiparous	Mean - 6 hours	Upper - limit 13.5hrs

MONITORING OF LABOR

00:10:54

- A per vaginal examination is done to assess station of the fetal presenting part and cervical dilatation.
- Station of Labor (Ischial spine is the reference point)
- Ischial spine is narrowest space of Mid pelvis



- A partograph is plotted to assess all events during labor. A modified WHO partogram does not have a latent phase and points are only plotted in active stage of labour

IMPORTANCE OF PARTOGRAM

00:13:20

- With partogram, we can monitor the progress of labor
- Partogram charting is started at 4cm Cervical dilatation
- Early warning system
- Following decisions can be taken if labor progression is slow

I. Decision to transfer to a better center if labor progression is not going well
II. Augmentation of labor (intervention to augment by Oxytocin etc.)
III. Termination of labor by cesarean→ If suggestions of obstruction have started coming in Partograph

Refer Graph 27.1

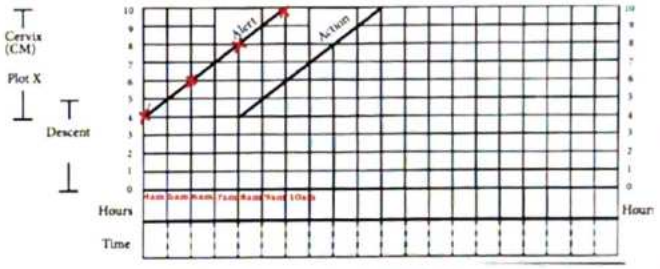
- Alert line and action line : Reference lines 4 hours apart to check the progress of labor, intervention is warranted when plotted line crosses action line

We can monitor

- Fetal Heart Rate: 120-160 (<110 bpm or >160 bpm is fetal distress)
- Membranes: intact or ruptured
- Liquor: clear or meconium or blood stained
- Moulding: sutures of fetal head: apart (no moulding), just touching (grade 1), overlapping (grade 2), overlapping and inseparable with fingers (grade 3)
- Cervical dilatations: start plotting at 4 cm. PV examination to be done 2 hourly in active phase of labour

How to remember

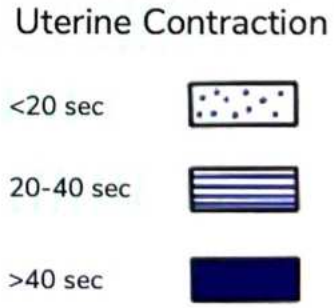
- **Suppose cervical dilatation at 4 am is 4cm. at 6 am is 6 cm. at 8 am is 8 cm and at 10 am is 10 cm**



- Descent of head
- Contractions: can use oxytocin and titrate according to contractions. Intervention in the form of cesarean section may be required when, even inspite of good contractions, progress of labor in terms of decent of head or cervical dilatation does not occur, s/o CPD
- Oxytocin administration
- Drugs & IV fluids administration
- Pulse rate, BP
- Temperature
- Urine output etc.

Plotting of Uterine contractions on Partograph

- <20sec - Dotted lines (mild contraction)
- 20-40sec - Horizontal lines (moderate contraction)
- >40sec - Full shade (strong contraction)



Benefits of partogram

- ↓Prolonged labor
- ↓Chances of Obstructed labor
- ↓chances of Uterine rupture
- ↓chances of Sepsis
- ↓PPH

} Reduction in MMR is ultimate goal

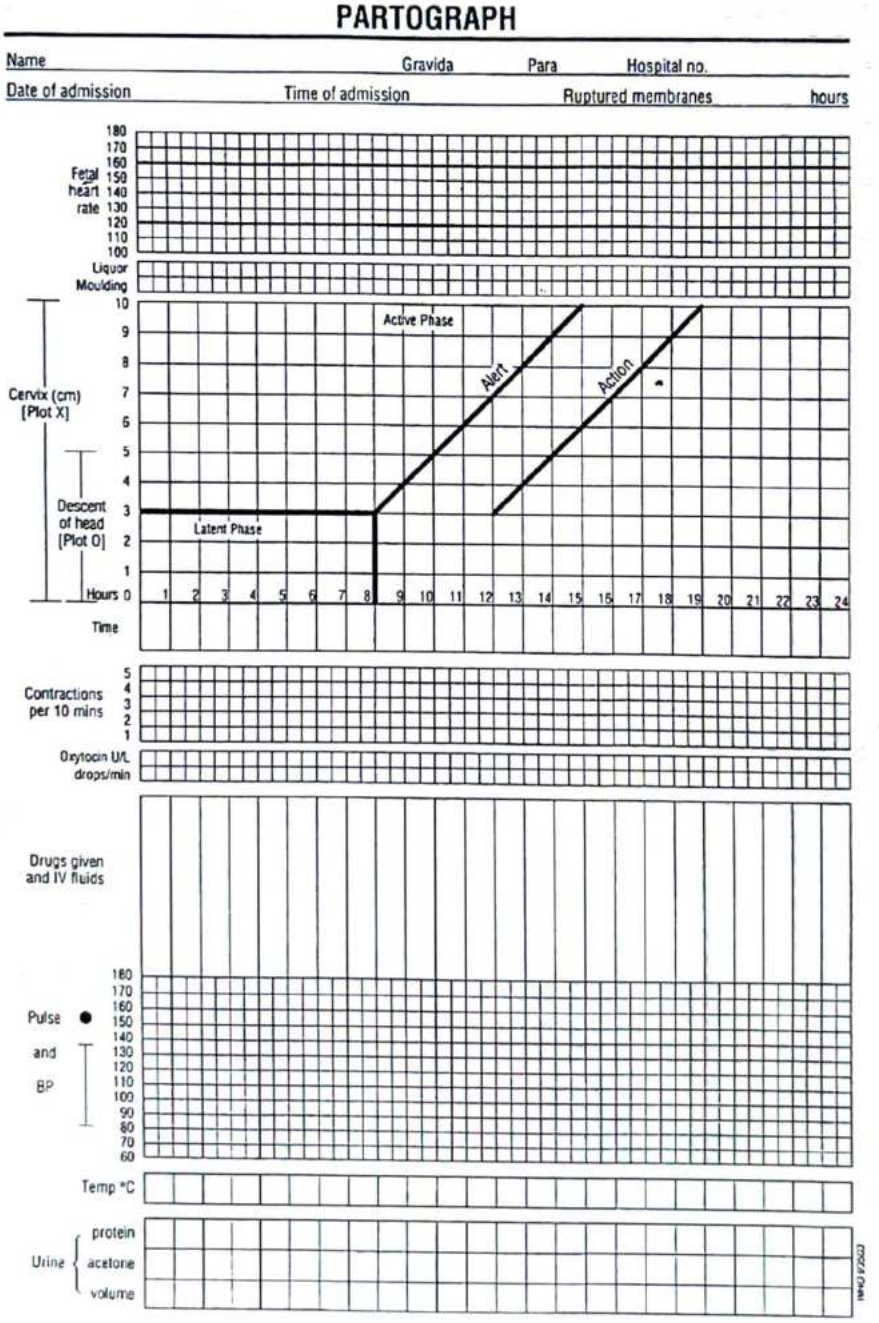
⏱ 00:25:35

Previous Year's Questions

Q. midwife was plotting a partograph. After how much dilatation she must start plotting the partograph? (INI CET 2020)

A. 4 cm
B. 5 cm
C. 7 cm
D. 2 cm

Graph 27.1



28 BASIC DEFINITIONS, CARDINAL MOVEMENTS, ECV

BASIC DEFINITIONS

00:40:00

Presentation

- Part of Fetus in the lower segment is Presentation
- Cephalic is the MC Presentation
- Breech is the MC Malpresentation (3% at term)
- Shoulder presentation (in transverse lie)

Cephalic

Breech

Shoulder

LIE

- Relation b/w the vertical axes of mother and baby. Both cephalic and breech have vertical lie. Transverse lie is when axis of fetus is perpendicular to that of mother

Presenting Part

- Part of Presentation that overlies Internal Os
- Presenting part depends upon Attitude of baby
- Vertex (flexed head), face (extended head), brow (deflexed)

Attitude

- Relation of the fetus to its own body : well flexed head (vertex presentation), extended head (face presentation), deflexed (brow presentation)

Denominator

- The lowest bony part of presenting part.
- Occiput for vertex

Position

- The relation of denominator to the various diameters in the Pelvis: occiput can be placed anteriorly in the pelvis (occipito-anterior), transversely (left or right occipito-transverse) or posteriorly (occipito-posterior)

Previous Year's Questions

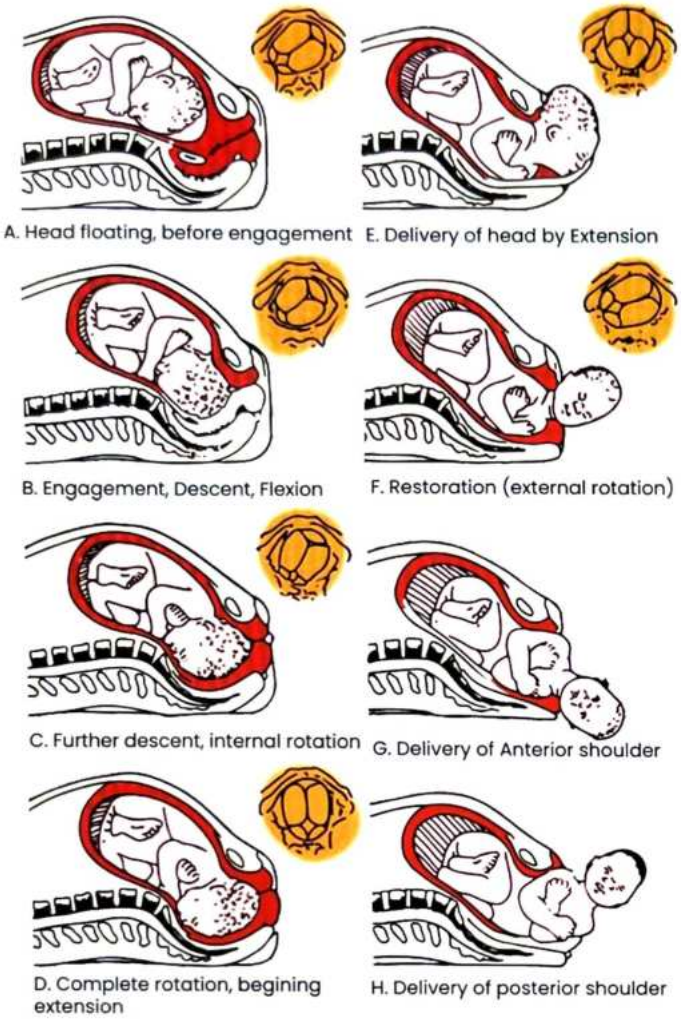
Q. What is the position of the fetus in the image shown below? (INICET 2020)

A. ROA
B. ROP
C. LOA
D. LOP

CARDINAL MOVEMENTS OF LABOR

00:07:41

Engagement
↓
Descent
↓
Flexion
↓
Internal rotation
↓
Extension
↓
External rotation
↓
Expulsion of fetus



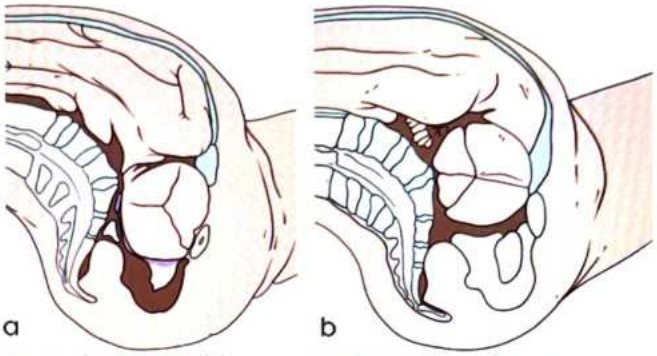
- Engagement: when the flexed head passes enters pelvic inlet, broadest part of the head, the biparietal diameter passes through inlet. Per abdomen <1/5th of head is palpable and vaginally, head is at level of ischial spines
- Decent along with progressive flexion
- Internal rotation occurs when the presenting part hits the pelvic floor (levator ani)
- Delivery by extension
- Restitution: To correct the internal rotation the occurred following which the posterior shoulder hits the pelvic floor and rotates internally which manifests as external rotation, seen externally
- Expulsion of fetus

ASYNCLITISM

00:11:19

Head while entering into pelvis may be inclined anteriorly or posteriorly in some women.

- Anterior Asynclitism
  - Sagittal suture is inclined posteriorly such that more of anterior parietal bone is seen
  - Seen more in Multigravida
- Posterior Asynclitism
  - Sagittal suture is inclined anteriorly such that more of posterior parietal bone is seen
  - Seen more in Primigravida (d/t ↑Abdominal tone)



FORMATION OF LOWER SEGMENT OF UTERUS IN LABOR

00:13:56

- Uterus: 3.5 cm
- Isthmus: 0.5 cm (Normal Uterus)
- Cervix: 2.5 cm
- Area between Anatomical Internal Os And Histological Internal Os is Isthmus which later forms the Lower uterine segment: 10cm at term.

Important Information

- **Lower uterine segment : This part does not contract in labour, it is the retractile part. Upper part of uterus contracts and lower retracts resulting in downwards movement of fetus. Also, a cesarean section is done here (lower segment cesarean section), as this part would not contract in next pregnancy and thus chances of scar rupture are less**

- Physiological Retraction ring:
  - Between the contracting and retracting parts of uterus
  - Seen in normal labor
  - Felt by P/V examination
- Pathological Retraction ring (Bandl's ring):
  - Seen in Obstructed labor: physiological ring moves upwards
  - Felt both internally (P/V) as well as externally

MANAGEMENT

00:18:07

Presented at the time of labor

- Cephalic Presentation → Can be delivered normally
- Breech Presentation → Trial of normal delivery in Institutional set up under the guidance of experienced gynecologist
- Transverse Lie with shoulder Presentation → Delivered by Cesarean section

Previous Year's Questions

Q. A lady presented in labour with a breech presentation, which amongst the following is false? (INI CET 2020)

A. For breech delivery, continuous fetal heart rate monitoring is done for mother

B. Breech identified for first time in labour, is contraindicated for normal delivery

C. Breech delivery to be done in hospital with emergency LSCS facility is available

D. Done in presence of obstetrician experienced in performing assisted breech delivery

Presented at 36-37 weeks

- Cephalic Presentation → Normal delivery
- Breech Presentation → Ext. Cephalic Version → Normal Delivery
- Shoulder Presentation → Ext. Cephalic Version → Normal Delivery
- ECV is done at 36 weeks in a Primigravida and at 37 [illegible] Multigravida
- ECV for breech or transverse lie is NOT done in labour : can cause rupture of uterus

Internal Podalic Version

- Not done in Transverse Lie (Risk of Uterine Rupture) of singleton pregnancy

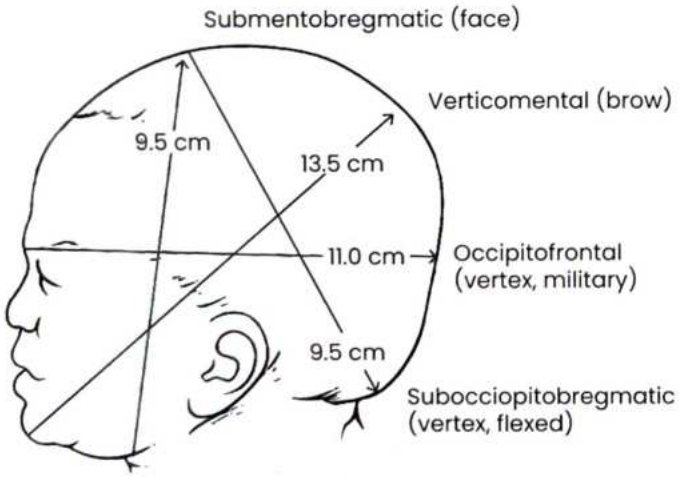
Important Information

- IPV can be done in only in Transverse Lie of 2nd baby in Twin pregnancy
- Reason: Uterus is relaxed

29 FETAL SKULL, MATERNAL PELVIS, IMPORTANT DIMENSIONS

FETAL SKULL DIAMETERS

Diameter	Measurement	Attitude of Head	Presentation
1. Suboccipito-bregmatic	9.5 cm	Complete flexion	Vertex
2. Suboccipito frontal	10 cm	Incomplete flexion	Vertex
3. Occipito frontal	11.5 cm	Incomplete flexion	Vertex
4. Mento vertical	14 cm	Deflexed head / military position	Brow
5. Submento vertical	11.5 cm	Incomplete extension	Face
6. Submento bregmatic	9.5 cm	Complete extension	Face



Important Information

- 3 diameters which are 9.5 cm: Sub-occipito-bregmatic, Sub-mento-bregmatic and Biparietal diameter
- Smallest diameter: Bimastoid

Transverse Diameters

- Biparietal diameter: 9.5 cm
- Bimastoid diameter: 7.5 cm
- Bitemporal diameter: 8 cm

Previous Year's Questions

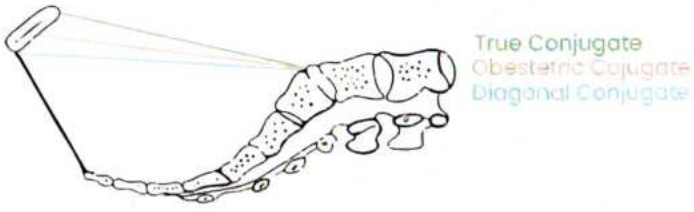
Q. Presenting diameter of a fully flexed head is? (NEET 2019)

A. Suboccipito-bregmatic
B. Suboccipito-frontal
C. Occipito-frontal
D. Occipito-posterior

FEMALE PELVIS

00:03:45

- 55° Inclined with horizontal
- AP diameters
  - Diagonal conjugate: measured with PV exam with fingers touching sacral promontory: 12 cm



  - True conjugate/ anatomical: Calculated by subtracting 1 cm from diagonal conjugate. From sacral promontory to tip of pubic symphysis.
  - Obstetric conjugate: calculated by subtracting 2 cm from Diagonal conjugate. From tip of sacral promontory to mid-point of pubic symphysis. Narrowest AP diameter. 10 cm
- Transverse diameter of inlet – 13 cm
- Oblique diameters from each sacro-iliac joint to iliopubic eminence of opposite side. 12 cm
- Sacro-cotyloid diameter: tip of sacral promontory to iliopubic eminence. Important in a flat pelvis as it is the diameter of engagement
- Inter-spinous diameter: Between the two ischial spines

Important Information

- **Narrowest part of pelvis: mid-pelvis**
- **Narrowest diameter of mid-pelvis: interspinous/ bispinous diameter. 10.5 cm**

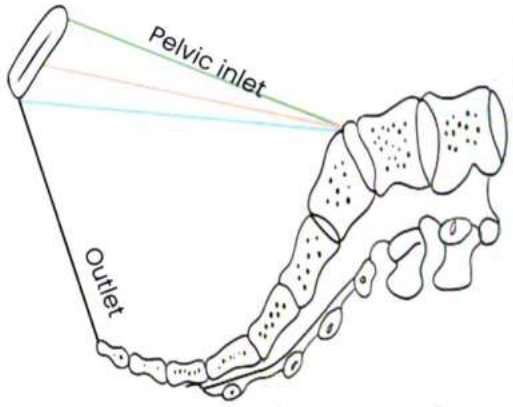
- Posterior sagittal diameter: imaginary line from mid point of interspinous diameter to the tip of sacral vertebrae. 5 cm

Diameters	Contracted Pelvis
Diameters of pelvic inlet	
True conjugate (DC-1) = 11cm	
Obstetric conjugate (DC-2) = 10cm	<10 cm
Diagonal conjugate (AP diameter) = 12cm	<11.5 cm
Transverse diameter = 13cm	<12 cm
Oblique diameter = 12cm	
Diameter of the midpelvis	
Interspinous diameter = 10.5cm	Suspected contraction <10cm Contracted <8cm
AP diameter = 11.5cm	
Posterior sagittal diameter = 5cm	
Interspinous + posterior sagittal diameter = 15.5cm	<13.5cm
Diameters of the pelvic outlet	
Transverse diameter / Inter Ischial diameter = 10.5cm	<8cm

- Plane of Maximum Pelvic Dimensions
  - From midpoint of posterior Pubic Symphysis to the junction of 2nd & 3rd Sacral Vertebrae
- Plane of Least Pelvic Dimensions
  - From lower border of Pubic Symphysis to the tip of Ischial spines to tip of 5th Sacral Vertebrae
- Rachitic Pelvis
  - d/t childhood deficiency of Vit. D
  - Shape of inlet – Reniform
- Osteomalactic Pelvis
  - d/t deficiency of Vit. D in adulthood
  - Shape of inlet – triradiate pelvis
- One Ala of Sacrum missing: Naegele's Pelvis
- Both Ala of Sacrum missing: Robert's Pelvis

Previous Year's Questions

Q. A line drawn from the mid part of the posterior surface of the symphysis pubis to the tip of sacral promontory (in red here) is which of the following diameters of the pelvis? (FMGE 2020)



A. Anatomical (True conjugate)
B. Obstetric conjugate
C. Diagonal conjugate
D. Interspinous diameter

30 MALPOSITIONS, MALPRESENTATIONS

DELIVERY OF VERTEX PRESENTATION

- *MC Attitude of Fetus: Flexion
- * MC presentation: Cephalic
- * MC presenting part: Vertex
- * Denominator: Occiput

Fetus in flexed attitude (Flexion)

↓

Engagement

↓

Descent

↓

Flexion

↓

Internal rotation

↓

Delivery of head by Extension

↓

Restitution

↓

External rotation of head

(occurs as result of internal rotation of shoulders)

↓

Delivery of anterior shoulder

↓

Delivery of posterior shoulder

- MC position of Vertex: LOT (40%) > LOA
- MC malposition of Vertex: ROP (Right Occipito Posterior)

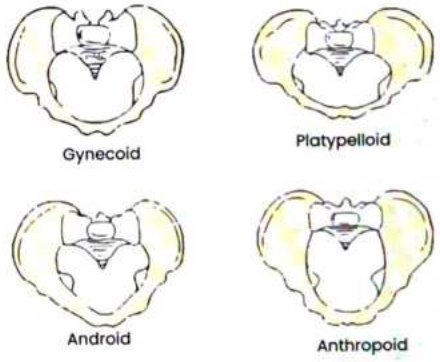
OCCIPITO POSTERIOR POSITION PROBABILITIES

00:03:02

Important Information

- Occiptio-posterior mostly delivers. If a patient in labour presents with OP position: wait and watch

1. 80% becomes Occipitoanterior
   - Mode of delivery → Normal
2. 15-16% becomes persistent Occipitoposterior
   - Short (1/8th) posterior rotation
   - Occurs in Anthropoid Pelvis
   - Mode of delivery→ Face to Pubis delivery



3. 2-4% undergoes deep transverse arrest
   - Occurs in Android Pelvis
   - Short anterior rotation to become occipito-transverse
   - Mode of delivery
     - Manual rotation and Forceps extraction :(Sagittal suture of baby should be in AP plane of pelvis)
     - Cesarean section

Previous Year's Questions

Q. A 32 year old pregnant woman with infraumbilical flattening and fetal heart heard in the left flank. Which of the following is the most likely presentation? (NEET 2021)

A. Right dorso-anterior
B. Occipito-posterior
C. Brow
D. Occipito-anterior

Previous Year's Questions

Q. A female during labour presented with persistent Occipito-posterior position of the fetus. Manual rotation was tried but it was unsuccessful. What is the type of pelvis? (FMGE 2020)
A. Gynaecoid
B. Anthropoid
C. Platypelloid
D. Osteomalatic pelvis

BROW PRESENTATION

- Military position/ deflexed head
- Supra-orbital ridges/ glabella is denominator
- Diameter of engagement: Mento-vertical : 14 cm
- Mode of delivery: Cesarean section

FACE PRESENTATION

- Extended head
- Engaging diameter : submento-bregmatic : 9.5 cm
- Generally seen in Platypelloid Pelvis

Lt. Mento Anterior Position

- MC position of face presentation
- Diameter of Engagement: Submento bregmatic (9.5 cm)
- Delivery occurs with flexion

Important Information

- Face Presentation delivers provided Mentum is anterior

Mento Posterior

- Becomes mento anterior by rotating 3/8th of the circle (favourable rotation)
- Mode of delivery: Normal delivery with flexion

Direct Mento Posterior

- Rotates posteriorly (unfavourable rotation)
- Diameter of Engagement: Sternobregmatic (17.5 cm)
- Mode of delivery: Cesarean section

Refer Table 30.1

BREECH PRESENTATION

00:19:30

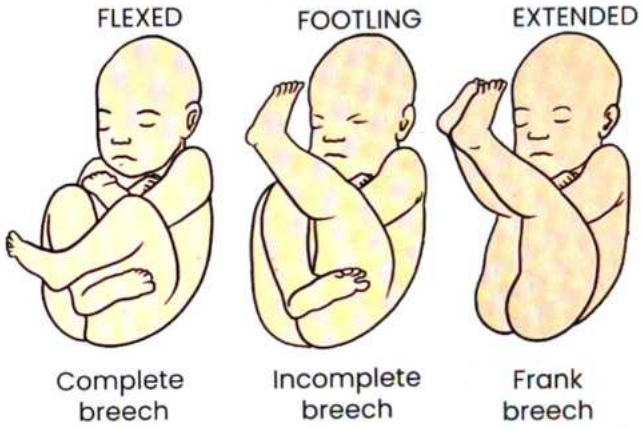
- Incidence: 3% at term
- 10% in next pregnancy, 30% in third pregnancy

Breech presentation is a/w 00:27:27

- Prematurity (MC)
- Twins
- Polyhydramnios
- Anomalies
  - Mother: Bicornuate Uterus, Unicornuate Uterus
  - Baby: Hydrocephalus
- Placenta previa
- Pelvic tumors

Variations in Breech Presentation

- Complete Breech (Flexed)
- Incomplete Breech (Footing)
- Frank Breech (Extended)



Important Information

- MC breech and breech best for vaginal delivery : FRANK breech

- Complete breech can be delivered vaginally
- Footling Breech can't be delivered vaginally & is delivered by Cesarean section
- Breech with extended head : star gazing sign on USG, is an indication for Cesarean section

Breech Vaginal Delivery

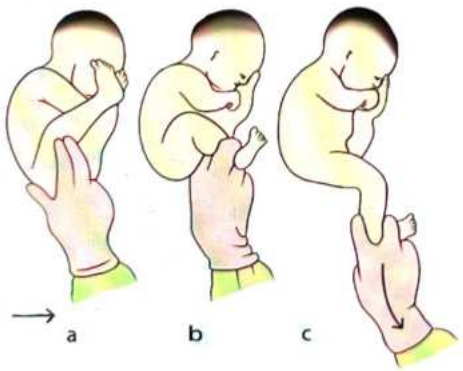
- Take Consent of mother before planning Breech vaginal delivery
- Give Epidural analgesia
  - Relaxes Pelvic muscles
  - Gives anaesthesia to Pelvic floor & skin in Perineum

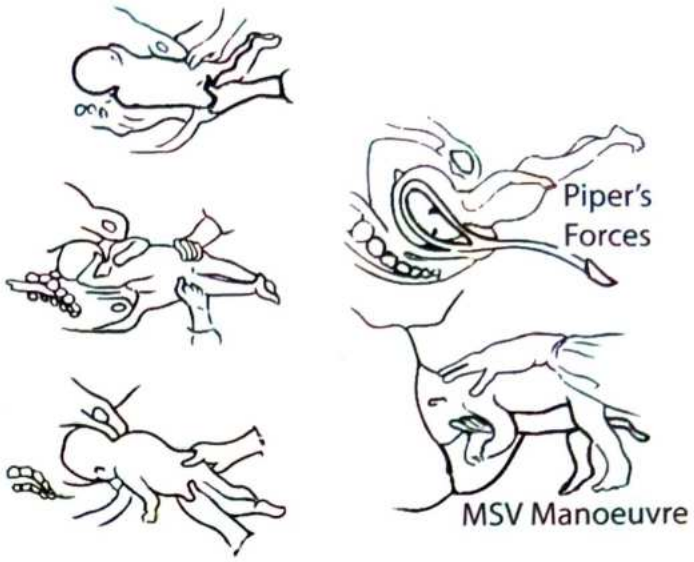
1. Breech Extraction: when the breech is seen pull the baby out can cause injuries done in dead babies
2. Spontaneous Breech Delivery: entire delivery occurs on its own also done for dead babies

3. Assisted Breech Vaginal Delivery: recommended
   - No touch till Umbilicus is delivered
   - For extended legs → Do Pinard's Maneuver (Reach popliteal fossaflex the knee)
   - Hold sacrum anteriorly and ASIS on sides with both hands and pull (don't hold by abdomen)
   - For flexed breech can pull out legs
   - For Extended arms → Do Lovset's Maneuver (turn baby sideways such that shoulders are in AP diameter pull out posterior arm turn again deliver other arm)
   - Delivery of after coming head: only when nape of neck is visible
     a. Piper's Forceps: only has cephalic curve, no pelvic curve. Easiest and safest
     b. Mariceau - Smellie - Viet Maneuver : put two fingers on shoulders and one on nape of neck promote flexion, other hand hold malar bones (malar flexion and shoulder traction). Can injure eyes, so, can also do jaw flexion instead.
     c. Burns - Marshall Maneuver : hold baby's legs with three finger grip (middle finger between medial malleoli of the legs support baby's body with other hand turn baby upwards head pops out with flexion

Left Sacro Anterior Position

- MC position of breech presentation: LSA (Left sacro-anterior)
- Attitude: Flexion (Flexed Breech)
  - Always keep the Back anterior
  - Legs comes out first
- Attitude; Extension (Extended Breech)
  - Buttocks comes out first
- Deliver the extended legs by Pinard's Maneuver





Complications of Breech Delivery : LSCS or Vaginal 00:45:27

- Maternal
  - Genital tract injuries
  - → Cesarean: extension of scar, laterally or need of inverted T incision
  - → Vaginal: cervical, vaginal laceration uterine rupture extension of episiotomy perineal tears
  - infections
  - post partum hemorrhage
  - cord prolapse
- fetal
  - fracture of humerus, clavicle, femur (more with vaginal)
  - brachial plexus injury
  - spinal cord injury
  - vertebral fractures
  - sternocleidomastoid hematoma (Pseudotumor of SCM) (R>L, Fibromatosis colli
  - fetal genital tract injuries
- inherent to breech (LSCS/ vaginal)
  - hip dysplasia

Table 30.1

PART	POSITION	ENGAGING DIAMETER	MECHANISM OF LABOUR
VERTEX (Flexed)	OCCIPITO-ANTERIOR	Sub-occipitobregmatic (9.5 cm)	Vaginal delivery (head born by extension)
	OCCIPITO-POSTERIOR	Sub-occipitofrontal (10 cm) or Occipitofrontal (11.5 cm)	Anterior 3/8 rotation → OA → Vaginal delivery Anterior 1/8 rotation → OT → manual rotation – forceps ext LSCS Posterior 1/8 rotation → DOP → Face to pubis delivery
BROW (deflexed)		Mentovertical (14cm)	No mechanism → LSCS
FACE (extended)	MENTO-ANTERIOR	Submentobregmatic (9.5 cm)	Vaginal delivery (head born by flexion)
	MENTO-POSTERIOR	Sterno-bregmatic	Anterior 3/8 rotation → MA → Vaginal delivery Anterior 1/8 rotation → MT → LSCS Posterior 1/8 rotation → MP → LSCS

31 BASICS OF INSTRUMENTAL DELIVERY, METHODS OF LABOUR INDUCTION

FORCEPS & VACUUM

- Forceps can be applied when head is fully rotated → The sagittal suture of the head lies in antero-posterior axis of Pelvis.
- Forceps can also be applied even if the rotation of head is partial [but should be ≤ 45°]
- Vacuum can be applied in a non-rotated head
- Forceps and vacuum can be applied only when the head is at +2 or lower, that is, the broadest part of the fetal head (BPD 9.5 cm) has negotiated the narrowest part of the pelvis (Bispinous diameter 10.5 cm)

1. Common Indications

- Fetal distress
- To shorten second stage of labor
  - Cardiac disease
  - Hypertensive crisis
  - Spinal cord injury
  - Prolonged second stage
  - Maternal exhaustion
  - Epidural analgesia

2. Common pre-requisites

- Adequate Pelvis
- Consent
- Empty bladder
- Good contractions
- Station +2 or lower
  - Head <1/5th palpable per abdomen
- Membranes ruptured
- Adequate anaesthesia
- Facility of emergency LSCS available

Refer Table 31.1

Complications

Refer Table 31.2

CAPUT SUCCADENEUM

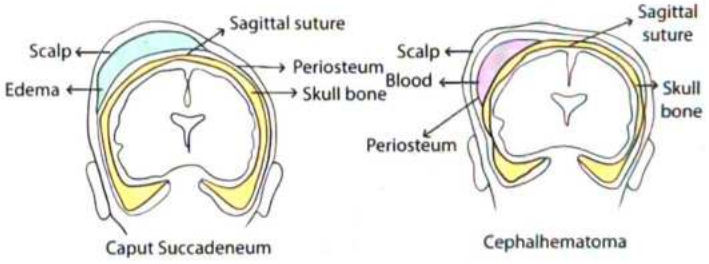
- Soft tissue edema
- Ill-defined borders
- Dependent head at labor
- Extends across suture lines
- Present at birth
- Does not increase in size
- Disappears over 48 hrs
- Complications are rare

CEPHALHEMATOMA

- Blood subperiosteal Hemorrhage
- Limited by suture lines
- Seen few hours after birth
- Gradually increases in size
- Resolves in few weeks

Complications

- Skull fracture
- Coagulations defects
- Intracranial bleeding
- Jaundice



INDUCTION OF LABOR (IOL)

⏱ 00:22:45

- Induce contractions before spontaneous onset of labor

Augmentation of labor

- Labor requires enhancement because the contractions are inadequate

Indications for IOL

- The risk of induction of labor are lesser than those on mother / fetus with continuation of pregnancy

1. PROM
2. Severe gestational HTN
3. Oligohydramnios
4. Non-reassuring Fetal Heart pattern
5. Post term pregnancy
6. Gestational DM, Overt DM, Chronic HTN

Bishop Score

- Used to assess Cervix and station of Fetal head before inducing labor

Score	0	1	2	3
Dilatation	Closed	1-2	3-4	5
Length (Effacement)	>4	3-4	1-2	0
Consistency	Firm	Medium	Soft	--
Position	Posterior	Midline	Anterior	--
Head : Station	-3	-2	-1,0	+1,+2

- Good score: ≥9
- Unfavorable score: ≤4

Main parameters of Bishop score

- Dilatation of Cervix
- Length of Cervix
- Station of Head
- These parameters give enough information to take decisions and also tell whether findings are favorable or not

Previous Year's Questions

Q. Which of the following is not included in the modified Bishop's score? (AIIMS 2020)
A. Cervical position
B. Cervical consistency
C. Type of pelvis
D. Cervical dilatation

METHODS OF INDUCTION OF LABOR

Medical methods (Drugs)

1. Oxytocin
   - Start with 4-6 mIU/min

↓

Results are better at this dose when Cervix is already ripe (Good Bishop score)

- If Bishop score is not good → we can ripen the Cervix with Prostaglandins
- >20 mIU/min Oxytocin (High dose)

↓

ADH action of Oxytocin

↓

Water intoxication

↓

Convulsions, Death of Mother

2. Misoprostal (PGE_1) (Off label use)
   - Dose = 25µg vaginally or 100µg orally
   - Avoid PGE_1 in previous C-section as it causes vigorous contractions

3. Dinoprostone (PGE_2)
   - Dose = 0.5mg gel (Cerviprime) → Applied Intra-Cervical
     Or
   - 20mg Suppository → given per rectum
     Or
   - 10mg 'Inser
     - Ideally taken out after 12hrs / after labor starts whichever is earlier
     - Pull the 'Insert' out if there is Tachysystole
     - Tachysystole → >5 Uterine contractions / 10mins

4. Mifepristone 200mg tablet
   - Anti-progestin & Anti-corticosteroid action
   - Also used for Cervical ripening & Induction of labor
   - Dose = 200mg / day x 2days

SURGICAL METHODS

1. Stripping of membranes

↓

Releases endogenous PG

↓

Causes IOL

2. Artificial rupture of membranes (using KOCHERS forceps)

↓

Causes IOL / Augmentation of labor

- Artificial rupture of membranes
  - Early Amniotomy: 1-2cm
  - Late Amniotomy: 5cm or later
- Indications of ARM
  - Post term pregnancy/ Past dates
  - Fetal anomalies
  - DM at term

- Abruptio placentae
- Contra indications of ARM (contraindications to vaginal delivery)
  - C.P.D. (Cephalo Pelvic Disproportion)
  - Contracted Pelvis
  - Previous Classical C-section
  - Pelvic Tumors
  - Active genital Herpes
  - Ca Cervix

Mechanical methods

1. Intra Cervical Foley's Catheter
   - Bulb of Foley's is distended with 30ml of fluid
   - Give traction: constant mechanical pressure to dilate cervix

2. Laminaria tents
   - Dry sea weeds
     ↓
     Hygroscopic action
     ↓
     Imbibe fluids & swell up (in 10-12 hrs) and open up Cervix

Risks of IOL

- ↑ C-section
- Chorio-amnionitis
- Uterine rupture
- PPH (may require Emergency Obstetric Hysterectomy)

Previous Year's Questions

Q. Female with 41 weeks gestation, confirmed with USG, very sure of her dates, no uterine contractions. Which of the following should not be used? (NEET 2019)

A. Intracervical Foleys
B. PGE1 tablet
C. PGE2 gel
D. PGF2alfa tablet

Previous Year's Questions

Q. Which of the following may be used for dilatation of cervix in a patient requiring induction of labour but is having an unfavourable cervix? (FMGE 2020)

A. Oxytocin
B. Methyl ergometrine
C. Laminaria tent
D. Carboprost

Table 31.1

Specific Pre-requisites and contraindications	
Forceps	**Vacuum**
• Fully rotated head or <45° remaining	• Rotated head or Non rotated head
• Vertex	• Used for Cephalic presentation only
• After coming head of breech	• Not used for breech or face
• Mento-anterior face	• >6 cm dilated Cervix
• Fully dilated Cervix	• Station → +2 & below
• Station → +2 & below	• Cannot be used for preterm fetus / fetal coagulopathy
• Can be used in preterm	• Cannot be used in presence of Caput
• Can be used in presence of Caput	

Table 31.2

Forceps	Vacuum
Maternal > Fetal	Fetal > Maternal
Maternal complications	
• Genital tract lacerations • Bladder & Urethral injury	• Genital tract lacerations & tears
Fetal complications	
• Cephalhematoma • Bruising, lacerations • Facial Nerve injury, Brachial plexus injury	• Scalp injury, Cephalhematoma • Intracranial hemorrhage • Retinal hemorrhage

32 EPISIOTOMY

- Widening of birth canal to facilitate delivery
- Not to be given electively for all deliveries

INDICATIONS

⏱ 00:01:11

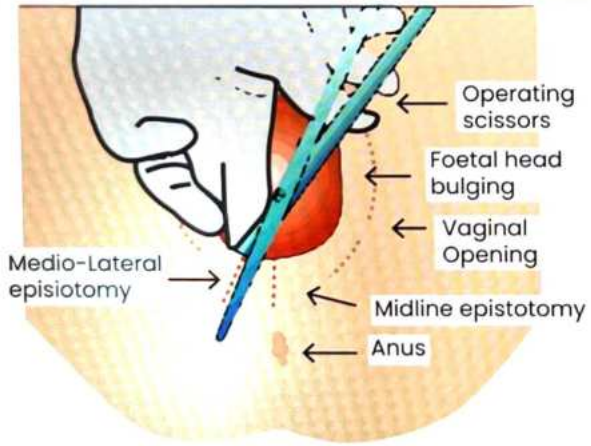
- Breech
- Instrumentation
- Large Baby
- Persistent Occipito posterior
- Shoulder dystocia

Routine episiotomies increase risk of Rectal Incontinence

- Flatal Incontinence
- Faecal incontinence

Important Information

- Episiotomies are not to be given routinely, unless indicated. They are associated with increased risk of rectal incontinence



Types

⏱ 00:02:45

- Median
- Lateral (mostly avoided) → As they can cut ducts of Bartholin's gland
- Medio-lateral

Structures Resected

- Skin
- Sub cutaneous tissues
- Superficial and Deep Transverse Perineal muscles
- Muscles fibres of Bulbospongiosus, levator ani
- Transverse perineal branches of Pudendal nerve & vessels
- Posterior Vaginal wall

Previous Year's Questions

Q. Which of the following structures is not cut in an episiotomy? (AIIMS 2020)

A. Pudendal nerve and vessel

B. Obturator nerve

C. Bulbospongiosus

D. Superficial and deep perineal muscles

Features	Midline/Median Episiotomy	Medio Lateral Episiotomy
Repair	Much easier	Easier
Healing	Faster & Better	Late
Blood Loss	Minimal	More
Scar wound	Even	Uneven
Dyspareunia	Rare	Occasionally present
POST OP Pain	Lesser	More
Wound Extension	More Common	Less Common

Previous Year's Questions

Q. Episiotomy extended posteriorly beyond perineal body. can injure which of the following structures? (NEET 2020)

A. External anal sphincter

B. ischiocavernosus

C. Bulbospongiosus

D. urethral sphincter

33 PUERPERIUM : NORMAL AND ABNORMAL

DEFINITION

- It is the time required to
  - Get back to Pre-pregnant physiology
  - Get back to pre-pregnant size and shape
- 42 days or 6 weeks
- Woman is still in Immunocompromised state

Normal Puerperium	Abnormal Puerperium
• Reproductive Organ Changes • Systemic Changes	• Endometritis • Mastitis

REPRODUCTIVE ORGAN CHANGES

Puerperal Uterus 00:01:45

- 1 week : weighs approx. 500 gms
- 2 weeks : 300 gms
- 4 weeks : involution is complete, uterus weighs approx. 100 gms
- Never comes back to nulliparous size
- Size of uterus :
  - Immediately after delivery → Just below the Umbilicus

Important Information

Best time to do Puerperal sterilization → 2-3 days
Maximum time to do Puerperal sterilization → 7 - 10 Days

  - Uterus becomes a pelvic organ by → 10-14 Days
  - Uterus becomes a normal organ in → 4-6 wks
  - Rate of involution : 1.5-2 cm/ day

LOCHIA 00:05:54

- Lochia Rubra → 1st to 4th day, RED (mostly blood)
- Lochia Serosa→ 5th to 9th day, YELLOW (mostly Mucus, becomes progressively pale)
- Lochia Alba → after 10th day, WHITE or yellow white (mostly Epithelial cells with leucocytes)

Important Information

Lochia can last up to 35-36 days

CERVIX 00:07:30

- Becomes firm
- Cervix closes by 3 weeks : if patient presents with retained bits after this time, it requires surgical evacuation after dilatation, not manual evacuation
- Epithelium starts to regrow
- Transformation zone starts to reform exposure to HPV at this stage more susceptible to Ca Cervix

Important Information

Woman is most susceptible to cervical dysplasia/ cancer immediately after delivery and early in puberty

VAGINA 00:10:12

- Starts shrinking
- Rugae starts to reform from 2nd to 3rd week onwards
- Epithelium starts to grow by 6th weeks (4 - 6 weeks)

PUERPERAL FEVER 00:10:40

- Any fever in 1st 10 days after delivery on 2 occasions (excluding 1st 24 hours)
- Causes
  - Endometritis (MC)
  - Breast engorgement
  - Respiratory infection
  - Pyelonephritis
  - Thrombophlebitis

ENDOMETRITIS 00:11:27

Reasons

- Prolonged labour
- PROM
- Frequent cervical assessment
- Anemia
- Chorioamnionitis
- Cesarean section is more likely to complicate as end[illegible] vs a vaginal delivery

Causes
- Group A β Hemolytic Streptococci (mc)
- Enterococci
- Gram negative : E. Coli, Klebsiella, proteus
- Anaerobes : peptostreptococcus
- Others: Mycoplasma, Chlamydia (Chlamydia is MC cause of late Endometritis)

Symptoms
- Fever
- Pain abdomen
- Dirty, foul smelling discharge
- Fatigue, weakness

Signs
- Lower abdomen tenderness
- On P/V examination
  - Uterine & Adnexal tenderness
  - Fullness in Pouch of Douglas (d/t Blood collection / Abscess)

Investigations
- ↑ leucocytes on CBC
- ↑ ESR, ↑ CRP
- High PCT

Treatment
- Clindamycin 900 mg + Gentamycin 5 mg/kg (Gold standard of therapy for Endometritis)
- Add ampicillin if sepsis syndrome
- 90-97% success rate

Previous Year's Questions

A patient presented with smelly greenish vaginal discharge 5 days after delivery. What is the next line of management? FMGE 2020

A. Antibiotics
B. USG
C. Urine analysis
D. Per vaginum examination

SUB INVOLUTION

00:16:22

- Normal rate of reduction of size of uterus → 1-2 cm/ day

Causes
- Infection
- Retained bits of Placenta & Membranes
- Blood clots
- Fibroids

Clinical features
- Boggy or flabby Uterus
- Palpable beyond 10 days per abdomen
- Tender Uterus
- Fever is present

Treatment
- Empty the Uterus by Gentle curettage after doing USG
- IV Antibiotics
  - Azithromycin 500 mg BD
  - Doxycycline 100 mg BD
  - For 7-10 days
- Methyl Ergometrine Tablets
  - TID X 5-7 Days

BREAST

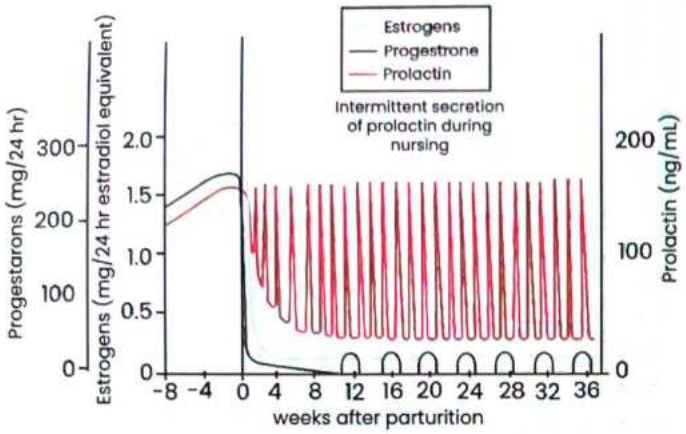
00:18:45

Colostrum
- Deep lemon yellow liquid
- Rich in IgA : protection against enteric pathogens
- Host resistance factors like
  - Complement
  - Macrophages
  - Lymphocytes
  - Lactoferrin
  - Lactoperoxidase and lysozymes
- More protein and less sugar and fat
- Persists for 5 days to upto 2 weeks
- Conversion to mature milk by 4-6 weeks

Mature milk
- Fats, carbs, minerals, vitamins
- Around 600 ml/day
- Isotonic with plasma
- Vit K is absent (inj Vit K is given to newborn)
- Vit D is low (supplementation is recommended)

Milk delivery
- Progesterone and estrogen decline abruptly
- Progesterone inhibition on alfa-lactalbumin is removed
- Prolactin is allowed to act unopposed in its stimulation of alfa-lactalbumin production
- Prolactin is essential for lactation (absent prolactin in Sheehan's syndrome : lactation failure)

Prolactin levels after delivery
- Prolactin levels fall after delivery
- Episodic rise is required for lactation, basal levels are low after delivery
- Each act of suckling triggers a rise in levels curtails the release of dopamine (prolactin-inhibitory factor)
- Hence prolactin is released



Milk ejection/ letdown reflex

- Initiated specially by suckling stimulates posterior pituitary oxytocin contraction of myoepithelial cells in alveoli and small milk ducts milk expression from lactating breast
- Milk production starts to increase after 3 days
- If baby is not breast fed normal shape and size in 3 weeks

Contraindications to breast feeding

- Drug abuser/ alcoholic
- Galactosemia
- Ca breast

Following are contraindications to breast feeding but are allowed in developing countries like India, with prophylaxis to baby

- HIV : give Nevirapine to baby
- Untreated Tuberculosis : INH prophylaxis to baby
- Hepatitis B infection : vaccine + IVIG to baby

Important Information

Hepatitis C infection is NOT a contraindication to breast feeding

MASTITIS

00:28:40

- MC cause → Staphylococcus aureus
- Source of infection : nose and throat of baby

Risk factors

- Difficult nursing
- Cracked nipples
- Oral antibiotic therapy

Clinical features

- Presents in 3rd to 4th week as a rule
- Engorged breast
  - Tender breast
  - Fluctuant mass present
  - Chills, rigor, fever, tachycardia

Treatment

- Diagnosis by USG
- Suppuration can be prevented by timely intervention
- Hot fomentation with wet towels with breast milk expression
- Continue breast feeding, milk is not infected
- Child may not feed due to latching difficulty as nipples are swollen, feed from normal breast, there is letdown which releases milk and now baby can suck from affected breast easily
- Antibiotics : Dicloxacillin 500 mg QID for 5-7 days and analgesics

Previous Year's Questions

A lady presented 5 days after a normal vaginal delivery with heaviness in breast. she complains that her baby is unable to latch on for breast feeding. The most likely reason is? FMGE 2020

A. Lactation failure
B. Breast engorgement
C. Breast abscess
D. Cleft palate

URINARY TRACT INFECTION

00:32:35

- MC cause → E. Coli

Management

- Cephalosporins
- Penicillins
- Nitrofurantoin

POST PARTUM THYROIDITIS : Acute Destructive Lymphocytic Thyroiditis

00:32:52

- First phase
  - Destruction induced thyrotoxicosis
  - Symptoms from excessive release of hormones
  - Hyperthyroidism is seen in 1-4 months
  - Rx : Propanolol
- Second phase
  - Hypothyroidism from thyroiditis
  - Between 4-8 months post partum
  - Rx : thyroxine supplementation, 25-75 mcg for 6-12 months

SHEEHAN'S SYNDROME

00:34:13

- Post partum pituitary necrosis
- Pituitary is very sensitive to hypoxia, usually due to torrential hemorrhage
- Lactational failure

- Global reduction in production of pituitary hormones

PSYCHIATRIC DISORDERS

Blues

- Occur within first few days and resolve by 2 weeks (50-60%)
- Due to withdrawal of Progesterone
- Characterized by mild mood swings, irritability, anxiety, decreased concentration, does not want to take care of child, or becomes overprotective, insomnia, crying spells

Psychosis

- Occurs in first 2-3 months (<1%)
- Severe Insomnia, rapid mood swings, psychomotor restlessness, delusions, hallucinations
- Cognitive impairment
- Psychiatric emergency

Depression

- Within first 3-6 months
- Insomnia, anxiety, low self worth
- Unable to care for or bond with the baby
- Excessive guilt, suicidal tendencies
- Prolonged course

34 CESAREAN SECTION

- Good rate of CS in any hospital: 18-25% overall
- Most institute CS rate: 30-35% is acceptable

Reasons for increased incidence of CS 00:03:50

- No. of children reducing
- ↑ age at pregnancy
- More use of electronic Fetal monitoring
- ↓ trial in previous CS & breech
- CDMR [Cesarean delivery on maternal request]

INDICATIONS OF CS

Important Information

- MC indication of cesarean – Fetal distress

Maternal Indications 00:07:17

Refer Table 34.1

Mortality rate in Cesarean Section 00:15:07

- Mortality rate 7 / 1,00,000 as compared to normal delivery [3-4 / 1,00,000]

Advantages for Mother 00:16:10

- Much less incidence of Prolapse
- Much less incidence of Urinary incontinence

Advantages to Baby

- ↓ Neonatal Morbidity [≤1%]
- ↓ Skull & clavicle fracture
- ↓ Skin lacerations (MC problem)
- ↓ Brachial plexopathy
- ↓ Cephalohematoma
- ↓ Facial nerve injury

- Failed Forceps f/b C-section is most problematic for Neonate

Procedure of C-section

1. Consent
2. Antacid 30 ml → to prevent MENDELSON SYNDROME (Aspiration Pneumonitis)
3. Regional anesthesia (Neuraxial)
4. Sensory block should be at T4 level and below (Epidural anesthesia in normal delivery should be at T10 to L1 & S2-S4)
5. Best position: Supine with wedge under the right hip
6. Prophylactic Antibiotics
   - Cephalosporin (Cefazoline 1gm once)
   - No routine continuous Antibiotics, no routine Catheterization
7. Preparation of Abdomen
   - Shaving is not done : increases risk of infections
   - Clipping of pubic hair can be done
8. Check the Fetal heart sound prior to incision in OT
9. Decision to delivery should not be more than 30 minutes

TECHNIQUE OF C-SECTION 00:29:42

Abdominal Incision

- Easy & fast incision: Vertical
- Preferred incision: Low Transverse / Bikini incision / Pfannensteil incision / Maylards incision

Previous Year's Questions

Q. Instruments used in a cesarean section are? (Multiple correct options)? (INI CET 2021)

A. doyen's retractor
B. allis forceps
C. bard parker handle and blade
D. green armytage forceps
E. karma's canula
F. cusco's speculum

Previous Year's Questions

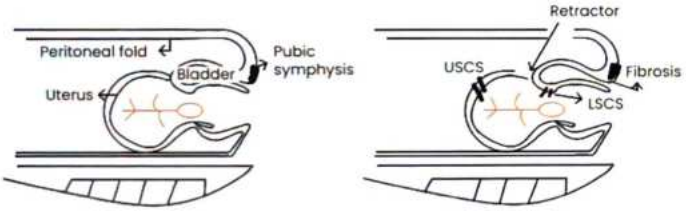
Which of the following surgeries is this instrument commonly used? (AIIMS 2019)

A. LSCS
B. Vaginal hysterectomy
C. Fothergill's repair
D. Manchester repair

Side effects of Lower Abdominal Incision

00:32:36

- Ilioinguinal nerve injury
- Ilio-hypogastric nerve injury
- Superior & inferior epigastric vessel injury



Classical CS: Upper Segment CS Indications

1. Bladder Fibrosis (MC indication)
2. Lower segment tumor like fibroid, Ca Cervix
3. Post Mortem CS
4. Old VVF repair

Refer Table 34.2

Important Information

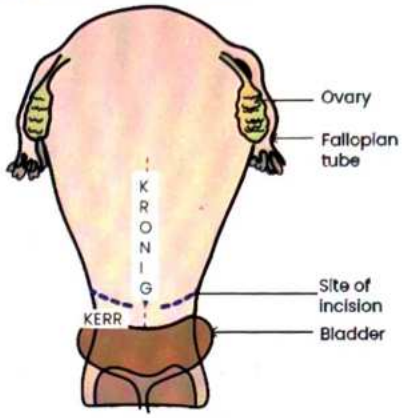
- Rate of uterine rupture in previous LSCS is 0.5-2% and that in previous classical CS is 8-10% in labour
- VBAC can be done for previous ILSCS only, not two

Incision on Uterus

00:44:20

Lower segment Incisions

1. Kerr's Incision
   - Transverse Incision
   - MC Incision on Uterus
2. Kronig Incision: Vertical Incision



Advantage of Transverse incision: Cosmetically better

- Pfannenstiel incision –Rectus sheath not cut, only separated
- Maylards incision- Rectus sheath cut

CS Complications

00:50:08

- Hemorrhage
- Sepsis, Peritonitis
- Endometriosis
- Thromboembolism
- Anaesthesia complications
- Visceral Injuries
- Fetal Injuries
- Hysterectomy

Late Complications

- Incisional Hernia
- Seroma formation
- Scar rupture
- Wound break down
- Infertility

PREVIOUS LSCS SCENARIO

- VBAC [Vaginal Birth after Cesarean]
- TOLAC [Trial of labor after Cesarean]
- Trial of scar

Important Information

Pre-requisites for VBAC

- It should be done in an Institutional set up
- There should be no CPD
- Previous ILSCS

- Rupture of Uterus can happen 00:54:48
  - Partial (Scar Dehiscence)

- Total
- Scar Dehiscence: Uterine Scar is separated but Peritoneum & bag of membranes is intact
- Total Rupture of Uterus
  - Uterine Scar, Peritoneum & bag of membranes all have ruptured
  - Baby may be found floating in abdomen
- Signs of Rupture of Uterus in a VBAC/ TOLAC 00:56:28
  - Maternal Tachycardia (1st sign)
  - Vaginal bleeding, ↓↓ BP
  - Fetal distress (Late sign)
  - Loss of Uterine contractions & labor pains
  - Loss of Uterine contour
  - Fetal parts felt more superficial in abdomen & they might be in sideways & not in midline

Previous Year's Questions

Q. A multigravida G4P3L3 presented with labour pains. On examination, her cervix was 5 cm dilated and doctor was unable to feel the presenting part. What is the likely diagnosis? (FMGE 2020)

A. Uterine rupture
B. False labour
C. Abdominal pregnancy
D. Abruptio placentae

Refer Table 34.1

Maternal Indications

- Previous CS
- Abnormal placentation
- Classical CS
- Scar dehiscence
- Full thickness Myomectomy
- Genital tract Obstructive mass
- Invasive Cervical cancer (combine with hysterectomy)
- Prior Trachelectomy
- Permanent cerclage
- Reconstructive Surgeries
- Pelvic deformities
- HSV or HIV Infection (only when Viral load is high)
- Cardiac & pulmonary disorders
- Cerebral aneurysm
- Perimortem CS

00:12:37

Maternal - Fetal Indications

- Cephalopelvic Disproportion
- Failed Operative Vaginal delivery
- Placenta Previa
- Abruption with fetal distress

00:13:47

Fetal Indications

- Non-assuring fetal heart pattern / Fetal distress
- Mal-presentation
- Congenital anomalies
- Abnormal Doppler studies (REDF
- Reverse End Diastolic Flow)
- Prior Fetal birth trauma

Refer Table 34.2

LSCS	Classical CS
• Easy to repair	• Difficult to repair
• Less bleeding	• More bleeding
• Heals faster	• Slow healing
• Passive lower segment (retracts in labor)	• Trial of NVD is C/I due to risk of rupture of Uterus
• Trial of labor is possible in next pregnancy (VBAC) (for 1 previous LSCS only)	• Rupture rate → 8-10%
• Rupture rate → 0.5 - 2%	

00:39:57

35 SPECIAL SITUATIONS IN OBSTETRICS

UMBLICAL CORD PROLAPSE

00:00:34

- Incidence <1% of all pregnancies
- Can be a cause of FETAL MORBIDITY & MORTALITY

Ways In Which Cord Can Present

00:02:32

- OVERT / OBVIOUS cord prolapse
- OCCULT on the side of presenting part
- CORD PRESENTATION (FUNIC) : cord just under fetal head

Etiology

Associated mostly with non cephalic presentation

- Breech
- Transverse lie
- Oblique
- Unstable lie

Prevention

00:03:32

- In non cephalic presentation with risk of cord prolapse : offer admission > 37 weeks
- Avoid A.R.M
  - Funic presentation
  - High presenting part
  - Non-fixed presenting part

Management

00:06:19

- Call for help!!
- Prepare for immediate delivery in O.T.→ C.S.
  (If fully dilated Cervix → Forceps delivery)
- Don't touch the cord
- Don't push the cord } Vasospasm
  - Push the presenting part upwards
  - Knee chest position or left lateral position
  - Fill the bladder to push up the presenting part
  - Tocolysis (can be done)

Previous Year's Questions

A midwife was examining a pregnant woman. Suddenly she noticed umbilical cord prolapse. What is the next line of management? INI CET 2020

A. replace cord inside vagina
B. trendelenberg position
C. inform higher authorities to shift to delivery room
D. fill urinary bladder to elevate presenting part and avoid cord compression

SHOULDER DYSTOCIA

00:11:47

- Anything that comes in the way of delivery →Dystocia
- Incidence: 1% of all deliveries
- A/w :
  - Large babies >4Kgs
  - Post term pregnancy
  - Diabetic mothers
  - Anencephaly → large baby

Important Information

Reason of shoulder dystocia in anencephaly is the absence of pituitary --> delayed onset of labour --> post term pregnancy --> large baby

There can be: Neonatal Morbidity & Mortality

- After the head delivery, rest of the body should deliver within 20-25 seconds

↓

If taking >60seconds

↓

Dystocia

Complications

00:16:25

- ERB's paralysis : C_5 - C_6
- KLUMPKE's Paralysis : $C_8 - T_{11}$

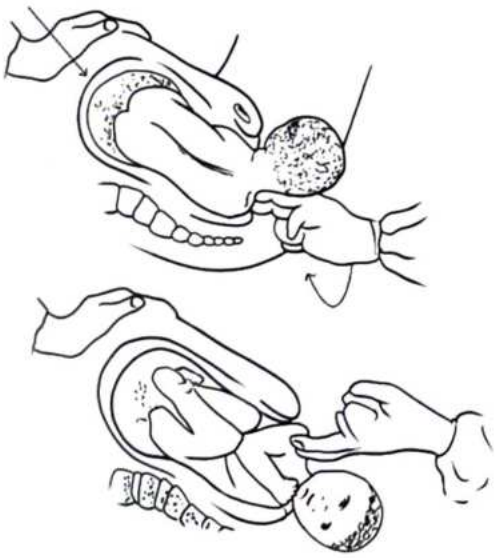
Management

00:17:10

- Call for help !!
- Suprapubic pressure → Rubin's maneuver (1st)
- Mc Roberts : >90°, Hyperflexion & Abduction of hip joint - pelvis opens up in AP diameter

MC ROBERTS MANEUVER

- Wood's 'Cork Screw' maneuver : turn baby like a screw



CORK SCREW MANEUVER

- Gaskins 'ALL FOUR' maneuver : turn patient on all fours, deliver posterior shoulder first lying in soft vagina

GASKINS MANOUVER

- Zavanelli's Restitution (70% babies are lost by this time)

PRECIPITATE LABOUR 00:26:43

- From onset of contractions to delivery of baby if <3hrs
- Incidence upto 3% of all deliveries
- A/w : PIH / HTN
  Abruption

Reason 00:28:05

- Very less resistance from soft pelvic parts
- Very strong uterine & abdomen contractions
- Less pain perception

Results 00:2:20

- Vaginal, vulval & cervical lacerations
- Amniotic fluid Embolism
- Uterine atony → PPH

Prevention 00:30:52

- Tocolysis
- Inhalational anaesthetics
- Stopping the oxytocin infusion

AMNIOTIC FLUID EMBOLISM 00:31:56

- Incidence : 5-10/ 100,000
- Anaphalactoid Reaction
  - AF→ Tissue factor→Coagulation cascade
  - Fetal squames→Endothelin-1
  - Amniotic membranes→Phosphatidyl serine

Chain Of Events 00:33:15

- **Phase 1**

Systemic & Pulmonary HTN
↓
Large dilated Rt. Ventricle, Akinetic
Vigorously contracting left ventricle, small–cavity obliterated
↓
Loss of systemic vascular resistance
↓
Cardiovascular collapse

- **Phase 2:** Consumptive Coagulopathy-DIC
- **Phase 3:** Multi organ Dysfunction
  (Lungs / Brain / Renal / Hepatic injuries)

Within 30 min. >50% women die
↓
Of the few survivors, 75% life - long neurological deficit

OBSTRUCTED LABOR 00:38:03

Definition: No progress of labor inspite of good Uterine contractions (i.e. there is no descent of the Presenting Part)

Causes

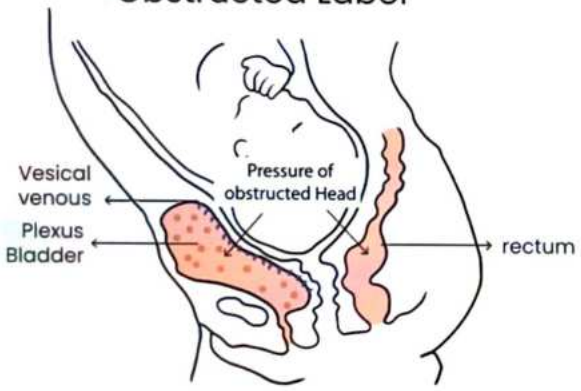
- Neglected Cephalopelvic disproportion (MC)
  - Large baby
  - Contracted Pelvis
- Malpresentation
  - Transverse Lie with shoulder presentation
  - Neglected Brow presentation
- Malpositions
  - Occipito-posterior

Signs

- Hematuria
  - Presents early
  - Due to pressure of Fetal head on Bladder which results in damage of Vesical venous plexus
- Vesico Vaginal Fistula (VVF)
- Injury to posterior part of Vagina → Rectal tear

} Late presentation

Obstructed Labor



Management

- Mx of Obstructed labor → C-section
- Obstructed labor with dead baby → C-section

> **Important Information**
>
> Management of obstructed labour is always cesarean section and NEVER forceps/ vacuum, not even for a dead baby

Maternal Complications

- Rupture of Membranes

↓

Chorioamnionitis

↓

Puerperal Sepsis

↓

Shock

↓

Death

- Ruptured Uterus → Shock → Death
- Bladder & Rectal Injuries
  - Stress Urinary incontinence
  - VVF
  - Rectovaginal fistula

Fetal Complications

- Still birth (Born Dead)
- Hypoxic Brain damage
- Neonatal Death

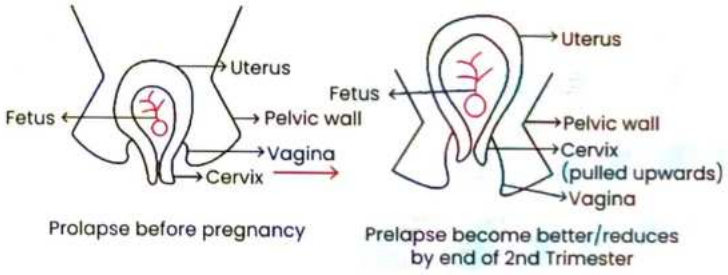
> **Important Information**
>
> - In case of ischemic injury to Vagina & Bladder, 5-7 days later, Vesico Vaginal Fistula presents
> - VVF is prevented by Urinary catheterization for 14-21 days

PROLAPSE IN PREGNANCY

00:47:22

1. Prolapse before pregnancy

- Becomes better/ reduces by end of 2nd Trimester



2. Prolapse happening first time in pregnancy

↓

Presents in 3rd trimester

Refer Table 35.1

Spontaneous Abortion

- **Mechanism** → Edematous Cervix

↓

Compression from the sides

↓

Venous return reduces

↓

Edema worsens

↓

Arterial supply to lower portion of Uterus also decreases

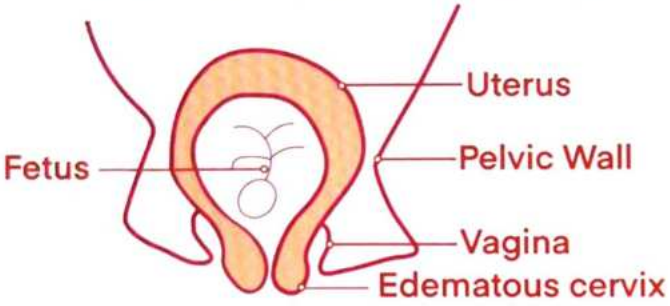
↓

Ischemia to Uterus

↓

Fetal death
↓
Abortion

- **Trendelenberg position** → Head Low position → reduces edema
- **Bed rest** → Reduces edema
- **A/G packs**
  - Acriflavin → Local Antiseptic
  - Glycerine → Hygroscopic Agent → Reduces edema



- **Pessary to be kept in Antenatal Prolapse**
  - To be used continuously till delivery
  - The largest pessary which can be comfortably kept without pain & which does not allow the uterus to come out and does not come out with valsalva

- **Modified Gillian Sx** → Pulling up the Uterus inside by
a) Plicating Round Ligaments
b) Hitch the Round Ligaments to Rectus sheath

- **Duhrssen's Incision**

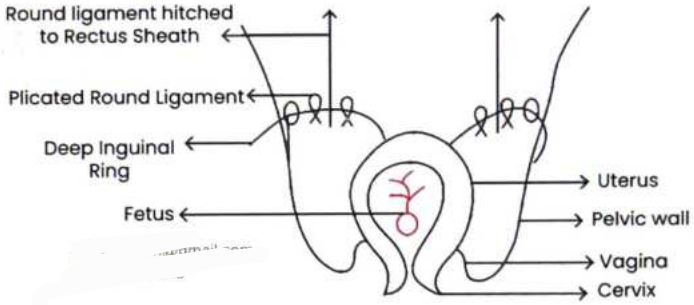


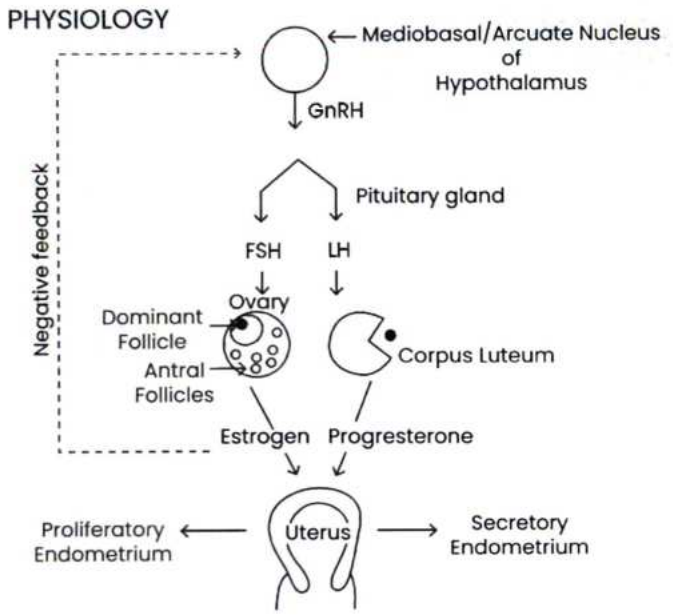
Table 35.1

	Antenatal	Intranatal	Postnatal
Complications	• Spontaneous Abortion • Preterm labor • Cervical Trauma • Lacerations. • UTI • Retention of urine	• Cervical Dystocia (Inadequate Cervix Dilatation) • Cervical lacerations • Obstructed labor • Uterine Rupture	• Puerperal Sepsis • Chronic Cervicitis • Subfertility
Management	• Bed Rest • Trendelenberg Position • Local Antiseptics to maintain hygiene (A/G Packs) • Pessary Continuously	• A/G packing reduces edema & helps in Dilatation • Manual Stretching & pushing up of Cervix • Duhrssen's incision (2 & 10 O' clock) • Avoid Fundal Pressure	• Antibiotics • Avoid weights • Reduce workload • Corrective surgery after 6 weeks

36 DRUGS USED IN GYNAECOLOGY AND OBSTETRICS

BASICS OF MENSTRUAL PHYSIOLOGY

00:00:36



DRUGS FOR OVULATION INDUCTION

00:02:02

1. Metformin

00:02:51

- Oral biguanide
- Doesn't cause hypoglycemia
- Dose: 500-1000 mg B.D
- Insulin sensitizer
  - Peripheral uptake of insulin
  - Hepatic gluconeogenesis
- Used for ovulation induction

2. Clomiphene Citrate (SERM)

00:05:13

- Racemic mixture of:
  - Enclomiphene 62% (Anti ER)
  - Zuclomiphene 38% (Mild ER)

In case of PCOS

Clomiphene citrate
↓
ER Receptor blocker
↓
Pituitary stimulation
↓
FSH
↓
1or 2 follicles will grow
↓
Ovulate

- It is a hypothalamic ER receptor blocker
- Dose: 50mg-100mg
- From 2nd to 6th day of periods.
- Ovulation rate is 80%
- Pregnancy rate is 40%

S/E:

- Vasomotor flushing
- Mood swings
- Pelvic discomfort
- Nausea, vomiting
- Visual scotomas

3. Letro...

00:10:00

- Aromatase inhibitor
- Vs. C.C. has: S/E
  Twins
- S/E
  - Locomotor defects
  - Cardiac defects

In fat cells:

Androgen
Letrozole ✕ Aromatase
↓↓estrogen

- Doc for ovulation induction
- Dose: 2.5 to 5 mg/day
  From 2nd to 6th day of periods

4. Inj. FSH

- Purified FSH
- Recombinant FSH

5. Inj HMG

- 75 IU FSH + 75 IU LH

(HMG: from urine of post-menopausal women)
- In menopausal women: FSH, LH in circulation & in urine

In IVF
- Ideal 6-15 eggs
- At least – 3 eggs

To get more eggs for IVF
- Give Inj. FSH from the beginning of the cycle till 14th day
  ↓
- Follicles will grow in size
  ↓
- LH surge will come much earlier (<14 days)
  (While the follicles are still small)
  ↓
- & the cycle gets wasted
  To prevent this early LH surge Suppress pituitary Give GnRH analogues in the previous cycle.

GnRHa (ANALOGUES) 00:29:24

- Leuprolide acetate – 20-40 times more potent than native
- Triptorelin – 130 times
- Buserelin – 80 – 100 times

Other uses
- Ovulation induction
- Suppressing hormone – based tumor – prostatic cancer
- Precocious puberty

GnRH ANTAGONIST

- Competitive inhibition of pituitary receptors of GnRH
- Faster action than agonists
- Cetorelix
- Ganirelix
- Given around 6th day till 14th day a cycle
- Will suppress pre-mature LH surge

OXYTOCIN

- Nano peptide
- Released From post. Pituitary
- ½ life: 2-3 minutes
- Duration of action: 20-25 min

Uses
- Abortion: in 2nd trimester, along with PG's
- Not in 1st trimester
- Induction of labour
  - 5 IU 500 ml R.L, 8 drops/minute
  - Or infusion set – pump
  - Given half the dose for multigravida's as compared to primigravida
- PPH prevention: DOC
  - Dose for prevention: 5-10 IU I.M/I. V bolus
  - Dose for Rx: 10-20 IU IV infusion
- For contraction stress test : Induce contraction (not in labor) & see response of F.H.R & this gives indication if women can have normal delivery or not

Side effects
- water retention – water intoxication :Anti diuretic effect)
- In multigravida – rupture of uterus
- Hyper stimulation – 45 sec contraction once in every 3 minutes (lot of contractions)
- Fetal distress/ death (d/t hypertonic contractions)

METHYLERGOMETRINE 00:49:45

- Ergot derivative – from fungus – claviceps purpurea
- Vial: 0.25 mg inj. Given IM/IV
- Tab: 0.5 to 1 mg

Uses
- For prevention of PPH 0.25 IV/IM (D.O.C oxytocin)
- For Rx of PPH
  - IV. Inj:
  - Acts within 90 seconds
  - S/E of sudden hypertension
  - Give slow push & not as a sudden bolus shot
  - Up to 3-4 inj. In 24 hrs
  - Maintain by tablet 0.5 mg T.D after 24 hrs.
  - I.M in takes around 10 min to act
- C.S: intraoperative bleeding
- Post abortal bleeding

Methylergometrine is never used for:
- Induction of abortion
- Induction of labour

C/I
- Not given in before 2nd twin is delivered
- PIH (B.P)
- Heart diseases
- Rhiso immunization

S/E
- Nausea, vomiting
- Sudden hypertension
- Gangrene of toes

PROSTAGLANDINS

01:01:02

- Derivatives of prostanoic acid which is made From P.U.F.A
- Used for
  - Induction of abortion
  - Induction of labor
  - Rx of PPH

> **Important Information**
>
> Unlike oxytocin, PG s can be used throughout the gestation

PG's USED FOR ABORTION

- **PGE1**: misoprostol : Tablet form can be given Orally 200 g /Vaginally 600-800 g / Rectally
- **PGF2 α:** carboprost

> **Important Information**
>
> Carboprost (PGF2 alfa is given only IM and never IV

PG's USED FOR I.0.L.

- **Dinoprostone**: PGE_2 In gel form: 0.5 mg , intravaginal or intracervical
- **PROPESS** (Dinoprostone pessary) :Dose:10 mg

PG's for PPH Mx

- **PGE1** : Misoprostal : Orally: 200 g or Rectally: 800 g
- **PGF2** α: carboprost
  - "Go to- drug - Dose: 25 g IM
  - Maximum up to 8 injection /24 hrs. (2 mg)

S/E PG's usage

- Hypersensitivity reaction
- Bronchospasm – $PGF_2 \alpha$
- Hyper stimulation of uterus "Tonus"
- Nausea, vomiting
- Diarrhea
- Uterine rupture in abortions or If used in previous C.S

ANTI-HYPERTENSIVE DRUGS

01:16:51

METHYL DOPA

- Pro drug α methyl norepinephrine
- Stimulates α_2 adrenergic system BP by sympathetic outflow
- Inhibits, dopa carboxylase
  ↓
  ↓↓ dopamine
  ↓↓adrenaline

Dose: 250 mg q.i.d

- Upto 500 mg can be given

S/E

- Drowsiness
- Depression
- False +ve coomb's test

HYDRALAZINE

01:20:04

- Arteriolar dilator
- Orally: 25 mg. up to 100 mg
- Given in 4 doses /day
- I.V 5 to 10 mg

S/E

- Hypotension
- Tachycardias
- Arrhythmias

LABETOLOL

01:21:37

> **Important Information**
>
> Labetalol is DOC in
> - In chronic hypertension
> - Hypertension of pregnancy (BP increasing after 20 week pregnancy)

- α + β blocker
- Dose: 100 mg T.I.D, up to 200 mg T.I.D
- If orally, up to 2400 mg /24 hrs.
- I.V: DOC For hypertensive emergencies
  - 20 mg I.V 40 mg I.V 80 mg I.V
  - Up to 220 mg (300 mg) I.V in 24 hrs.

S/E

- Headaches
- CHF
- Bronchial asthma

NIFEDEPINE

01:24:41

- Ca ++ channel blocker
- Vasodilatation
- Dose: 5 mg to 10 mg q.i.d.
- up to 80 mg

S/E

- Sudden Hypotension
- Tachycardia
- Headaches

NITROGLYCERINE

01:27:43

Drip - infusion pump
Dose - 5 g /min Up to 80 g /min

S/E

- Hypotension
- Tachycardia
- Meth hemoglobinemia
- Headaches

SODIUM NITROPRUSSIDE

01:29:37

- Emergency situations
- Can cause cyanide toxicity to the fetus
- Used for short period, preferably avoided.

37 INSTRUMENTS IN GYNAECOLOGY & OBSTETRICS

• SIMS SPECULUM (DUCK BILLED SPECULUM)

00:01:01

- Inspection & Examination of vagina and cervix
- Examination of obstetric trauma or vaginal trauma
- Used for DNC
- 2 blades of different sizes
- Trough'

SIMS ANTERIOR VAGINAL WALL RETRACTOR

00:03:18

- Retraction of vagina to expose the cervix
- Also for a Curretage
- Spoon shaped ends
- Transverse serrations

CUSCOS SPECULUM

00:04:56

- 2 blades connected by a Hinge
- Just like sims, but is Self retaining
- Colposcopy, Cx Biospy, IUCD insertion & Removal, Embryo transfer
- Take up too much space in the vagina
- Not useful for doing surgical procedures

TEALE'S VULSELLUM

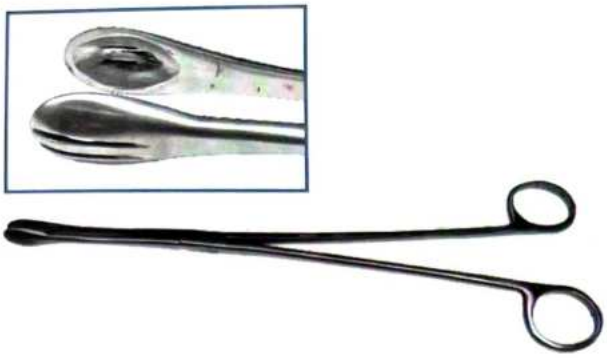
00:07:27

- 2 by 3' teeth
- To hold: Anterior and Posterior cervical lips
- For traction in surgeries like Colpocentesis, Colpotomy
- Used for Surgeries like Biopsies, Amputation, Electro and Cryo Cauterization
- Endometrial Biopsies and Curettage

JARCHO TENACULUM

00:12:44

- Single Tooth at the end of each Blade
- More secure as the bite is deeper
- But more traumatic, especially with Novices!



- Similar to sponge holding forceps
- Does not have a lock
- The blades are cupped

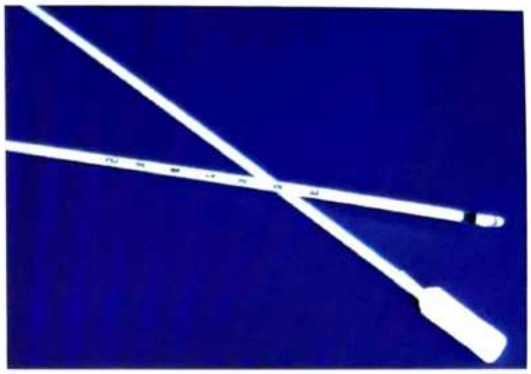
BLAKES UTERINE CURRETTE 00:28:18

- AUB not responding to treatment
- Curettage in MTP
- Diagnosis of Disease:
  - Eg. TB, Endometrial Cancer
- Diagnosis of Infertility cause
  - Endometrial Dating

RANDALL's ENDOMETRIAL BIOPSY 00:29:55

- Has got serrated top
- Not used for MTT
- Similar to blakes

PIPELLE ENDOMETRIAL SAMPLING DEVICE 00:31:08



- Used for Sampling of Endometrium

TISCHLERS CERVICAL BIOPSY FORCEPS 00:32:37

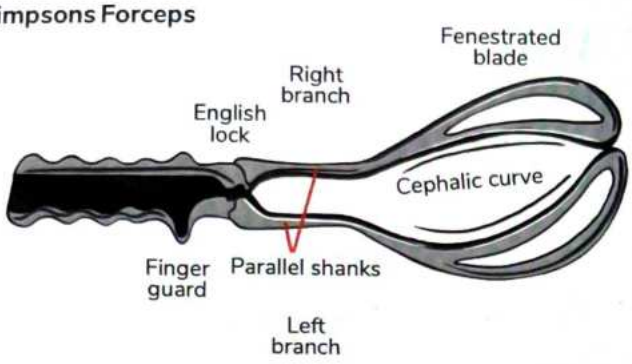
- Has got teeth at the top
- Used for OPD procedures

CARDIAC TOCOGRAPHY 00:33:54

- It has 2 probes
- One for charting of FETAL HEART RATE
- Another for UTERINE CONTRACTIONS
- If only 1 probe is present → NON STRESS TEST

FORCEPS 00:35:54

Simpsons Forceps



WRIGLEYS FORCEPS

00:39:11

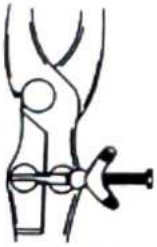
- Used for outlet procedures
- For stations > + 3

FORCEPS LOCKS

00:39:49

French Lock

English Lock



German Lock

Sliding Lock

Pivot Lock

VACUUM

00:40:46

Silastic Cups

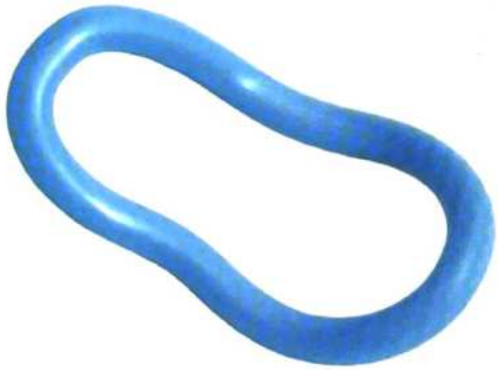
Metallic Cups

- C/I in preterm delivery
- Suction pressure
  - Applied on head is 0.8kg/cm or 80 kpa
- It is a slow process
- Build vaccum for 2-8 minutes at least
- Swelling on head formed after vaccum k/a CHIGNON SWELLING

PESSARY's

00:45:57

Hodge Pessary



- Made of hard Rubber
- Pushed into vagina to correct retroversion
- For reducing the prolapse
- For correcting stress urinary incontinence

Important information

Ques. How do you know the size of the pessary is adequate for relieving patient's complains?
Ans. The size of pessary which relieves the complains & does not give any added due discomfort.

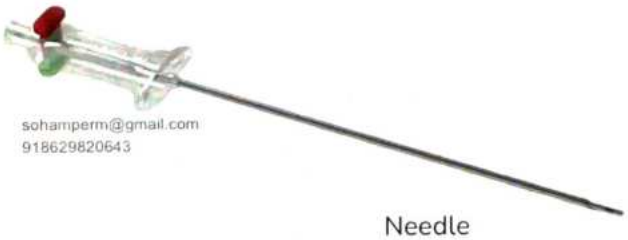
Ring Pessary

- Hollowed & fenestrated
- Used for reducing prolapse
- Can not correct retro version or stress urinary incontinence

VEERES NEEDLE

00:47:45

Metallic Needle



Needle

Disposable Plastic

- Can be reused after sterilizing
- Held in Pen Holding Fashion
- Used to get access into the abdomen
- Flow rate → 1- 2 l/min
  (To distend abdomen)
  - Total → 2.5 – 3 liters of air
  - Working pressure → 13-15 mmHg
  - And never > 20 mmHg

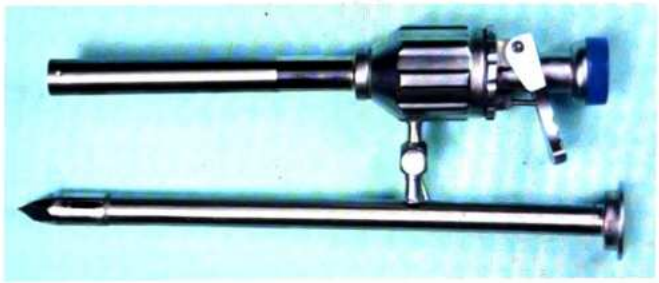
Previous Year's Questions

Q. Identify the instrument used in gynaecological surgeries? (INI CET 2021)

A. jamshedi needle
B. tuhoys needle
C. veress needle
D. oocyte aspiration needle

TROCAR & CANNULA

00:52:28



LAPROSCOPE

00:53:28

- Diameter = 10mm
- Small scopes = 5mm
- End of the scope can be:
  - 0°
  - Angulated (can see finer details)

Types of laparoscope

- 0°
- Angulated

EPISIOTOMY SCISSORS (BUSCH'S) 00:55:35

- Angulations takes the scissor away from the perineum & makes it easier to cut the vagina
- Always do episiotomy under L.A.

DOYENS & DEE LEE's RETRACTOR 00:58:11

Doyen's Retractor

Dee Lee's Retractor

- Mostly used over the suprapubic area
- To retract the bladder
- Dee Lee's is lesser traumatic

Previous Year's Questions

Q. Which of the following surgeries is this retractor commonly used in? (AIIMS 2019)

A. LSCS
B. vaginal hysterectomy
C. Fothergill Repair
D. Manchester Operation

DEAVER's RETRACTOR 01:01:25

- Deeper retractor
- For deep abdominal Sx

PINARD's FETOSCOPE 01:02:09

- Much less used now-a-days

BONNEY's MYOMECTOMY CLAMP 01:02:47

- Used to reduce blood loss during myomectomy
- Clamping the uterine arteries

MYOMA SCREW 01:05:13

- Screwed into the fibroids & upward traction is applied

PREP NUGGETS

Prep Nuggets

Tumor Markers

Dysgerminoma	_____
Epithetial cell tumors	_____
Granulora Cell tumors	Inhibin
Choriocarcinoma	_____
Yolk Sac Tumors	_____

Prep Nuggets

Risk of Conversion to Malignancy

Simple hyperplasia without atypia	%
Complex hyperplasia without atypia	%
Complex hyperplasie with atypia	8%

Prep Nuggets

Semen analysis

Volume > 1.5 me	_____
Concentration>	– million/me
Counts >	– Million
Morpuology> 4%	Normal

Prep Nuggets

Failure rates of contraception

Vasectimy	0.1
Tubectomy	0.2
IUCD	_____
COCP	_____
POP	1-2
Barreirs **C** Ideal use	9
Barriers **C** typical use	_____
Implants – 0.05	0.05

Prep Nuggets

Semen analysis

Volume > 1.5 me	_____
Concentration>	– million/me
Counts >	– Million
Morpuology> 4%	Normal

Prep Nuggets

Physiological changes in pregnancy

Heart rate	Increases
Stroke volume	Increases
Peripheral resistance	_____
Blood volume	_____
Respiratory rate	no change
FRC	_____
GFR	Increases