1 MENSTRUATION

Menstruation 00:00:17

- Number of follicles vary throughout life. These are
  - Primordial follicles: 6-7 millions at 20 weeks of IU Life, which is the maximum
  - 1-2 millions at birth
  - 3-4 lakhs at puberty
- A total of around 400-450 are utilized in a woman's life

Case 1: Women in whom Fertilization Occurs

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

Case 2: Women in whom Fertilization does not take place

- Oocyte dies in 24-48 hours followed by degeneration of corpus luteum.
  - Corpus luteum begins to degenerate at 9th to 10th day
  - Complete degeneration at 14th to 15th day followed by shedding of endometrium
- Progesterone withdrawal is responsible for shedding of endometrium
- Uterine contractions to expel menstrual blood cause dysmenorrhea
- Normal length of Cervix → 3.5 to 4cm (Short Cervix → 2.5 cm)
- Mittleshmerz/ mid cycle pain: This occurs due to 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 due to rupture of follicle which 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

- These are characterized by the following differences from ovulatory cycles
  - No MITTLESHMERZ/ mid cycle pain
  - No Prostaglandins, shed endometrium keeps collecting in uterus → intermittent recoil of uterus → blood comes out → irregular bleeding
  - Painless (due to no or 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 Dysmenorrhea

- 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: here the endometrium is shed like cast of endometrial cavity. Thus due to clumping of blood, there are more contractions, causing more pain

Treatment

1. NSAIDS: ibuprofen, naproxen, mefenamic acid
2. Anti Spasmodics: dicyclomine, drotaverine, hyoscine
3. Combined oral contraceptives → With use of OCPs, cycles become anovulatory, hence pain free
4. Surgical dilatation of cervix: Helps dysmenorrhea as drainage of blood is better. Thus parous women have lesser spasmodic dysmenorrhea as 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:

- Normal length of the cycle is 28 7 Days.
- Polymenorrhea is defined as cycle length < 21 days, while Oligomenorrhea is cycle length of > 35 days

Duration

- Normal duration of flow is 2-7 Days.
- Hypomenorrhea is defined as period lasting < 2 days while Menorrhagia is when period lasts > 7 days

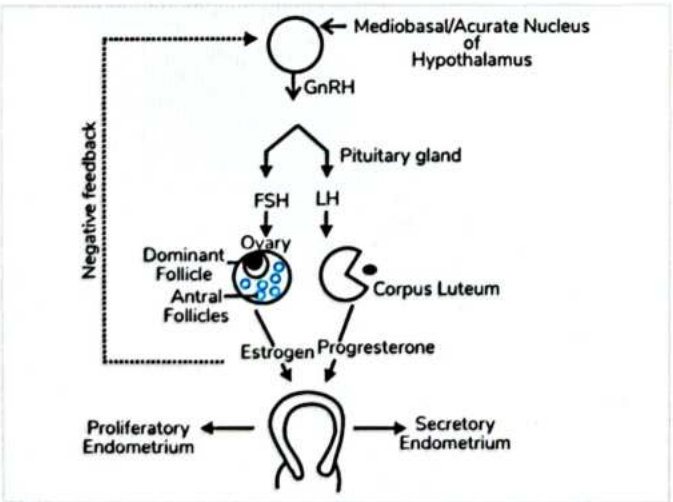
Amount

- Normal flow is 30-50 ml per cycle
- Excessive blood loss is > 80 ml defined as menorrhagia

Terminologies

- **Polymenorrhagia:** < 21 days & > 80 ml of blood loss
- **Metrorrhagia:** Irregular cycles superimposed on regular cycles or intermenstrual bleeding/ spotting
- **Menometrorrhagia:** Irregular acyclical bleeding (Ca Cervix, Polyp)
- **Metropathia Hemorrhagica**
- It is characterized by prolonged amenorrhea of 2-3 months followed by heavy withdrawal
  - Usually occurs in a women > 40 yrs
  - This occurs in an anovulatory cycle, due to absence of progesterone, the endometrium is non secretory and there is excessive hyperplasia of endometrial glands, which leads to heavy withdrawal.
  - It is diagnosed by curettage & microscopic examination which reveals Cystic Glandular Hyperplasia (CGH) or [SWISS CHEESE ENDOMETRIUM with very less stroma
  - It is a self limited condition
  - Curettage is also curative

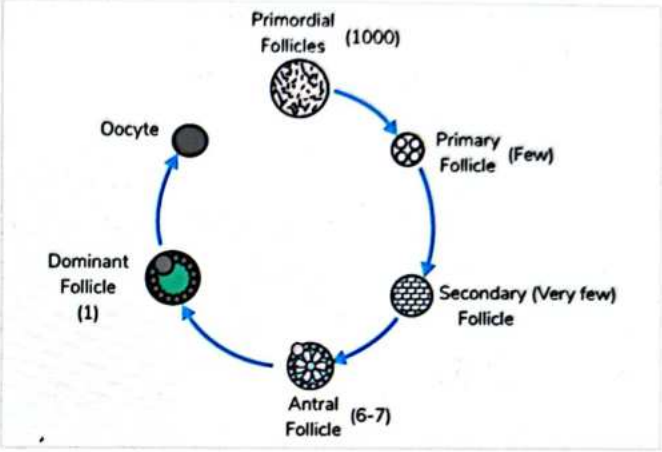
Physiology of Menstruation



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

How to Remember

- Faster (60min) in Follicular phase
- Longer (90min) in LUTEAL phase
  - Granulosa cell of follicle are sex cord cells which produce estrogen
  - Antral follicles: these are fluid filled follicles out of which 6-7 are recruited every month



- Women have set number of follicles, which exhaust every month and are over by menopause thus perimenopausal women have irregular cycles due to OLD follicles
- Fate of Reproduction During Perimenopausal Period: cycles are commonly anovulatory, oocyctes are of poor quality, hence less chances of fertilization. Even if fertilization occurs, embryos are of poorer quality and hence abort. risk of abortion is upto 40% after 40 years.
- > 35 yrs Pregnancies → ELDERLY GRAVIDAS indicated for
  - LEVEL II scanning
  - Triple markers, dual marker
  - Amniocentesis

Tests for Ovarian Reserve 01:25:44

- ANTRAL FOLLICULAR COUNT: lower the AFC, lesser the ovarian reserve. It is around 6 to 7 in young women and around 1 in older women.
- OVARIAN VOLUME: lower the ovarian volume, lower the reserve. It is around 3.5 x 2.5 x 3cm in younger women and around 1 x 1.5 x 1cm in older.
- AGE: ovarian reserve decreases with advancing age
- ESTROGEN: lower the estrogen, lower the reserve
- FSH: higher the FSH, lower the reserve. In younger women it is around 2 to 6IU, while in older women it is > 15IU.
- ANTI MULLERIAN HORMONE: it is made from granulosa cells of ovary, with lower AMH, ovarian reserve is poorer.

01:30:50

Important Information

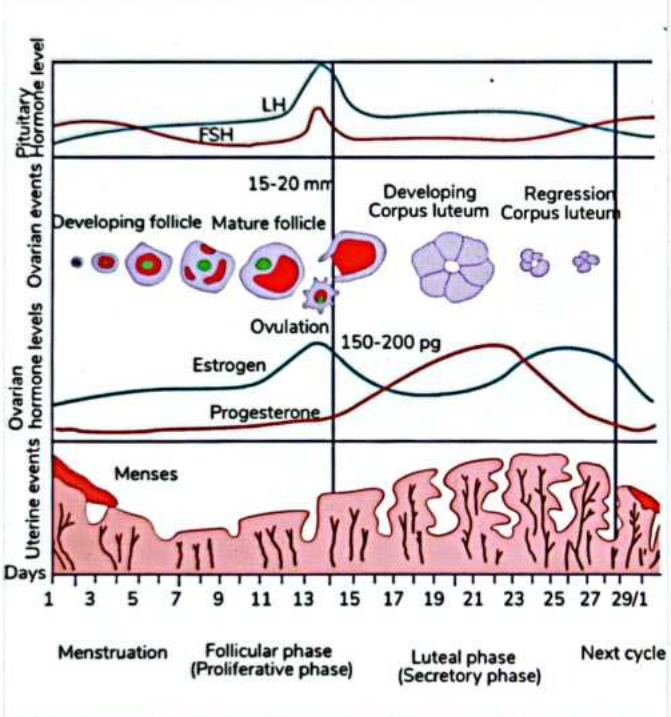
- Purpose of FSH → Estrogen production
- Purpose of LH → Progesterone production

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

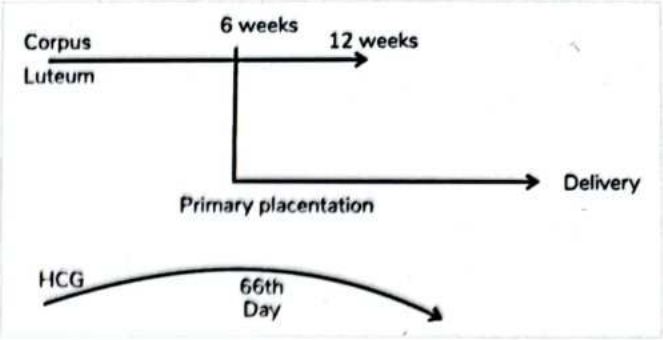


Maintainance of Pregnancy

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



Implications of Menstrual Physiology

- **Hyperemesis** is maximum at 66th day [9 wks + 3days], matches HCG peak
- **Prevention of abortion**: This can be done by progesterones and HCG
- **Spinnbarkiet stretchability**: cervical mucus stretchability which is maximum at 14th day
- **Ferning/arborizing pattern**: Cervical mucus on drying forms: Ferning/arborizing pattern which is due to presence of NaCl crystals
- **FERTILE PERIOD** → 11th to 16th day
  - Life span of sperm → 72 hrs
  - Life span of ovum → 24-48 hrs
- **SAFE PERIOD** → Before 11th day & after 16th day. If a woman had intercourse on 24th day of cycle: The cervical mucus is too thick for fertilization, and there is no oocyte: as a result fertilization doesn't occur. Even if embryo forms, no implantation occurs
- **BILLING METHOD** is a natural method of contraception. It is based on cervical mucus physiology
  - Thin and stretchable cervical mucous implies wet days and intercourse done on these days can lead to pregnancy, thus is can be avoided for contraception.
- **PROGESTERONE PILLS [POP]: Mechanism of action for contraception**
  - Progesterone given from start of the month makes cervical mucus on 14th day thick & viscid, sperm cannot penetrate easily.
  - Progesterone inhibits LH surge causing anovulation
  - Makes endometrium hyper secretory and thus unfavorable for implantation. Endometrium is thus out of phase endometrium wherein pinopods are internalized
  - Failure rate → 1 to 2%

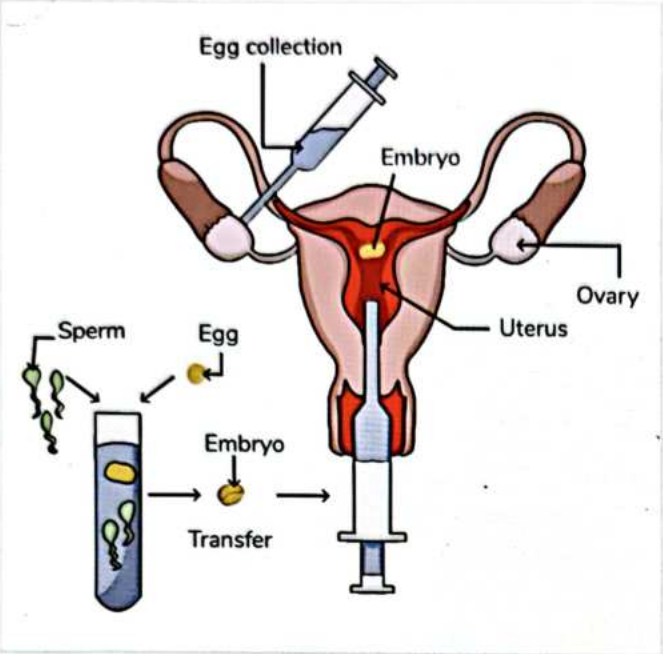
Hormonal Management of AUB

02:22:20

- 1st line hormonal management of abnormal uterine bleeding is PROGESTERONE which stabilizes endometrium in a physiological way
- Next line of management is ESTROGEN, however it leads to heavier withdrawal

- First line of drug in acute SEVERE Menorrhagia is ESTROGEN

IVF: Controlled Ovarian Hyperstimulation 02.29.13



- Give multiple FSH injection from beginning of the cycle, thus 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 & fertilize with sperm in test tube, thus an embryo is formed
- Embryo is implanted back in the uterus
- Excess embryos can be stored in liquid N2 [- 196° c] for frozen embryo transfer, which may be required later.
- 1st IVF baby → LOUISE BROWN [1978]
- 1st IVF done by → STEPTOE & EDWARDS. In 2010, Noble prize was given to EDWARDS

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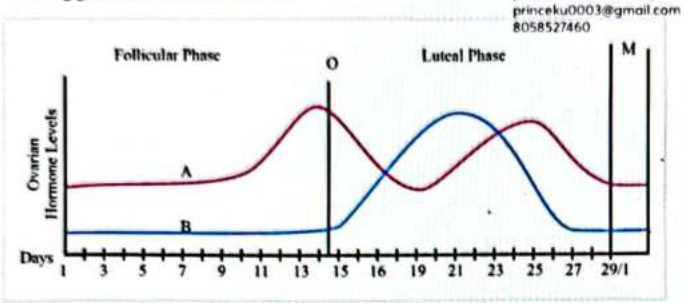
PREVIOUS YEAR QUESTIONS

Q. Day 20 of menstrual cycle falls in which phase?(NEET 2019)

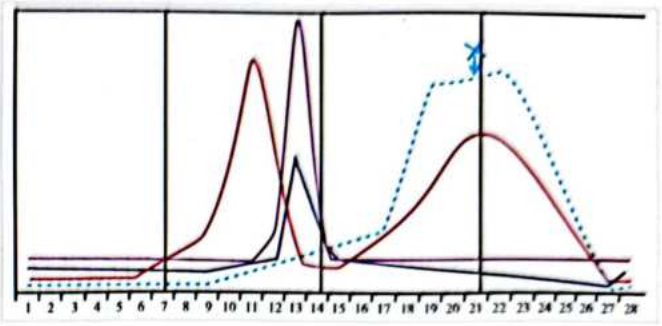
A. Menstrual phase
B. Follicular phase
C. Ovulation phase
D. Luteal phase

Q. In this graph of menstrual cycle, which alphabet shown is suggestive of ovulation? (EMGE 2020)



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

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



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

Q. HCG is structurally and functionally similar to (INI CET 2021)

A. Prolactin
B. LH
C. ACTH
D. Oxytocin

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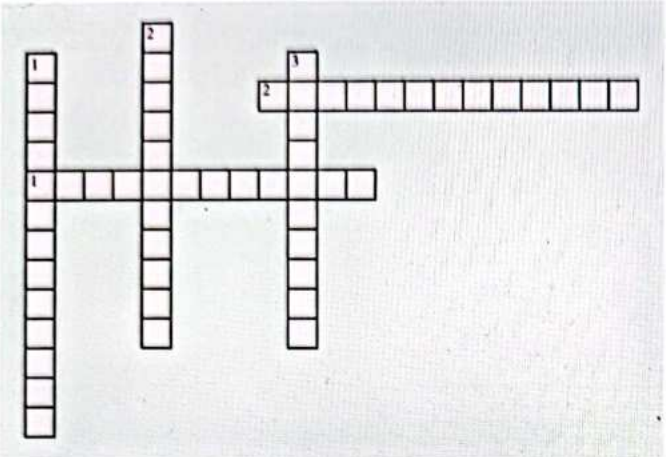
CROSS WORD PUZZLES

Crossword Puzzle



Across

1. _____pain occurs at the time of ovulation
2. Cycle length of less that 21 days is known as _____

Down

1. The best test for ovarian reserve is _____ hormone
2. _____ cycles are painless
3. _____type of dysmenorrhea is seen in endometriosis

2 MENSTRUAL PROBLEMS IN YOUNG AND SMALL GIRLS

Puberty

Normal Puberty 00:00:56

- Normal age of puberty is 10-12 years in girls
- First sign of puberty is physical growth
- Specific events of puberty
  1. Thelarche: Or breast growth is the 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

- Onset of puberty at 9 years or earlier

Precocious Puberty 00:03:52

- Onset of puberty 8 years or earlier

Pre-Pubertal Vaginal Bleeding 00:04:12

- **Neonatal vaginal bleeding**
  - It is usually due to maternal estrogens. Counselling must be done to avoid anxiety
- **Pre-pubertal vaginal bleeding:** Can be due to
  - 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 00:09:50

- Inflammation and irritation: Causes vaginal discharge
- Inflammation is primarily vulvitis, while 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

Treatment

- Topical estrogens for around 4 weeks (short term): makes vulva soft, reduce irritation
- Antibiotics
- Focus on hygiene

Precocious Puberty 00:13:03

Definition

- Periods in the absence of secondary sexual characters, 8 years or before
- Presence of pubic hair growth before 7 years
- Breast growth before 6 years (U/L or B/L)
- Precocious puberty leads to premature closure of epiphysis leading to inadequate height

Etiology

- Most commonly idiopathic
- CNS lesions like hypothalamic hematoma

Tests

- Raised LH/FSH > 1

Treatment

- GnRH analogues (depot form) cause desensitization/ down regulation of pituitary receptors
- Growth hormone has a controversial role

Vaginal Tumors

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

Trauma

- Any girl presenting with vaginal trauma, we must rule out sexual abuse
- Another cause may be 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

Normal and abnormal patterns

- During first 2-5 years of periods: Anovulatory cycles. These cycles are irregular (delayed 21-45 days cycles), with mean duration of 7 days.
- >80 ml is called excessive
- Definition of abnormal bleeding in adolescents is cycle length > 45 days or < 21 days with bleeding for > 7 days

Management of anovulatory bleeding

- First line is tranexamic acid and NSAIDS
  - Hormones used may be COC which give artificial cycles or Progesterones: 10 days regime (for 10 days from day 14) or 5 days regime
- No endometrial biopsy

Important Information

- No endometrial biopsy for puberty menorrhagia

Evaluation

- Also rule out the following
  - Hematological abnormalities: Von Villebrands
  - Infections: Chlamydia, STD
  - PCOS
  - Anatomical defects like Transverse vaginal septum or uterine anomalies like Didelphys
  - Ask h/o sexual activity: Adolescents tend to hold back information about sex and avoid using contraception. This leads to increased chances of unwanted pregnancies and unwanted abortions

Long Term Menstrual Suppression 00:30:00

Indications

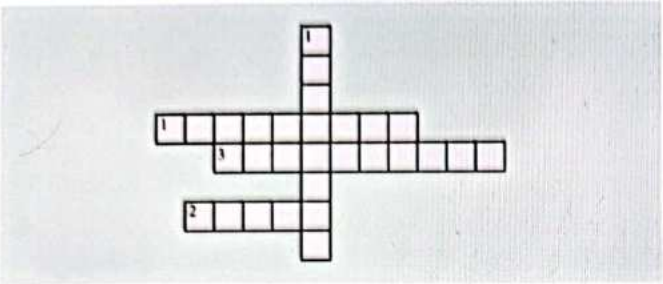
- Coagulopathy
- Malignancy requiring chemotherapy
- Developmental disabilities

Treatment

- Progesterones such as Norethindrone or Medroxyprogesterone. Side effects include metrorrhagia (mid cycle spotting)
- Long term COC given continuously or may give break once in 3-4 months
- DMPA: Causes endometrial atrophy. Side effects include bloating, mood swings
- GnRH analogues cause amenorrhea by downregulation of pituitary
- LNG-IUCD (MIRENA): No systemic side effects, causes atrophy

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The first specific sign of puberty is _____
2. In a prepubertal girl presenting with vaginal bleeding, a history of _____ must always be ruled out first
3. The most common cause of precocious puberty is _____

Down

1. The most common cause of vaginal bleeding in a neonatal girl is presence of maternal _____

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3 OVARIAN HYPERSTIMULATION SYNDROME (BAKERS DOZEN)

Controlled Ovarian Hyper Stimulation 00:00:45

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

Understand with 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**

↓

Fluid shifts ⟶ Hemoconcentration → PCV > 45 or > 55

Ⓝ packed cell volume [HCT] -33

↓

Thrombo embolic phenomenon

↓

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

Third space collections

- Ascites
- Pleural effusion
- Pericardial effusion
- Edema

- Torsion
  Rupture of ovary
  Hemorrhage

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

Mathur Classification 00:11:00

Category	Features
Mild OHSS	• Abdominal bloating • Mild abdominal pain • Ovarian size usually < 8 cm
Moderate OHSS	• Moderate abdominal pain • Nausea ± vomiting • Ultrasound evidence of ascites • Ovarian size usually 8 - 12 cm
Severe OHSS	• Clinical ascites (± hydrothorax) • Oliguria (< 300 ml/day or < 30 ml/h) • Hematocrit > 0.45 • Hyponatremia (sodium < 135 mmol/l) • Hypo-osmolality (osmolality < 282 mOsm/kg) • Hypoproteinemia (serum albumin < 35 g/l) • Ovarian size usually >12 cm
Critical OHSS	• Tense ascites/large hydrothorax • Hematocrit > 0.55 • White cell count > 25000/ml • Oliguria/anuria • Thromboembolism • Acute respiratory distress syndrome

- 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 by tapping ascites & effusion
- Give oral fluids [Mild, moderate forms] IV Fluids for fluid replacement
  - NaCl, DNS [crystalloids]
  - Albumin, Dextran, starch [colloids]

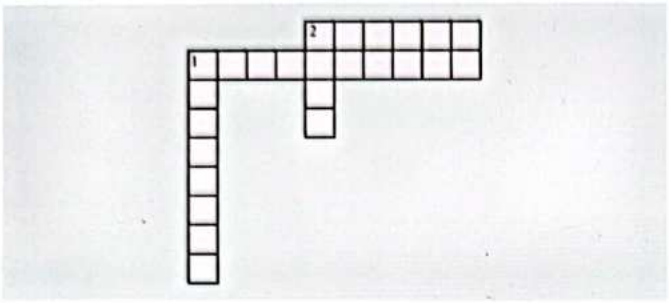
> **Important Information**
>
> - Colloids will hold the fluid in the Intra-vascular space and are thus important for management of OHSS

Occurrence 00:20:01

- Most commonly seen in 13-15% of patients on Clomiphene Citrate
- However more severe forms are seen with Gonadotropins: Inj. HMG [Human Menopausal Gonadotropins, Inj. FSH recombination

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. A drug commonly associated with OHSS is_____
2. Classification of severity of OHSS commonly used is _____

Down

1. IV fluids which hold fluid in intravascular space in OHSS are _____
2. Ovary size of 7 cm without ascites is _____ form of OHSS

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4 TESTS OF OVULATION

Tests of Ovulation 00:00:15

Tests the effects of progesterone

1. **Basal body temperature**: rises by 0.5° F as progesterone is a thermogenic hormone
2. **S. LH**: > 15 IU is suggestive of ovulation
3. **S. progesterone** on day 21, if >3nglml is suggestive of ovulation
4. **Serial USG**: Follicular monitoring done in OPD is the usual method used, start follicular monitoring on day 9 onwards

Understand with 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 & ferning is due to estrogen: This is max around day 14.
- Loss of spinnbarkeit & ferning are due to progesterone.

Important Information

- Spinnbarkeit and ferning of cervical mucous are NOT suggestive of ovulation.
- Loss of spinnbarkeit and ferning 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 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)

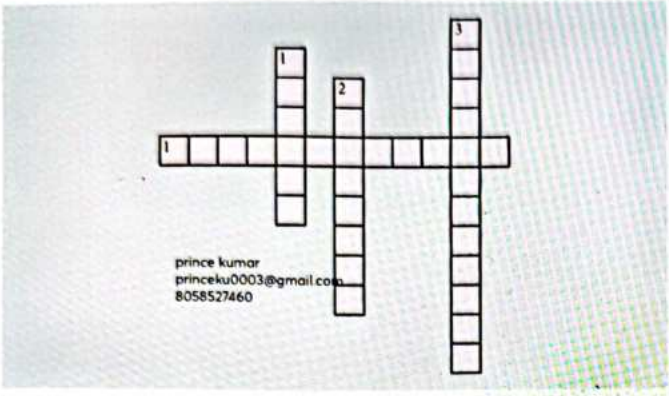
A. Serum LH at day 21
B. Serum progesterone at day 21
C. Serum LH at day 14
D. Serum estrogen at day 21

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 estrogen
D. High progesterone

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The Hormone responsible for rise in body temperature after ovulation is _____

Down

1. Endometrial biopsy should be done in _____ phase of menstrual cycle
2. Ferning of cervical mucous is due to _____
3. The extreme stretchability of cervical mucous is known as _____

5 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 who have poor immunity & increased estrogenecity would develop endometriosis

Age of Presentation

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

Diagnosis

- Raised CA 125, however it is not diagnostic nor very specific
- USG, MRI
- Laparoscopy: gold standard for diagnosis

Sites of Prediliction

- Most common site is the ovary
- Second most common site is Pouch of Douglas
- Bowel
- Lung [periodic hemoptysis] } VICARIOUS
- Nose [Periodic epistaxis] } MENSTRUATION
- Eyes [Periodic sub conjunctival hemorrhage] }

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 presenting as severe congestive dysmenorrhea
- Deep dyspareunia
- Menorrhagia
- Infertility
  - Altered tubo-ovarian relation by adhesion, impairing oocyte pick up
  - Decreased frequency of intercourse due to dyspareunia
  - Poor ovulation
  - Embryotoxic Endometriotic Deposits
    - → Poor quality embryos
    - → Reduced implantation
    - → Increased risk of Abortion

Treatment 00:12:09

Surgical Rx

- Adhesiolysis for adhesions
- Cystectomy for chocolate cysts of ovary
  - Ablation for deposits: Fulgration of Deposits may be done by Thermal ablation 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 as progesterone stabilizes endometrium
   - Atrophy of endometrium occurs in 3-4 months of Rx
2. Tab Danozol
   - Androgen have anti estrogenic action, thus cause faster atrophy
     - Side Effects include hirsutism which is a reversible change. Changes of virilization, which are permanent include breast atrophy, hoarsness of voice and clitromegaly.
     - The first sign to stop treatment with Danazol is thus hoarsness of voice
3. Combined oral contraceptive pills
   - These cause anovulatory cycles which are painless
   - Limits endometriosis by causing amenorrhea when given continuously.
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
   - Atrophy of endometrium

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

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

Ans. Medical management till conception

Management protocol

- Pregnancy, due to amenorrhea limits endometriosis. The patient should be encouraged to complete her family after which she should be started on COCPs. These can be prescribed as 21 x 4 packs, given for 84 days continuously, such that patient will have periods once in 90 days
- GnRH analogues: when given for more than 6 months, estrogen dependent osteoblastic action will stop while estrogen independent osteoclastic action continues, this results in osteoporosis. Add Back Regime; to be started if GnRH are to be given for longer than 6 months which includes low dose estrogens and RALOXIFINE [selective estrogen receptor modulator]

Adenomyosis/ Endometriosis Interna 00:39:19

- Adenomyosis is seen in, multiparous women over 40 yrs of age and in about 30% of hysterectomy specimens
- It is also known as Endometriosis Interna, which implies endometriosis within uterus, in the muscle layer.
- It occurs due to disruption of endometrial-myometrial border due to repeated pregnancies, hence associated with multiparity.

Presentation

- Menorrhagia
- Progressive dysmenorrhea
- Infertility in young women [Rare]
- Uterus is uniformly enlarged & ≤ 14 weeks size of pregnant uterus [14cm], in contrast to asymmetrically enlarged uterus in fibroid.

Diagnosis 00:45:44

1. **USG, MRI**

- Sub endometrial halo is present
- Hetero echoic deposits in uterine myometrium
- Ill defined hypoechoic areas are seen as Lakes of Endometrial Blood
  - Junctional zone b/w endometrium & myometrium which normally is 5-8 mm is increased to > 12 mm and is diagnostic of adenomyosis.

00:48:58

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

- Endometrial glands within uterine muscles is a pathognomic sign
- Localized adenomyosis looks similar to fibroids, however fibroids have pseudocapsule while adenomyosis has a diffuse border.

Treatment 00:51:04

- Menorrhagia can be managed with NSAIDS and Hormones
- For young women, not suitable for hysterectomy, hormonal therapy may be given in the form of COCPs for longer duration or IUCD's with progesterone [mirena] or less commonly localized excision
- Surgical Management of Menorrhagia can be done by Dilatation and Currettage
- Overall best treatment hysterectomy

Important Information

- Most definitive treatment of adenomyosis is hysterectomy

PREVIOUS YEAR 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

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

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

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)

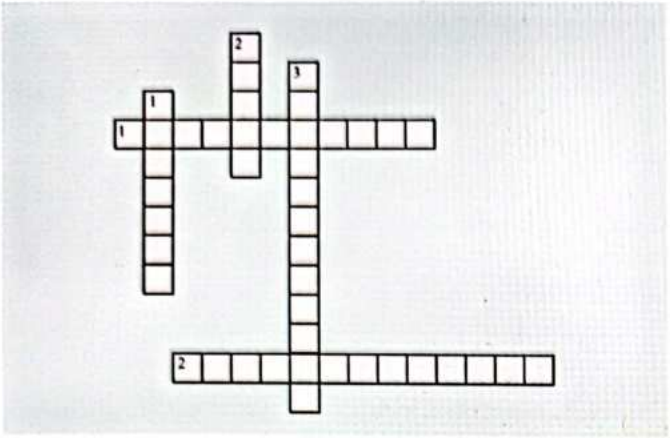
A. GnRH analogues
B. OCPs
C. Hysterectomy with oophorectomy
D. B/L cystectomy with adhesiolysis and plan for IVF

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The gold standard for diagnosis of endometriosis is _____
2. The most common cause of unexplained infertility is _____

Down

1. The drug _____ is used for treatment of endometriosis and causes hirsuitism
2. The most common site of endometriosis is _____
3. The definitive treatment of adenomyosis is _____

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6 HORMONAL REPLACEMENT THERAPY (SWEET SIXTY-SIXTEEN!)

Menopause 00:01:20

- The average age of menopause is 52 years (51 years), while the average age of menopause in India is 47-48 years. The range is 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

Features at Menopause due to lack of Estrogens 00:03:00

- **Skin** is smooth, supple, glistening due to subcutaneous collagen which is maintained by estrogen. At menopause low collagen, skin becomes lax and loose.
- **Voice**: There is hoarseness of voice
- **Brain:** after menopause, woman may have mood swings, depression, reduced anger threshold, anxiety, insomnia
- **Hot flushes:** occurrence of hot flushes coincides with LH rise.
  - There is an increase in NA, serotonin, dopaminergic pathways, which causes vasodilatation in brain causing a flash of heat from brain to neck to back
  - Around 75% menopausal women get hot flushes
  - This is seen in up to 1-2 years in most women, can go upto 10 years
  - A hot flush is not just because of estrogen deficiency but due to estrogen withdrawal

Important Information

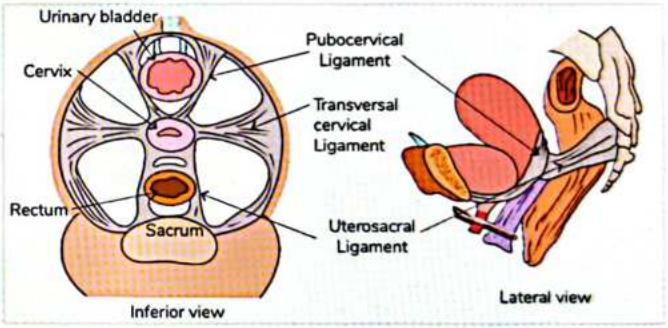
- Hot flushes are important indication for HRT
- Due to estrogen withdrawal

- **Bones:** there is an increased risk of fractures due to osteoporosis as there is more osteoclastic activity and less osteoblastic activity. These fractures include:
  - Vertebral compression fractures [MC]
  - Wrist fractures
  - Femur fractures

Important Information

- Most common fractures due to menopause: vertebral compression fractures

- **Hair:** Vellous hair are soft, thin and light, while terminal hair are hard, thick and dark. At menopause, there are more terminal hair as the pilosebaceous unit is more under control of androgens
- **Pelvis:** there is increased risk of fractures of hip bone
- **Vagina:** the normal PH of vagina is acidic which is protective against infections.
  However glycogen is converted to $\xrightarrow{\text{lactobacillus}}$ Monosaccharides + lactic acid + H2O2.
  - No Estrogens makes pH alkaline due to reduced lactobacillus. This increases anaerobic infections causing vaginitis, vulvitis, urethritis, UTI
  - PID [Pelvic Inflammatory Disease]
  - Dry atrophic vagina also leads to decreased sexual activity
- **Heart**: Risk of Coronary artery disease increases.
  - 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

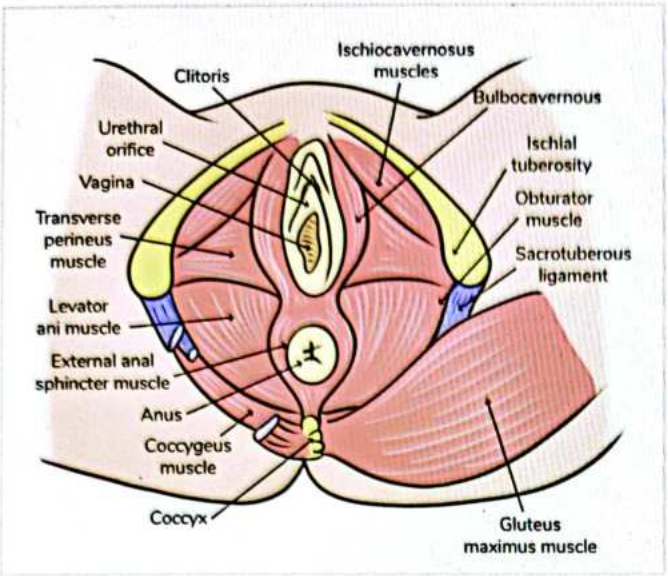


  - Muscular support: levator ani/ pelvic diaphragm: best support
    - → Puborectalis
    - → Pubococcygeous
    - → Iliococcygeous

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

Hormone Replacement Therapy

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: check Endometrial lining, if < 4 mm, HRT can be started, however if 5 mm, then patient needs an evaluation first by biopsy.
- 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

Drugs for 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:** it is a synthetic estrogen which has a progestational metabolite present. The dose given is 2.5 mg/day
4. **Serm [Selective Estrogen Receptor Modulators]**

- Raloxifene: dose given is 60 mg/day. It is estrogenic on bone and anti-estrogenic on brain, therefore it is contraindicated for hot flushes.

Important Information

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

- Bazedoxifene: dose is 20 mg/day

5. **Plant Estrogens:** these are safer but less effective
6. **Bisphosphonates**

- These form the non hormonal treatment of osteoporosis
- Various drugs and doses are:
  - Alendronate: 70 mg/ week
  - Risedronate: 35 mg/ week
  - Ibandronate: 150 mg/ month
  - Zolendronic Acid: 5 mg/ year
- Major side effects include gastrointestinal intolerance, which can be reduced by taking on empty stomach with lots of water and patient must then sit upright for half hour immediately after.

Important Information

Treatment for osteoporosis

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

7. **Calcitonin**

- Miacalcin: Dose given is 200 IU as an intranasal puff

- It acts by reducing osteoclastic action

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

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

Treatment of Hot Flushes 00:48:10

- **Estrogen:** It is the drug of choice, however it takes some days to act
- **Estrogen 0.45 mg + bazedoxifene** 20 mg can be used
- **Clonidine Hydro Chloride**: Is given for acute relief as 100 - 200 µg OD. It decreases vasomotor flushing
- **Alprazolam:** Given in doses of 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

Role in 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

Role of HRT in Vaginal Atrophy 00:52:28

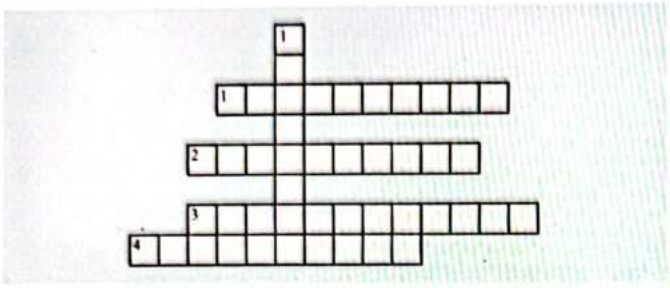
- Local estrogens are better, such as estriol cream (evalon), with lesser systemic side effects.
- local DHEA application
- Oral ospemifene, which is a SERM, helps to reduce dyspareunia

Important Information

- Start HRT only after 1 year of menopause

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The main cause of a hot flash is estrogen _____
2. _____ is a SERM used for the treatment of menopausal symptoms
3. Menopause causes _____ of bone
4. Most crucial ligament of pelvic support is _____

Down

1. The drug of choice for hot flashes is _____

7 OVARIAN TUMORS

Normal Ovary

- 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

  } More ovulation; more scars
  - Perineal talc
  - Asbestos exposure

Ovarian Epithelial Cancers

Etiology

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

- **Associated with Mutations in**
  - BRCA 1 [On chromosome 17]
  - BRCA 2 [On chromosome 13]

- **Familial Predisposition**
  - 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

Presentation

- 70% of all ovarian cancers are 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 postmenopausal women: > 35
- Pre menopausal women: > 200
- **Clinical features** : abdominal mass (big abdominal masses are however mostly benign) and usually present with vague GI symptoms such as abdominal bloating, distension, indigestion etc

Diagnosis

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

Risk of malignancy index

Criteria	Scoring system
A. Menopausal status	Premenopausal : 1 Postmenopausal : 3
B. Ultrasound features • Multiloculated • Solid areas • Bilateral masses • Ascites • Metastasis	No features : 0 One feature : 1 >1 feature : 3
C. CA 125 levels	Absolute levels
RMI = A X B X C	<25 : low risk 25-250 moderate risk >250 : high risk

Refer Table 7.1

- Human epididymal protein 4 (HE4) : > 94% specificity, no effect with endometriotic cyst
- ROMA score : Risk of Malignancy Algorithm

Pre-menopausal PI : 12 + 2.38 x LN(HE4) + 0.0626 x LN (Ca125)

Post-menopausal PI : 8.09 + 1.04 x LN(HE4) + 0.732 x LN (CA125)

ROMA (%) : 100 X Exp PI/ (1 + Exp PI)

ROMA cut off : 7.4% for premenopausal
25.3% postmenopausal

Treatment

- Staging Laparotomy + Optimal Debulking
  - Vertical Midline incision / Paramedian incision
  - Ascites for cytology for malignant cells, (if no ascites, then take peritoneal washings of POD, paracolic gutters, B/L hemidiaphragms with 50-100 ml NS and send for cytology)
  - Assess pelvis, Abdominal organs, extent of malignancy, spread in a clockwise direction
  - Peritoneal biopsy
  - Scrape both hemidiaphragms
  - Supracolic omentectomy
  - Retroperitoneal lymph node sampling (pelvic and para-aortic)
- Optimal Debulking
  - Remove the involved ovary in young patient or total hysterectomy with bilateral salpingectomy in an old woman
  - Remove all visible tumors

- Residual cancer < 1 cm is optimal debulking
- Lesser post operative morbidity and better response to chemotherapy

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

1. **Epithelial ovarian tumor**
   a. Cyclophosphomide
      Adreomycin
      Platins { Cis / Carbo
   b. Platins } Better choice
      Taxol
2. **Germ Cell Tumors** 00:42:13
   a. Vincristine
      Bleomycin
      Platins
   b. Bleomycin } Better Choice
      Etopside
      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

Guidelines : Management of Ovarian Cancer

Early	Low risk	Stage 1A, 1B, low grade	Surgical staging
	High risk	Stage 1C, high grade	Surgical staging + adjuvant chemotherapy
Advanced		Stage II,III,IV	Maximal cytoreduction + adjuvant chemotherapy

Important Information

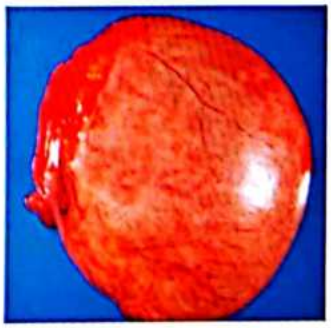
- Maximal cytoreduction means removal of entire pelvic tumor + resection of metastasis
- Optimal debulking : <1 cm of residual lesion
- Fertility sparing surgery : done for younger women (unilateral salpingo-oophorectomy) : for stage 1A with low grade or borderline tumors
- Neo-adjuvant chemotherapy : Stage III and IV with massive ascites, pleural effusion, unresectable tumor. It increases chances of optimal debulking.

Types of Epithelial Ovarian Tumors

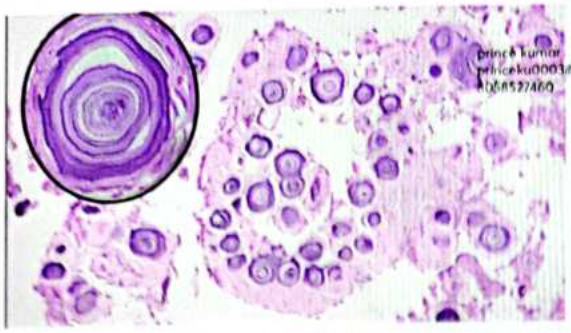
- MC [75%]
- Older age group
- Bilateral

Types

- 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

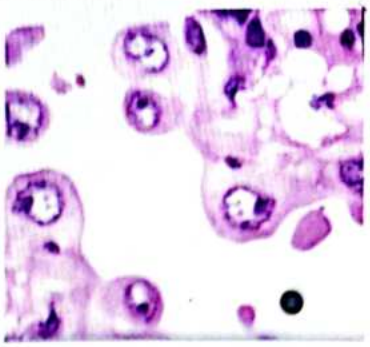
- **Mucinous Cystadenoma**
  - Less malignant
  - B/L in 10%
  - Multilocular
  - Pseudomyxoma peritonei: Mucinous cystadenoma ruptures to release mucin in peritoneal cavity which heals with peritoneal fibrosis → Severe hypoproteinemia
    → MC cause in ovarian tumor → mucinous cystadenoma
    → MC cause (Overall): Appendiceal cancer
    - Cells are like cervix

- **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

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

- **Clear cell carcinoma** : also known as mesonephroid ovarian tumor
  - Very rare but very malignant
  - Poor prognosis
  - Large cuboidal cells with clear cytoplasm:hobnail appearance (protruding nucleus into the lumen)



Germ Cells Tumors

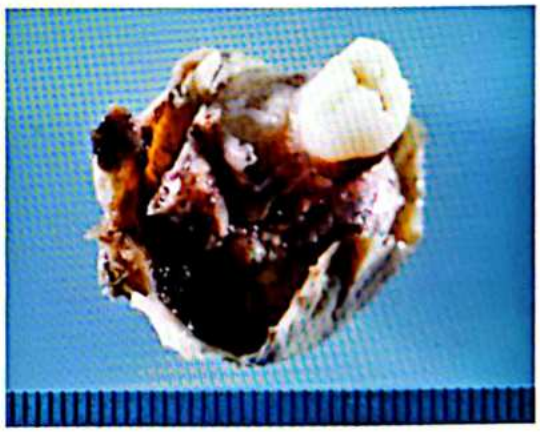
- Younger age group
- Unilateral

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

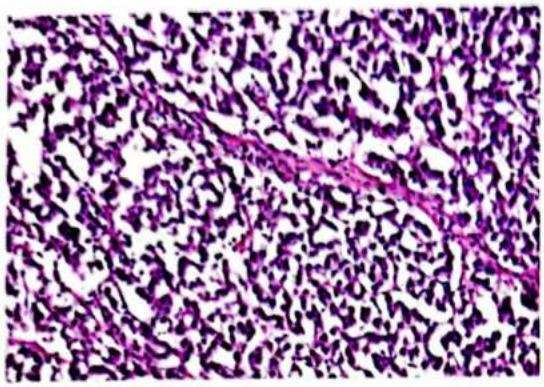


Dermoid

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

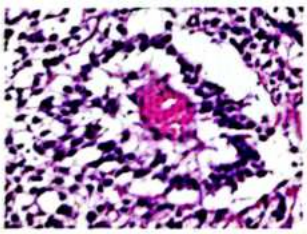
- Associated with
  - ↑LDH
  - ↑Placental alkaline Po4
  - Alpha feto protein: Not increased

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

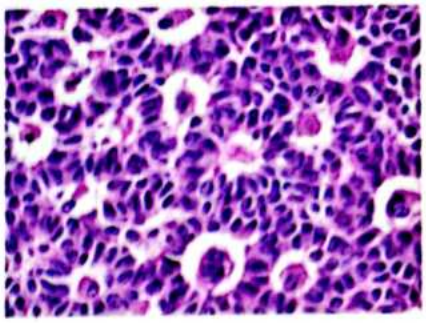


Sex Cord Tumors

01:13:24

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

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

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

Management

- 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 within 1-2 wks after

delivery, can do a laparoscopy
- If doing a cesarean section → Remove at the time of CS

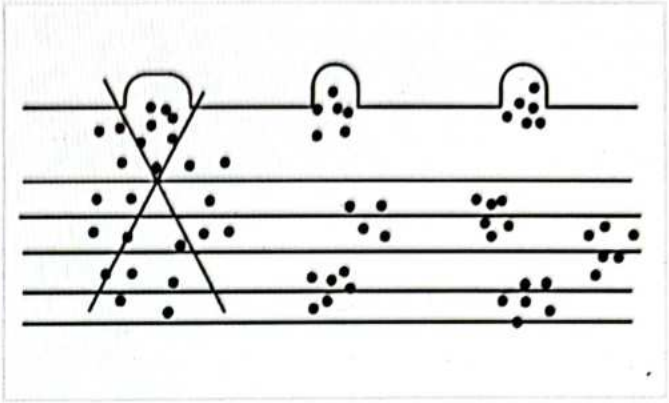
Krukenberg Tumor

- 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

Features

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



Tumor Markers

	CA 125	AFP	HCG	PLAP	LDH	Inhibin, AMH
Epithelial	+					
Dysgerminoma			+/-	+	+	
Granulosa cell						+
Endodermal sinus		+				Alpha-1 Anti trypsin is specific
Embryonal Tumor		+	+		+	
Choriocarcinoma			+			
Teratoma		+				

Table 7.1

Variants	Ultrasound Score (U)[a]	Menopausal Score (M)	Tumor Size (S), cm[b]
RMI I = U × M × CA-125	U = 0 (0 parameters) U = 1 (1 parameter) U = 3 (2 parameters)	M=1 (premenopausal M=3 (postmenopausal)	Not applicable
RMI II = U × M × CA-125	U = 1 (0 or 1 parameter) U = 4 (2 parameters)	M=1 (pre-menopausal) M=4 (postmenopausal)	Not applicable
RMI III = U × M × CA-125	U= 1 (0 or 1 parameter) U = 3 (2 parameters)	M=1 (premenopausal) M=3 (premenopausal)	Not applicable
RMI IV = U × M × S × CA-125	U = 1 (0 or 1 parameter) U = 4 (2 parameters)	M=1(premenopausal) M=4 Postmenopausal)	S=1 (<7) S=2 (7)

S= Size of tumor

PREVIOUS YEAR 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

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

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

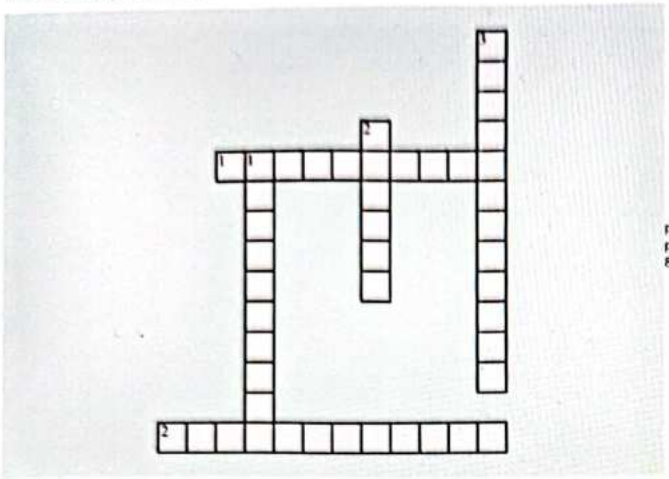
Q. During a laparotomy of a 60 year old woman, a mass is seen next to the uterus as shown in the picture. What is this mass likely to be? (FMGE 2020)

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

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most common type of ovarian malignancies are ___in origin
2. LDH and alkaline phosphatase are raised in _____

Down

1. Brenner tumor with pleural effusion with ascites is known as _____ syndrome
2. Psammoma bodies are found in _____ cystadenoma
3. Arrhenoblastomas are associated with changes of ____t of MgSO4 as a tocolytic in preterm labor is _____

8 POLYCYSTIC OVARIAN SYNDROME

Polycystic Ovarian Syndrome

- Also called as Stein Levinthal Syndrome. Almost 15-20% women (1/5th) have PCOS and it is the most common endocrine disorder of reproductive age women.
- It is also the most common cause of hirsutism

Important Information

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

Diagnosis: Rotterdam's Criteria 00:03:35

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

1. Clinical or Lab evidence of hyperandrogenism
2. Anovulation as suggested by irregular cycles
3. USG features of PCOS

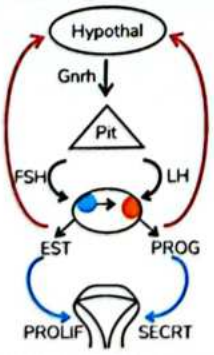
- Polycystic ovaries have no cysts, smooth surface of ovary
- Multiple small follicles arranged in periphery (Necklace of pearls), 2-6 mm (< 9mm) > 20 such follicles per ovary
- Thick stroma
- Slightly enlarged ovary, ovarian volume > 10 mL (L X W X H X 0.523)

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

- Most common: type 1 (70%)

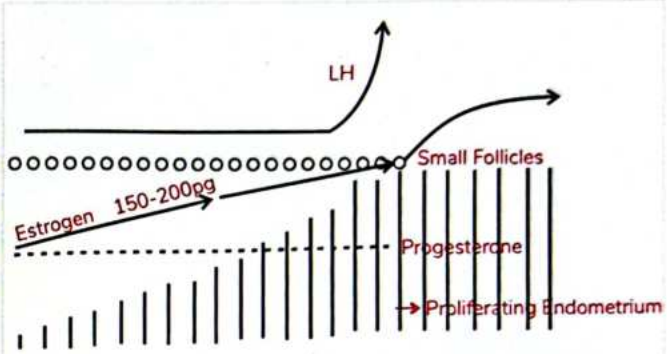
Pathophysiology 00:11:42



- 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 (Endometrium outgrows its blood supply): Oligomenorrhea, Amenorrhea (amenorrhea here is defined as missed 3 cycles or no periods for 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
- 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 reduction leads to ovulation [in 30% cases], loss of even 5-10% weight increases insulin sensitivity and can regularize cycles
- Insulin sensitizer [metformin] causes ovulation in 30% cases, however it is not a first line treatment
- Clomiphene Citrate causes ovulation in 80% cases out of which pregnancy may be achieved in 40% cases.
  - Excess estrogens in PCOD gives negative feedback on hypothalamus causing low FSH and thus less follicle development. Clomiphene acts as hypothalamic estrogen receptor blocker, thus causing high FSH and follicle development
  - It is given from day 2-6 in doses of 50 mg-250 mg and is combined with follicular monitoring
  - Side effects include vasomotor flushing, headache, visual scotomas
  - The incidence of twinning is 8-10%
  - Mild-moderate OHSS, cysts

- Aromatase Inhibitors → Letrozole [1st line Drug]
  - It inhibits conversion of androgens to estrogens. This causes less negative feedback to hypothalamus which increase FSH and thus follicular development
  - 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)

Irregular Cycles Treatment 00:47:35

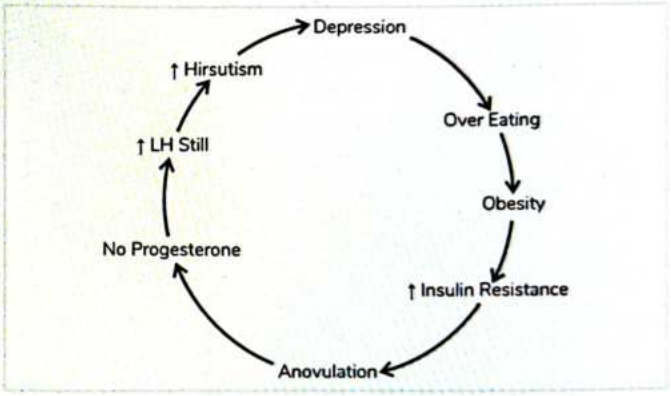
- Combined Oral Contraceptive Pills (drug of choice) : gives artificial cycles, give for as long as regular cycles are desired
- Progesterone Pills: makes endometrium secretory
  - For 10 days [From 14th day/mid cycle]
  - For 5 days [day 20-25]

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 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: Laparoscopic Ovarian Drilling: 00:59:27

- It is used for non responders
- It uses cautery to burn ovarian stroma, and drill 4-6 holes. Thick Stroma in PCOD increases local production of

androgens, this makes follicles harder. Ovarian drilling decreases androgenic stroma such that there is better response to ovulation inducing drugs, ultimately resulting in better follicular growth

Laparoscopic
Ovarian
Drilling

Important Information

ESHRE recommendations

- Rotterdam's criteria for diagnosis
- USG 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

PREVIOUS YEAR QUESTIONS

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

A. Ovarian drilling

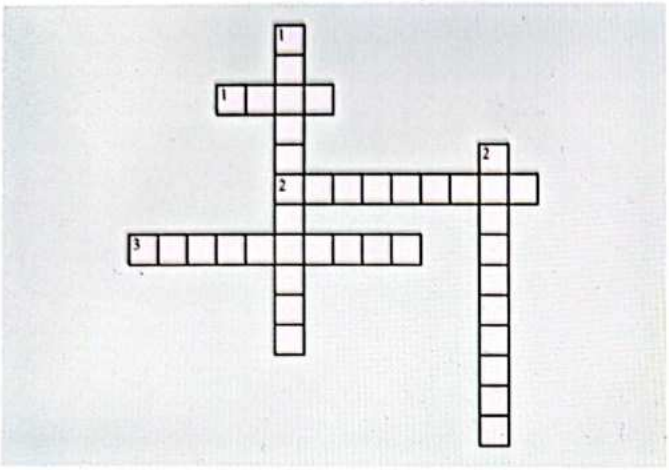
B. Ulipristal

C. Letrozole

D. Clomiphene citrate

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The most common cause of hirsutism in a 30 year old woman is _____
2. The drug of choice for ovulation induction in PCOD is _____
3. Insulin _____ is seen in PCOD

Down

1. The most common ovarian defect in PCOD is _____
2. The hypothalamic estrogen receptor blocker used for inducing ovulation is _____

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9 CERVICAL CARCINOMA

Cervical Carcinoma

- Most common cancer of women in India is Ca Breast, while the most common gynecological cancer of women in India is Ca cervix
- HPV infection is associated with around 99% of cervical cancer

Screening 00:01:08

- It is done for asymptomatic women and is done by:
- **Pap Smear:**
  - It is taken by Ayre's spatula. It has a sensitivity of about 47 to 62%.
  - Screening has brought down the incidence of Ca Cervix by 75 – 80 % & incidence of death by Ca cervix by around 70%
  - Use of cytobrush and cytobroom has increased sensitivity upto 90%, by prevention of drying artefacts prevented. This method washes the smear in fixative and filters out cells.
  - This method is called Liquid Based Cytology. it ensures >90% cells are utilized for cytology.
  - A routine paps smear is taken with Ayre spatula, placed on a slide and fixed with 95% ethanol by immediately placing the slide in the Coplin jar.
- **Site of taking paps smear** 00:08:28
  - Cervical smear is taken from the Transformation zone or the are between old and new squamo-columnar junction. The endometrium is composed of columnar cells while vagina & ectocervix is made of squamous cells, the junction of the two is known as the squamocolumnar junction.
  - TZ is more prone to infection by HPV (and thus cancer) as the cells are continuously dividing here.

Etiology and risk factors 00:12:30

- HPV infection (Human Papilloma Virus)

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 00:19:1

- Any woman > 21 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

Cervical Dyplasia 00:24:13

Classification of cervical dysplasia

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 of CIN I 00:28:18

- CIN I $\xrightarrow{5\text{ yrs}}$ CIN III $\xrightarrow{10\text{ yrs}}$ Ca CERVIX, CIN I not a precursor of Ca cevix. In case of CIN I & CIN II, 65-80% will regress spontaneously, however high grade lesions are precursor of Ca Cervix
- CIN I can be followed up with 6 monthly PAP smear along with antivirals & antibiotics. HPV DNA must be done.
- If CIN I persists for > 2 yrs, we must continue surveillance and an ablative or therapeutic procedure must be planned

Management of CIN II & CIN III (HSIL/ High Grade Intrepithelial Lesion) 00:30:36

- First step is a colposcopy biopsy as the cervix is normal looking, so we need to use some agents and magnification

Important Information

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

- Colposcopy biopsy procedure
  - Acetic acid application to coagulate the proteins of the rapidly dividing areas which appear Acetowhite. Biopsy is now taken from acetowhite areas
  - Schiller iodine [LUGOL IODINE] application stains the glycogen rich areas which appear Mahogany Brown, biopsy is now taken from unstained areas or lugol's negative areas.
  - In the absence of availability of colposcopy VIAA (Visual Inspection under Acetic Acid) or VILI (Visual inspection under lugol's iodine) may be done
- Results of Colposcopic Biopsy
  - Invasive cancer Cx: Rx by Radical hysterectomy
  - Biopsy proven CIN III is treated by LLETZ (Large Loop Excision of Transformation Zone) or LEEP (Loop Electro surgical Excision Procedure)

Other Options

- Conization: not usually done
  - Problem with conization: It leads to a short cervix which causes cervical incompetence leading to recurrent abortions. It may cause stenosis of cervix which may lead to infertility
  - Can be done if colposcopic Biopsy is inconclusive
- Surgical Conization (If > 35 yrs)
- Hysterectomy (If > 40 yrs)
- Cryocautery
- Laser ablation: However requires training & experience

Symptoms of CA Cervix 00:52:12

- Abnormal bleeding
- Post coital bleeding, is most common, (Note: 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

Mx of Post Coital Bleeding

- Do a local examination, rule out any lesion, take biopsy if any obvious growth is seen. If the cervix appears normal, 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

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 } Transverse → ⊗ Removed from staging
    - → A_2 - 3-5 mm depth } Spread < 7 mm
  - **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 } Imaging [PET CT / MRI/USG] required
- C_2 - Para Aortic lymphnodes involved }

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 protocol 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 to point A: this point corresponds to Obturator lymph nodes at the pelvic side walls. Obturator LN is the Sentinel group of LN. Upto 6000 RADs given here

Important Information

- New studies show that the most commonly involved group in cervical cancer is external iliac

Histopathological variants 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

- 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
- SAGE guidelines : atleast 1 gardasil to all girls 9-14 years.

Cervical Cancer in Pregnancy 01:41:40

- All pregnant women should get a pap smear. If malignant cells are positive, conization is done
- Conization done after 12 weeks has reduced the risk of abortion.
- If Ca Cx: Diagnosed
  - Stage IA: can allow pregnancy to go till term. At term plan a cesarean section along with radical hysterectomy and LAD

- Stage IB: wait till Fetal lung maturity: till 28 weeks or 32 weeks followed by cesarean section along with radical hysterectomy and LAD
- Stage II – IV - Radiotherapy irrespective of gestation
  → If detected beyond 28 wks, do a cesarean followed by radiotherapy
  → If detected in first Trimester give radiotherapy, fetus will abort
  → If detected in second Trimester, try to check for viability and plan accordingly.

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PREVIOUS YEAR 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

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

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

A. Women > 65 years of age
B. Woman < 15 years of age
C. Woman between 21-65 years of age
D. All teenagers

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

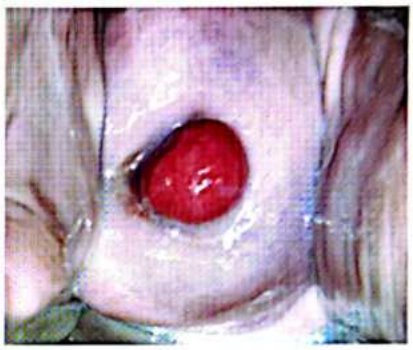
Q. A 30 year old woman who is P2L2 underwent a screening PAP smear. The cytology report came out to be carcinoma in situ. What is the next step in management? (AIIMS 2020)

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

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

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

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

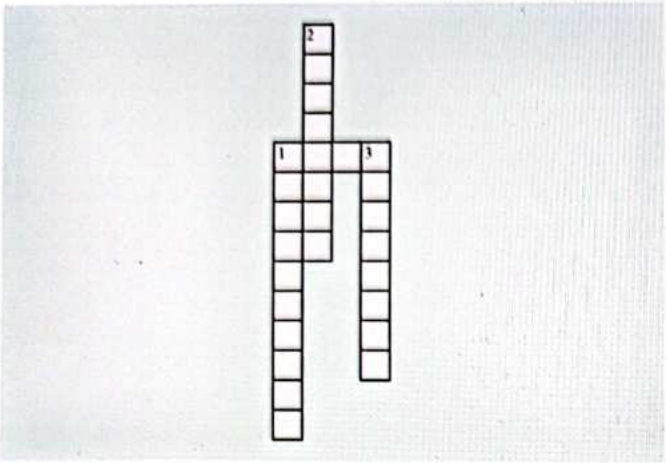
A. Type 16
B. Type 31
C. Type 33
D. Type 42

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Screening for cervical cancer is done by _____ smear

Down

1. _____ bleeding is the most common symptom of ca cervix
2. The bivalent vaccine against ca cervix available in India is _____
3. The most common histological type of cervical cancer is _____cell

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10 POST MENOPAUSAL BLEEDING

Post Menopausal Bleeding 00:00:20

- Any bleeding after 1 year of menopause
- The two very important causes are Ca cervix and Ca endometrium

Difference between 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

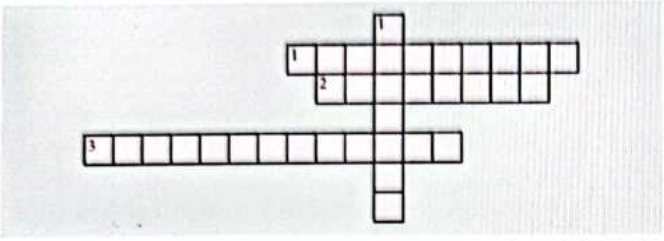
Important Information

- 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 causes senile Endometritis which may bleed intermittently

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. _____bleeding is the most common presentation of cervical cancer
2. _____ cancer is the most common cause of postmenopausal bleeding in India
3. biopsy is the best test for evaluation of uterus in postmenopausal bleeding

Down

1. Endometrial _____ is thin endometrial associated with postmenopausal bleeding

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11 VULVAR CARCINOMA

Vulvar Cancer

- 2-5% of all genital tract malignancies of women in India
- Age group: presents at approximately 65 yrs
- Associated with Field phenomenon: associated with cancers of surrounding structures like Ca vagina, Ca Cervix (27%)
- Association with Syphilis, LGV, Granuloma inguinale, HIV, immunosuppression

Types

00:02:20

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

Squamous Cell Carcinoma

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

Sites

00:05:00

- Labia majora is the most common site (60%), followed by clitoris, which is the second most common (15%)

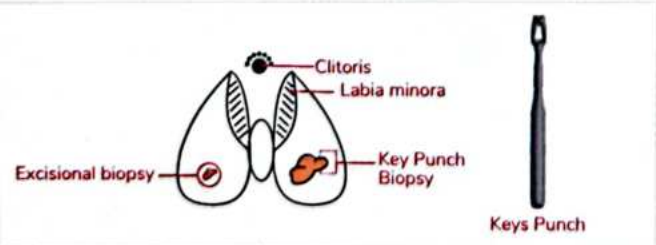
Presentation

- Growth which is exophytic and ulcerative
- Pruritis is the most common symptom, associated with Itch-scratch cycle
- Cancer cachexia
- Cancer pain

Diagnosis

00:07:00

- Wedge biopsy
- Key's biopsy
- If lesion is less than 1 cm do an excisional biopsy, if ≥1 cm do an incisional biopsy



Lymphatic Drainage of Vulva

- Lymphatic of vulva cross over the midline
- Pelvic group of lymph nodes is not involved. If it is involved, it is constituted as distant metastasis
- Most common group involved is Inguino-femoral
- Lymph node involvement is suggestive of poor prognosis, without LN involvement treatment has 90% success rate, which reduces to < 40% if lymph nodes are involved
- Radical vulvectomy + B/L Inguino-femoral LAD is a very extensive surgery and is associated with 50% wound breakdown and surgery related mortality of 40%
- Sentinel lymph node biopsy
  - Sentinel LN for vulva is inguino-femoral. Sentinel lymph node mapping is done by Tecnitium 99/ isosulphane blue dye, which is injected to find out the first draining LN. a biopsy of this LN is done, if involved do radical LAD also, else only a vulvectomy.
  - The major advantage of this technique is that it limits morbidity, by reducing extent of surgery.

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	• One LN: > 5 mm
	Aii	• One or two LN: < 5 mm
	III Bi	• Two LN: > 5 mm
	Bii	• 3 or more LN: < 5 mm
	III C	• LN involvement ⊕ , with extra capsular spread
Stage IV		
	IV Ai	• Upper urethra, upper vagina, rectal involvement, growth fixed to pelvic bone
	Aii	• 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

Important Information

- Involvement of pelvic LN in Ca vulva is Stage IV

Treatment 00:22:23

Stage I A	• Limited to Vulva • Size < 2cms, • Invasion < 1mm	• Wide Local excision + Sentinel Lymph Node Biopsy • Sentinel LN Biopsy o If negative: Radical vulvectomy alone o If positive: Radical vulvectomy + LN removal
Stage I B	• Size > 2 cms • Invasion < 1mm	• Radical Local Excision o Central Lesion: B/L LAD o 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

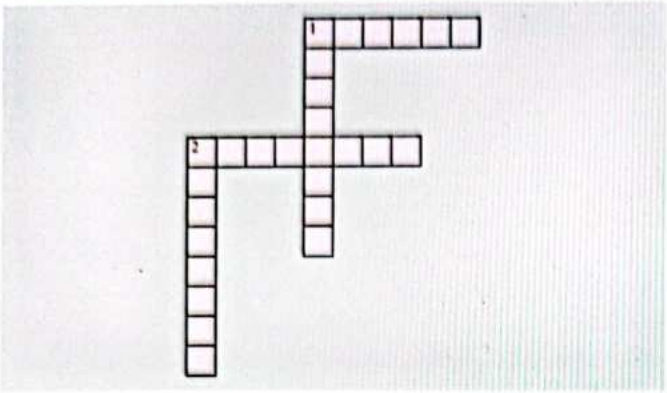
- Bleomycin
- 5-FU

Prognosis: 5 Year Survial 00:25:12

- Ca vulva without Inguino femoral LN involvement has >90% 5-year survival while Ca vulva with Inguino femoral LN involvement has 50%
- Groin recurrence is associated with Poor Prognosis

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. _____ group of lymph nodes are not involved in vulvar cancer
2. _____ lymph node biopsy is done for vulvar cancer for detection of lymph node involvement during surgery

Down

1. _____ is the most common presenting symptom of vulvar cancer
2. _____ cell carcinoma is the most common histopathological type of vulvar cancer

12 FIBROIDS

Fibroids

- It is the most common tumor of women overall. Also known as Leiomyoma
- It is also the most common cause of hysterectomy around the world.

Etiology and Risk Factors

- Fibroids are seen in as many as 30% of all women. This incidence rises to about 80% in women >50 years.
- A woman is 2.5 times more likely to get affected if one female relative has fibroid.
- Associated with chromosomal abnormality in 40% such as 12-14 Translocation, 12 Trisomy and 7 deletion
- Seen in nulliparous women
- Associated with an increase in Estrogen & Progesterone

Important Information

- Fibroids are not seen before puberty or after the menopause due to the 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)

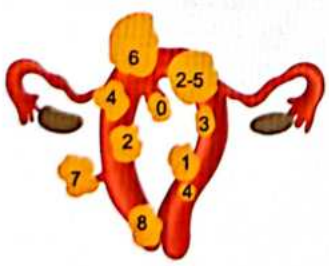
Pathology

00:04:37

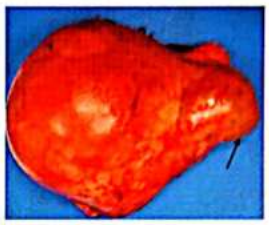
- Fibroids are monoclonal smooth muscle cell tumors, they always start in intramural area of the muscle layer like Whorls of smooth muscle cells surrounded by pseudocapsule. This fibroid present in the intramural area is treated as the foreign body by the uterus. Uterus responds by contracting to push the fibroid either outwards (subserosal fibroid) or inwards (submucosal fibroid)

Figo Classification

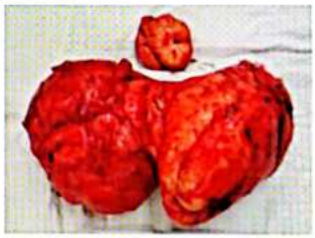
00:06:47



- 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: may present with both congestive & spasmodic type
  - Compression of vital organs such as ureter, causing hydronephrosis
  - Torsion
  - Degeneration
    - → Most common 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

- Menorrhagia (Most common symptom) due to increased endometrial surface area, also due to ineffective contraction, while uterus attempts to expel out the fibroid treating it as a foreign body. There is also increased pelvic congestion as a result of increased vasodilator prostaglandins, causing dysmenorrhea.
- Infertility
  - Uterine factors: Increased uterine contractility resulting in increased expulsion of embryos due to decreased implantation thus causing increased chances of a bortion
  - Tubal factors: due to blocked tube especially at cornua and also due to 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: this is the best imaging technique for fibroid, and is also used for fibroid mapping.
- Endometrial biopsy must be done to rule out endometrial hyperplasia which occurs due to increased estrogen.

Principles of Treatment 00:33:35

- A small fibroid <5cm without pain, bleeding or infertility requires no treatment, however if there is pain or bleeding or infertility, then treatment is required
- Large fibroid (>10 cm) with or without pain or bleeding or infertility requires treatment as an asymptomatic large fibroid may undergo torsion, compaction, degeneration, compression of bladder and bowel or it can detach (parasitic fibroid).

Medical Management 00:38:05

- NSAIDS: Reduce pain & bleeding
- Tranexamic acid: Reduces bleeding
- GnRh analogues (Leuprolin, Goserlin) cause downregulation of pituitary, such that no FSH, LH are made, causing amenorrhea. these drugs reduce the size and vascularity of fibroid, therefore are beneficial when given prior to surgery, to minimize blood loss.
- GnRh antagonist (cetorelix, ganirelix) these cause direct suppression of pituitary and amenorrhea
- Mifepristone: Acts as "Anti-growth" (anti-progestin) agent towards fibroid growth.
- Ulipristal: Selective progesterone receptor modulator, it has pure antagonist action on progesterone receptor in uterus.

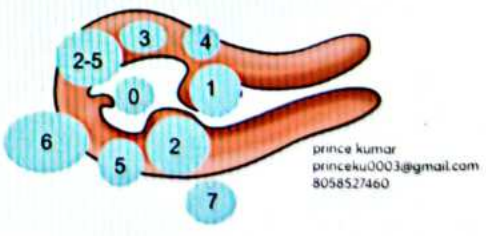
Newer Methods 00:42:33

- 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
- Myolysis needle: Electrocautery or laser needle is used to cause lysis of muscle.

Surgical Management 00:48:55

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

- Myomectomy is preferred for those planning pregnancy. Open technique may be used for any size, while Laparoscopic myomectomy, which is a more skilled procedure, may be done for smaller fibroids. Criteria for laparoscopic myomectomy include, 3-4 fibroids with size ≤ 5cm or one fibroid ≤ 15 cm can be removed. It is preferred for types 7, 6, 5



Pre-Requisites for Myomectomy

- Hb > 10 gm
- Normal semen analysis

Techniques for reducing blood loss

- Pre-operative GnRh therapy
- Intra-op use of Uterine clamp, Tourniquet and 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

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.

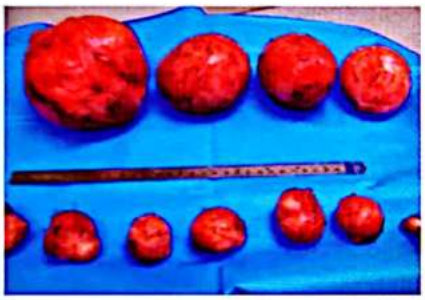
- Fluid can escape into peritoneal cavity or into circulation. Hence fluid deficit should be monitored

	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 in operative hysteroscopy 01:06:54

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



Myoma clamp

Myoma screw

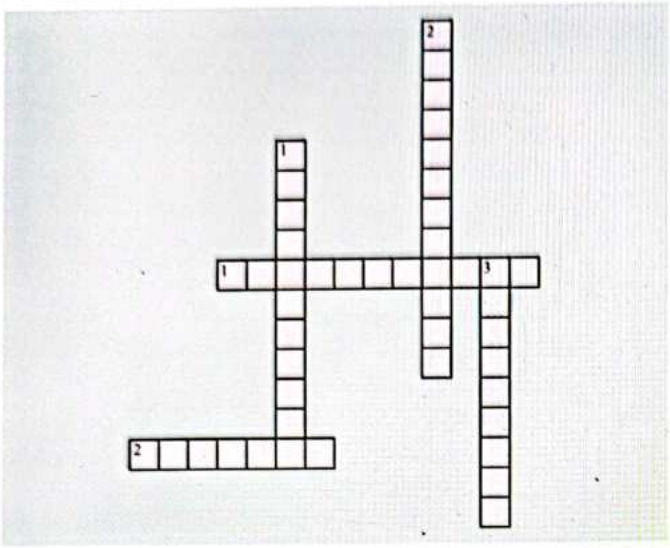
PREVIOUS YEAR QUESTIONS

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

CROSS WORD PUZZLES

Crossword Puzzles



Across

1. Preferred route of removal of a type 8 fibroid is by _____
2. _____degeneration is the most common type of degeneration seen in fibroids

Down

1. The drug injected into the muscle layer during myomectomy to reduce blood loss is _____
2. Preferred route of removal of a submucous fibroid, type 0 and 1 is by _____
3. Type 8 fibroids tat detach from the uterus and fall into peritoneal cavity are called _____

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13 HYSTERECTOMY

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

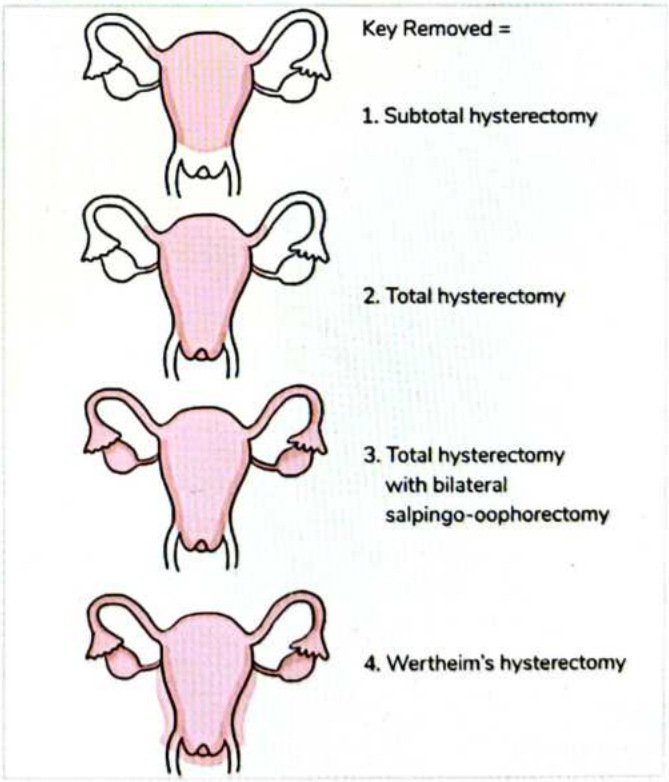
Post OP Complications

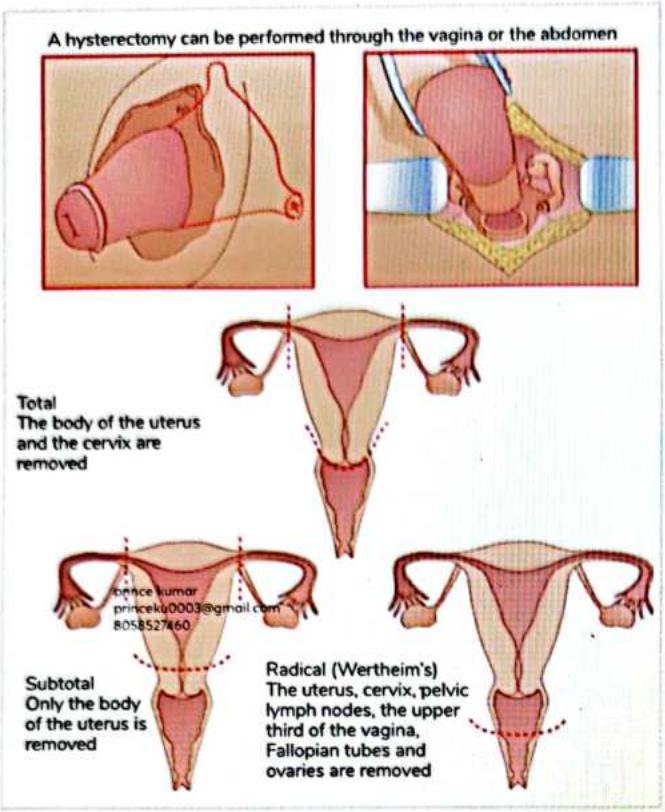
- Hemorrhage:
  - Immediate hemorrhage is easily visualized and there are signs of hemodynamic compromise such as tachycardia, hypotension, shock, even in concealed hemorrhage such as when bleed is retroperitoneal
  - Reactionary hemorrhage is seen in first 24 hrs and is due to slippage of ligature
  - Secondary is seen after 24 hrs uptill 2-3 weeks and is due to infections
- Wound Infections [4-6 % cases]
- Cuff/ Vault Cellulitis [vaginal cuff]
- Urinary Retention may occur due to bladder hypotonia
- Ureteric Injury: presents with post op Flank pain. The next step is to do USG/CT for diagnosis followed by a cystoscopy to localise the block. One can attempt ureteric catheterization followed by repair.
- Bladder Injury which may result in a vesico vaginal fistula or a uretero vaginal fistula
- Prolapse of Fallopian Tube through the vault
- Cuff Dehiscence or breakdown of the vault wherein patient must be adviced to not have intercourse for 6 weeks

Laparoscopic Hysterectomy 00:20:14

1. **LAVH [Laparoscpic Assisted vaginal Hysterectomy]:** Some part of surgery is done laparoscopically and some part vaginally. This may include
   - Diagnostic laparoscopy + Vaginal Hysterectomy
   - Adhesiolysis + Vaginal Hysterectomy
   - Resection of Adnexae
   - Uterine vessels are resected after bladder mobilization
2. **Total Laparoscopic Hysterectomy** is done entirely by laparoscopic approach

Types of Hysterectomy





Preservation of Ovaries 00:23:50

- Ovaries must be conserved at least till 50 yrs. If Surgical oophorectomy done < 50 yrs, there are more chances of coronary Artery Disease by 65 yrs

Prophylactic Oophorectomy 00:25:32

- It is to be done for familial cancer syndromes, BRCAI & BRCA II mutations as first degree female relatives having CA Breast, CA ovary, CA ovary have a 10-50% lifetime Risk of having ovarian cancer.

PREVIOUS YEAR 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)

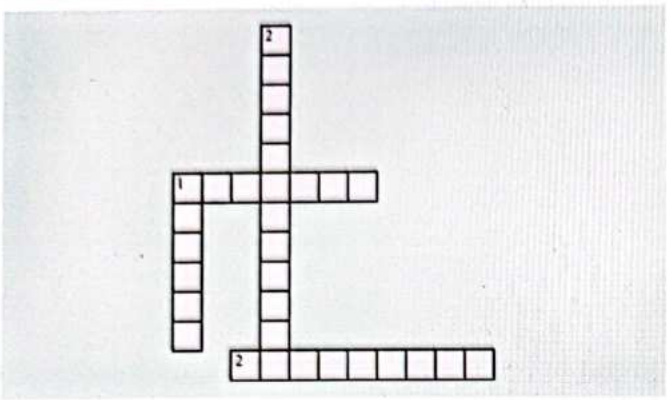
A. Hyperkalemia
B. Hypokalemia
C. Hypernatremia
D. Hyponatremia

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The most common indication of doing a hysterectomy is _____
2. Post op urinary retention in patient of hysterectomy most commonly occurs due to bladder _____

Down

1. A ureteric injury is a hysterectomy would cause pain in the _____
2. Most definitive management of adenomyosis is _____

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14 GAMETOGENESIS

Gametogenesis

00:00:30

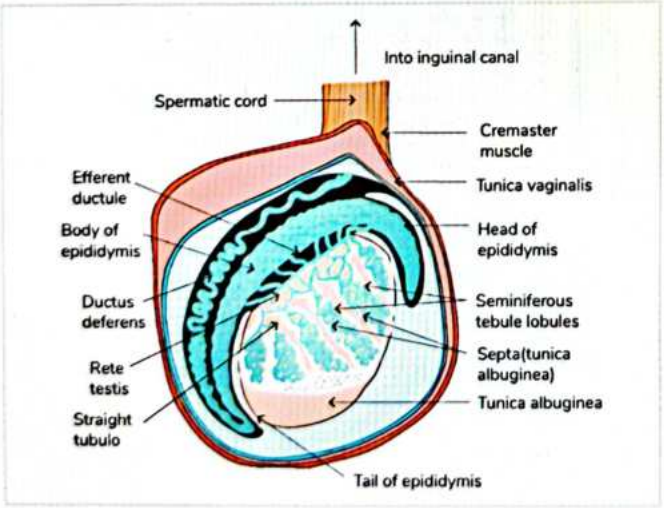
- SPERMATOGONIA $\xrightarrow[\text{Spermiogenesis}]{\text{74-75 days}}$ SPERMATOZOA (4 no)
- SPERMATID $\xrightarrow[\text{(21-22 days)}]{}$ SPERMATOZOA

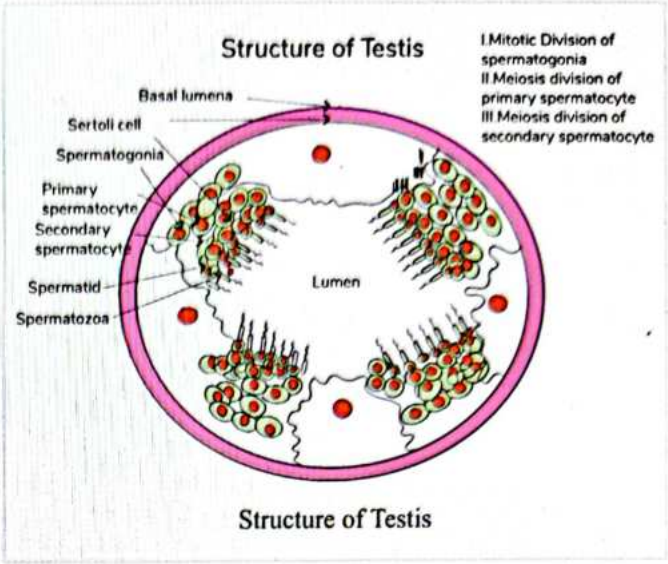
- Spermiation: Release of sperms from Sertoli cells into Lumen of semeniferous tubules
- In the testes LH acts on Leydig cells to produce testosterone. This testosterone along with FSH acts on Sertoli cells lining the semeniferous tubules to produce spermatocytes.

Sperm Pathway

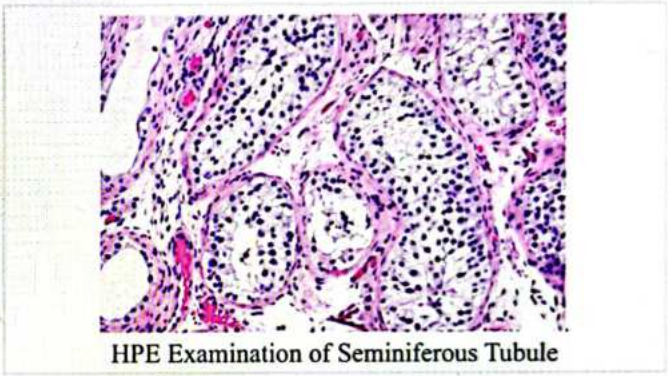
Testis [250-290 lobules present]
↓
Seminiferous Tubules (70% of testes)
↓
Rete Testis
↓
Epididymis [sperms are stored]
↓2-6 days (attain motility)
VAS Deferens [more motile sperms]
↓
Ejaculatory Duct
↓
Urethra
↓
Penis

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





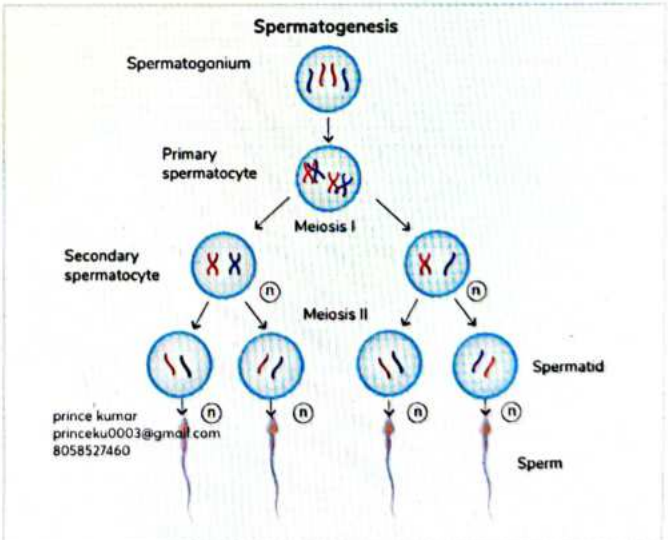
Structure of Testis


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

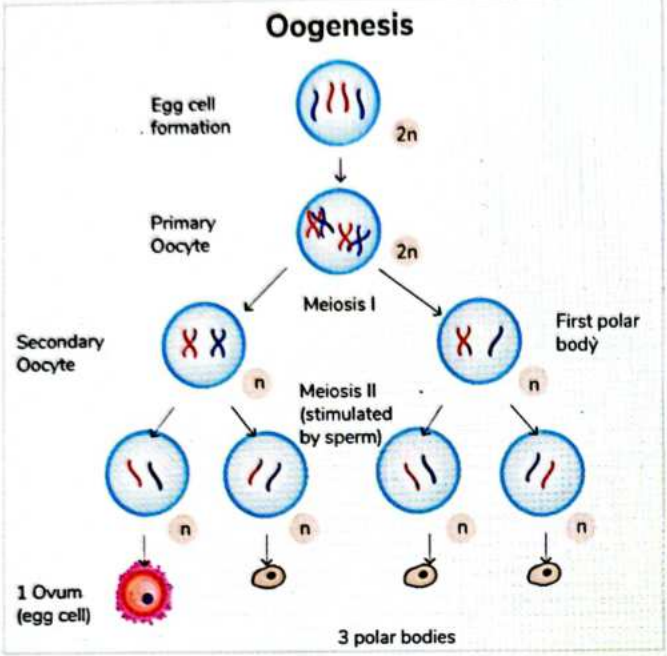
00:09:28



- 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]

Oogenesis

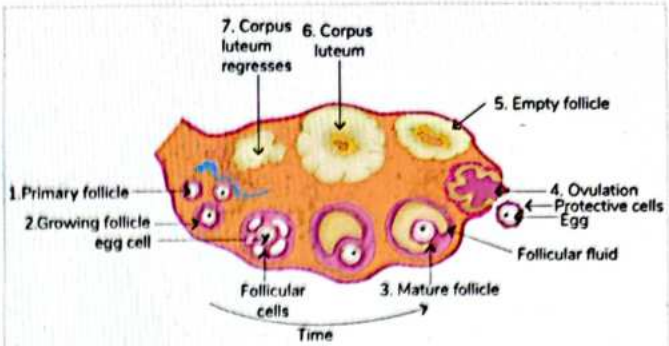
00:11:40



- 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 2 min ampulla

Capacitation of Sperms

00:20:30

- It is the potential to fertilize oocyte and 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

PREVIOUS YEAR QUESTIONS

Q. Testosterone is secreted by? (FMGE 2019)

A. Leydig cell

B Sertoli cells

C. theca lutein cells

D. Granulosa cell

Q. Sequential order of sperm formation is? (AIIMS 2019)

A. Spermatocyte, spermatid, spermatogonia, spermatozoa

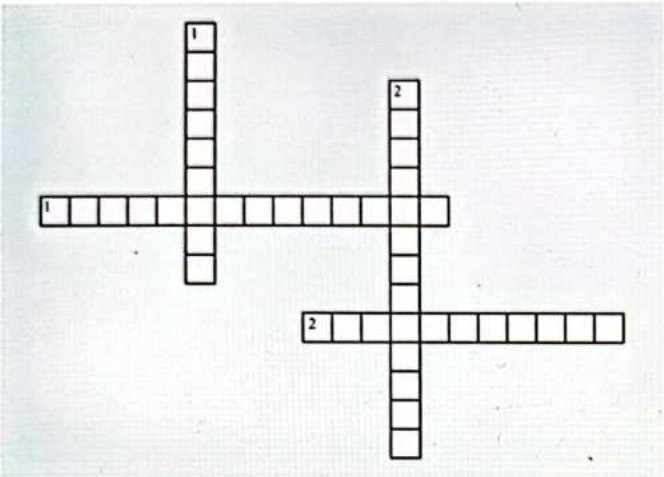
B. Spermatid, spermatocyte, spermatogonia, spermatozoa

C. Spermatid, spermatogonia, spermatocyte, spermatozoa

D. Spermatogonia, spermatocyte, spermatid, spermatozoa

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Formation of spermatozoa from spermatids is known as _____
2. Potential to fertilize an oocyte by a sperm is acquired in the fallopian tube and is known as _____

Down

1. First polar body is released at the time of _____
2. Second polar body is released at the time of _____

15 MULLERIAN ABNORMALITIES

Mullerian Defects

- 0.5% of all women have Mullerian defects. These are 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 are derived from Mullerian/ Para Mesonephric Duct
- Male internal genitalia are derived from Wolffian/ Mesonephric/ Gartner Duct

1. Mullerian Duct Derivatives 00:03:00

- Uterus

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

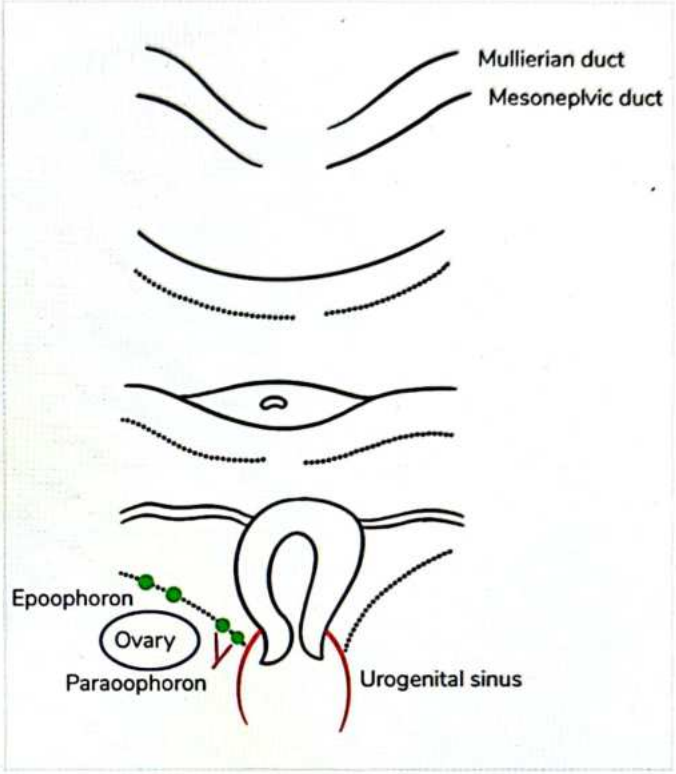
- Cervix
- Fallopian tubes
- 4/5th vagina
  - Lower 1/5th derived from Urogenital Sinus (or split as 2/3rd and 1/3rd)
  - Ovaries are derived from Genital Ridge
- Renal pelvis and ureter

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 on the upper lateral vaginal wall and gives remnants above & on sides of ovary namely Epoophoron and Paraoophoron



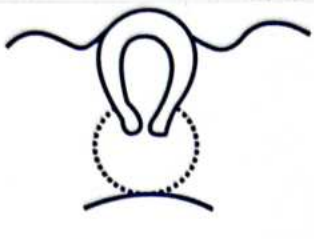
- **Gartner Duct and cyst**: Wolffian duct obliterated at lower end is called Gartner's duct and a collection in upper lateral vaginal wall is a Gartner cyst. A Gartner duct cyst is mostly asymptomatic, simple cyst and is treated by simple excision
- **Bartholin's gland and cyst**: It occurs in Bartholin's gland/ greater vestibular gland.
  - The cyst is 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 is columnar, epithelium of duct: stratified squamous and epithelium of terminal part of duct: transitional
  - Bartholin's abscess occurs as a result of a blocked duct causing mixed infections of aerobic and anaerobic (MC Staph aureus.) it is very painful and is treated by Marsupilization under GA wherein we incise and evert edges to cause exteriorization of cavity to keep it drained.
  - Preferably do not excise Bartholins gland/cyst

Mullerian Duct Anomalies 00:15:30

- These result from arrested development in the form of fusion defects: which can be vertical or lateral, or can be due to failure of resorption of septum

1. Vertical Fusion Defects 00:16:32

Transverse vaginal Septum



Vaginal Atresia

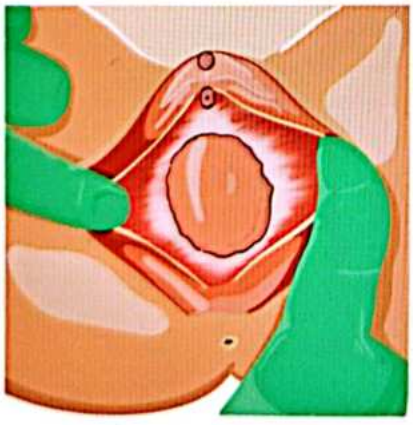
Cervical Vaginal Atresia

Complete mullerian Agenesis

Presentation

Cryptomenorrhea 00:18:50

- This implies hidden menstruation, which means menstruation is occuring but menstrual blood is not coming out due to outflow obstruction in conditions like:
  - Transverse vaginal septum
  - Vaginal atresia
  - Cervical vaginal atresia
  - Imperforate hymen



Imperforate Hymen

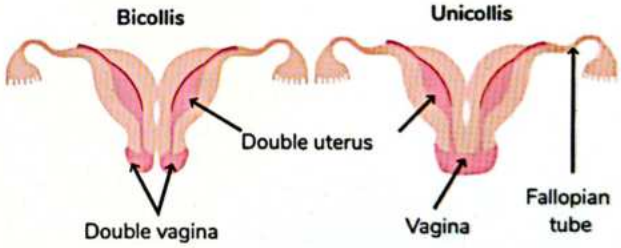
Imperforate Hymen

- It is not a mullerian anomaly as all Mullerian structures are normal, rather it is a cannulation defect of vaginal opening.
- **Presentation:**
  - Hidden menstruation occurs called as cryptomenorrhea. This may present with Hematometra or blood in uterus with hematocolpos - blood in vagina, due to regular menstruation and thus there is also cyclical pain every month, corresponding to the period while there is no external bleeding and patient presents with primary amenorrhea
  - Can rarely present with Urinary retention: Hematocolpos compresses urethra against pubic symphysis
  - Classical presentation: young girl with primary amenorrhea with acute retention of urine
  - Due to outflow obstruction, there is retrograde menstruation leading to increased risk of endometriosis
- **Treatment:** Cruciate incision given and hymen is cut along the edges of incision

Lateral Fusion Defects 00:24:40

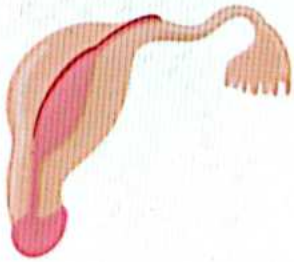
1. Didelphys

- Usually associated with good reproductive outcome
- Requires no treatment
- In pregnancy however there is increased incidence of breech presentation and preterm labour
- Increased incidence of retrograde menstruation leading to increased risk of Endometriosis



2. Unicornuate uterus

- This type has the worst pregnancy outcome and is associated with abortions and Preterm labour
- Non communicating rudimentary horn leads to retrograde menstruation causing endometriosis



Unicornuate

3. Septate uterus

- The entire uterine cavity fuses while just a septum remains
- This type requires surgery more commonly than bicornuate as it is associated with Infertility and recurrent abortions
- In pregnancy it is associated with transverse lie

Septate

4. Bicornuate uterus

- The uterine cavity has two horns
- This is associated with recurrent abortions, which forms an indication for unification surgery
- In pregnancy it is associated with Breech/ transverse lie and Preterm labour

Bicornuate

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

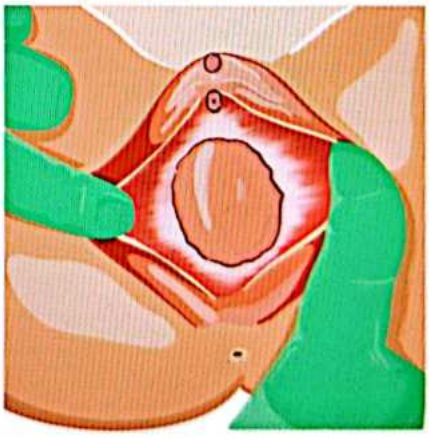
- Diagnostic Laparoscopy + Hysteroscopy
- MRI [Best imaging method]

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

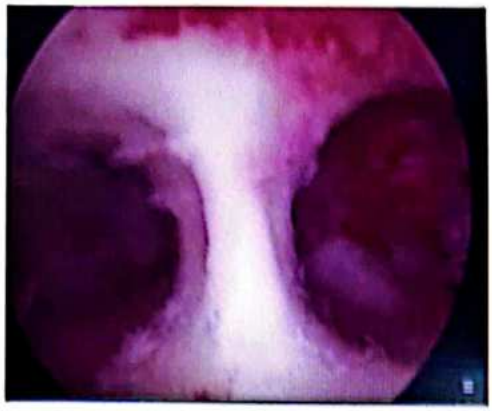
Image Discussion 00:38:55

Uterus Didelphys

HSG of unicornuate uterus



Imperforate Hymen

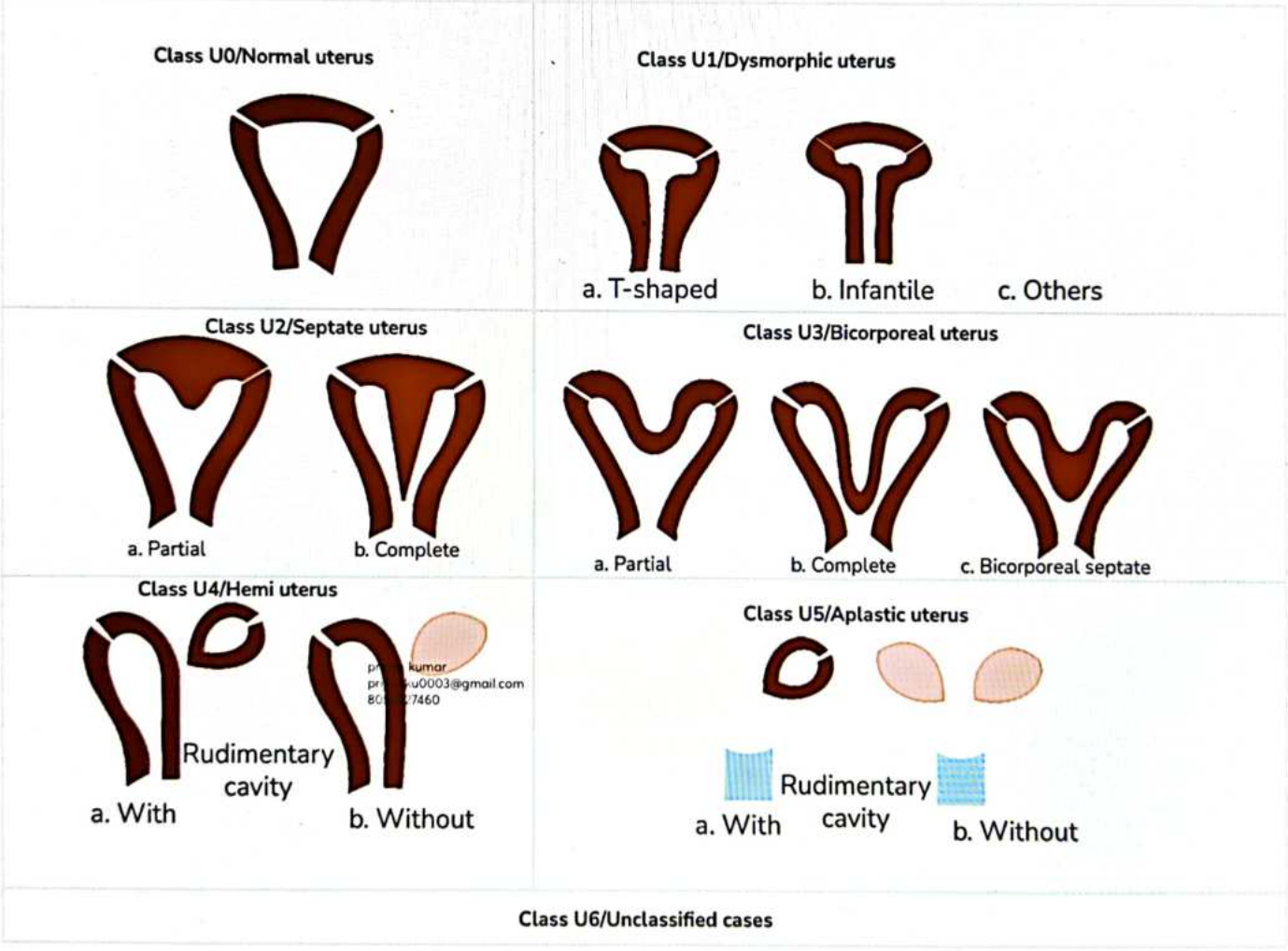


Hysteroscopic view of septate uterus

Eshere Classification

00:42:55

- European society for Human Reproduction & Embryology



PREVIOUS YEAR 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.

Diagnosis likely is? (NEET 2020)

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

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

Q. Which of the following is the least common in didelphys uterus? (NEET 2021)

A. Preterm labour
B. Transverse lie
C. Endometriosis
D. Abortions

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

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

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

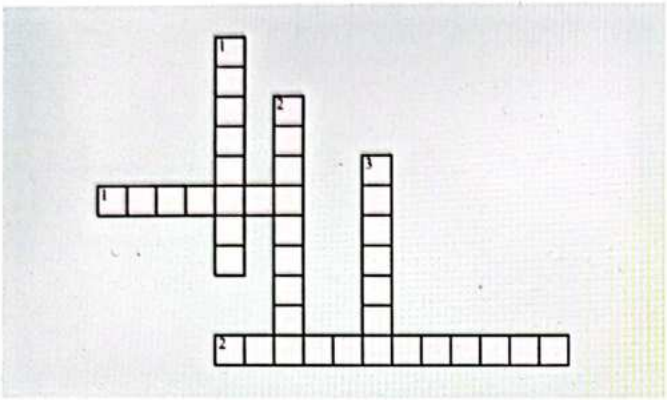
A. x ray pelvis and laparoscopy
B. X ray pelvis and HSG
C. Falloposcopy and HSG
D. Laparoscopy and HSG

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The most common type of uterine anomaly is ___
2. Septal resection is best performed by ____

Down

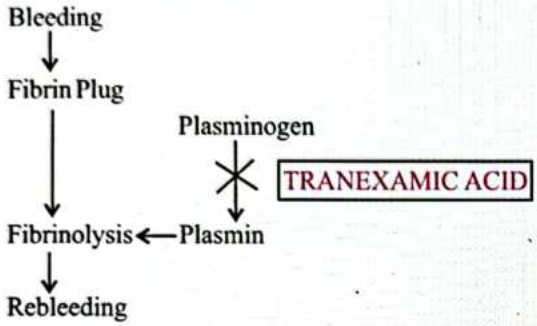
1. Treatment of imperforate hymen is by ___ incision
2. Double uterine cavity with two cervix is called __
3. Wolffian duct obliterated at lower end is called ____ duct

16 ABNORMAL UTERINE BLEEDING (ITS A DOWNPOUR!)

Management of Abnormal Uterine Bleeding 00:00:30

Non-Hormonal Management 00:00:51

- **NSAIDS:** includes drugs like ibuprofen, mefenamic acid which inhibit vasodilator prostaglandins, reducing pain and bleeding in uterine blood vessels. These now form the first line drugs for management of AUB.
- **Tranexemic Acid:** it inhibits conversion of plasminogen to plasmin and is the first line drug for management of AUB



Hormonal Management 00:03:57

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

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

First step is to rule out pregnancy related causes

Understand with 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

PALM-COEIN classification

P: Polyp
A: Adenomyosis
L: Leiomyoma
M: Malignancy
C: Coagulation defect
O: Ovulatory dysfunction
E: Endometrial hyperplasia
I: Iatrogenic
N: Not yet classified

DUB [Dysfunctional Uterine Bleeding] 00:33:58

Conditions 00:37:00

- **Anovulatory DUB**
  - Seen in extremes of age groups such as Pubertal Girls and Peri menopausal women, where in cycles are mostly anovulatory, hence irregular
  - Metropathia Haemorrhagica: Bleeding occurs every 2.5 – 3 months with heavy bleeding, usually in women > 45 years. Dilatation and curettage is both diagnostic and therapeutic.

- Most common type of DUB is anovulatory. In 65% with anovulatory DUB, the Endometrium is Hyperplastic

- **Ovulatory DUB** 00:40:34
  - Decreased Corpus Luteal Function
    ↓
    Irregular ripening
    ↓
    Premenstrual spotting/ Bleeding
  - Increased Corpus Luteum Function (Persistence of CL of previous cycle)
    ↓
    Irregular shedding
    ↓
    Post menstrual spotting/ Bleeding

PREVIOUS YEAR 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

Q. 35-year-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)

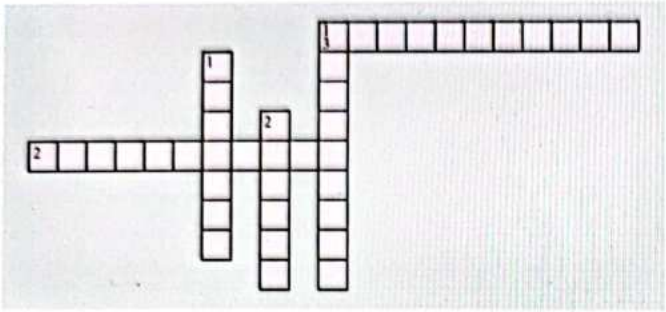
A. Endometrial ablation
B. Endometrial sampling
C. Hysterectomy
D. Hormonal therapy

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Irregular shedding of endometrium presenting as postmenstrual spotting is seen with _____ of corpus luteum
2. Most common cause of irregular bleeding in pubertal girls is _____

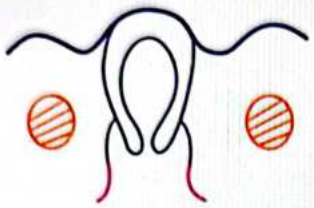
Down

1. Androgen that causes endometrial atrophy and is used in AUB is _____
2. Androgen that causes endometrial atrophy and is used in AUB is _____
3. First cause to be ruled out in any woman of reproductive age presenting with heavy vaginal bleeding is _____

17 INTERSEX (SHE IS YOUR BROTHER!)

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 weeks 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]

Refer Image17.1

- External genitalia formation is under the influence of Androgens

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

- Default/Basic Human Sexuality is Female unless they are acted upon by androgens

Mullerian Agenesis and Testicular Feminization Syndrome

	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,
  - There is androgen insensitivity, thus they do not act on tissues, and thus the external genitalia remain feminine. In periphery, these excess androgens are converted to estrogens, (Androgens Aromatase → Estrogens)
  - This estrogen is then responsible for formation of feminine breasts, however the pubic & axillary hair remain absent, due to absence of androgenic action. Thus, the patient has 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

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

Classical variety

- Boy presenting with Precocious puberty due to excess androgens
- In Girl
  - Penis & scrotum present } Ambiguous Genitalia
  - No testes

In salt losing variety

- ↓ Na^+
  ↓ H_2O
  ↑ K^+
- Fatal to the baby [boy or girl]

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: 11 hydroxylase deficiency

- **Prevention**
  - Start the steroid at the time of Dx of next pregnancy

Hermaphroditism 00:40:15

Pseudohermaphrodite

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

Understand with 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 structures are formed

Turner Syndrome

- Basic pathology is Streak gonads, thus there is less production of estrogens leading to an infantile uterus with primary amenorrhea
- Stigmata of Turner's Syndrome
  - Short stature
  - Shield chest
  - Low set hair line
  - Lymphedema
  - Cubitus valgus
  - Normal intelligence
  - Streak gonad
  - Reduced estrogen
  - Uterus small
  - Primary amenorrhea
- Typical presentation: Patient presents with Short stature, Primary amenorrhea, and On USG has hypoplastic uterus with streak gonads is Turner Syndrome

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 1 Amenorrhea: Gonadal dysgenesis
- Mc type of gonadal dysgenesis: Turner syndrome

- 46 XX: 1 BARR body [Normal female]
- 45XO: No Barr body → Turner Syndrome
- 46 XY: No BARR body [Normal male]
- 47XXY: 1 Barr body in male: 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)

Q. Which one has the best clinical prognosis?

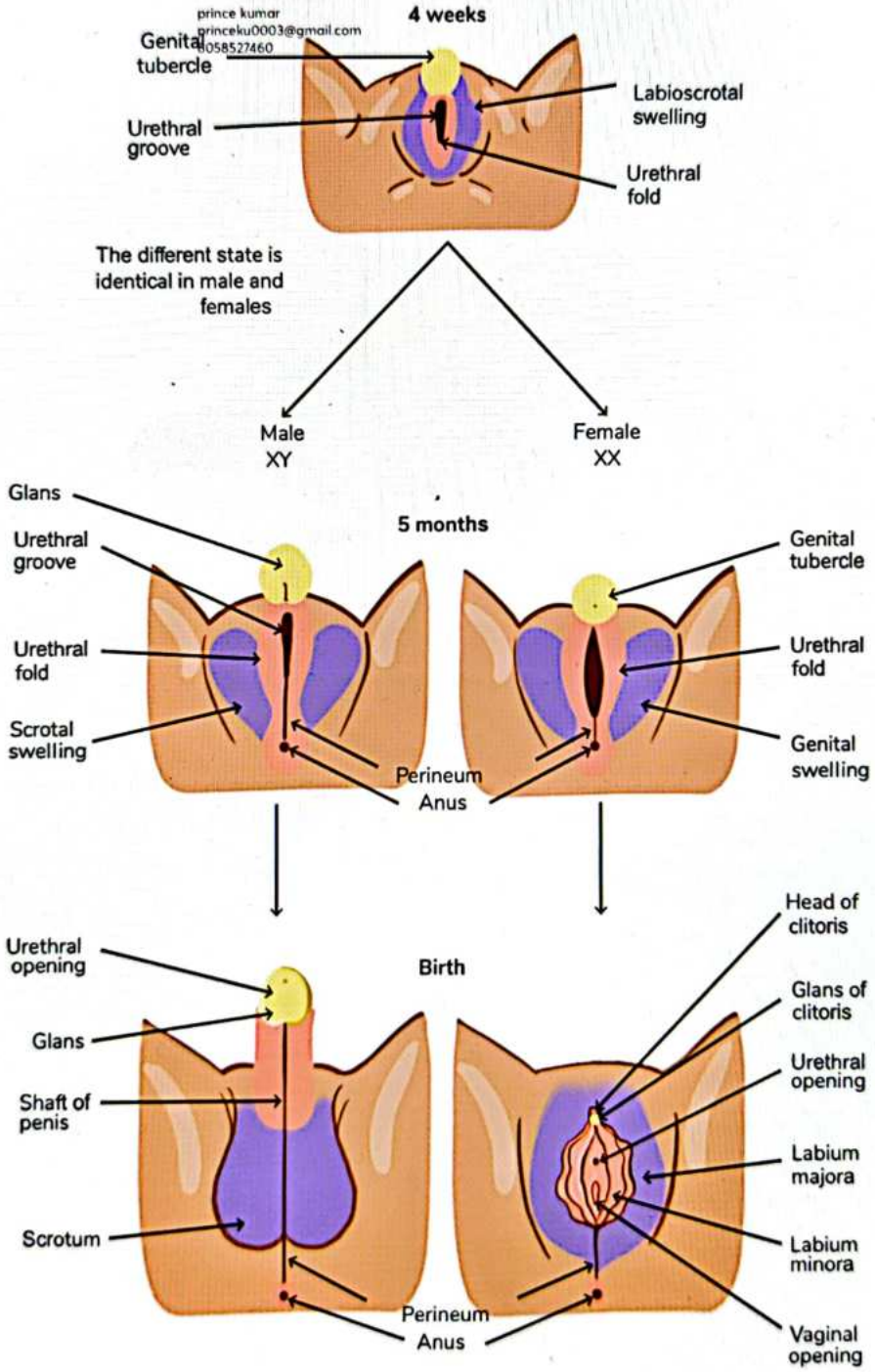
A. CAH

B. TFS

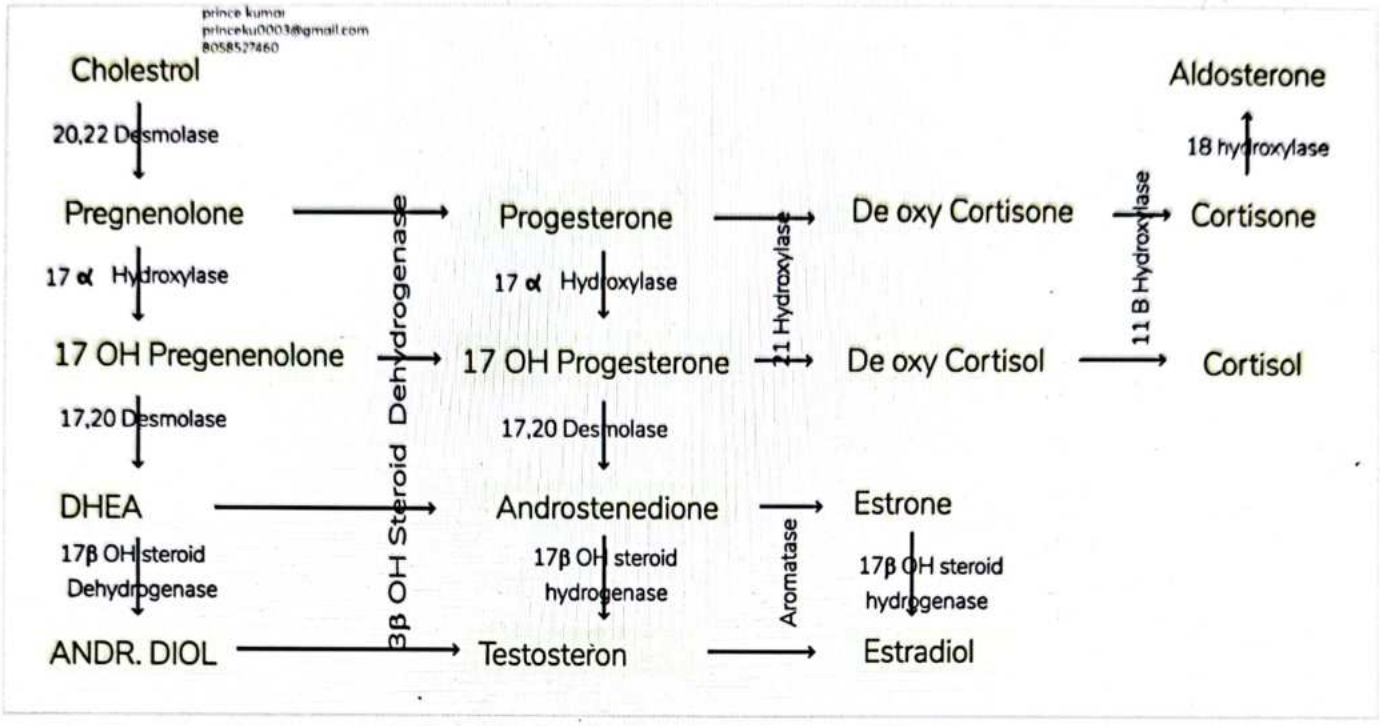
C. Mixed Gonadal Dysgenesis

D. True Hermaphrodites

Image 17.1



Flow Chart 17.1

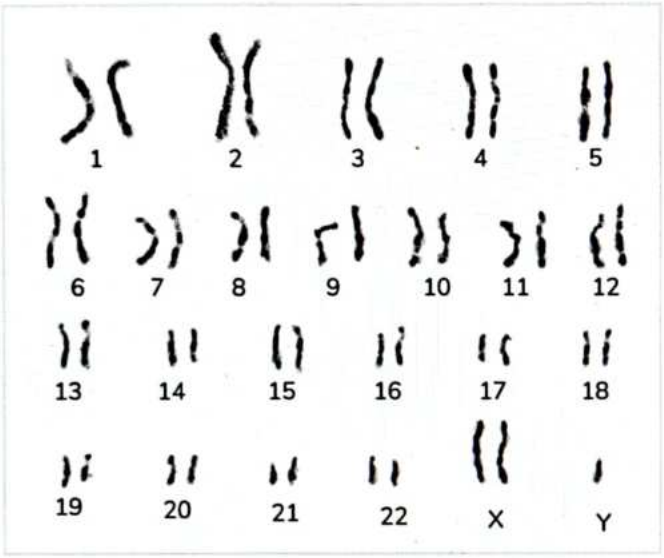


PREVIOUS YEAR QUESTIONS

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

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

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

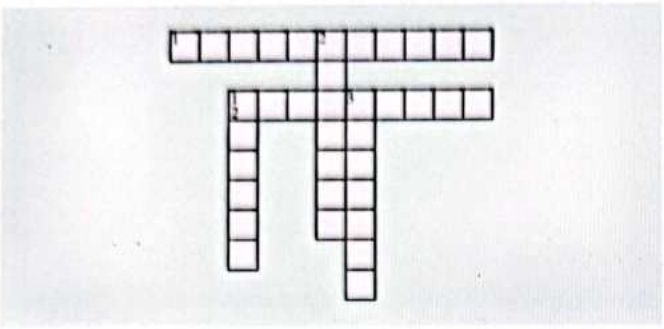
Q. Match the following

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Best test to distinguish androgen insensitivity from mullerian agenesis in a patient with primary amenorrhea and absent uterus is ___
2. External genitalia formation is under the influence of __

Down

1. Axillary and pubic hair are ___ in androgen insensitivity syndrome
2. 45XO genotype is seen in __ syndrome
3. Genital ridge in female develops into the __

18 PUBERTAL CHANGES

Pubertal Changes 00:00:14

- First event of puberty is growth spurt

Specific Events of Puberty on Girls

- Breast growth: 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
- Most common 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 QUESTIONS

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

A. Hair growth

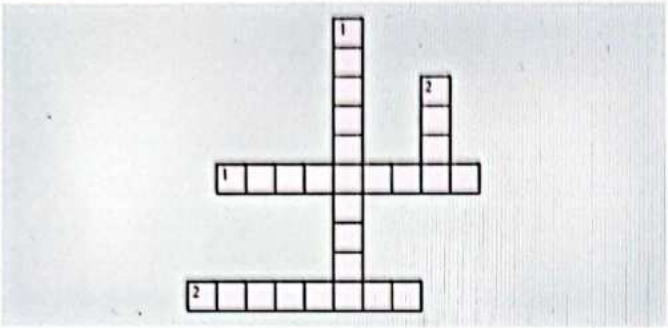
B. Vaginal cornification

C. Menstruation

D. Cervical mucous changes

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. First specific event of puberty in girls is _____
2. Onset of periods in a girl is called _____

Down

1. Most common cause of precocious puberty is _____
2. Treatment of precocious puberty is _____

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19 INFERTILITY

Infertility 00:00:45

- 15-20% couples are infertile
- Infertility is defined as inability to conceive even after 1 year of unprotected intercourse. It can further be classified as Primary or Secondary.
  - Primary infertility is infertility in a couple who have never been pregnant
  - Secondary infertility is infertility is a couple who have a previous child or abortion
- Subfertility is when a couple conceives after trying for almost a year/, also called 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 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 are most common followed by Tubal factors. Anovulation is also the most treatable cause.

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

2. Female 00:30:20

- Examination
- TVS
- Ovulation tests
  - Basal body temperature [>0.5° F]: Progesterone is thermogenic, hence a rise in basal body temperature is suggestive retrospectively of ovulation
  - Sr. Progesterone: > 3ng/ml on day 21, is retrospectively suggestive of ovulation
  - LH: > 15 IU
  - Serial USG - Follicular Monitoring is done serially from day 9 onwards, to follow growth and rupture of a dominant follicle. This is the most common method used
  - Direct evidence is by laparoscopy, a yellow puncta on ovary is suggestive of ovulation
  - Cervical mucous studies: LOSS of spinnbarkeit and ferning due to progesterone. Note that the presence of both of these is suggestive of estrogen effect and not ovulation.
  - Premenstrual Endometrial biopsy: this is done from day 20-26, in the premenstrual period. Presence of Secretory changes is suggestive of ovulation. Endometrial changes should correspond to day of biopsy, thus 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, however it is not a very reliable sign of ovulation

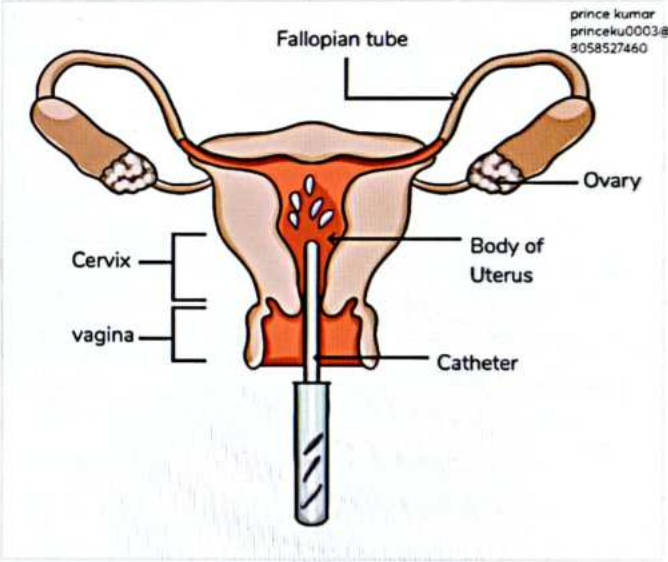
- Hysterosalpingography 00:35:33
  - Radio-opaque dye pushed into uterus with Leech canula and the uterine cavity and tubes are seen with fluoroscopy. It outlines both uterine cavity and tubal patency. However, it does not tell about outer adhesions/ endometriosis
- Sonosalpingography: Fluid is pushed into cavity and the outline is thus better seen on USG
- Laparohysteroscopy: it is a better investigation to know anatomy, adhesions, endometriosis effecting fertility. Along with this, dye can be put through cervix, which can be seen coming out of tube through the laparoscope, known as chromopertubation, which confirms tubal patency. In the same sitting, a hysteroscopy is done to check uterine cavity for anatomical defects or lesions or adhesions. If an HSG is done, which shows blocked tubes, a laparoscopy must be done .to confirm.

Treatment 00:40:10

1. Ovulation Induction

- Indicated for anovulation and also for timing of inetrcourse in ovulating women
- In PCOS, high estrogen from multiple small follicles, inhibits hypothalamus, which inhibits production of gonadotropins, thus drugs used for ovulation involve, inhibition of this negative feedback on hypothalamus to make Gonadotropins and cause follicle development and ovulation.
- Clomiphene citrate
  - Blocks hypothalamic estrogen receptor to inhibit negative feedback from estrogens, thus increase FSH
  - Dose used is 50-250 mg/day from day 2-6 + follicle monitoring
  - 80% women will ovulate with clomiphene while 40% will conceive
- Letrozole
  - It is an aromatase inhibitor which inhibits peripheral conversion of androgens to estrogens, less estrogen thus causes less negative feedback inhibition of hypothalamus, making more FSH, thus more follicle development.
  - Dose used is 2.5-5 mg/day, given from day 2-6
  - This is the drug of choice for ovulation induction
- Inj FSH
- Inj HMG (human menopausal gonadotropin: LH + FSH)

2. Intra Uterine Insemination 00:47:28

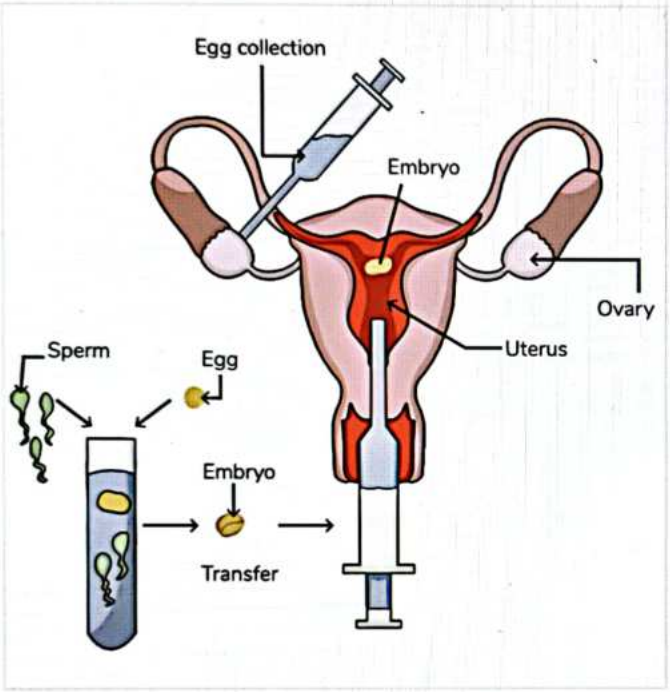


- Artificial insemination of prepared semen into uterine cavity is called IUI
- Indications
  - Cervical factor: stenosis, anti-sperm antibodies
  - Endometriosis
  - Low sperm counts: 5-10 million

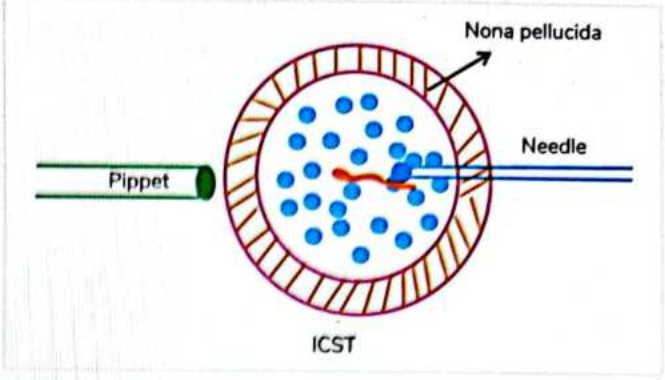
- Procedure: ovum is prepared by ovulation induction and washed sperms are placed in uterine cavity by a IUI canula at the time of ovulation. Note that SEMEN directly is never placed in the uterine cavity. Success rate is around 20-25%

3. In Vitro Fertilization 00:50:10

- High dose ovulation induction is done to cause superovulation which recruits around 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%

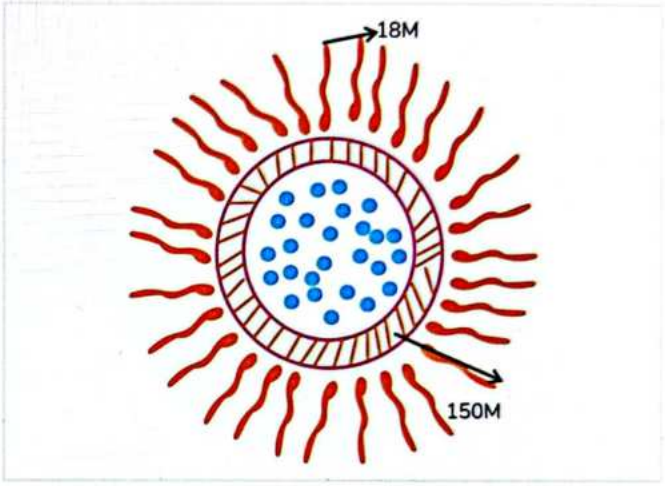


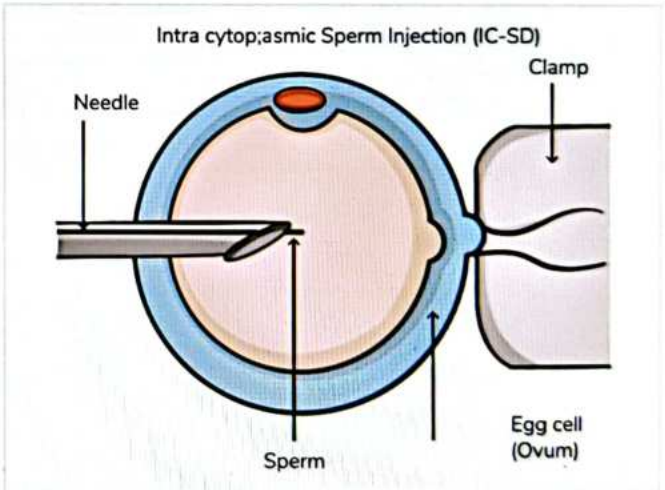
- In normal intercourse, most sperms die due to vaginal acidity and much lesser reach progressively up till oocyte. Around 1/5th of semen will ultimately reach the site of fertilization. Around 1 lakh sperms now collide with ovum & release Acrosin (like hyaluronidase). This acrosin softens the Zona Pellucida known as Acrosome Reaction. One sperm now enters the ovum and fertilization occurs. This is followed by Cortical Reaction, which hardness zona again, prevents Polyspermy.
- Capacitation: loss of cholesterol/ Ca influx/ tyrosine phosphorylation: this is a process by which a sperm becomes capable to fertilize, occurs in Cervical Mucous/ Proximal Fallopian Tube (better answer Proximal Fallopian Tube)



4. Intra Cytoplasmic Sperm Injection 01:05:00

- Indicated for very low sperm count < 1 million
- A tiny needle, called a micropipette, is used to inject a single sperm into the center of the egg. Once fertilization occurs, the embryo grows in vitro for 1 to 5 days before it is transferred to the uterus.





Azoospermia 01:07:45

- For spermatogenesis, hypothalamus releases FSH, which acts on the testes to produce sperms and androgens. These androgens give a negative feedback which regulates FSH.

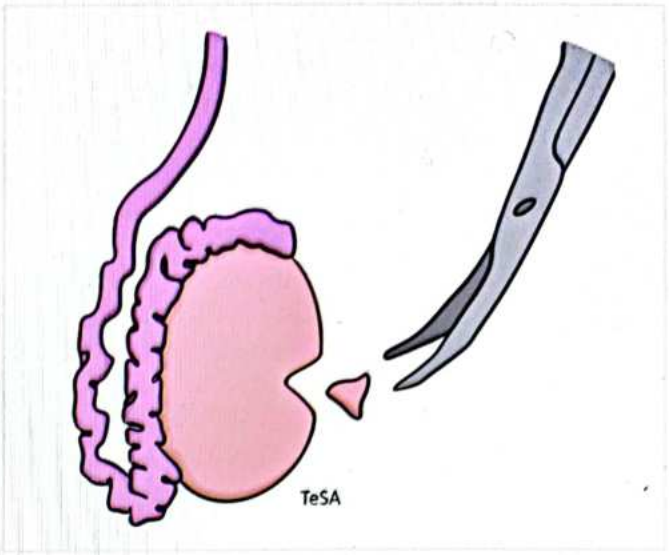
- **Central cause (pretesticular):** Hypothalamic/ kallmans: Characterized by Low FSH, LH
- **Testicular cause**: Mumps orchitis etc. Here, there is no androgen production from testes, thus no negative feedback, thus high FSH, LH
- **Post testicular (Obstructive) azoospermia:** Vas obstruction. Here there is normal levels of LH, FSH, Androgens. In any male with normal FSH & azoospermia on semen analysis, think of obstructive azoospermia.

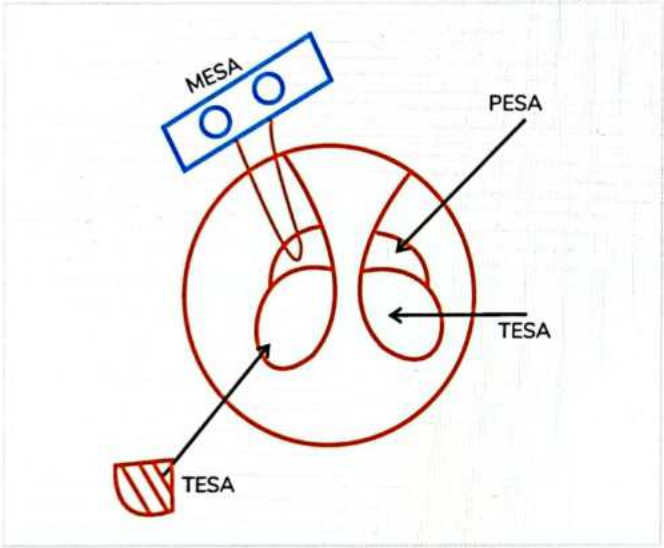
Sperm Extraction Techniques 01:12:00

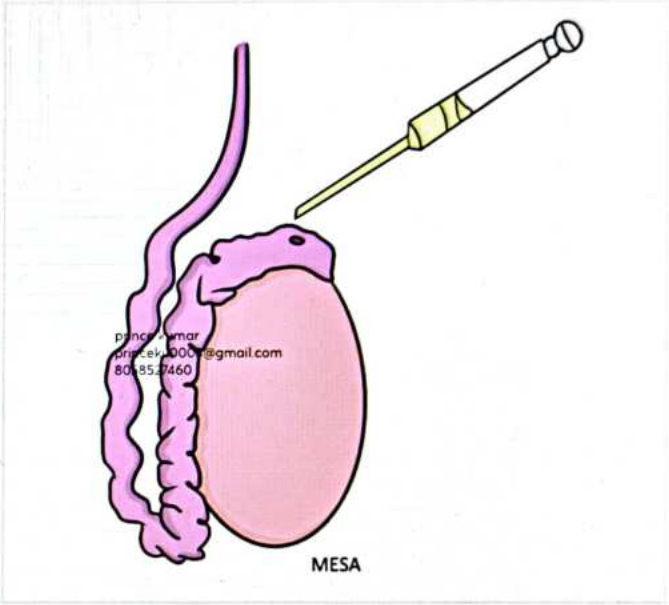
- For obstructive azoospermia
  - PESA [Percutaneous Epididymal Sperm Aspiration]
  - TESA [Testicular Sperm Aspiration]
  - MESA [Micro Surgical Epididymal Sperm Aspiration]
  - TESE [Testicular Sperm Extraction]

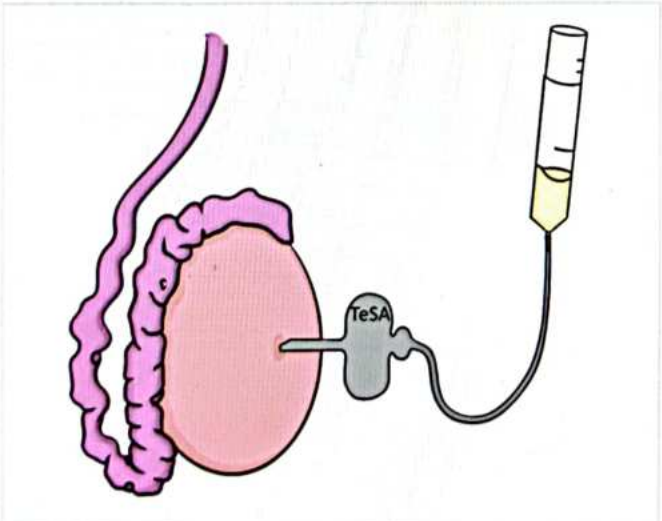
Important Information

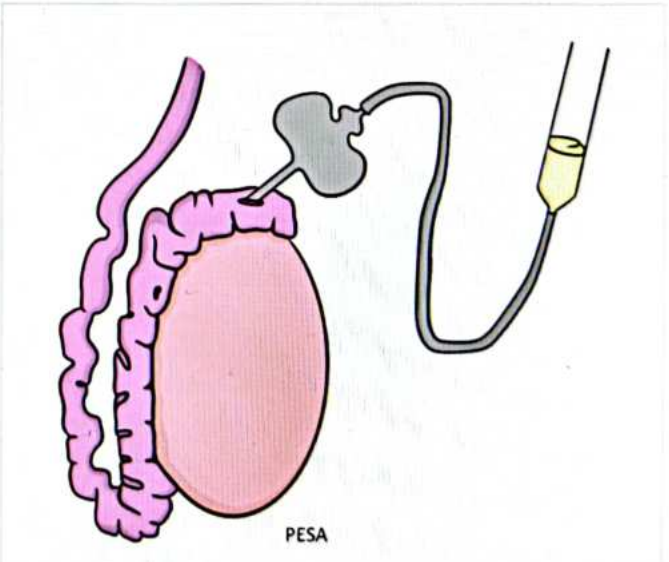
- Single best technique for sperm extraction: MESA











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

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

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

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

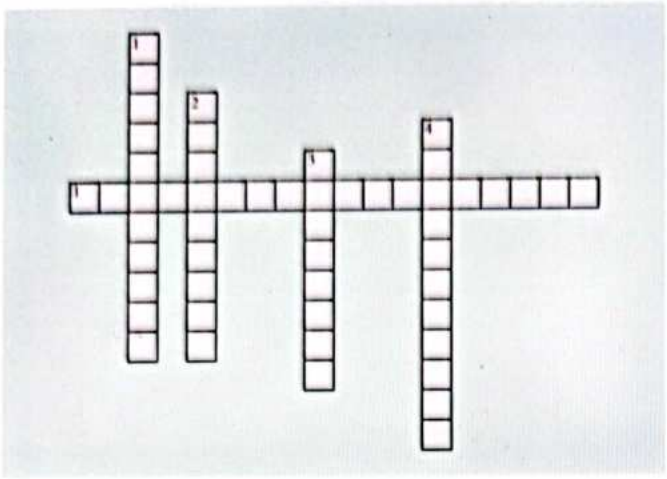
A. Repeat USG
B. Hysterosalpingography
C. Endometrial biopsy
D. Urine c/s

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Next step when HSG shows tubal blockage in infertile woman is ___

Down

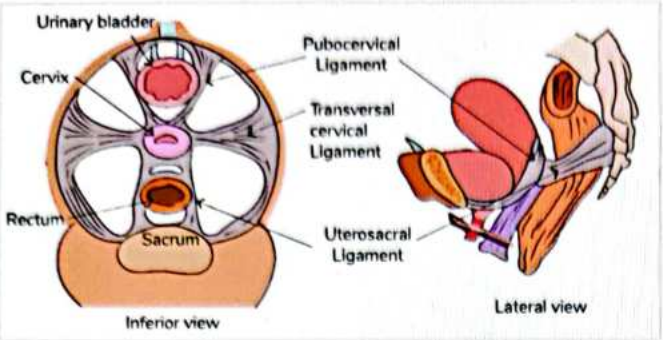
1. Absence of sperms in semen is called __
2. Drug of choice for ovulation induction is __
3. Clomiphene blocks ___receptors on hypothalamus
4. Most common cause of female factor infertility is__

20 GENITAL ORGAN PROLAPSE

Genitourinary Prolapse

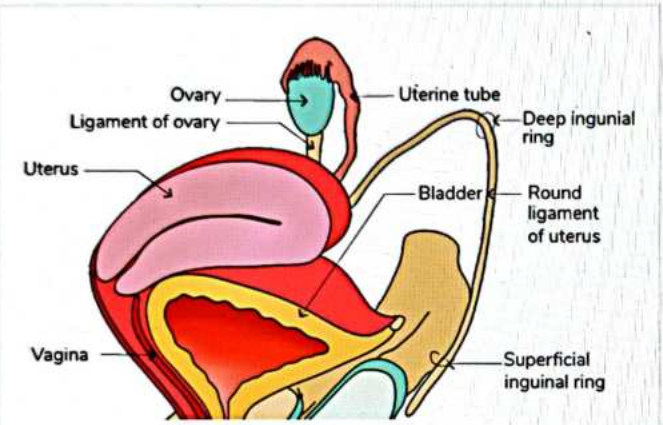
Supports of Uterus

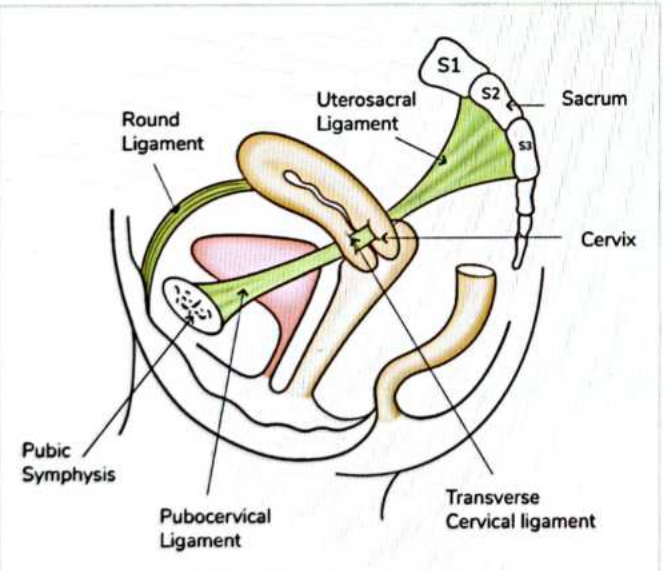
00:00:28



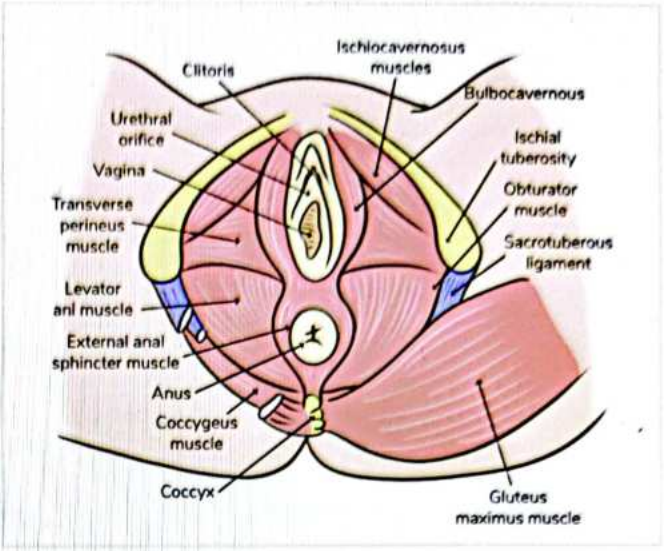
1. Ligament Support

- 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 is the most important cause
  - Early bearing down
  - Prolonged 2nd stage
  - Faulty instructions
  - Early resumption of work
  - Multiparity
- Connective tissue disorder
- Spina bifida
- Increased abdominal pressure in conditions such as ascites, chronic cough or abdominal mass

Early Bearing Down against partly dilated cervix, leads to cervical stretching or elongation & cervical descent, stretching of ligamentous support, thus causing prolapse. Therefore, in parous prolapse, usually cervical elongation is present.

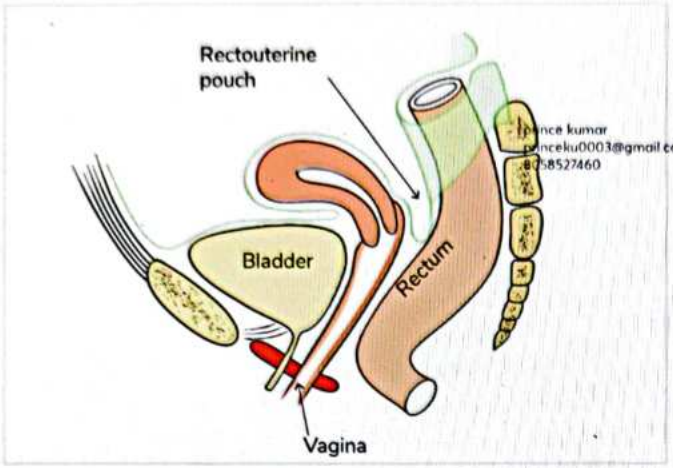
Prolonged 2ND Stage of Labour: duration of second stage in primi is around 1 hr (upper limit is 2hr), while in multi is around half hr (upper limit is 1hr). prolongation of second stage causes ischemic damage of nerves supplying levator ani, causing Neuronal injury, which is the single most important injury predisposing to prolapse.

Faulty Instrumentation

Important Information

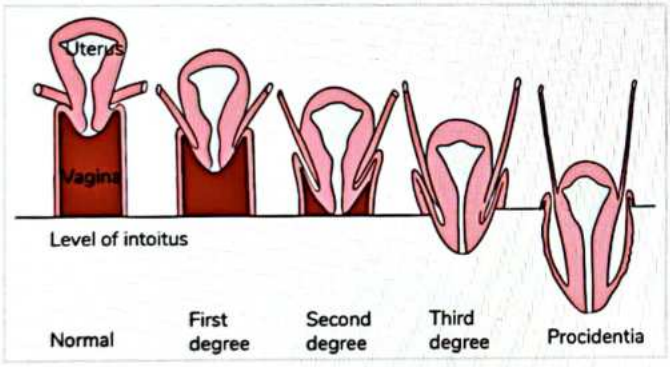
- Good instrumentation prevents prolapse
- Faulty instrumentation causes prolapse

Early resumption of work: < 6wks of purperium, may lead to development of prolapse.

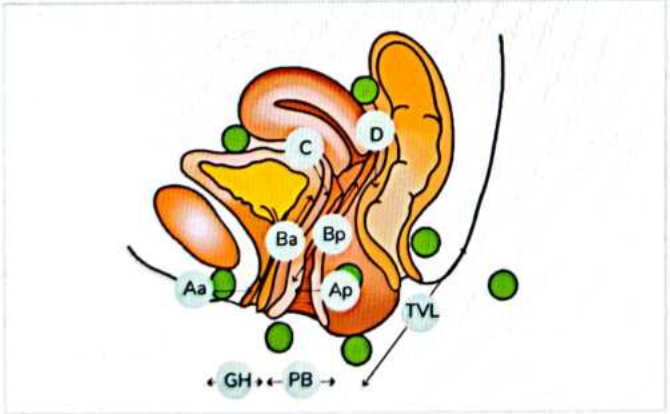


Shaw's Classification 00:19:46

- **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]



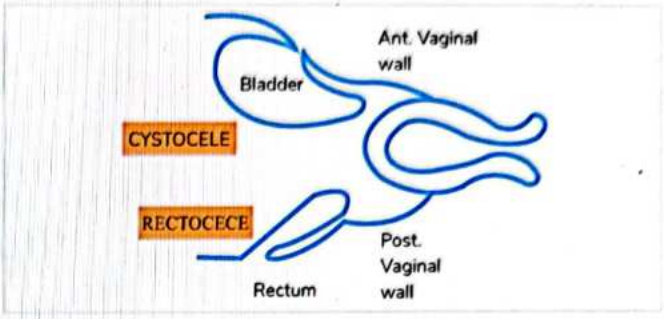
POPQ System 00:21:02



- 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

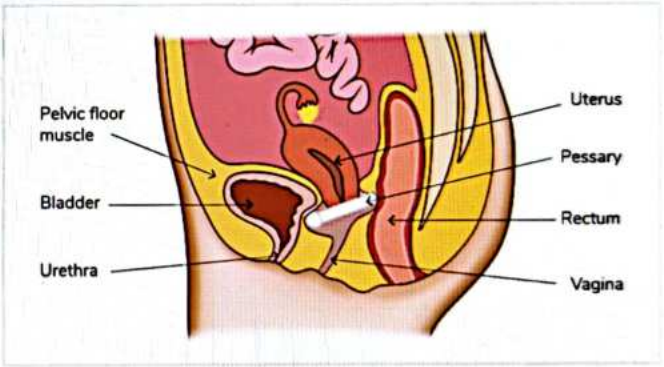


Cystocele - Complications 00:26:16

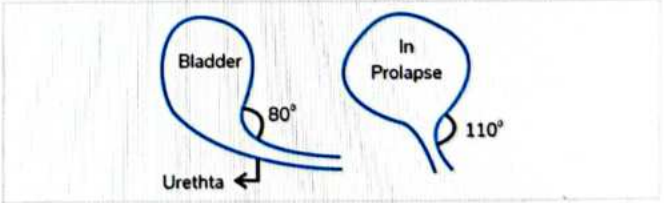
- Difficult in initiation of micturition: Needs to reposit first
- Retention of urine
- Infection
- Stone formation

Rectocele – Complications 00:26:48

- Difficult initiation
- Fecolith formation



Other Complications 00:28:47



- Venous congestion due to vaginal band causing deoxygenated Uterus
- Decubitous / Dependent Ulcer occurs due to venous

congestion: treated by repositioning with pessary, appropriate size is confirmed 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 or a sense of insecurity in the vagina / perineum is the most common presenting symptom.

Prevention of Prolapse 00:35:11

- Physiotherapy: Antenatal and post natal: Kiegel's exercises
- Prevention of other causes

Treatment 00:37:22

1. Vaginal Hysterectomy with Pelvic Floor Repair

- Treatment of choice for elderly women, which is the most common presenting age group. It is also called Ward & Mayo's Operation.
- **Procedure:** A vaginal hysterectomy is done. The bladder & rectum are repositioned and vault is closed. Pelvic floor is then repaired by anterior colporrhaphy along with Posterior colpo perineorrhaphy (repair of perineal body) done. Both these together are called Pelvic Floor Repair (repair of levator ani)
- **Complications**
  - o Usual complications of hysterectomy: hemorrhage, infection, vault dehiscence, bladder, bowel injury, VVF
  - o Vault Prolapse: Vault prolapse can present in 3-4 months of surgery of WARD & MAYO'S OPERATION. It is due to pressure by enterocele through peritoneal defects, most common cause being a neglected enterocele.
    - → Prevention: It is prevented by High ligation or closure of peritoneal defect.
    - → Treatment: By Sacrospinopexy / Sacropexy. In this procedure, the vault is physically reposited and then tied to ischial spines or uterosacral ligament.
  - o Stress Urinary Incontinence: Presents by 2-3 weeks of surgery due to improper anterior wall repair causing urethral prolapse leading to straightening of UV angle

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

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

- It is the treatment of choice for younger women
- Procedure:
  - o D&C
  - o Reposition of the uterus
  - o Cervical amputation for the lax/ elongated cervix is done.
  - o Fothergill stitch is made B/L Mackenrodt' ligaments ligated to uterus anteriorly.
  - o Reposit the bladder & rectum
  - o Anterior colporrhaphy + post colpoperineorrhaphy (pelvic floor repair)
- Pioneered by DONALD in Manchester city hospital

3. Sling Surgeries

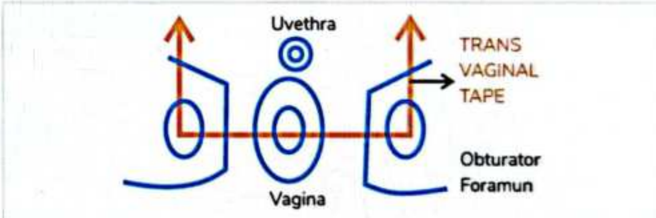
- Rx for nulliparous prolapse of very young women
- Tie a sling to the posterior part of cervix & pull in & tie inside
- Shirodkar Sling
  - o Tie to anterior longitudinal ligament
  - o Tie to anterior superior iliac spine
- Khanna's Sling
  - o Rectus shealth
- Purandare's Sling

Stress Urinary Incontinence 01:04:04

- Can occur as a complication of vaginal hysterectomy, due to improper anterior colporrhaphy
- Can be a complication in 2-3 weeks after hysterectomy

Surgical Management

- Peyrera's } Needle suspension procedure
- Stamey's } Uplifting of urethra
- MMK's Colposuspension
- Burch Colposuspension } Uplifting of ant. Vaginal wall
- 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

87

PREVIOUS YEAR 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

Q. 55-year-old multigravida 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

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

CROSS WORD PUZZLES

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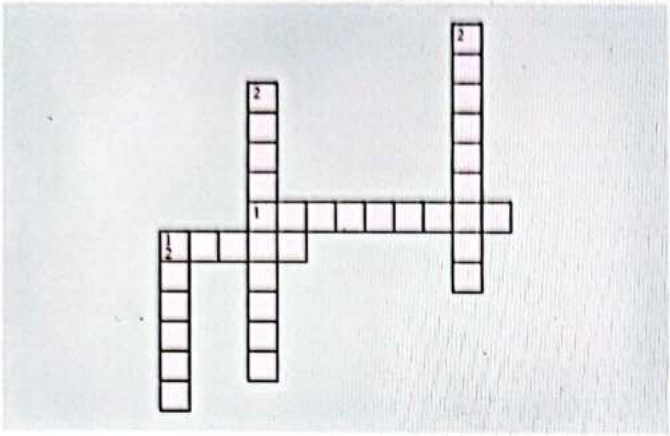

Across

1. Manchester repair is treatment of choice for prolapse in young women with _____ cervix
2. Treatment of choice for nulliparous woman with prolapse is_____ surgery

Down

1. _____urinary incontinence may develop after vaginal hysterectomy due to improper repair
2. Best ligamentous support of uterus is _____ligament
3. First part of uterovaginal prolapse is a _____

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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

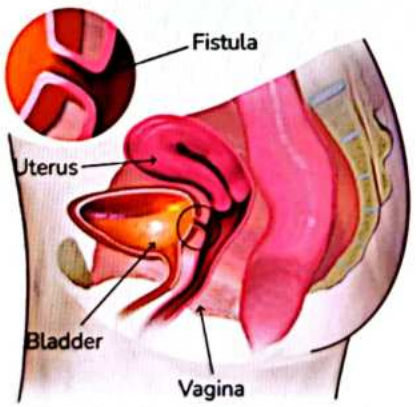
00:06:04

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 dribbling 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

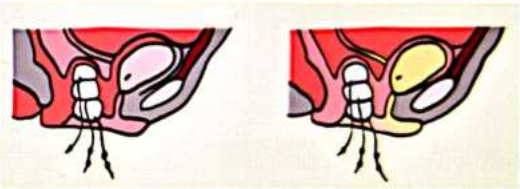
- If patient presents 5-7 days after injury, an immediate repair should not be done as ischemic area cannot hold sutures.
- Repair after 3 months

Diagnosis

00:15:00

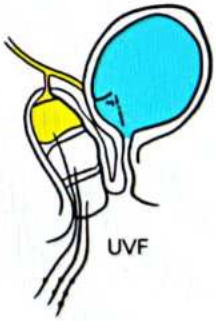
1. 3 Swab Test

- 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



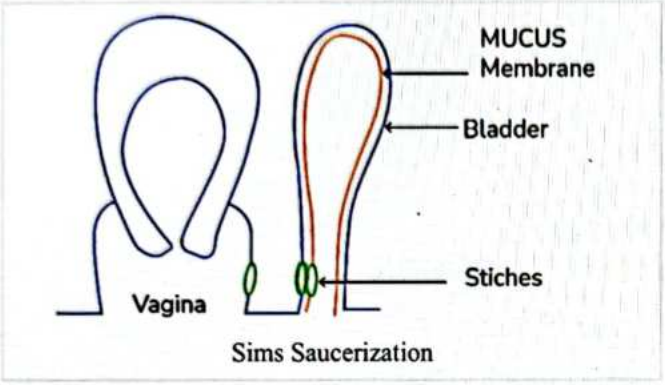
2. Double Dye Test
- Colon balls in vagina
- Methylene blue in the bladder
- Pyridium rablets given Orally → Impact RED colour to urine
- Helps to Dx Ureterovaginal Fistula: top swab is orange red, none is blue

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

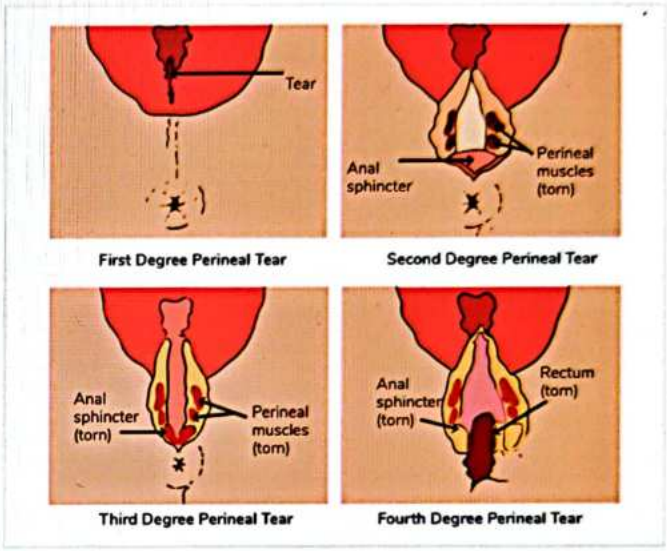
- Done under General anesthesia
- 3 Circular stiches on
  - Mucus membrane of bladder
  - Bladder serosa
  - Vagina
- Done in Knee Chest Position
- Marion Sims used silver wire
- Dr Chassar Moir did FLAP SPLITTING method: Vagina is entered and defect is identified, the vaginal flap is separated from the bladder, bladder defect is now seen, edges are freshened, then both flaps are repaired in layers
  - Even large fistulas up to 4 cms can be repaired
- Martius graft technique: Grafts can be used for larger defects like gracilis muscle graft or vulval fat pad
- Post hysterectomy small fistulas: Latzko technique/ partial colpocleisis: freshen and approximate only the vaginal defect.

  - It is a simple technique.
  - Good success rate
  - Less operating time

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
- 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



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 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)

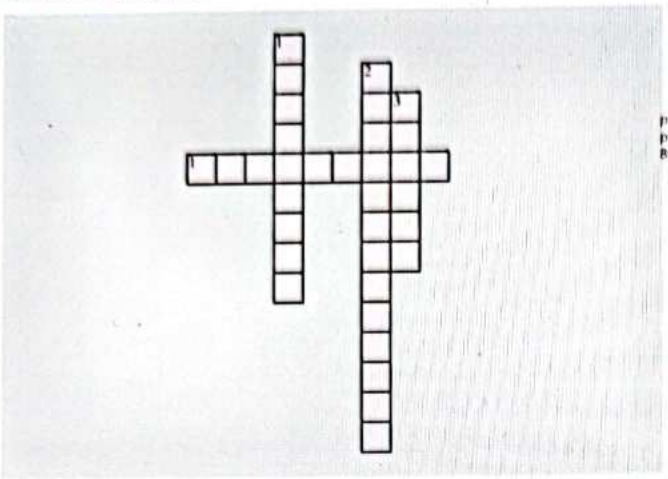
A. Repair immediately
B. Repair after 3 weeks
C. Repair after 6 months
D. Repair after 3 months

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most common cause of vesico-vaginal fistula is ____ labor

Down

1. Larger defects are repaired by flap _____
2. Surgery for repair of a VVF is sims _____
3. Small fistula are repaired by _____ technique

22 EMERGENCY CONTRACEPTIVES

Interception / Emergency Contraception / Post Coital Contraception 00:00:20

- Contraception within 72 hours 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

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 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 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

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

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

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

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

Criteria For Drug of Choice For Emergency Contraceptives

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

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PREVIOUS YEAR 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

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

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

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

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)

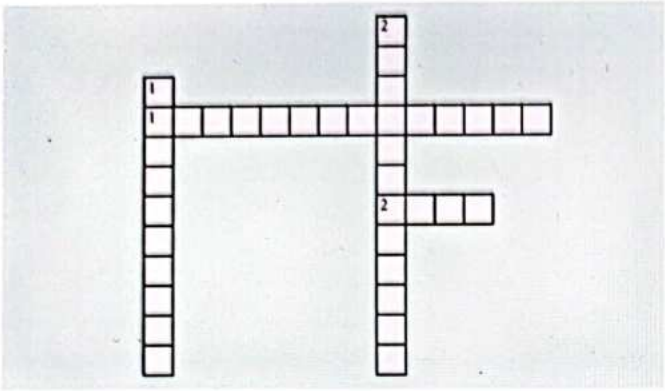
A. 300 mg
B. 30 mg
C. 300 mcg
D. 30 mcg

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

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Drug of choice for emergency contraception is _____
2. Most effective emergency contraceptive is _____

Down

1. A selective progesterone receptor modulator used for emergency contraception is _____
2. An abortifacient also used for emergency contraception is _____

23 CONTRACEPTION

Principle of hormonal action for conception

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

Hormonal Contraception 00:01:00

Combined Oral Contraceptive Pills (C-OCP)

- **Mechanism Of**

Estrogen tablet / Progesterone tablet → (negative feedback) ⊖ {FSH Release, LH Release} → No follicle development & rupture → Anovulatory

- **Patient on C.OCP have**
  - Anovulatory cycle
  - Less Dysmenorrhea: anovulatory cycles are painless
  - Pill period / Artificial period: these patients have menstruation due to the pill and not due to natural Estrogen/Progesterone. There is monthly endometrial proliferation and secretion due to exogenous estrogen & progesterone respectively.
  - Regular periods: C.OCPs are given for 21 days and patient will have period by 28th day
  - Less bleeding & less anemia: low dose estrogen (Ethinylestradiol 0.03 mg or 30 µg) causes minimal endometrial proliferation, compared to natural cycle. Low dose pills contain 10 µg -20 µg of estrogen.
- **Non contraceptive benefits of low dose combined 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. This is advisable mainly for low socioeconomic & teenage patient, who are not expected to be very compliant.
  - 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
- **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

- **Types of OCPs** 00:24:00
  - Type I - High Dose
  - Type II - Low Dose
  - Type III - **Newer Progestins** with minimal androgenic action such as
    - → 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

Minipill / Progesterone Only Pill (POP)

- Should maintain same time of consumption, that is within 3 hours of the same time on 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)
  - Drug: Ormiloxifene. It makes endometrium out of phase for embryo implantation causing embryo-uterine asynchrony.
- 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

- Permanent methods should be for those with 2 children at least & last child preferably > 3 years. Note that this is only sound advice and not a guideline.

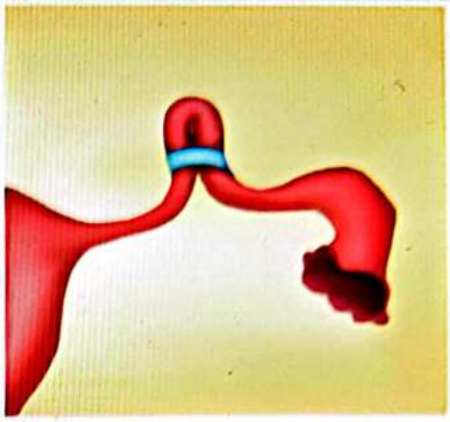
Female Sterilization

Site of ligation

- Site of tubal ligation of Fallopian Tube is the Isthmus as it has uniform diameter. Also, Isthmo isthmic reanastamosis has up to 80% success: thus prefer to ligate at isthmic area

Timing:

- Post partum: most commonly performed in India is postpartum ligation. This is done immediately after delivery when uterus is at the level of umbilicus, as uterus is an abdominal organ, it is easy surgery.



Tubal Ligation

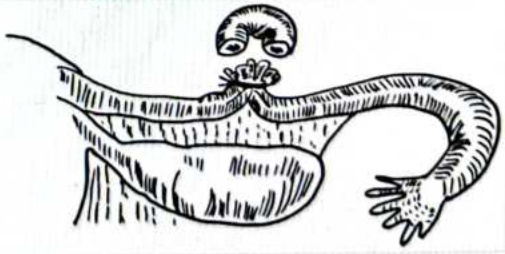
Tubal Ligation Resection

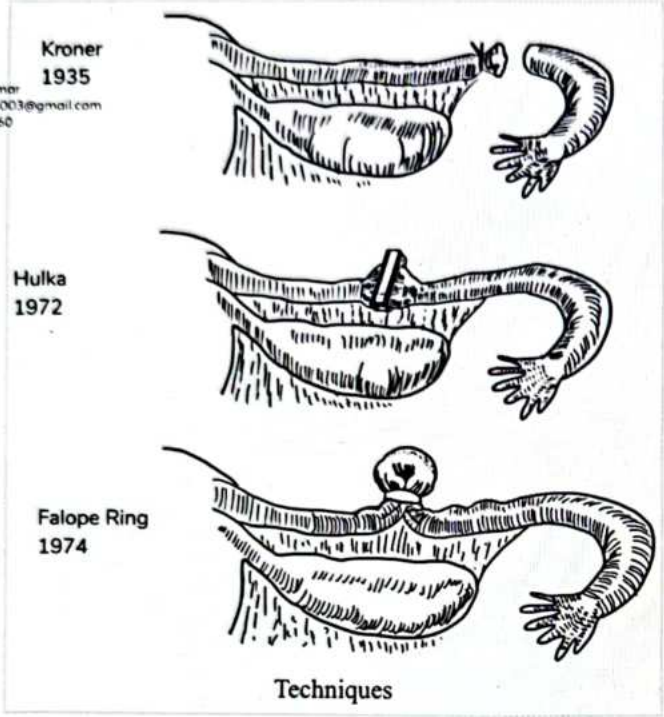
- Puerperal Sterilization : this is best done within 2-3 days after delivery, upper limit is 7-10 days (not 6 weeks). This is done while uterus is an abdominal organ as uterus becomes pelvic organ in 10-14 days, and back to its normal size in 4-6 weeks
- Interval Sterilization : This is done after 6 weeks of delivery, commonly done by Laparoscopic methods
- Concurrent Sterilization : This is done along with MTPs or cesarean section

Entry into abdomen is by 00:45:20

- Laparotomy [Minilap (1.5 to 2 inch incision, Most common)]
- Laparoscopy: mostly for interval sterilization, but never do in puerperium as
  → it can cause injury
  - Failure chances are more : as the tube is edematous & the falope ring may slip from the tube

Pomeroy 1930

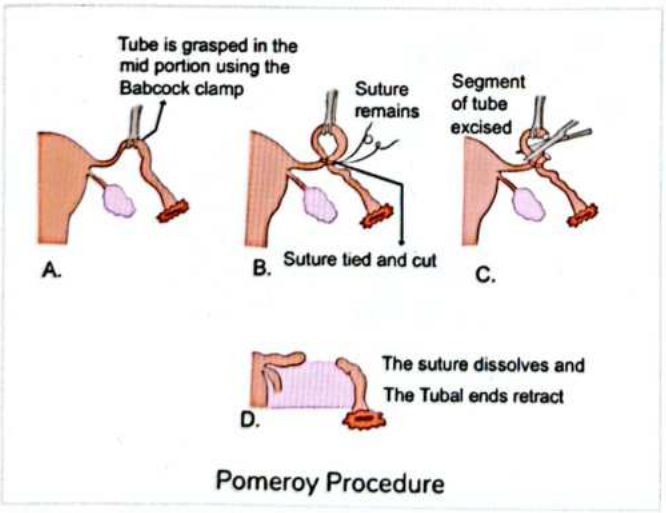




Techniques

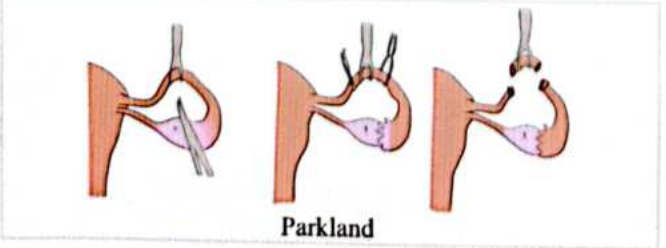
Techniques of Tubectomy 00:48:30

- **Pomeroy Technique:** This is most commonly done, wherein a single ligature is used and ends are cut. However, the tube cut end are together, which can lead to fistula formation leading to failure.

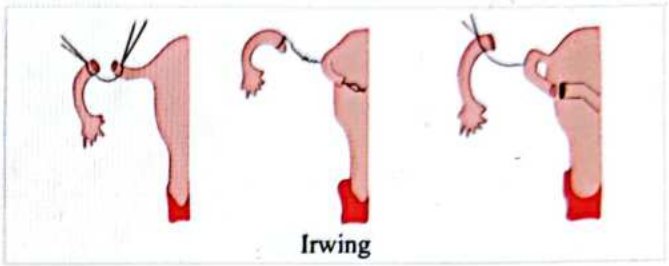


Pomeroy Procedure

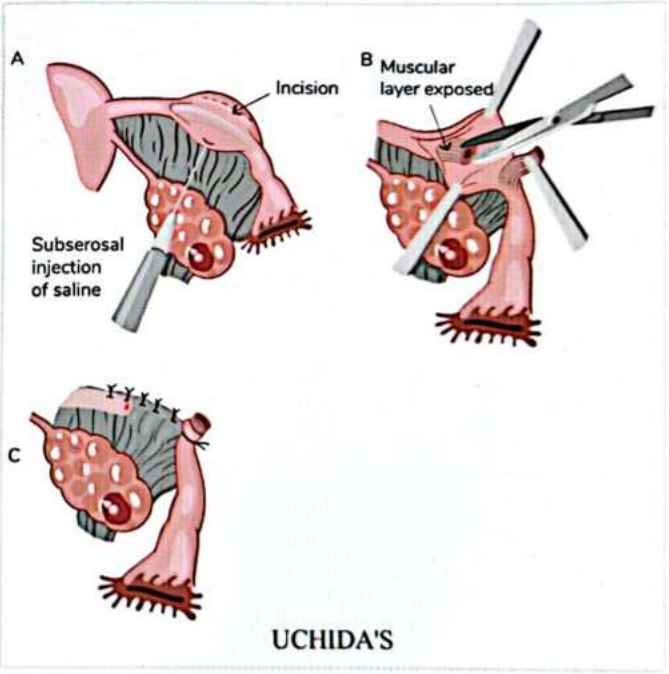
- Parkland Technique: Double ligature is used such that tubes are ligated separately


Parkland

- Irwing Procedure: One end of tube is buried into uterine musculature and the other end of tube is anastamosed into mesosalpinx

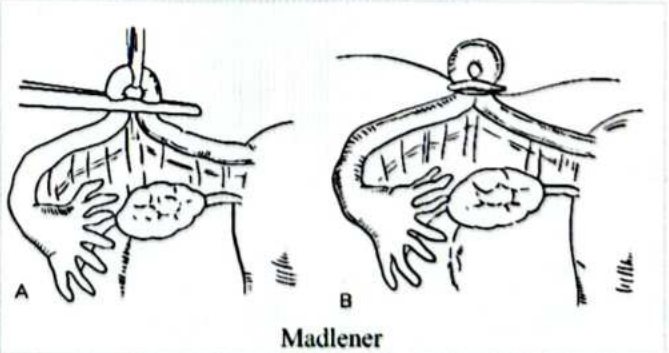

Irwing

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



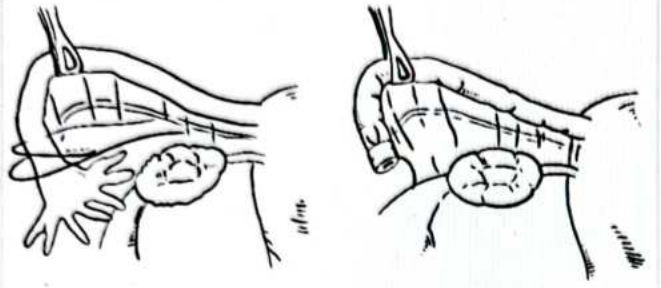
UCHIDA'S

- Madlener's Method: The tubes are crushed, not resected. This procedure is not done these days due to high failure rates.



Madlener

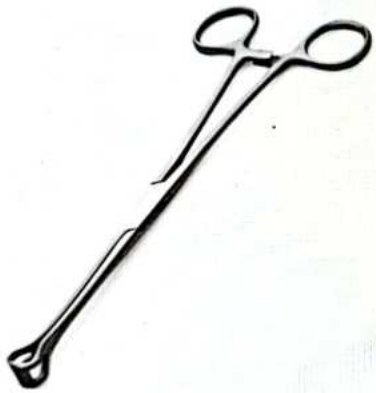
- Kroner's Fimbriectomy: Fimbria are excised, however this procedure is also not done these days as no reversal is possible.



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

Important Information

- Failure rate of tubectomy is more than vasectomy

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 formed

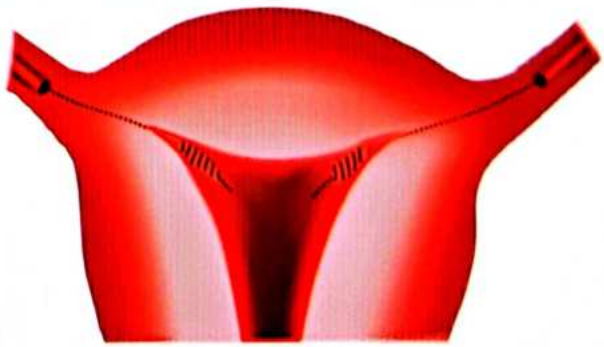
Important Information

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

- Implant of Essure Ring is placed in bilateral fallopian tubes hysteroscopically under LA or GA. This Causes Fibrosis & blockage of tube and takes 3 months to completely block the tube.
- Made up of Nitinol (Alloy of Nickel & Titanium)
- Hysterosalpingography done to confirm blockage.



Essure Ring

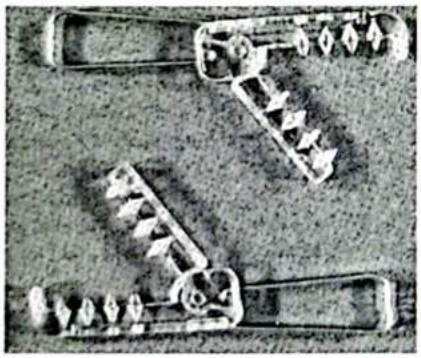
Laparoscopic Sterilization 01:11:49

Important Information

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

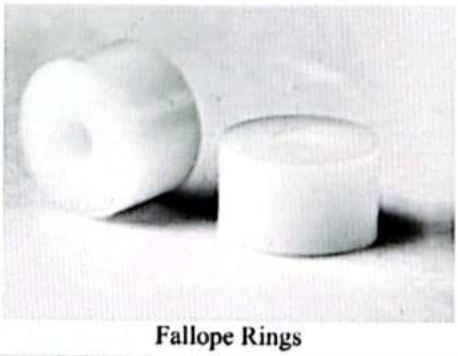
Laparoscopic Clips:

Filsche Clips (Clips without serration)



Hulka Clemens Clips (Clips with serrations)

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

Cauterization:

- **Bipolar Cautery**: Current goes from one prong to the fallopian tube & goes to the other prong & goes back to machine.
- **Monopolar Cautery**: Current flows through the instrument into the fallopian tube & into the earthling attached to patient. This damages tube more than Bipolar cautery due to higher current dissipation.
  - 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, thus not recommended now - a – days
  - It has worst chances of reversibility

Re-Anastomosis:

Laparoscopic Clips such as Hulka, filsche have best chances of reversibility followed by falope ring. Laparoscopic or open cautery: has worst chances of reversibility.

IUCDS [Intra Uterine Contraceptive Devices] 01:21:02

Mechanism of action

- To induce Foreign body action, common to all types, such that uterus will contract to expel the FB [IUCD], thus the FB action will expel the embryo

TYPEs

- **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

Mechanism of action

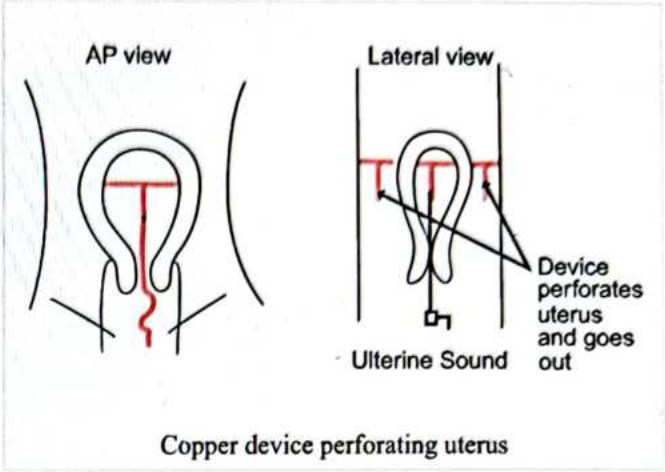
- Foreign body action
- Aseptic Inflammation of endometrium causing reduced chance of implantation
- Reduction of sperms motility
- Fertilization ↓↓
- Sperm destruction

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 effects of IUCD

- **Bleeding:** this is the most common side effect [3 times more common than pain]. For this, Tranexamic acid & NSAIDs are given for 1st 3 cycles during periods. (Best time of insertion of IUCD is within last days of periods)
- **Pain**: This is the second most common side effect
- **Infection**
- **PIDs**: Infection should be ruled out before inserting IUCDs. PID after IUCD insertion is mostly a result of aseptic technique of insertion or pre-existing infection rather that due to the IUCD itself.
- **Perforation**: is a n extremely rare complication



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 % and Ectopic pregnancy: 4-5 %, thus IUCDs per say do not cause ectopic pregnancy, rather prevent it

Important Information

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

- Therefore, incidence of ectopic pregnancy is also less 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

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

Implants 01:42:12

- These are sub Dermal Implants containing progesterone which can be inserted surgically into arm of women, providing very good control as contraceptive. Failure rate of implants is very low even when compared to vasectomy & tubectomy

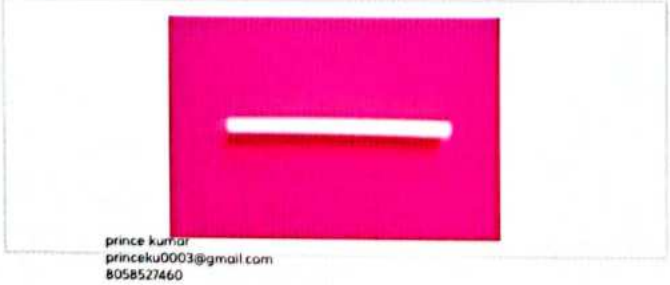
Norplant

- 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 placed for 3 years, and should be removed after 3 years surgically under LA

Implanon



- Contains 68 mg of Etonogestrel, which is a biological metabolic of Desogestrel
- Can be used For 3 years
- Has only one rod thus causing less discomfort, easy insertion & easy removal

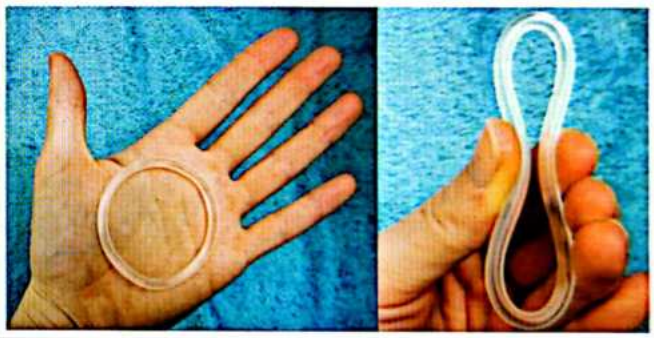
Nexplanon

- 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 (0.120 mg/day) + Ethinyl Estradiol (0.015 mg/day).
- Can be inserted just before intercourse and work for 3 weeks. After removal, within a gap of 1 week, women will get her periods & then reinsertion can be done
- Can be conveniently used as they don't have to remember to use everyday unlike pills.

Sponge / Today 01:50:50

- It is a vaginal sponge with can be inserted just before intercourse into vagina and works For 24 hrs and has band

attached to it which makes it easy for removal
- It contains Nonoxynol - 9 [Spermicidal]

Injectable Progesterone 01:52:04

Used similar to 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

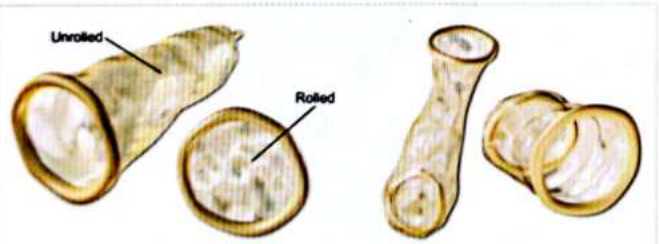
EVRA Patch 01:53:56

- This is a hormonal patch of size of 4 cm approx. applied over the arm or abdomen, contains E. Estradiol (released 20 mcg/day) & Norelgestromin (released 150 mcg/day). The patch has to be changed every week & the 4th week is given as break & patient will have periods

Barrier Contraceptives 01:56:03

- These are the most convenient to use contraceptives, E.g. condoms, Diaphragms

Condoms



Male Condom Female Condom

- These are not the ideal method.
- Conveniently used for people having multiple partners
- Interferes with pleasures
- High failure rate: 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

Diaphragm / Dutch Cap

- This is shaped like a cup, the convex part is facing outside; while the 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 for over 24 hours, it may lead to Toxic shock syndrome (due to staph. aureus (mc), strepto- coccus [rarely] may occur

Natural Methods of Preventing Pregnancies 02:00:00

1. **Abstinence** [no sex]
2. **Withdrawal Technique**: It implies pulling out before ejaculation. A major disadvantage is that even the pre-ejaculate can have sperms that can lead to pregnancy and is associated with high failure rate, and it cannot be used in patients with premature ejaculation.
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, after ovulation due to progesterone, it becomes thick, thus when 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.

- All these methods have high Failure rates: Require Lot of commitment & accuracy is less
- Pearl index: 60/100 women years

Failure Rates 02:06:03

- 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	9
Typical usage 14-21	14-21
Implants	0.05

Long Acting Reversible Contraceptives [LARC]

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

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 patients with 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 and IUCDs: both are good

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 is that 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 02:24:59

- 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 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

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

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

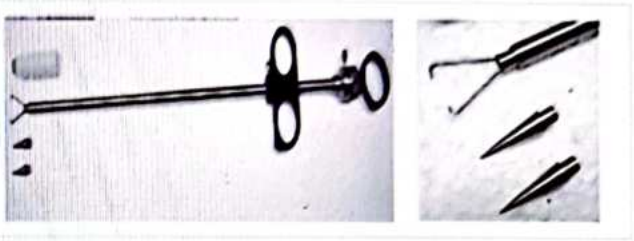
Q. The oral contraceptive pill 'Mala N' contains which of the following type of progesterone component? (JIPMER 2019)

A. Levonorgestrol
B. Etonorgestrel
C. Desogestrel
D. Drosperinone

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

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

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

Q. Spermicidal cream used in cotraceptives is? (FMGE 2019)

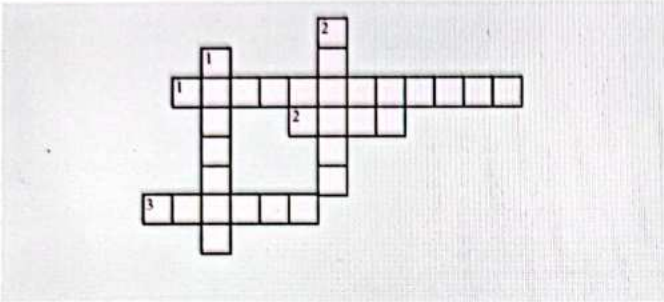
A. Gossypol
B. Nonoxynol-9
C. Centchroman
D. Clomiphene

Q. Choice of contraception in women with heart disease is? (AIIMS 2020)

A. IUCD
B. Mala N
C. Inj DMPA
D. Condom

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Rise in basal body temperature around ovulation is due to _____ hormone
2. Contraceptive of choice in women with heart disease is _____
3. Progesterone releasing IUCD used for 5 years is_____

Down

1. Technique of fimbriectomy done for permanent sterilization is _____
2. Hysteroscopic implant for tubal sterilization is _____

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24 GENITAL TRACT INFECTIONS

Asherman Syndrome

Etiology

00:02:14

- Overzealous Curettage done For

  - AUB (Abnormal Uterine bleeding),
  - MTP
  - Secondary PPH [d/t retained bits of Placenta]
  - Such curettage injures basal lamina causing scarring & Fibrosis of endometrium [no further gland development]. This then leads to secondary amenorrhea.
- Endometrial TB also causes Asherman Syndrome

Important Information

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

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

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 } 1 shot For gonorrhea
  Cefotaxime 1gm iv
- Doxycline 100 gm 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

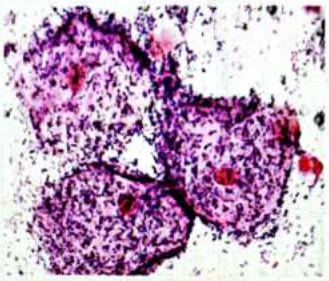
Important Information

- MC Vaginitis: Bacterial Vaginosis

Bacterial Vaginosis can cause

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

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, Frothy discharge
• Treatment ○ Azoles ○ Oral ○ Fluconazole ○ Rx both male & female	• Treatment ○ METRONIDAZOLE ○ Rx the Women [no sexual transmission]	• Treatment ○ METRONIDAZOLE ○ Rx both man & women

PREVIOUS YEAR 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

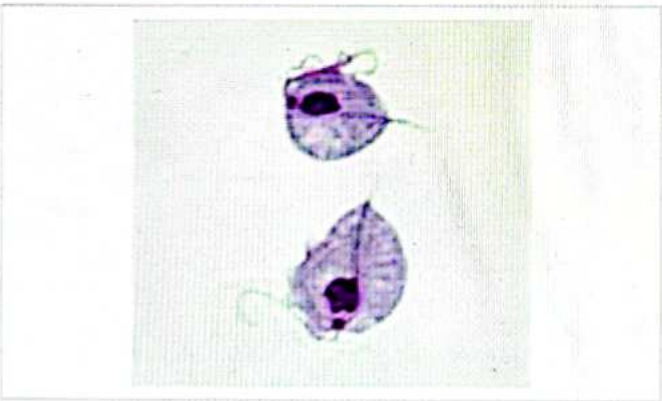
Q. A sexually active lady came with profuse yellowish frothy discharge with intense itching. On local examination of the vagina a 'strawberry' like cervix is revealed. What condition she is likely suffering from? (NEET 2020)

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

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

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

Q. Identify the image? (FMGE 2020)



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

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. Amenorrhea
B. Oligomenorrhea
C. Menorrhagia
D. Dysmenorrhea

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

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)

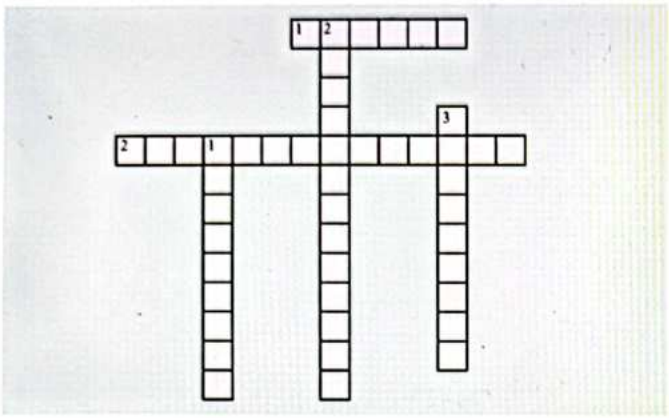
A. 100
B. 80
C. 60
D. 50

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Diagnosis of bacterial vaginosis is made by _____ criteria
2. Vaginitis that occur in alkaline pH are bacterial vaginosis and _____

Down

1. Most common cause of PID in India is _____
2. Drug of choice for bacterial vaginosis in pregnancy is _____
3. Secondary amenorrhea with intrauterine adhesions is known as _____syndrome

25 AMENORRHEA

Amenorrhea 00:00:50

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 if secondary sexual characters are absent
- No periods till 15 years if secondary sexual characters are present

Work up of a case of amenorrhea 00:03:46

- Pregnancy test
- Examination
  - 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 Present

- **Absent uterus** → MRKH Syndrome
- **Present uterus**
  - i. Hypothyroidism, Hyperprolactinemia
  - ii. ↑LH, ↑FSH (pure gonadal dys genesis)
  - iii. ↓LH, ↓FSH
    - Malnourishment
    - Chronic illness
    - Anorexia
  - Imperforate hymen
  - Transverse vaginal septum
  - Cervical atresia

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	

Secondary Amenorrhea 00:13:21

Secondary Amenorrhea (pregnancy Test -ve)

↓

Rule out Hypothyroidism Hyperprolactinemia

↓

PR challenge

- **Periods occur** → P.C.O.D (Periods occur in Estrogen primed endometrium)
- **No periods** → ER + PR challenge
  - **No periods** → Asherman syndrome
  - **Periods occur**
    - ↑LH, ↑FSH
      - Premature ovarian failure
      - Ovarian injury
        - → Radiotherapy
        - → Chemotherapy
      - Oophorectomy
    - ↓LH, ↓FSH
      - CNS tumors
      - Chronic illness
      - Sheehan syndrome

Common Etiology 00:21:30

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

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

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

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

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

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

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

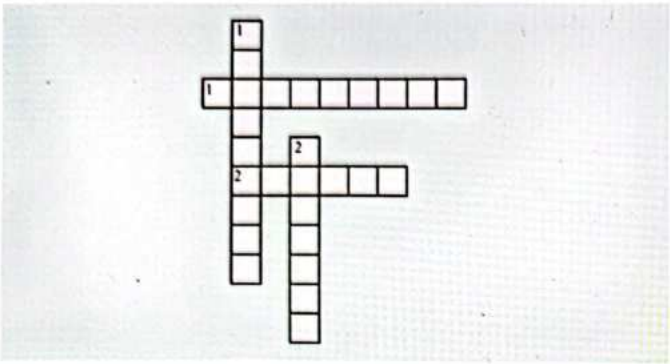
A. High LH and High FSH
B. Low FSH and High LH
C. Low FSH and normal LH
D. High FSH and low LH

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Amenorrhea in a previously menstruating woman is known as _____ amenorrhea
2. Androgen sensitivity syndrome is characterized by _____ uterus

Down

1. First thing to rule out in a woman of reproductive age presenting with amenorrhea is _____
2. Absence of periods after estrogen and progesterone withdrawal in a woman with secondary amenorrhea could be due to _____ syndrome

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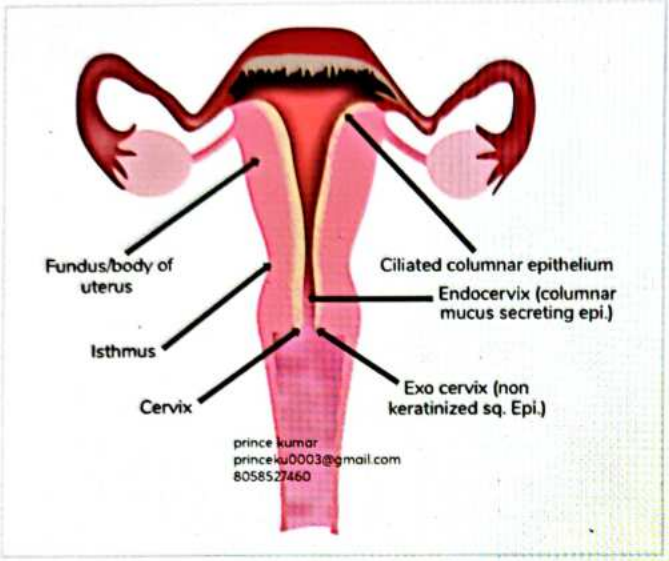
26 CLINICAL ANATOMY FEMALE REPRODUCTIVE TRACT

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

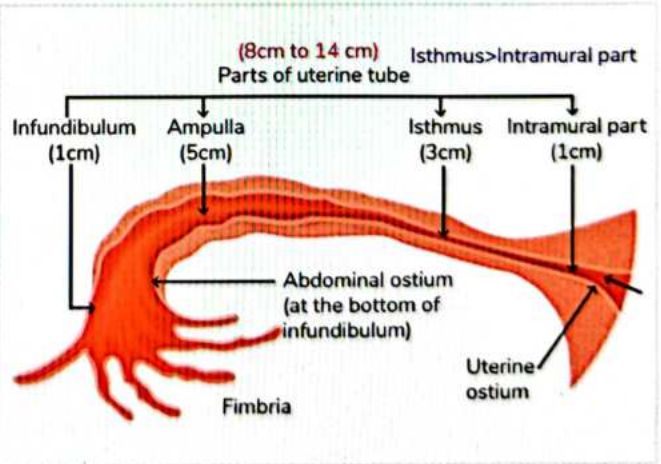
- Anterior Fornix
- Posterior Fornix
- Cervix is downwards & forwards, the semen is laid in the posterior Fornix of vagina & sperms easily swim up into the cervix
- Post Coital Tear
  - In the: Posterior Fornix (MC): posterior Vaginal wall
  - Button hole tear
- Pelvic Abscess: Drained by doing a Posterior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

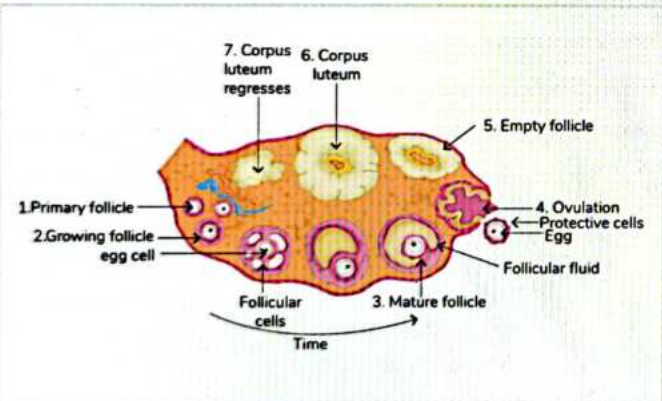
- Narrowest part: Interstitium
- Widest part: Ampulla (5cm)
- Site of fertilization: Ampulla
- Longest fimbrial strand: Fimbria Ovarica

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

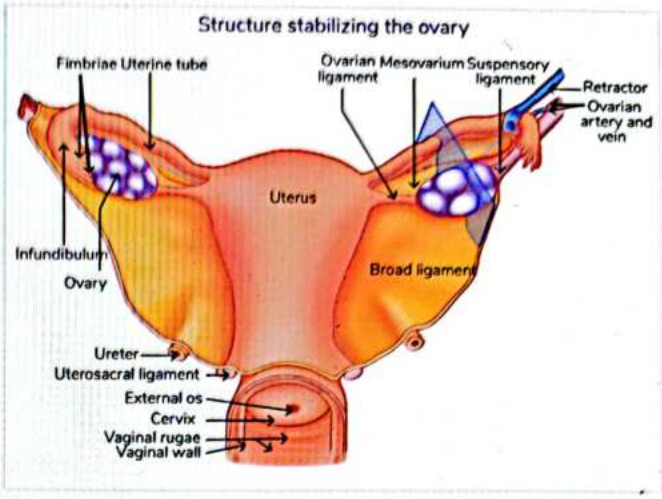
00:16:58



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

Ovary	
Cortex	**Medulla**
• Stroma ⊕ • Follicles develop here	• Has Fibromuscular coat • 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

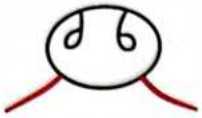
One Genital Tubercle and 2 genital swellings

6 wks

Testes	Ovaries
↓	↓
Androgens	Absence of Androgens
↓	↓
Increases length of tubercle	Swelling do not fuse
↓	↓

↓
Penis

- Descent of testes into the scrotal sac



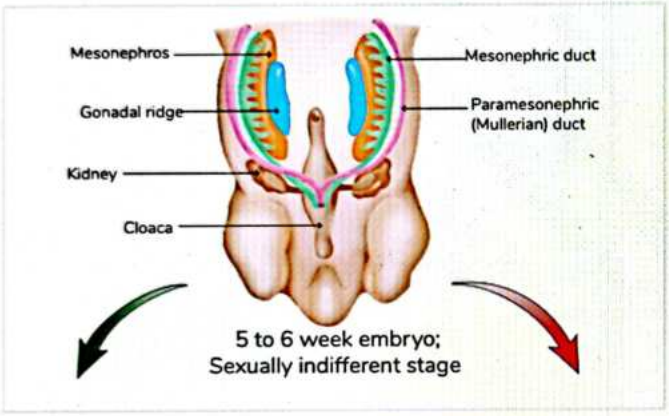
- Urogenital sinus fuses into base of scrotum makes, part of perineum, scrotal base & the rectum

↓

- Labia majora
- Labia minora
- Genital tubercle makes the clitoris
- Urogenital sinus invaginates between L. majora & L. minora & makes lower 1/5th of vagina

Refer Image 26.1

Formation of Internal Genitalia

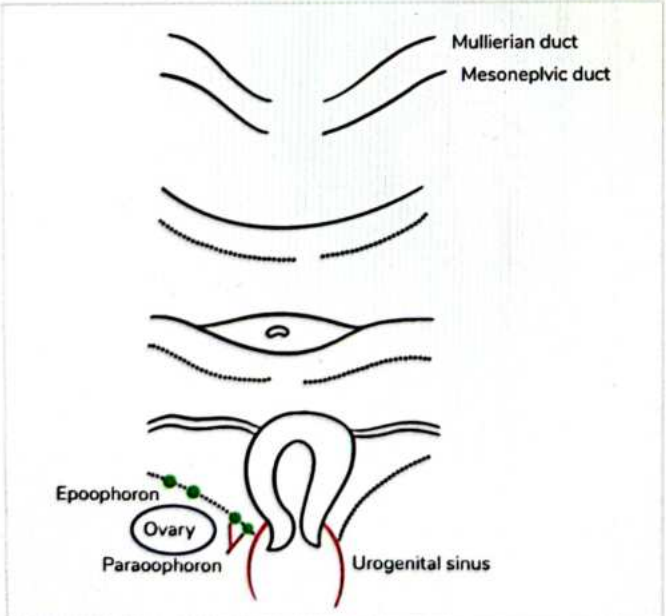


- In females Para Mesonephric duct (Mullerian ducta)

In males: Mesonephric duct (Wolffian duct)

Formation of Female Internal Genitalia

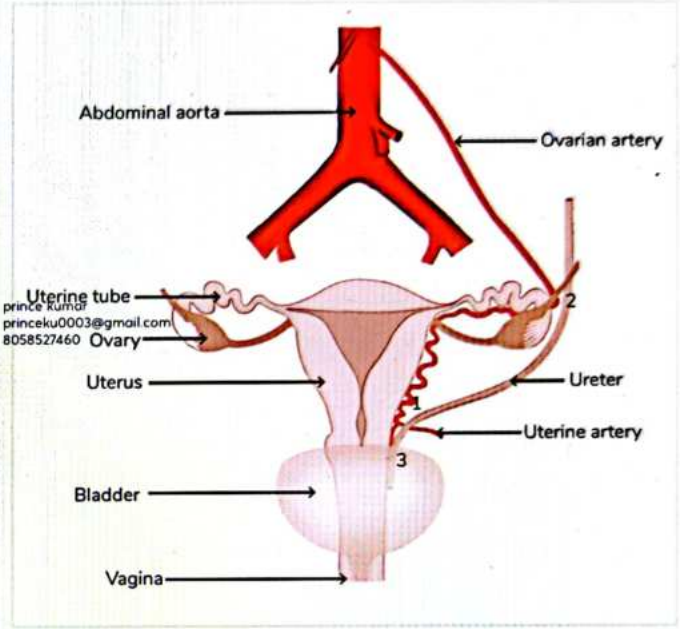
00:27:24



- 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
  - o Epoophoron
  - o Paraoophoron
- Epoophoron & Paraoophoron can have their ducts blocked → Para Ovarian Cysts.

Blood Supply of Pelvic Organs

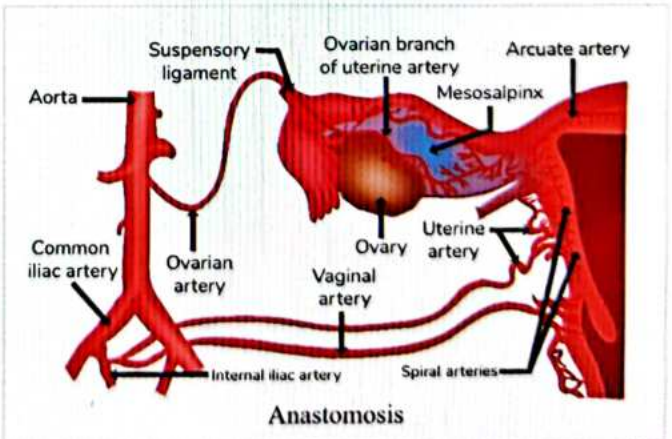
00:32:00

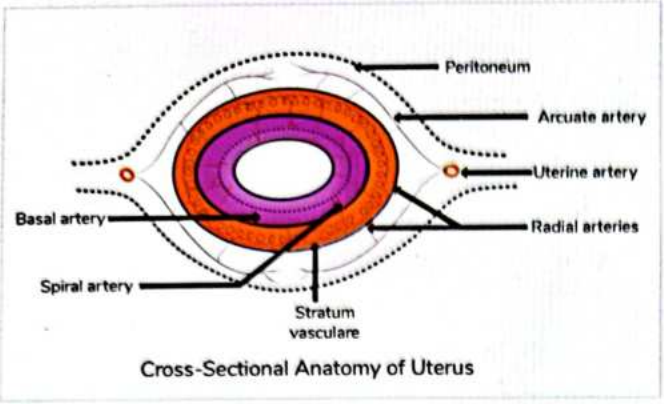


Refer Image 26.2

Short GILLS

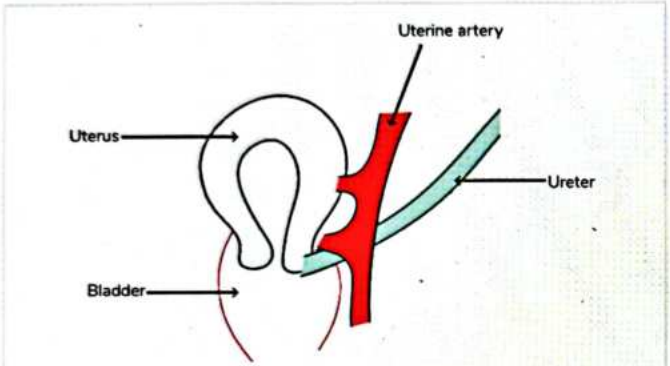
- S – Superior
- G – Gluteal
- IL - Ilio-Lumbar
- L – Lateral
- S - Sacral





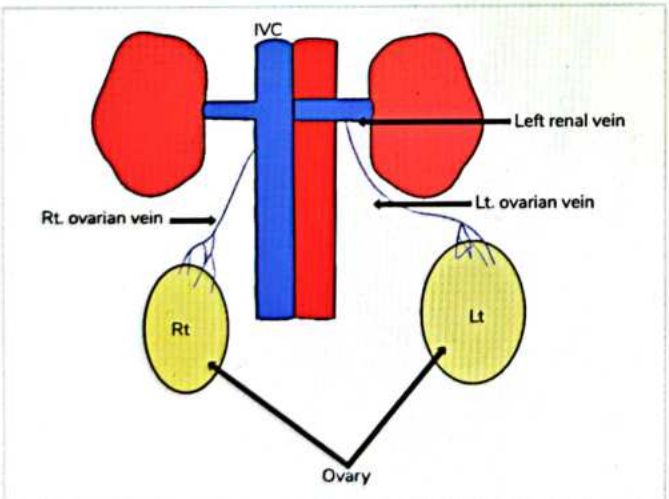
Cross-Sectional Anatomy of Uterus

Importance of Uterine Artery & Relation to the Ureter



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

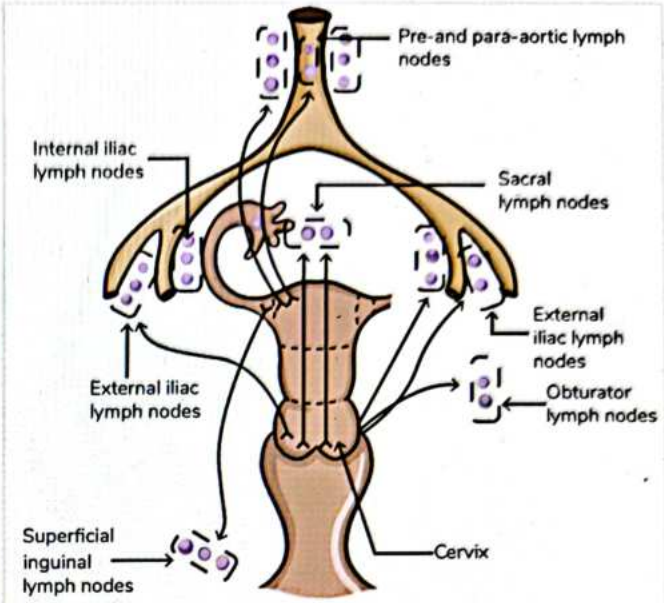
Venous Drainage of Ovaries



- 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

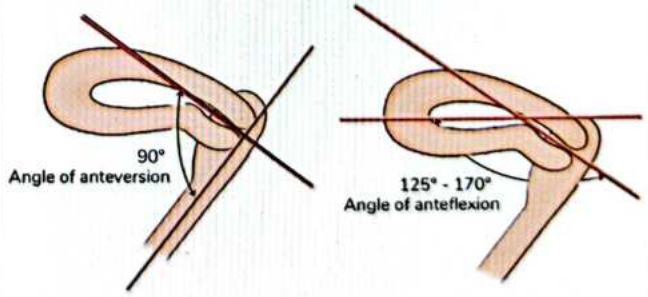
Important Information

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

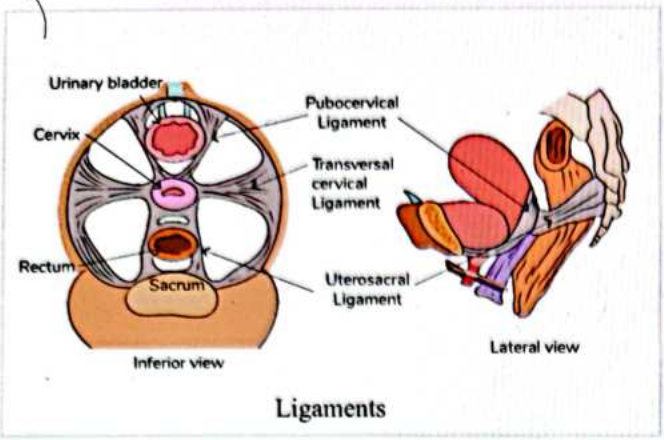
Ans. External iliac L.N > Obturator L.N

Supports of Uterus

00:42:06

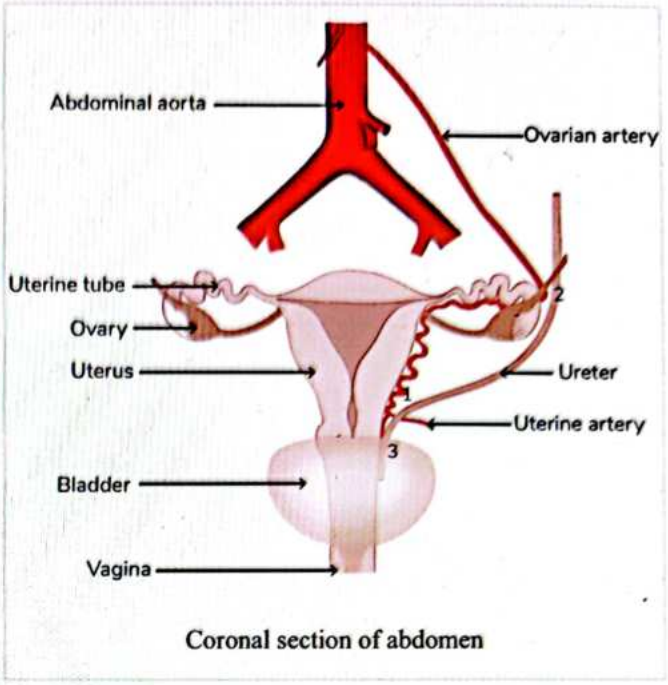


Axis of uterus: (is preventive)

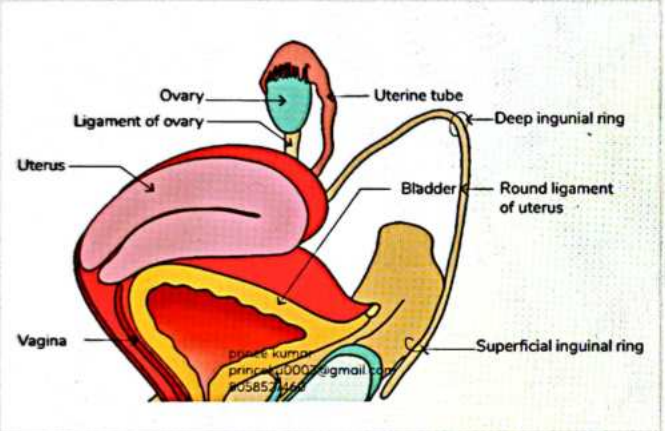


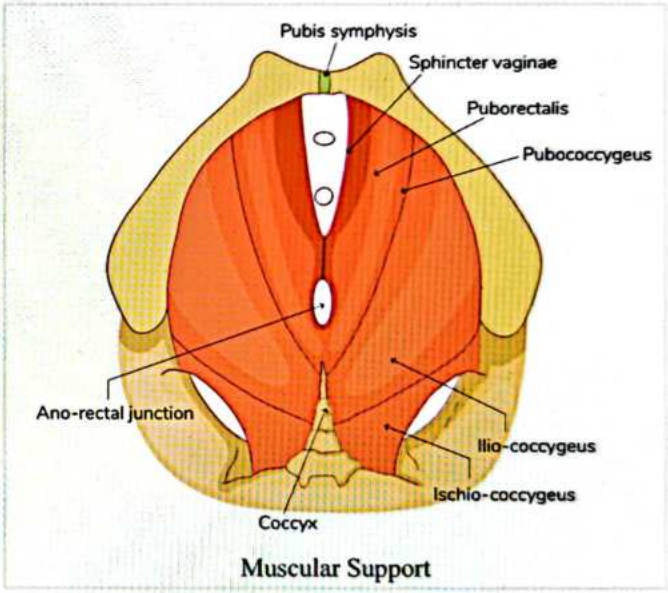
Ligaments

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

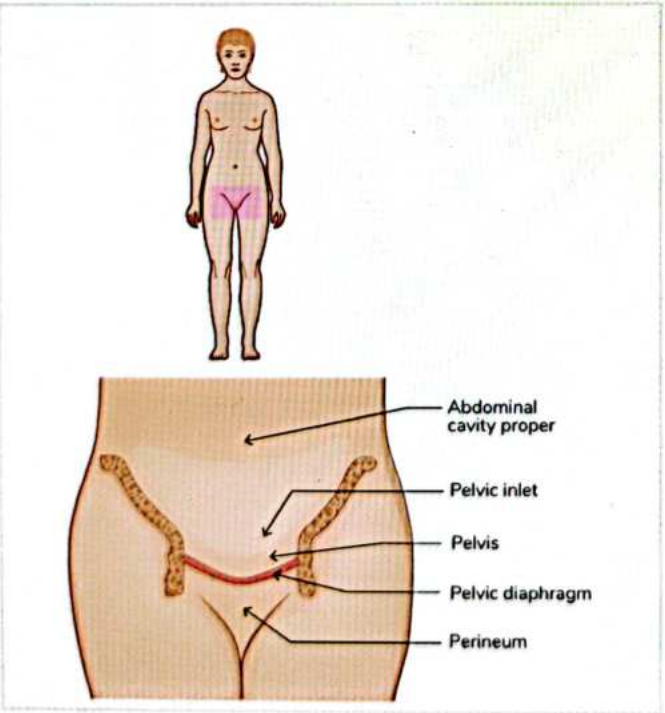


Coronal section of abdomen





Muscular Support



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

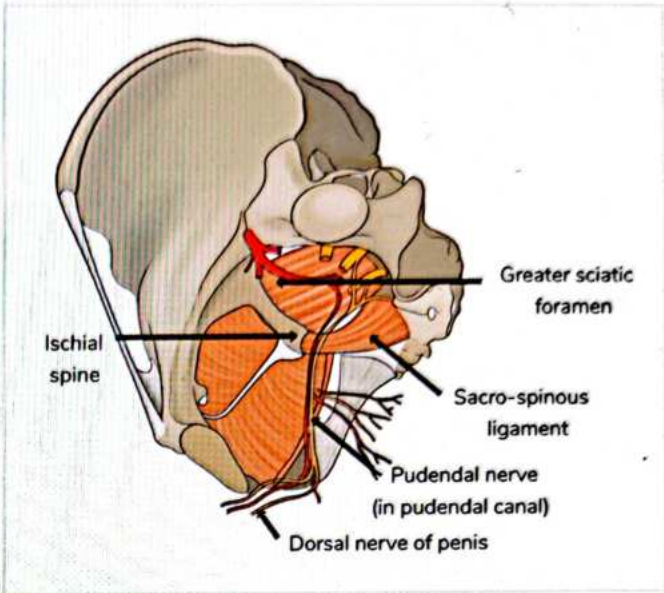
- Through pelvic splanchnic nerves via S2, S3 & S4

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



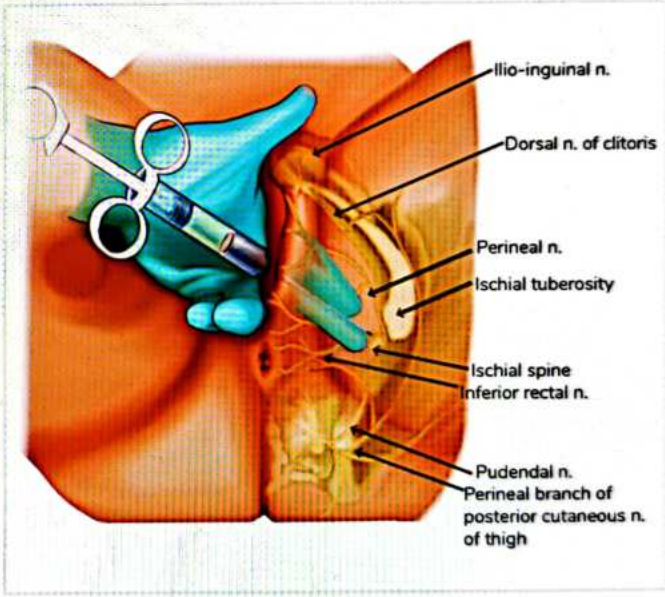


Image 26.1

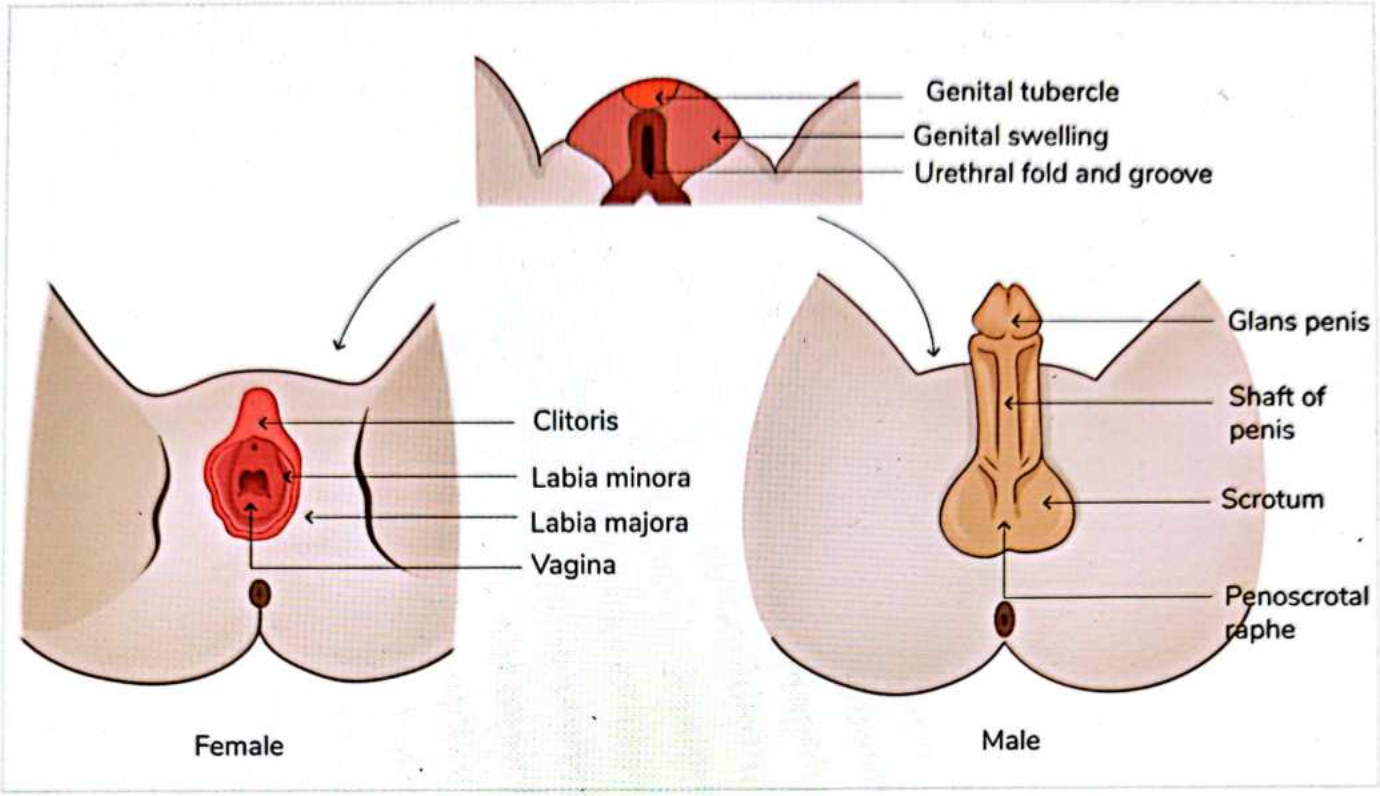
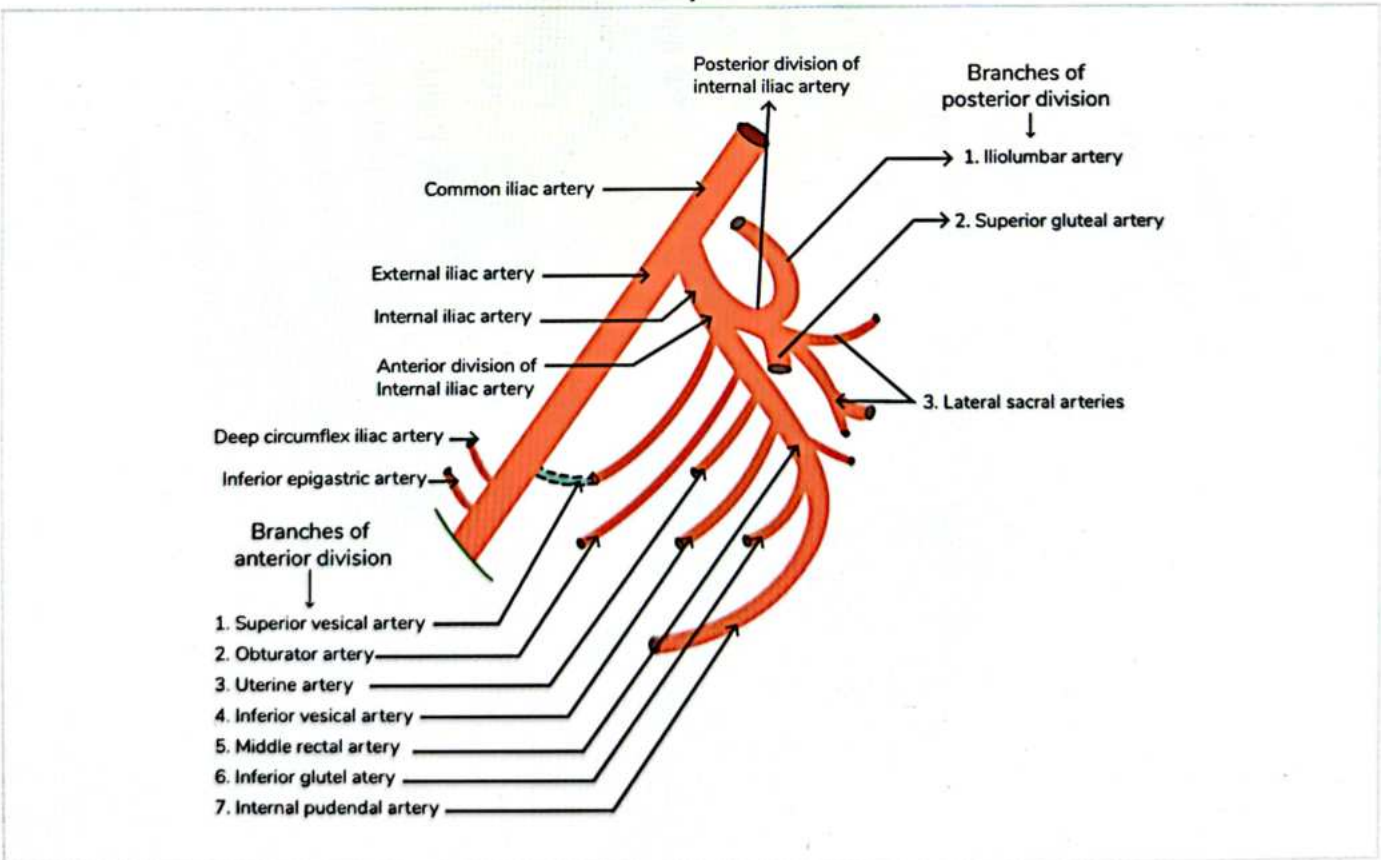
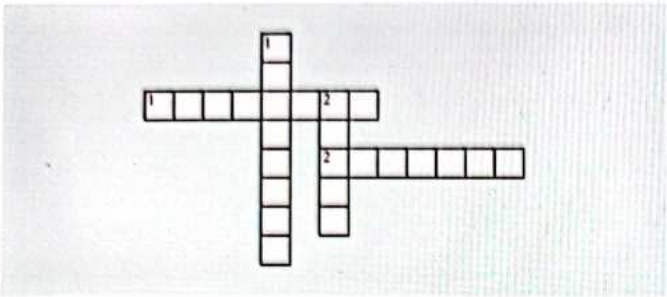


Image 26.2



CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Cervix does not drain into _____lymph nodes
2. Genital ridge in the females develops into the _____

Down

1. Genital tubercle in females develops into the _____
2. Uterine artery lies _____ the ureter at the level of cervix

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27 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

Endometrial CA

Etiology: High Estrogens 00:00:50

- Hormone replacement therapy: Estradiol 1-2 mg/ day, CEE (conjugated equine estrogen 0.625-1.25 mg/day) causes endometrial hyperplasia and cancer. Therefore, we must add progesterones to protect endometrium when giving HRT to non- hysterectomized patients.
- Tamoxifen: SERM: Highly estrogenic on uterus, anti-estrogenic on breast, used in Ca breast
- Early menarche and Late menopause: more menstrual cycles, more Estrogen exposure
- Estrogen producing ovarian cancers like Granulosa cell tumor
- Anovulatory conditions like PCOD, which is associated with persistent high Estrogen
- Obesity: Fats (1.5-2.5 times more likely)

Androgens
↓ Aromatase
Estrogens

- Corpus cancer syndrome (Corpus = Uterine body) associated with patients with diabetes-hypertension and 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

Important Information

- Excess estrogen: 80% of Ca endometrium: Type 1
- No association with E excess: 20% of Ca Endometrium: Type 2

- Age group: 45-55 yrs

Conversion from Endometrial Hyperplasia [PRE MALIGNANT] 00:11:54

Type of hyperplasia	Risk of conversion to malignancy	Treatment
Simple Hyperplasia without atypia	1%	Progesterone
Complex Hyperplasia without atypia:	3%	Progesterone
Simple Hyperplasia with atypia	8%	Simple hysterectomy
Complex Hyperplasia with atypia	29%	Simple hysterectomy

Histopathological types of endometrial cancer 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

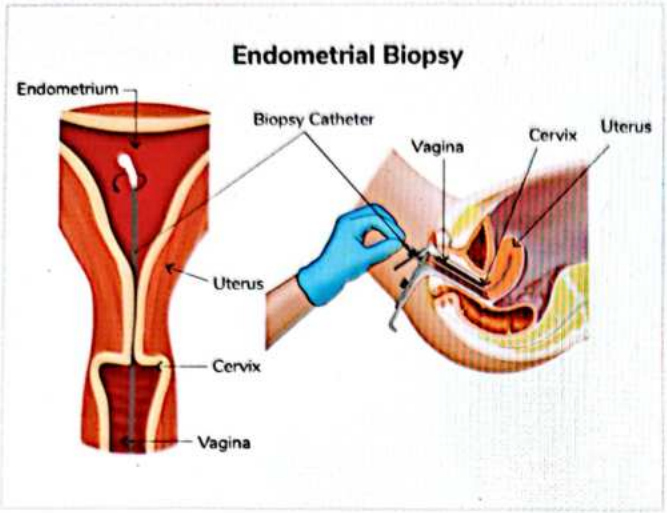
Important Information

- 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 in a patient with irregular or heavy vaginal bleeding is a local examination and Pipelle Endometrial Biopsy. This can be done on OPD basis, may use paracervical block and is 90% sensitive



- **Fractional currettage [D & C]** In this case, the biopsy is done from all walls and isthmus in an operation theatre under GA. It is 95-99% sensitive
- **Hysteroscopic biopsy:** This is the best test (Investigation of choice) for diagnosis of endometrial cancer and is 100% sensitive
- **Transvaginal sonography:** Note that an ultrasound is not the best or first investigation for diagnosis of endometrial cancer. It is at best a good adjunctive investigation
  - ET should be ≤4mm is normal in menopausal women
  - 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.

Staging Laparotomy 00:27:23

- Endometrial cancer is staged surgically. A total abdominal hysterectomy + B/L salpingo-oophorectomy is done along with peritoneal cytology
- LN assessment is done, if involved, do a lymph node dissection

Staging of CA Endometrium 00:29:20

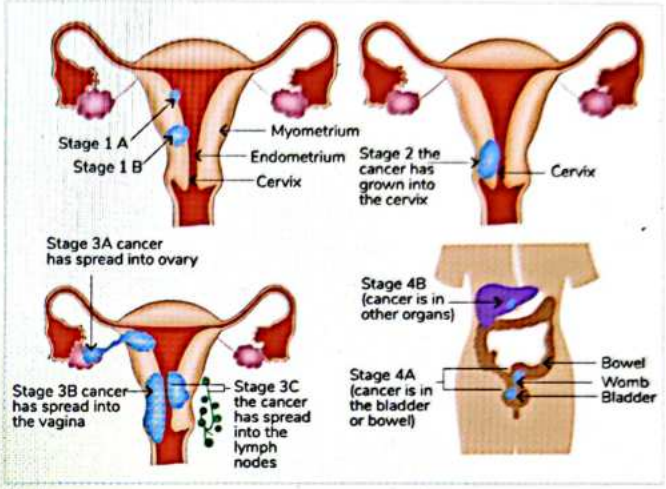
2009 FIGO staging system for carcinoma of the endometrium

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

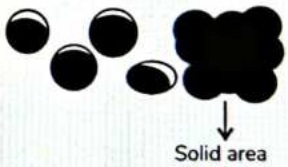
Stage III: Local and/or regional spread of tumor
- IIIA: Uterine serosa + positive peritoneal cytology
- IIIB: Vaginal and/or parametrial involvement
- IIIC: Metastases to pelvis and/or para-aortic lymph nodes
  - IIIC1 Positive pelvic nodes
  - IIIC2 Positive para-aortic lymph nodes

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



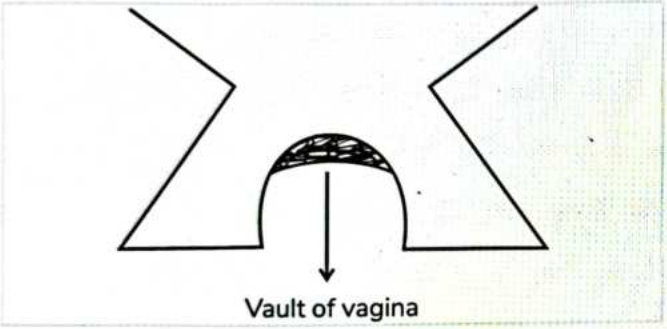
Important Information

- 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 is known as the vault and it is the most common site of recurrence and vault irradiation may be done in some cases.
  - First line management of recurrence → High Progesterone [200-250 mg/ day]

Important Information

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

PREVIOUS YEAR QUESTIONS

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

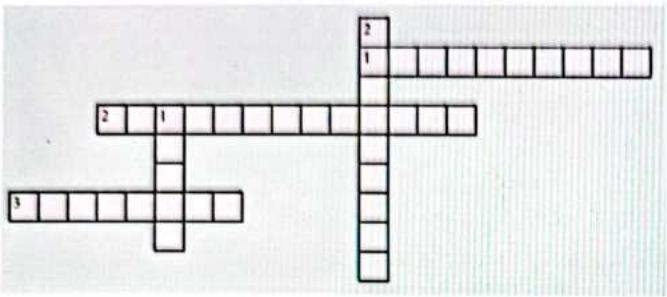
A. Ovarian cancer
B. Endometrial cancer
C. Myeloid cancer
D. Contralateral breast cancer

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. An OPD procedure done for diagnosis of endometrial cancer is endometrial _____
2. Investigation of choice for diagnosis of endometrial cancer is a _____ biopsy
3. Main hormone responsible for endometrial hyperplasia and Cancer is excess of _____

Down

1. Most important prognostic factor in Ca endometrium is the _____
2. Drug used for treatment of breast cancer that also causes endometrial hyperplasia is _____

28 COVID IN PREGNANCY

Coronavirus in Pregnancy

New Varieties of zoonotic origin

- SARS-CoV
- Middle East respiratory syndrome (MERS-CoV)
- Novel coronavirus of 2019 (SARS-CoV-2) : COVID 19, Wuhan Virus

Transmission

- Respiratory droplets.
- Asymptomatic or presymptomatic cause 40 to 50 % transmissions, thus Social distancing, masking is rightly advised

Maternal Infection

- Incubation: 5- 14 days
- Presentation
  - It is similar to general population : both presentation and outcome
  - Fever
  - Cough
  - Myalgia
  - Loss of smell and taste
  - Diarrhea
  - Nausea Vomiting
- **Signs of worsening disease**
  - Dyspnea, tachypnea
  - Decreased PO2
  - Acute respiratory distress syndrome.

Radiology

- Multiple Peripheral lobular
- Consolidations
- Ground glass opacities.

Complications in pregnancy

- Mostly No obstetrics complications.
- Severe Illness may be associated with abortions and Preterm Labor
- Requirement for Intensive care
- Requirement for Invasive ventilation
- Mortality

Fetal infection

- Infection of the placenta by SARS-CoV-2 is Possible
- Transmission to the fetus is rare
- Amniotic Fluid, Cord Blood, Neonatal Throat Swabs, breast milk sample, all have tested negative for coronavirus

Intranatal transfer

- Currently no evidence to prove that Covid 19 transmits through genital fluids
- During labor: Do electronic fetal monitoring

If vertical transmission does occur

- New-born can be asymptomatic, may have mild illness or may have severe illness

Breast feeding

- No evidence suggests transmission through breast milk, but proximity can transmit infection through respiratory droplet, however lack of breast feeding is more of a concern than the infection.
- Newborns with SARS-CoV-2 do not need to be separated from their mothers
- Isolate from other newborns

Diagnosis

- RTPCR - Viral RNA
- Rapid antigen- Viral antigen

Treatment

- **Delivery:** Obstetric Indications only, caesarean also only for obstetric
- **Mild illness with Pregnancy:** Anti-SARS-CoV-2 monoclonal antibodies can be given within 10 days
- **Moderate :** Admission and care
- **Severe illness**
  - Support Respiratory Function : maintain PO2 >95%, reduce Tachypnea & Dyspnea
  - Prone Ventilation done, If required
  - Dysregulated Inflammatory Response (Cytokine storm) can cause harm : thus give Dexamethasone 6 mg daily x 10 days reduces mortality
  - Intravenous remdesivir is now FDA approved and is given especially for Low Flow requiring & Ventilated patients. It is known to shorten time to recovery

COVID Vaccination

- All pregnant women can be given the vaccine in all trimesters, also to lactating mothers
- Low risk mothers: Covisheild (Viral Vector Vax)

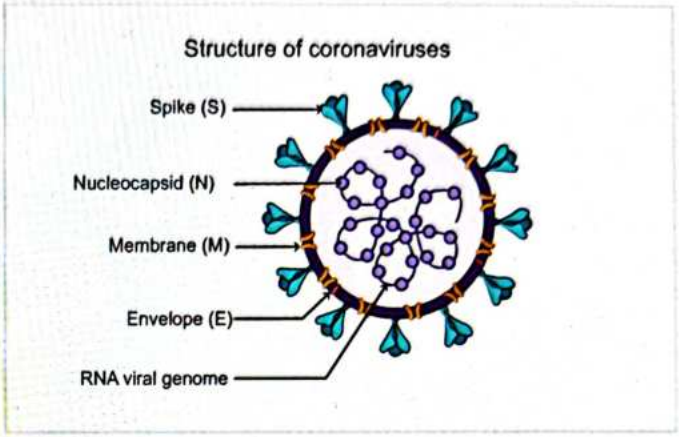
- High risk mothers: PIH, GDM, Anemia etc - Covaxin (Killed)
- Interval between 2 doses: Covisheild: 12-16 weeks, Covaxin: 4-6 weeks

Special situations

- TD and covid vaccine: Can be on same day
- Anti D and covid vaccine: Can be on same day
- Covid vaccine can be combined with Blood transfusion and iron sucrose
- If women is covid positive: leave 3 months gap before vaccination

Latest updates

- BNT162b2 mRNA vaccine : has reduced number of positive women
- Associated with a reduction in COVID-19 Diagnosis
- Pregnant and lactating women can take COVID-19 vaccine (ACOG & SMFM)



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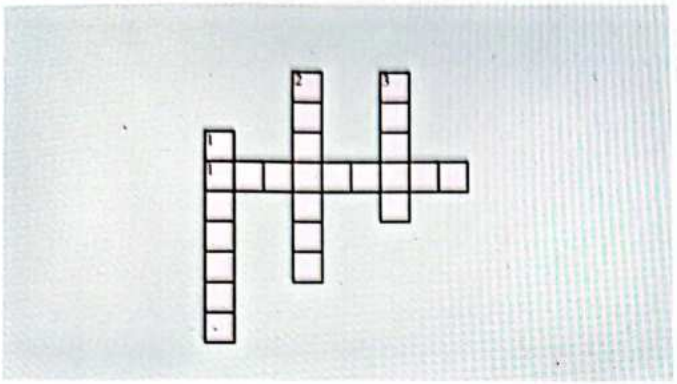
CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Cesarean in COVID is done for __ indication

Down

1. COVID vaccine recommended for high risk pregnant mothers is __
2. Severe COVID in pregnancy may be associated with abortions and __ Labor
3. Transmission of COVID infection to the fetus is ____

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29 POSTPARTUM HEMORRHAGE

Maternal Mortality

- MMR: Around 97/100,000 women

Causes of Maternal Mortality

- Most common cause: Obstetric hemorrhage
- Amongst obstetric hemorrhage causes are:
  - Abortion related
  - Ante-partum Hemorrhage: Any bleed in genital tract after 28 wks & before delivery
  - Postpartum Hemorrhage: Any bleed in genital tract after delivery, MCC of MMR in India

Post Partum Hemorrhage (PPH)

Definitions

- Any bleeding in the genital tract after delivery, not only uterine, includes traumatic and other causes too.
- Traditionally > 500ml in normal delivery and > 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
- **Significant blood loss:** > 1000 mL

- Concept of **added Blood volume in pregnancy**
  - Non pregnant woman blood volume = (50 x height (in) + 25 x Weight (lb)) /2
  - Woman adds around 50% to blood volume in pregnancy
  - Hct is around 33%
  - If blood loss is less than the pregnancy added volume, the hematocrit remains the same
  - If post delivery Hct is less than Hct before delivery, then blood loss can be estimated as the sum of the calculated pregnancy added volume plus 500 ml for each 3 volume% decline of hematocrit
  - Example: blood volume was 5000 ml, pregnancy added volume is around 50%, that is 2500, total of 7500 ml.
    → Hct has dropped from 33 to 30%
    → Now blood loss is 2500 (added volume) + 500 ml (500 ml for every 3% drop in Hct) = 3000 ml

Active Management of 3rd Stage of Labor

- 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

Causes

- 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

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

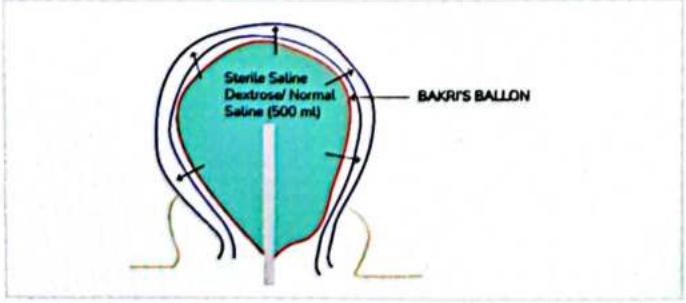
- DOC for prevention and treatment of PPH is Oxytocin

2. IV Methyl Ergometrine 0.2 mg [peak action at 90 sec]
   - Can also be given IM (IV acts faster)

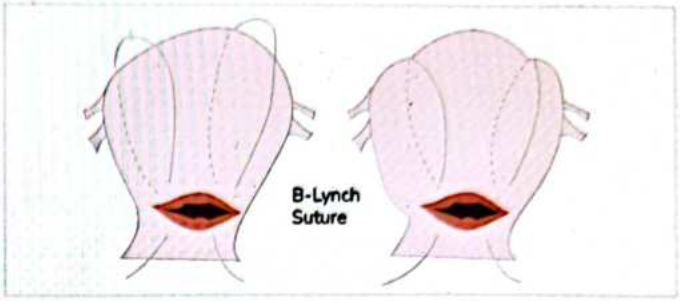
- Contra indications
  - → Heart disease
  - → PIH [Pregnancy Induced HTN]
  - → Rh Iso immunization
  - → Before 2nd twin is delivered

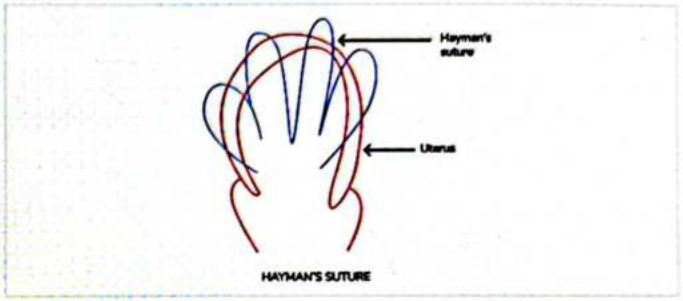
3. Tab Misoprostol (PGE_1): 1000 µg per rectum
4. Inj. Carboprost ($PGF_2\alpha$)
   - IM only
   - Never given IV – causes sudden HTN
   - Can be given intra-myometrial
   - Drug given when no other drug is working
5. Recombinant VII: 90 mg/kg body wt. in 3-5 min IV infusion
6. Carbetocin: Synthetic analogue of oxytocin
   - 100 mcg in 1 ml IV over 1 min
   - Onset of action in 2 mins and lasts around 1 hour (while oxytocin starts to act after 5 mins and lasts for 20 mins)
   - One bolus injection equivalent to 16 hours action of oxytocin drip
7. Tranexamic acid: 1 gm IV, is an anti-fibrinolysis
8. 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
9. Uterine artery embolization
   - Prophylaxis for Placenta Previa, Placenta Accreta
   - for Rx in acute conditions
10. Intravascular AORTIC balloon compression – prophylactic

11. Balloon Tamponade 00:31:02
    - Bakri's balloon [Now-a-days]
    - Bakri's balloon is distended by 500 ml fluids
    - Sengstaken tube
    - Foley's catheter [can hold up to 100 ml of fluids]
    - Condoms



12. 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

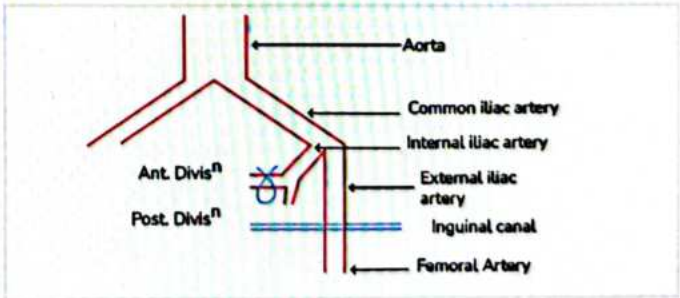




Internal Iliac Artery Ligation 00:37:40

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

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

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 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

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

Q. Identify this lesion. (INICET 2021)

A. Condyloma Acuminata
B. Vulvar Hematoma
C. Vulvar Cancer
D. Bartholin Cyst

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

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

Q. All of the following are used for prevention of PPH, EXCEPT? (AIIMS 2019)

A. Misoprostol
B. Dinoprostone
C. PGF 2 alfa
D. Oxytocin

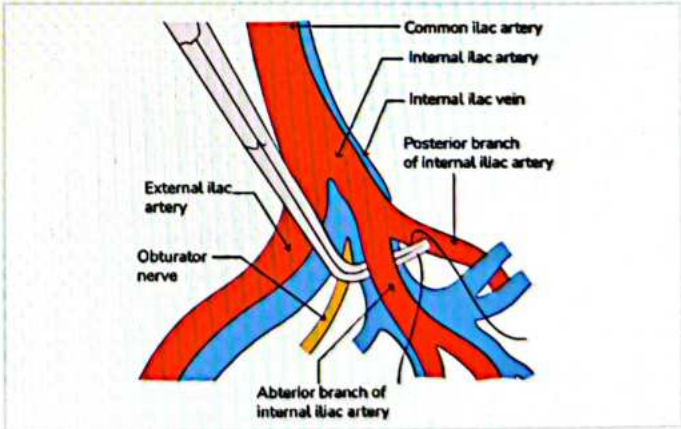
Q. 25 year old primigravida, after giving birth to her child had continuous bleeding from the uterus. The patient was taken to OT and planned for uterine devascularization. Which of the following is the correct order of uterine devascularization? (NEET 2021)

A. Uterine artery, pudendal artery, vaginal artery
B. Uterine artery, Internal iliac artery, obturator artery
C. Uterine artery, ovarian artery, internal iliac artery
D. Uterine artery, ovarian artery, external iliac artery

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

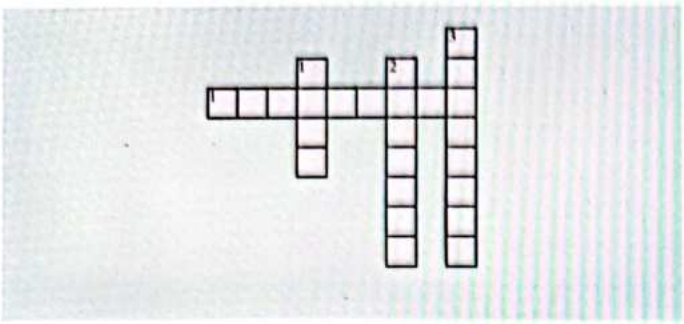
Q. What is the common obstetric/ gynaecological condition, where this procedure is done? (FMGE 2020)



A. Dysfunctional bleed after hysterectomy
B. Atonic PPH
C. Recurrent bleed from Ca cervix
D. Bleed from vulva

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Excessive uterine bleeding at 3 days after deliver is known as __ PPH

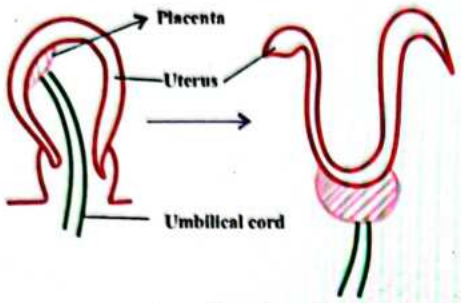
Down

1. An Hb drop of __ gm% is considered as massive obstetric hemorrhage
2. Active management of third stage of labor includes controlled cord traction, oxytocin and uterine __
3. Drug of choice for prevention and treatment of PPH is __

30 PLACENTA: SEPARATION AND COMPLICATIONS

Uterine Inversion 00:01:21

- Pulling the cord without placental separation causes acute uterine inversion. It is defined as turning inside out of the fundus into uterine cavity following child birth



Inversion of uterus

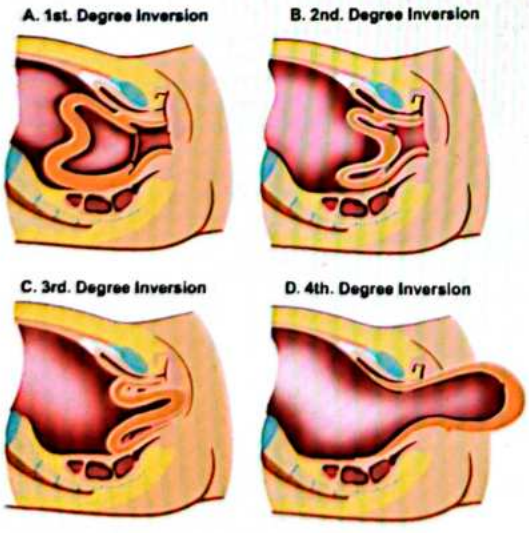
- Inversion complications → Neurogenic shock (pain)
  → Hemorrhagic shock

Important Information

- MCC of death d/t Inversion→Hemorrhagic shock

Classification

1. First degree- The top of the uterus (fundus) has collapsed, but the uterus hasn't come through the cervix.
2. Second degree-The uterus is inside-out and coming out through the cervix.
3. Third degree-The fundus of the uterus is coming out of the vagina.
4. Fourth degree-Both the uterus and vagina protrude outside the introitus



Causes 00:02:37

- Fundal Implantation of Placenta
- Uterine atony
- Morbidly adhered placenta
- Sudden cord traction

Management 00:03:49

- Get IV Access
- Give rapid infusion of fluids, arrange Blood
- Try & Reposit as soon as possible

1. Manual Reposition : The part which came out last should be reposited in first. This is the first line management of acute uterine inversion.
2. Hydrostatic Reposition : Also called as O' Sullivan's method, this can be tried if manual reposition fails.

- For repositioning, first give a tocolytic such as Inj Terbutaline, which relaxes the uterus when repositioning is done. By filling fluid in uterus, keeping one hand in vagina, so that water does not come out (hydrostatic) or manually. Following repositioning, oxytocics such as Inj Oxytocin or Inj Methylergometrine are given.

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 & ANDREWS 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 of placental separation 00:11:34

- Permanent lengthening of Cord
- Fresh gush of bleeding
- Supra pubic bulge (Most specific sign)

Retained Placenta 00:13:00

- It is defined as separation of placenta in the third stage of Labor taking longer than 30 min

Management

- Retained placenta is managed by Manual Removal of Placenta under General Anesthesia in OT

Retained Placental Bits

- Causes secondary PPH, that is, it presents after 24 hours of delivery up to 12 weeks.
- Management is done by Curettage for evacuation of uterus
- Complication of curettage done for secondary PPH can result in Asherman's Syndrome

Mode of placental separation

00:18:40

Central Separation/ Shultze Separation → SHINY

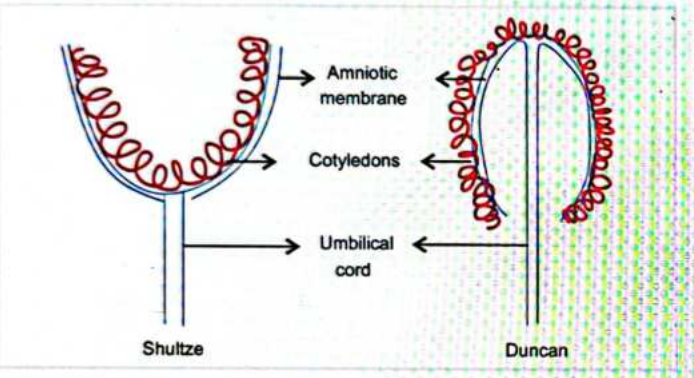
- Placenta folds on itself and comes out, such that membranes come out first
- This is the more common mode of separation and is also seen in Controlled cord traction

Marginal Separation / Duncan's Separation → DIRTY

- Placenta everts and comes out such tat the cotyledons (outer surface) comes first and membranes come out later.

How to remember

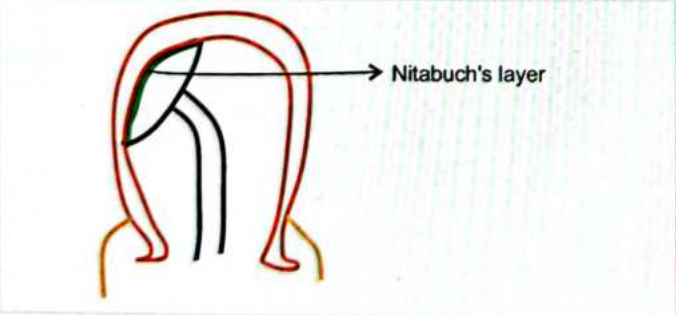
- Shultze : Shiny
- Duncan : Dirty



Morbidly Adherant Placenta

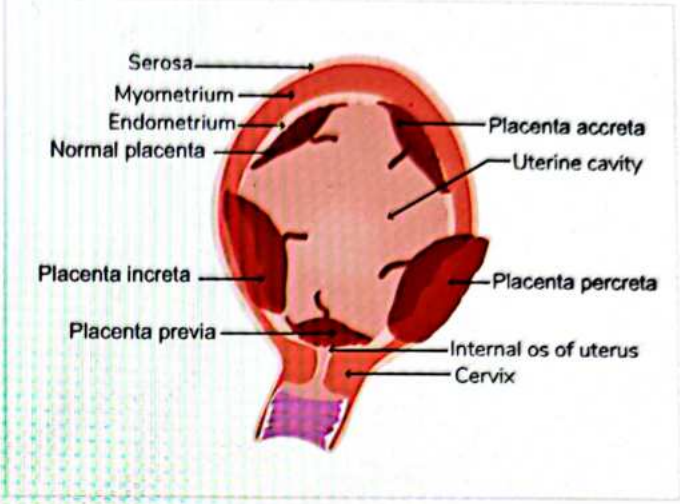
00:24:45

- The main pathology in morbidly adherent placenta is the absence of Nitabuch's layer, which is the fibrinoid layer at which Placental separation happens in normal placentation.



Types :

a. **Placenta Accreta** : The placenta is stuck to uterine wall, but does not invade myometrium
b. **Placenta Increta** : The placenta is adhered to muscle layer, but does not reach upto serosa
c. **Placenta Percreta** : The placenta invades muscle layer and reaches up to serosa



Management

- Management usually involves Laparotomy, which includes cesarean to deliver the baby, along with an obstetric hysterectomy
- In cases of young age, and where the uterus can be saved, by separating as much placenta as possible at the time of cesarean section, the bleeding may be controlled by compression sutures or stepwise devascularization. Following this, post op Methotrxate or Actinomyin can be given, to autolyze the placental tissue and prevent conversion to trophoblastic neoplasia.

Predisposing Conditions

00:29:31

- Previous Cesarean Section
- Previous Curettage
- Placenta Previa (low Lying Placenta) – Most common and most important
- Chronic Infections

Important Information

- Most common cause of Placenta accrete is Placenta previa (Not previous cesarean)

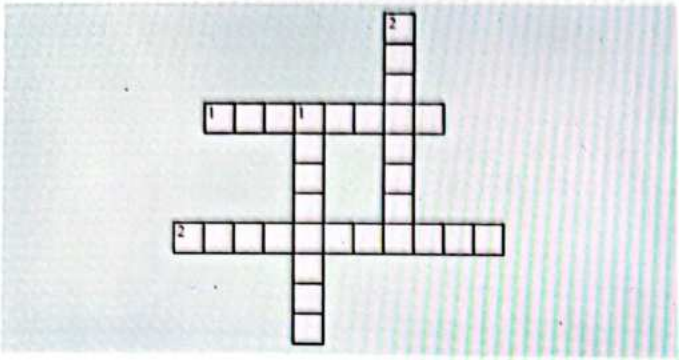
PREVIOUS YEAR QUESTIONS

Q. 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 accreta
D. Placenta previa

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Absence of ___ layer is responsible for adherent placenta
2. Most common cause of death in uterine inversion is ___ shock

Down

1. Curettage for secondary PPH may lead to __ syndrome
2. Adherent placenta invading muscle upto uterine serosa is called placenta ___

31 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

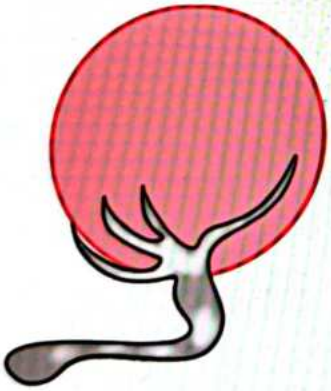
Cord Abnormalities

Single umbilical artery 00:01:35

- Seen 1% in singleton pregnancy and around 5% in twins
- This is the most common pathology of umbilical cord and occurs due to 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

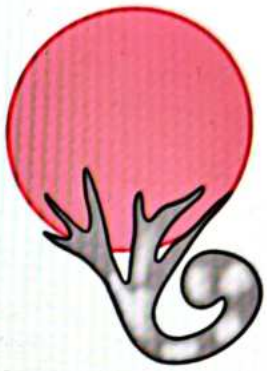
- Peripheral Insertion of cord instead of centre, such that it can get detached in delivery of placenta
- If associated with low-lying placenta, can cause cord compression



Battledore/ Marginal insertion

Velamentous Cord 00:05:30

- Splitting of cord before insertion into the placenta
- **VASA PREVIA** → Presence of velamentous Cord at the level of internal Os, such that it can present with fetal bleeding (50% fatal)
  - Painless bleeding
  - Fatal fetal bleeding
  - Diagnosis is best made by doppler.
  - APT TEST or Alkaline denaturation test is used to detect whether the blood loss is maternal or fetal, hence is a qualitative test. Addition of NaOH to vaginal blood in a test tube causes Alkaline Denaturation of maternal blood, and it becomes colorless while fetal RBCs resist alkaline denaturation and thus remain red.



Velamentous placenta

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 and do not cause any fetal harm during delivery.

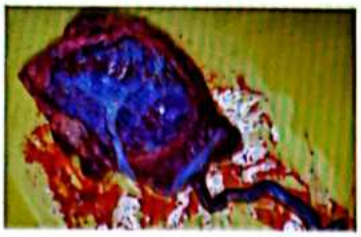
Long And Short Cord 00:12:40

- Normal length: 50-60 cm
- Long cord: Upto 300 cm
- Short cord: 20 cm

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

Circumvallate

- **CIRCUMMARGINATE PLACENTA**
  - Thin fibrous ring present at the chorionic plate margin
  - Transition from membranous to villous chorionic is flat
  - No clinical significance

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

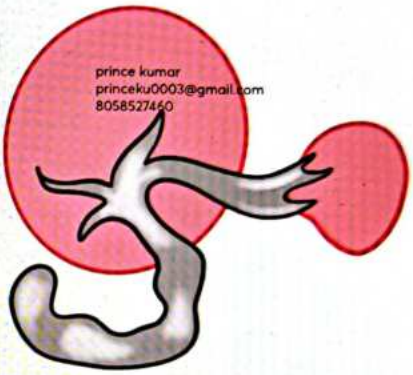
- Presentation
  - First trimester bleeding
  - Polyhydramnios
  - Abruption
  - Retained placenta
  - No fetal anomalies

Placenta fenestrata

- This is a fenestrated placenta, may rarely be a placenta with a true hole, or more commonly, the villi are absent but the chorionic plate is intact which appears as a fenestration.

Accessory / succenturiate lobe

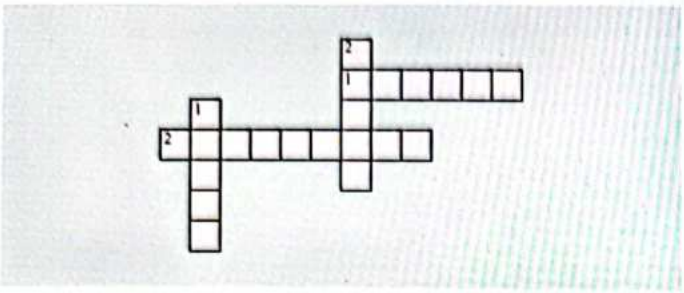
- One must always examine placenta for completion, right after delivery to rule out a retained bit or cotyledon, however an accessory lobe is an extra lobe away from the main placenta, which may still be retained and cause PPH.
- This usually presents with secondary PPH due to retained placental bit or as a placental polyp. Other presentations may be subinvolution of uterus or in delayed cases as sepsis
- Management is removal by uterine curettage.



Succenturiate lobe

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Single umbilical artery is not associated with any fetal abnormalities in __ % cases
2. Accessory lobe can present after few days of delivery with bleeding known as __ PPH

Down

1. Bleeding in case of vasa previa is __ in origin
3. In an APT test, ___ RBCs appear red or pink in color.

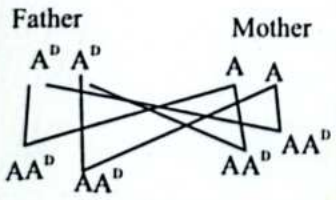
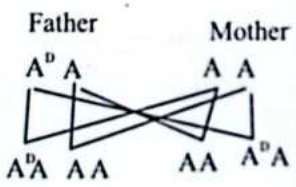
32 RH ISOIMMUNIZATION

Rh Isoimmunization

Rh antigen

- Rh antigen group of 5 antigens and is present on Chromosome 1. These are c, C, D, E, e. Out of these the "D" antigen is the most antigenic. Thus Rh positive essentially means Rh 'D' positive. This is now known as the CDE grouping.
- Rh alloimmunization implies that mother makes antibodies against the fetal D antigen.
- Presence of D antigen is Rh positive and absence of it is Rh negative. The other group is A, B, O antigens.

Example:

Mother A Negative Father A Positive (Homozygous)	Mother A Negative Father A Positive (Heterozygous)
	
Fatus is A negative (100%)	Fetus is A positive (50%)

When mother is Rh negative and father is Rh positive, then fetus is Rh positive in 50-100% cases.

Mechanism of Rh isoimmunization

- The blood of the mother and fetus never mixes, only exchange of oxygen and nutrients, occurs across the villi.

Mixing of blood can occurs at the time of

- Delivery (5-30 ml) (Most Common time of mixing): at the time of placental separation after delivery, there is placental blood, composed of both maternal and fetal blood, some of this blood goes into the maternal veins as the uterus contracts. This is the time, the mother gets contaminated with fetal blood. Do not give methergine as it causes sudden contraction of uterus and causes increased risk of contamination.
- Abortion
- Molar Pregnancy
- Ectopic pregnancy
- IUFD (Intrauterine fetal death)
- Abruption
- Placenta previa
- Injury of abdomen
- Amniocentesis
- Chorionic Villi Sampling
- ECV: external cephalic version

What happens after mixing of blood at the time of delivery

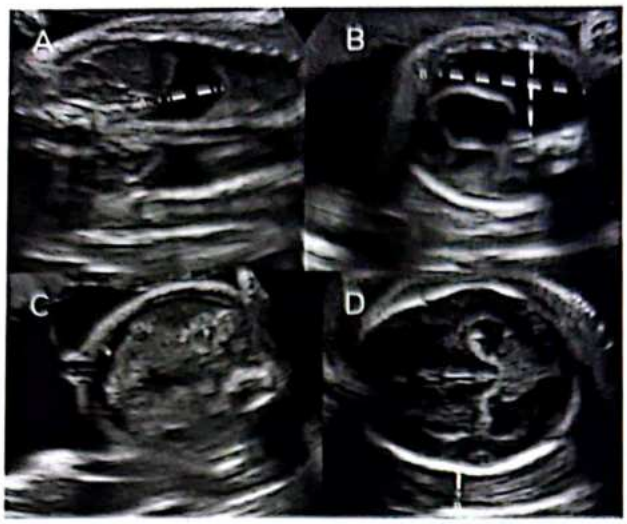
- Mother gets sensitized and starts making D antibody. These antibodies cause lysis of D carrying fetal RBCs in the maternal circulation and not in the baby, as it is already born. The baby is safe.
- In the next pregnancy, the mother is already sensitized, has anti D antibodies in her circulation now, now if the baby is Rh positive, all the anti-D from the circulation now gets transferred through the placenta and causes lysis of fetal RBCs in the baby. this causes antigen-antibody reaction on the fetal RBCS.

Important Information

- **Rh Negative Mother + Rh Positive Baby (first pregnancy)**
  - Sensitization of Mother lysis of fetal RBCs in maternal circulation
  - 1st Baby will be safe
- **Rh Sensitized mother + Rh Positive Baby**
  - Rh Incompatibility occurs she already has anti D lysis of fetal RBCs in fetus
  - Baby is not safe

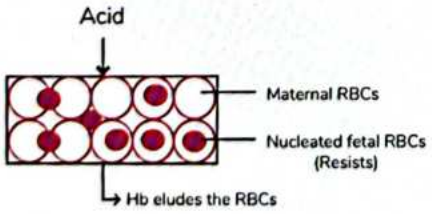
Antigen / Antibody reaction on Fetal RBCs

- Hemolysis
- Anemia
- Increased Bilirubin → Jaundice, Kernicterus (> 20mg/dl)
- Hydrops fetalis: there is increased third space collections leading to ascites, pleural effusion and edema
- Erythroblastosis Fetalis: increased hemolysis is compensated by bone marrow hyperplasia to increase red cell production. This is called erythroblastosis fetalis.



Prevention

- Mortality: 20-30%
- Anti-D 300 µg is given within 72 hrs of delivery. The purpose of this anti-D is to neutralize any fetal RBCs in the maternal circulation before the mother can make her own anti-D and thus she does not get sensitized.
- 300 mcg anti-D (or 1500 IU) will neutralize 30 ml blood (15 mL RBCs)
- Should be given within 72 hours, can be given upto 4 wks. If given after 72 hours, the mother's immune system gets to recognize the D antigen and creates memory for it.
- In case of an abortion (before 12 weeks), the dose can be 50 mcg up to 120 mcg. After 12 weeks, full dose must be given.
- **Dose of anti-D required**: Kliehauer Betke Test (Acid Elution Technique): this method measures amount of feto-maternal hemorrhage. The blood from mother is taken and put in an acid bath: citrate phosphate buffer. The maternal hemoglobin elutes the RBCs, and RBCs now become colorless. Some RBCs which do not become colorless are nucleated fetal RBCs, resist acid elution. This is a quantitative test.



- $\text{FMH} = \%\,\text{Contamination} \times \text{Maternal Blood Volume} \times \frac{\text{Maternal Hematocrit}}{\text{newborn Hematocrit}}$
- $\%\,\text{Contamination} = \frac{\text{Fetal RBCs}}{\text{Maternal RBCs}}$, $\text{Eg} = \frac{3}{300} = 1\%$

Example:

Q. Mother wt. = 60 kg; % contamination = 1 %, calculate dose of Anti-D ?

Ans. Maternal blood volume at term (100 ml/kg body weight) = $60 \times 100 = 6000$ ml

$$\text{FMH} = \frac{1}{100} \times 6000 = 60 \text{ ml}$$

- 30 ml blood is neutralized by 300 µg Anti-D

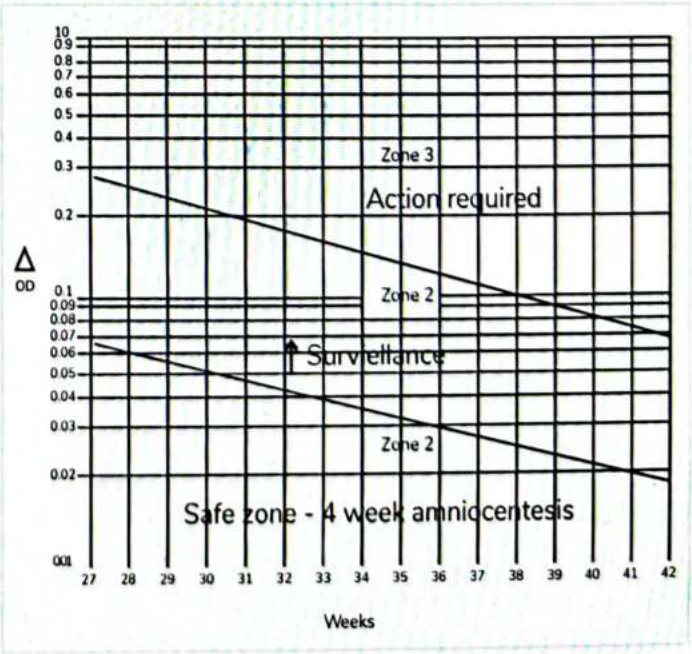
Therefore 60 ml blood will be neutralized by 600 µg Anti-D

Antenatal Management

- When mother is Rh negative and father is Rh positive, do an ICT (Indirect Coomb's test), a positive test implies mother is already sensitized, requires monitoring and treatment. If ICT is negative, then continue pregnancy and repeat test at 20 weeks, then 4 weekly (24 weeks, 28 weeks, 32 weeks, 36 weeks and 40 weeks), if all are negative, the deliver at 40 weeks, do a kleihauer betke test and give the required dose of anti-D.
- During the pregnancy also, any trivial transplacental hemorrhage may happen, which may sensitize her and cause lysis of fetal RBCs, thus rarely the fetus may have hemolysis even in first pregnancy. This can be prevented by prophylactic anti-D 300 mcg at 28 weeks.
- If ICT becomes positive at anytime during pregnancy, then check the titre, up to 1:16 dilution is safe titre, check titre monthly now.
- If titre is 1:1024 (high titre) : now check for the amount of hemolysis.

Methods To Check For Amount of Hemolysis

- **Liley's Graph**: not used now-a-days as it requires amniocenetesis, which is invasive



- **Brain sparing effect on doppler USG:** is seen in case if increasing hemolysis. This is checked by MCA-PSV (middle cerebral artery-peak systolic velocity). Very high MCA-PSV > 1.5 MoM implies significant hemolysis.

Management of Significant Hemolysis

- **> 34 weeks pregnancy:** deliver and manage baby
- **< 34 weeks pregnancy:** intra-uterine blood transfusion, given in the umbilical vein.
- Blood transfusion amount = estimated fetal weight x 0.02 for every 10% rise in hematocrit required
- Blood can be transfused in umbilical vein or can be given intraperitoneal
- Characteristics of blood for transfusion
  - O negative blood
  - Leucocyte poor
  - Hematocrit > 80%
  - Irradiated (to prevent graft vs host reaction)
  - CMV negative

Management of ICT Positive In Early Pregnancy

- Check the zygosity of the husband:
  - if heterozygote then there is a 50% chance that the baby is Rh positive, then check baby's blood group by NIPT/ amniocentesis, if negative then continue pregnancy, if Rh positive, then do anemia surveillance
  - if homozygous, then baby is definitely Rh positive, do anemia surveillance

Queenan's Chart (More Sensitivity)

- Can be charted from 14 wks onwards

Another Presentation

- Woman had 1st Pregnancy (with Rh Negative mother & Rh positive Baby), was given anti-D within 72 hrs, but even the in her 2nd Pregnancy the baby dies due to Hydrops fetalis. This could either be due to inadequate anti-D or, missed anti-D after an abortion or due to non-immune fetal hydrops

Probable Causes of such presentation

- Abortion
- Mixed – Matched Blood Transfusion (ABO incompatibility)
- Inadequate Anti – D
- Non-Immune Hydrops Fetalis: more common cause of hydrops fetalis compared to Rh isoimmunization
- **Grandmother effect:** When this mother (Rh neg) was in her mother's womb (who was Rh positive), some feto-maternal hemorrhage happened and sensitized her against D antigen. Sensitization started in intrauterine life

If Anti-D Is Not Given

- Chance of Rh isoimmunization in next pregnancy is 16%

Co-existant ABO incompatibility

- If mother is A negative and father is B positive, such that baby is B positive: at the time of delivery due to feto-maternal hemorrhage, mother (A-ve) comes in contact with B+ blood, antibodies are made against B antigen and all fetal RBCs get destroyed immediately, before she gets sensitized against D antigen.
- Therefore co-existing ABO incompatibility is protective against Rh isoimmunization.

ABO Incompatibility

- Mother is A positive and father is B positive: this is the most common cause of hemolytic disease of the newborn.
- However it is a much milder hemolysis: anti-A and anti-B antibodies are usually IgM type and so do not cross placenta.

Role of IVIG

- ICT positive with high titre with significant hemolysis: IV immunoglobulins given to mother will neutralize the maternal antibodies.
- This gives us 3 weeks time to attain lung maturity.

Non-Immune Fetal Hydrops

- Most common cause of hydrops fetalis

Causes of Hydrops Fetalis

- **Cardiac** (MC): Congenital Heart Block (most common cardiac cause), others like Ebstein's anomaly, tartalogy of fallot
- **Chromosomal causes**: Turner's, Trisomies (remember: aneuploidies have lymphedema)
- **Infectious:** Parvo Virus B – 19: causes slapped cheek appearance
- **Haematological**: Thalassemia (Hb Bart's)
- **Cystic Hygroma**
- **Gastrointestinal**: meconium peritonitis
- **Renal**- bladder outlet obstruction
- **Genito Urinary**
- **Placental**: chorioangioma
- **Twins:** TTTS, TRAP
- **Thoracic**: pulmonary sequestration, mediastinal tumors
- **Idiopathic**

PREVIOUS YEAR 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

Q. Anti D is to be given in all cases EXCEPT? (AIIMS 2019)

A. Abortion at 63 days

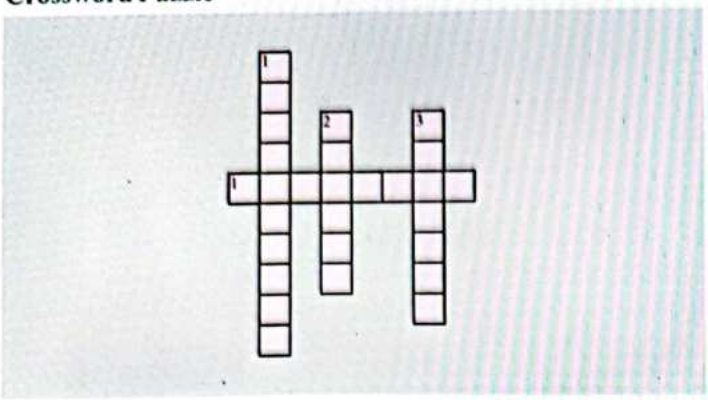
B. Manual removal of placenta

C. Amniocentesis at 16 weeks

D. Intrauterine transfusion at 28 weeks

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most common time of feto-maternal hemorrhage is _____.

Down

1. Co-existant ABO incompatibility is_____ for Rh isoimmunization.
2. 300 mcg of anti-D neutralizes_____ ml of fetal blood.
3. Most common cause of non immune fetal hydrops is_____.

33 TWIN PREGNANCY

Multiple Pregnancies 00:00:44

Incidence

- HELLIN'S LAW defines incidence of multiple pregnancies as
  - Twins: 1 in 80 Pregnancies
  - Triplets: 1 in $(80)^2$ Pregnancies
  - Quadruples: 1 in $(80)^3$ Pregnancies

Risk Factors

Increased incidence of multiple gestation increases with following factors

- Advancing age
- Increased parity
- Increased 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 labour	• Single Fetal Demise
• ↑HTN / PET	• Congenital anomalies (12 folds ↑incidence)
• ↑GDM	• ↑Malpresentation
• ↑PPH	• Twin-Twin Transfusion Syndrome

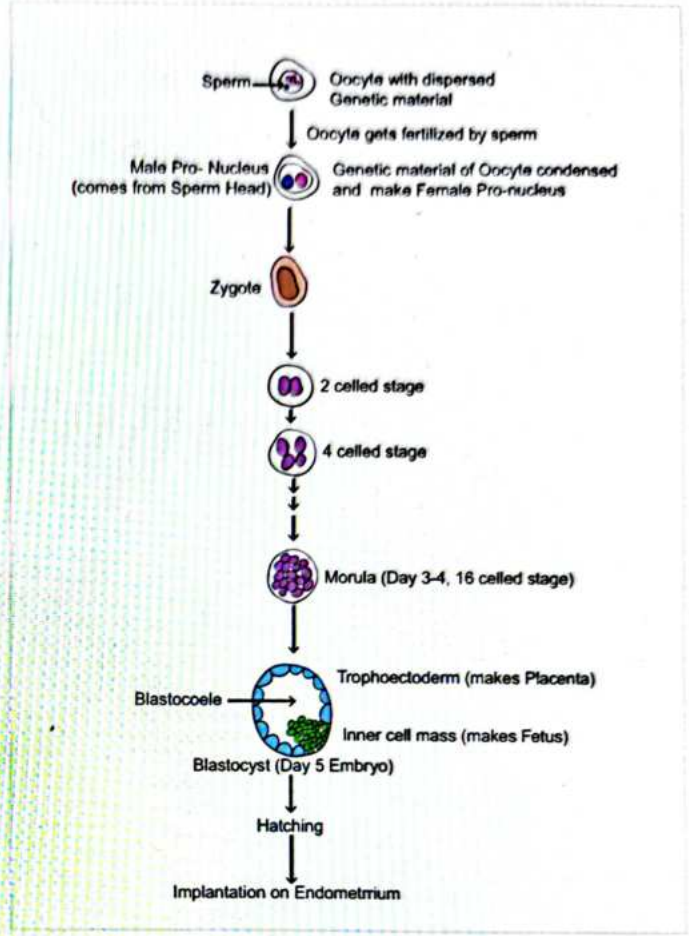
Important Information

- 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

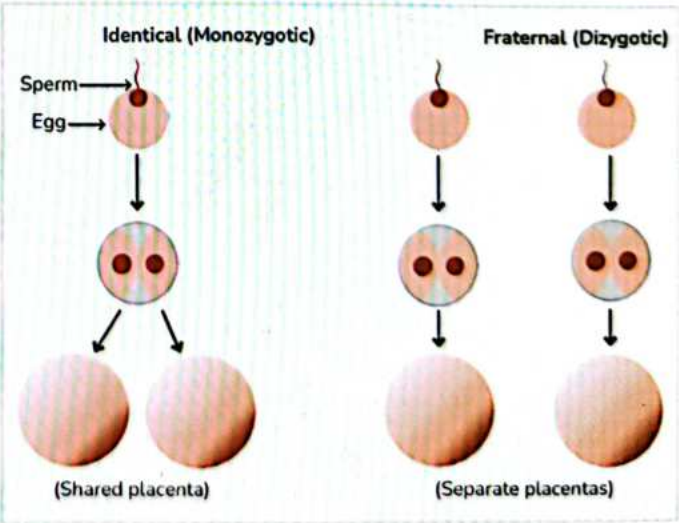
Events of Zygote Formation 00:07:08



Formation of Twins 00:10:08

Dizygotic / Non-Identical / Fraternal Twins

- Two separate eggs get fertilized by two sperms
- Incidence: 1/60 – 1/80 Pregnancies



- **Superfecundation:** Two Oocytes of the same cycle are fertilized by two Sperms by same act of coitus. This is the most common type of Dizygotic twins
- **Superfetation:** Two oocytes of two different cycles fertilized by two Sperms from two separate acts of coitus. This type is very rare in humans, common in cattle & horses

Monozygotic/ Identical Twins

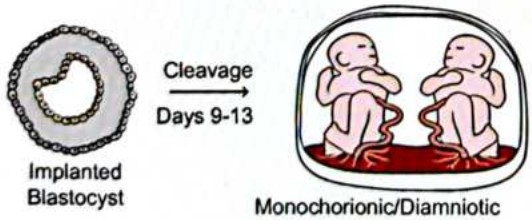
- This involves formation of two fetuses from splitting of one embryo
- Incidence: 1/250 pregnancies: constant incidence across the world

Fate of Monozygotic Twins

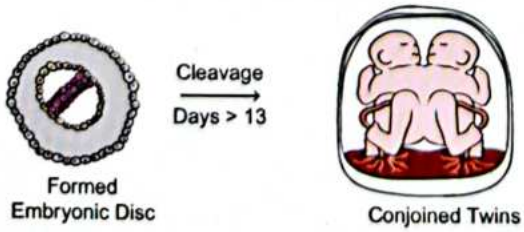
1. Dichorionic Diamniotic (30-35%)

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 00:23:40

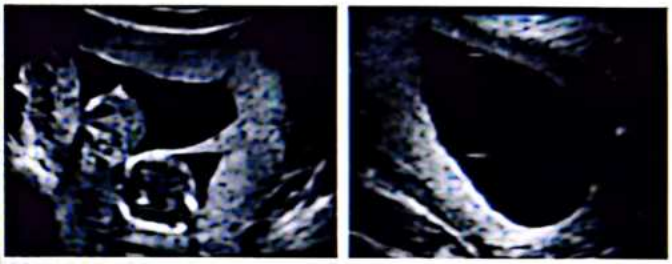
- Done at around 12 weeks

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

Monochorionic Twins (20%)
(One placentas)
T sign

Monozygotic Twins Complications 00:29:25

1. Twin Twin Transfusion Syndrome (TTTS)

- This occurs due to deep AV Anastomosis in monochorionic twins
- More common in MCDA > MCMA as MCMA has protective Arterio – Arterial Anastomosis, which reverses 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**
  - If TTTS occurs at 26 wks or before, mortality is almost 100%
  - Laser Ablation of A-V anastomosis can be done to stop this aberrant blood flow
  - Amnioreduction in larger baby who has polyhydramnios, can be done for prolongation of pregnancy
  - Single fetal reduction of donor can be done at early gestation to improve survival chances of the second twin.

2. Twin Anemia Polycythemia Sequence (TAPS)

- This is diagnosed when there is Hb difference between the two twins of 5gm %, while there is no difference on weight or liquor.
- Diagnosis of TAPS is made on fetal doppler when donor twin has MCA PSV of > 1.5 MoM, while recipient twin has MCA PSV < 1.0 MoM (PSV = Peak Systolic Velocity)

3. Twin Reverse Arterial Perfusion Syndrome (TRAP)

- This is characterized by aberrant blood flow from a healthy donor twin to an acardiac recipient twin such that cardiac failure in donor baby occurs as it is pumping blood to itself as well as recipient baby
- The blood goes from Donor to Recipient via A-V anastomosis. This is deoxygenated blood, which keeps the recipient twin alive, however this deoxygenated blood goes only to lower limb of baby resulting in a mass of flesh with very small head & properly formed lower limbs

4. Cord entanglement

- Cord entanglement occurs in MCMA, where the twins share a common sac.
- Much lesser chance of cord entanglement and its complications resulting in fetal growth retardation of demise after 32 wks

5. Single Fetal Demise

- If happens in early Pregnancy (1st trimester), baby gets totally absorbed and is known as 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
- Management 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

- This occurs in monochorionic twins due to Vascular Anomalies
- This can also occur in Dichorionic Twins as there are two different placentas that can cause nutritional differences or due to genetic factors
- Criteria of Discordance
  - Abdominal circumference: > 20mm
  - Wt difference: > 20%

7. Abruption

8. PROM

9. Sepsis

Clinical Diagnosis if 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

- Excessive HCG compared to singleton, leads to hyperemesis
- Increased fluid volume in body leads to increased cardiac output which increases 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)
- Excessive uterine size and liquor may cause compression of ureters causing obstructive Uropathy

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 : In case of monochorionic gestation, 2 weekly USG must be done to detect abnormalities
- Increased Fetal surveillance
  - Regular NST of both twins separately
  - Biophysical profile
  - Doppler (Decisions are based on Doppler of Smaller baby's readings)
- Timing of delivery
  - DCDA can be taken up to 38 wks and delivered
  - Monochorionic Gestations can be delivered at 34 wks
  - Monoamniotic must be delivered by caesarean at 32 wks after steroid cover
- 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 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. ait for spontaneous onset of labour

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

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

Q. Which of the following is a specific complication of monochorionic twins? (INICET 2021)

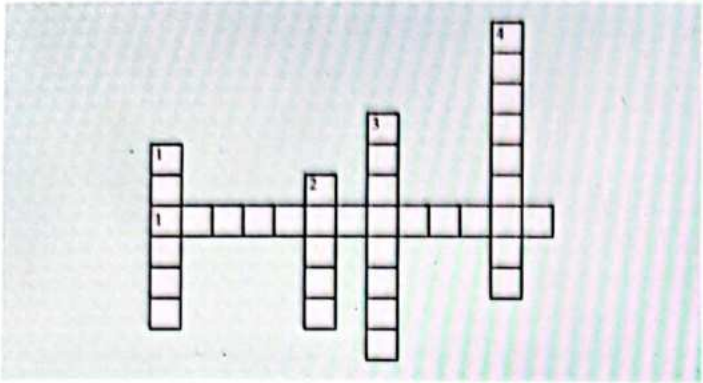
a. Twin to twin transfusion
b. preterm labour
c. discordant growth
d. IUGR

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Twin to twin transfusion is seen in ___ type of twin pregnancies

Down

1. Ultrasound of DADC pregnancy shows ___ sign at the insertion of inter-twin membrane
2. A single zygote dividing into two before __ days will lead to a dichorionic diamniotic pregnancy
3. TRAP is seen in monochorionic pregnancies when the recipient twin is __
4. Increased incidence of multiple gestation is seen these days due to use of drugs for ___ induction

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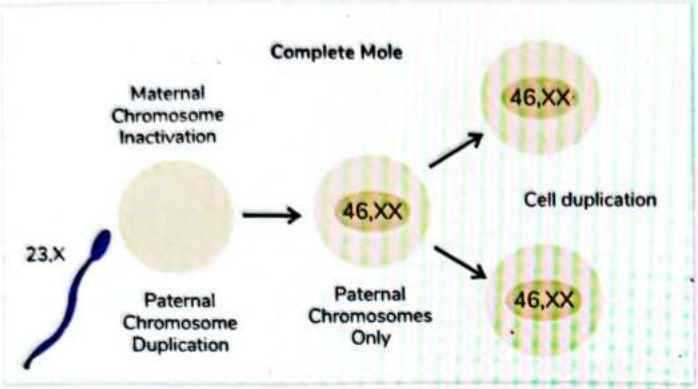
34 MOLAR PREGNANCY AND GESTATIONAL TROPHOBLASTIC DISEASE

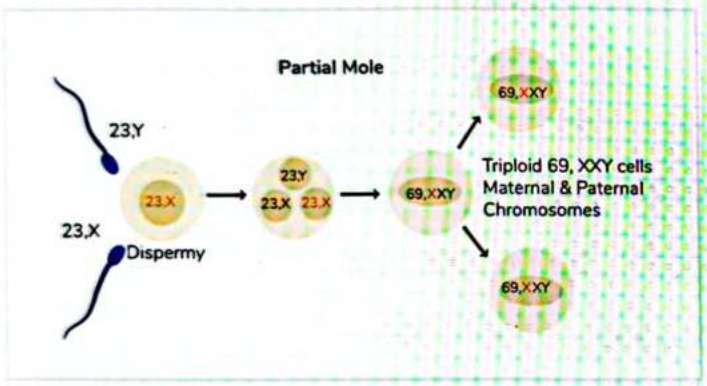
Molar Pregnancy

Formation of Partial Mole

00:00:26

- Formed by 3 pronuclei (triploidy). The karyotype is 69XXX
- Fetus and placenta are present but placenta has vesicles, such that the pregnancy is non viable beyond 12-16wks
- Partial mole is associated with almost no chance or 2-4% chances of Choriocarcinoma
- Karyotype can be 69 XXX (Most Commonly), 69 XXY, 69 XYY, but never 69 YYY





Formation of Complete Mole

00:02:34

Type 1

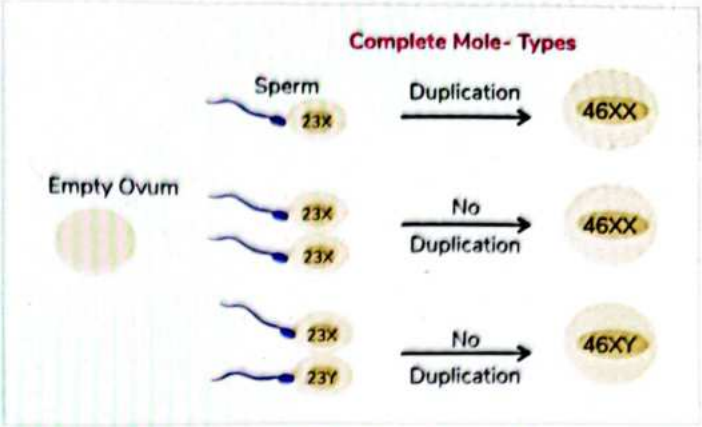
- Empty oocyte fertilized by sperm of 23 X, followed by endoduplication to form a zygote of 46XX
- Both X chromosomes are of Paternal origin forming abnormal villi
- Aka Vesicular mole → Snow storm appearance on USG

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



Differences between partial and complete mole

00:06:27

Partial Mole	Complete Mole
• Fetus present	• No fetus
• Focal Trophoblastic hyperplasia	• Diffuse Trophoblastic hyperplasia
• 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%

Associations of molar pregnancy

- 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 of Incomplete Mole:

- Partial mole has a missed Abortion like presentation

Presentation of Complete Mole

- Features of excessive HCG
  - Thyrotoxicosis : During Evacuation, patient may suffer from Thyroid Storm (Pulse Rate, Temp, High Output Cardiac Failure), therefore keep β blocker ready while doing Evacuation
  - Hyperemesis
- Passage of grape like vesicles (Rare)

- Bleeding PV (Most Common Presentation)

Important Information

- Most common presentation of complete mole is bleeding PV and not passage of grape like vesicles.

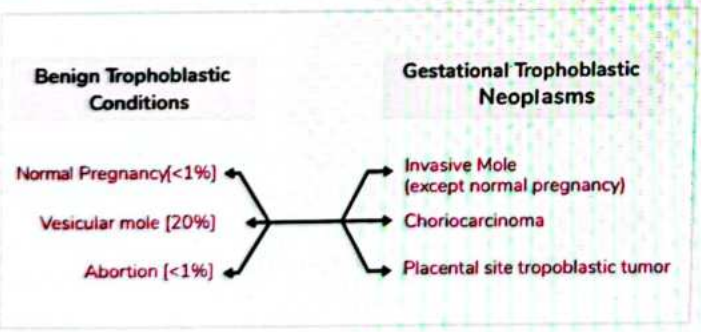
- Uterine size more than POG
- Empty Uterus (Doughy)
- Patient may present with Trophoblastic Embolization (respiratory distress)
- Patient may have Theca Lutein cysts (due to high HCG, resolve by themselves after evacuation)
- Early onset HTN (d/t abnormal Trophoblastic proliferation)

Management of Vesicular Mole / Complete Mole 00:14:32

- The management of a complete mole is always a suction evacuation irrespective of size of uterus or gestational age. Also do a gentle curettage with a sharp curette after suction evacuation. One must do a USG after a week to rule out retained bits.
- Do CXR to Rule out metastasis, most common site of metastasis is the 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)

Gestational Trophoblastic Neoplasia



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 </= 6 is low risk
- Score >/= 7 is high risk

Management

- </= 6 Score: Single Agent (Methotrexate / Actinomycin) or Combo (MTX + Actinomycin + Cyclophosphomide)
- >/= 7 Score : [(High Risk Patient) (High Risk Patient with Metastasis)] : EMACO
  - ETOPOSIDE
  - MAC (MTX + Actinomycin + Cyclophosphomide)
  - Oncovin

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

	0	1	2	4
Age (years)	39	>39		
Antecedent pregnancy	Hydatidiform mole	Abortion	Term	
Interval between end of antecedent pregnancy and start of chemotherapy (months)	<4	4-6	7-12	>12
Human chorionic gonadotropin (IU/L) at the time of GTN diagnosis	$<10^3$	10^3-10^4	10^4-10^4	$>10^5$
ABO groups		0 or A	B or AB	
Largest tumor, including uterine (cm)	<3	3-5	>5	
Site of metastases		Spleen, Kidney	GI tract	Brain, liver
Number of metastases		1-3	4-8	>8
Prior chemotherapy			1 drug	2 drugs

The total score for a patient is obtained by adding the individual scores for each prognostic factor. Total score <7, low risk; 7, high risk

PREVIOUS YEAR 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)

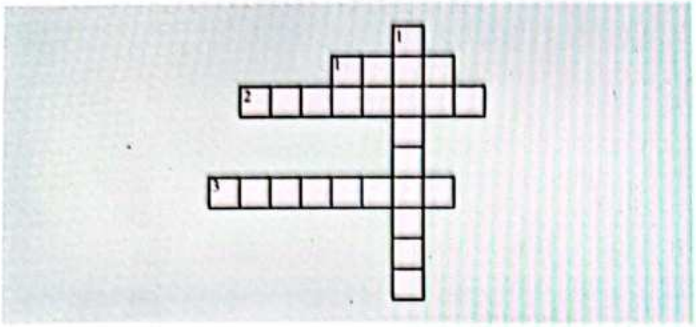
A. Follow up with HCG levels
B. Continue pregnancy
C. Suction and evacuation
D. Diagnostic laparoscopy

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most common site of metastasis of choriocarcinoma is the __
2. Nucleus of a partial mole is ___
3. P57 negative on immunohistochemistry of a molar pregnancy is suggestive of ___ mole

Down

1. USG of complete mole shows a __ appearance

35 ANTEPARTUM HAEMORRHAGE

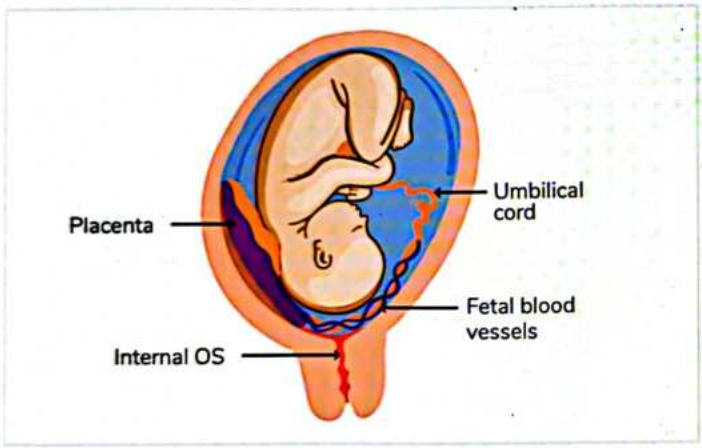
- Any bleeding in the genital tract after >28 Weeks (Viability) of gestation is known as antepartum hemorrhage. Note: Any bleeding before 28 weeks is related to abortion

Causes 00:01:24

- Vasa previa
- Placenta Previa
- Abruptio Placentae

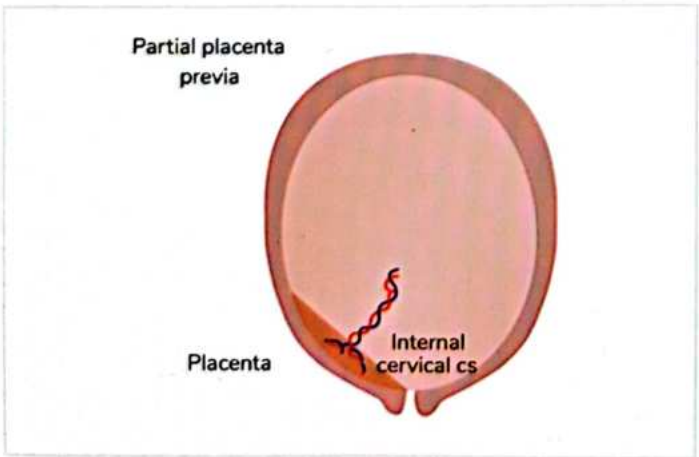
Placenta Previa (PP) 00:02:16

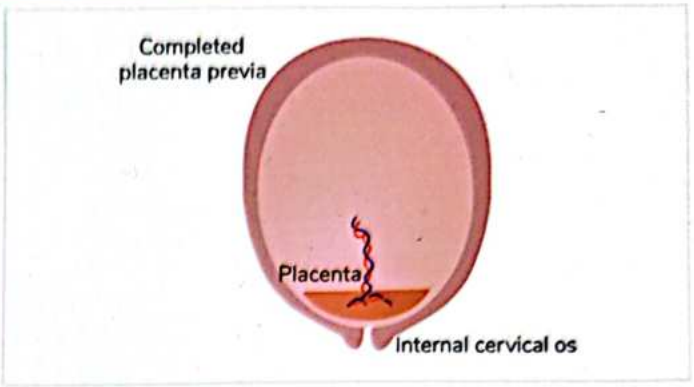
- 1 in 300-400 pregnancy
- Associated with
  - Multiparous
  - Twins, triplets (due to big or multiple placentas)
  - Previous C.S (scar predisposes to nidation)
  - Previous Hysterotomy (cesarean before 28 weeks)
  - Myomectomy



Classification 00:05:16

- **Placenta previa**
  - Partly covering os
  - Completely complelety covering os
- **Low lying placenta** within 2 cm of the OS





Presentation

- Placental migration: migrates and becomes in upper segment in later months
- Most cases of placenta previa are asymptomatic and the diagnosis is mostly just a finding on USG
- Only presentation is a Painless bleeding P/V

Diagnosis

- 3D USG (in full bladder, Doppler assisted)

Management 00:12:20

- **Placenta previa presenting with bleeding at term (37 to 42 wks)**
  - Manage with resuscitation + emergency cesarean section
  - No P/V examination should be done as it may increase the bleeding
- **Placenta Previa at Term 37-42 wks (Not Bleeding)**
  - Placenta previa partly/ totally covering os : do a cesarean section
  - In case of low lying or partly Covering, we may do a Double set-up examination in the OT. Here a PV is done in OT, the finger is moved 5cm in all directions, if we cannot feel placenta, we can allow vaginal delivery, if placental edge is felt with the finger, it may bleed, so emergency cesarean section is done. This examination is based on the fact that in later gestation, cervix gets effaced, so placenta moves away from os and a partly covering placenta may now, not cover the os, and so a vaginal delivery can be allowed.
- **Low lying placenta at term**
  - Trial of normal delivery can be given
  - If posterior low lying (Type IIb of earlier classification) → Look out for fetal HR drop with contractions
- **Placenta Previa Bleeding at 32 wks**
  - Resuscitation + Rest in a High Risk Ward + Steroids for fetal Lung Maturation. This conservative management, known as Mcaffee Jhonson Regime shall reduce and stop bleeding in 90% cases and pregnancy can be allowed to continue to term

- If bleeding continues → C.S
- Contraindications to this conservative management include
  - → Intrauterine fetal demise
  - → Fetal anomalies
  - → Maternal instability
  - → Any indication where pregnancy need not be conserved

- **Placenta Previa with Transverse Lie at 32 weeks**
  - Not a contra indication to conservative management

Important Information

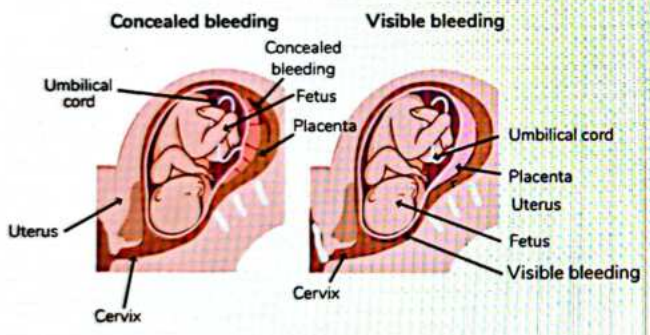
- Tocolysis is contraindicated in bleeding placenta previa
- Tocolysis for preterm labour, is NOT contraindicated in PP which is not bleeding

Abruptio Placenta/ Accidental Haemorrhage 00:40:41

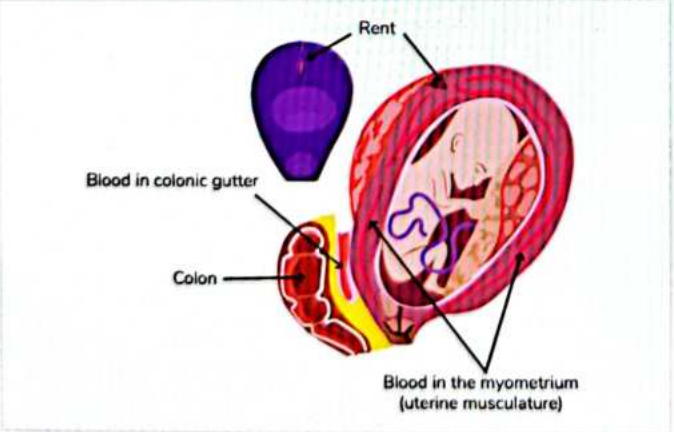
- 1 in 200 Pregnancies

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 due to bruising of uterine muscle
- Protracted labour: poor uterine contraction of bruised muscle
- PPH: poor uterine contraction of bruised muscle (Indication of obstetric hysterectomy/ surgical compression suture)

Management

1. **Abruption at term (37-42 wks)**

- Resuscitation + deliver
- Delivery can be done vaginally or by cesarean
  - Cesarean is done in case of fetal distress
  - Normal delivery in abruption: A.R.M is done to augment labor by release of local prostaglandins and also causes the compression of placenta against fetus which stops the bleeding

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

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. **Abruption at 32 weeks**

- Deliver : there is no role of conservative management in abruption at any gestation
- Management includes : resuscitation, high risk vigilance, steroids to mother, sedation and rest
- Abruption is not an indication for LSCS, must 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 of abruption

Grade	Vaginal Bleeding	Uterine Tetany	Fetal Distress	Maternal Shock	USG
0	-	-	-	-	RPC: Small
1	+	+/-	-	-	+/-
2 (MC)	+/-	+/-	+	-	+/-
3	+/-	+	Fetal Demise	+ With possible DIC	+/-

PREVIOUS YEAR 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)

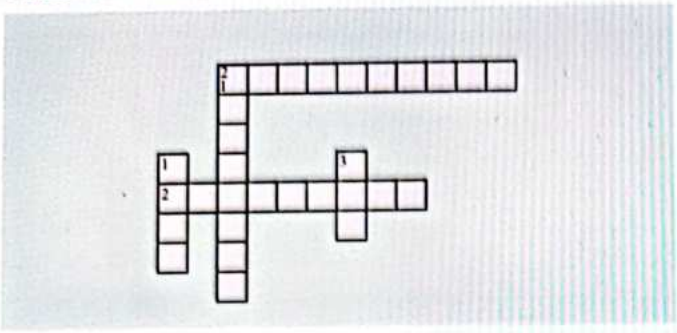
A. Preterm labour
B. Abruption
C. Hydramnios
D. Placenta previa

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Intraoperative finding of abruption is a __ uterus
2. Tender painful uterus with antepartum hemorrhage is suggestive of __

Down

1. Fetal origin bleeding in antepartum hemorrhage is due to __ previa
2. Bleeding placenta previa at term is managed by __
3. Consumptive coagulopathy occurring in abruption results in __

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36 HYPERTENSIVE DISORDERS IN PREGNANCY

Hypertensive Disorders in Pregnancy: Classification

Gestational Hypertension

00:00:39

- BP > 140/90 mmHg, in > 2 occasions > 6 hrs apart, after 20 weeks of gestation in a previously normotensive woman

Chronic Hypertension

- Known hypertensive, with high BP before 20 weeks of gestation
- Causes of pre-existing hypertension could be
  - Essential hypertension
  - Phaeochromocytoma
  - Renal artery stenosis

Pre-Eclamptic Toxemia

- BP > 140/90 mmHg + proteinuria, in > 2 occasions > 6 hrs apart, after 20 weeks of gestation in a previously normotensive woman
- Proteinuria: > 300 mg/ 24 hours urine or urine protein/creatinine ratio >/= 0.3
- Can be early onset (<34 weeks) or late onset (>34 weeks)
- Can be preterm (<37 weeks) or term (at or after 37 weeks)

Eclampsia

- Pre-eclampsia + convulsions
- The seizure is a generalized tonic-clonic seizure, followed by post ictal state characterized by hypoxia to CNS and also to the fetus
- Complications
  - Liver/ renal failure
  - Intracerebral hemorrhage
  - Abruption
  - HELLP syndrome
  - Pulmonary edema
  - DIC
  - Death

Acute On Chronic Hypertension

- Patient had chronic hypertension and now after 20 weeks she has
  - Acute worsening of BP
  - New onset proteinuria
  - Platelet < 100000
  - Creatinine > 1.1
  - Liver transaminases > 2 times

Delta Hypertension

- BP is normal throughout the pregnancy and it reaches high normal values in the later stage pregnancy.
- Can be associated with convulsions

Imminent Eclampsia/ Worsening HTN

Signs

00:03:40

- Headache
- Nausea/ Vomiting
- Blurring of vision
- exaggerated Knee jerks
- Epigastric pain : can be due to liver edema stretching the capsule or due to a subcapsular hematoma
- Pulmonary edema
- Falling platelets : due to platelet aggregation
- Raised liver enzymes
- Deranged renal function
- Proteinuria: > 2 gms/ 24 hrs urine (> 3.5 gm/24 hrs - Nephrotic range)
- BP: > 160/110 mm Hg

Management

- Management of both ECLAMPSIA AND IMMINENT ECLAMPSIA IS : MgSO4 + IV Labetatol + termination of pregnancy

> **Important Information**
>
> - Management of both ECLAMPSIA AND IMMINENT ECLAMPSIA IS: MgSO4 + IV Labetatol + termination of pregnancy

Management

Eclampsia

- DOC for seizures: $MgSo_4.7H_2O$
  - IV only (ZUSPAN REGIMEN)
  - IM + IV (PRITCHARD'S REGIMEN- Method of Choice)
    - → Loading dose : IV $MgSo_4$: 4 gms (in dilution of 20%) +10 gms IM (50%) (5gms in each buttock)
    - → IV Mg So_4: 2 gms added if no relief
    - → Deliver the baby: most definitive management of eclampsia
    - → BP returns to normal in 1 week in 90% patients and in 100% patients in 2 weeks
    - → IM MgSo4 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 (MgSO4 has renal excretion)

- MgSO4 toxicity

Therapeutic range	4-7 mEq/Lt
Loss of knee jerks	8-10 (first sign of Mg toxicity)
Respiratory depression	10-15
Respiratory paralysis	12-15
Cardiac arrest	25-30

- Antidote: Ca gluconate: 10% 10 mL iv over 10 min

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
  - Start with 10 mg, then keep doubling every 20 mins as 20 mg, 40 mg, 80 mg till BP is controlled
  - Maximum dose total 220 mg
  - Labetalol is a + Blocker (Labetalol)

- Guedel's Airway
  - Prevents the tongue bite
  - Maintains the oxygenation
  - Do not use mouth gags etc.

Gestational Hypertension

- can be managed on OPD basis with home BP charting and anti-hypertensives

Pre-eclampsia

- always admit her for evaluation
- Give steroids if < 34 weeks
- Fetal surveillance
- Maternal surveillance
  - 4 hourly BP charting
  - weight gain
  - urine r/m
  - uric acid
  - liver functions
  - creatinine
  - LDH
  - Coagulation
  - Serum FMS like tyrosine kinase (increasing trend)
  - Serum Platelet like growth factor (PLGF): decreasing trend

Anti-Hypertensive Drugs

- **Tab LABETELOL**
  - 1st Line drug
  - 100 - 200 mg TID, upto 1200 mg in 24 hours
  - α + non-selective β blocker
  - does not cause hypotension, headache, tachycardia
  - does not reduce utero-placental flow
  - contraindicated in asthmatics
- **HYDRALAZINE**
  - 25-50 mg BD or OD, up to 200 mg in 24 hours
  - Arteriolar dilator, no action on veins
  - Causes hypotension, headache, tachycardia
  - IV 5 - 10 mg in hypertensive emergencies
  - Acetylated in the liver : slow acetylators should be given lesser dose
  - Lupus like syndrome
- **Tab METHYL DOPA**
  - Prodrug: Active form → Methyl Norepinephrine, centrally acting
  - Depression and drowsiness, rarely hemolytic anemia and positive Coomb's test
  - 250 - 500 mg QID, up to 2 gm per day
- **Calcium channel blockers: TAB NIFEDEPINE**
  - S/L Nifedepine is C/I (can cause sudden Hypotension when taken sub lingually)
  - 5-10 mg TID (upto 90 mg/ day can be given)
  - Causes flushing and headaches
- **Tab PRAZOSIN**
  - α Blocker, acts only on capacitance vessels, veins
  - 2 - 4 mg/ day
  - Causes rapid reduction of BP
  - Side effect: hypotension

Contra Indicated Drugs

- Furosemide, β Blockers, ACE Inhibitors } cause Intra Uterine Growth Restriction
- ACE inhibitors can cause
  - Hypocalvaria
  - Limb contractures
  - Renal Agenesis
  - Oligohydramnios
  - IUGR

Termination of Pregnancy

- Well controlled gestational hypertension: > 37 weeks, if BP remains < 110, may go up to 38 weeks
- Pre-eclamptic toxemia: > 37 weeks

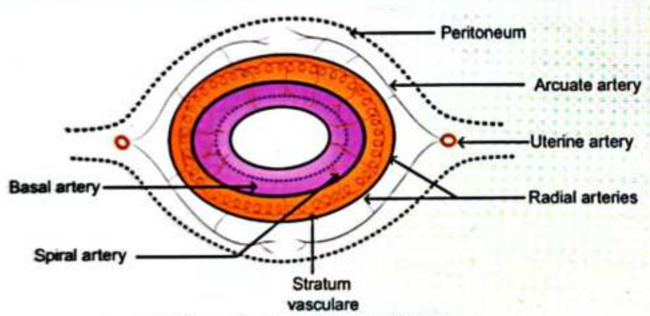
- Terminate earlier if
  - o BP is not controlled with three drugs
  - o signs of worsening
  - o worsening KFT, LFT, hemolysis, decreasing platelets
  - o imminent eclampsia
  - o eclampsia
  - o abruption,
  - o reversal of end diastolic flow
  - o IUD

Etiology of HTN in Pregnancy

- Poor placentation leading to vasospasm, to overcome this vasospasm, maternal BP increases
- Two step theory
  - o Step 1: poor placentation
  - o Step 2: maternal syndrome

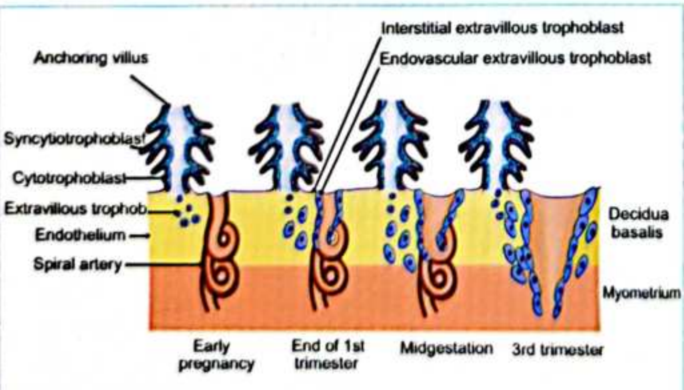
Uterine and Placental perfusion

- Uterine artery splits into two arcuate arteries, which end in spiral arteries which supply till the endometrium, and in pregnancy supplies the placenta.
- Villi take oxygen and nutrients from these spiral arteries.



Cross-Sectional Anatomy of Uterus

- These villi are composed of syncytiotrophoblast and cytotrophoblast. Some of these cells come out of these villi, known as the extra-villous trophoblast, ones which are in the interstitial space are called interstitial extra-villous cytotrophoblast, while some come into the muscle layer of the spiral arteries called the endovascular extra-villous cytotrophoblast.



- This endovascular extra-villous trophoblast, in mid-pregnancy, invades the muscle layer of spiral arteries to replace it, and it completely replaces muscle by third trimester. This converts small diameter high resistance vessels into higher diameter low resistance vessels, which increases perfusion to the placenta and hence the fetus.

Pathogenesis of PIH

Poor placentation

- Persistence of smooth muscle layer (primitive vasculature) or inadequate Trophoblastic invasion leads to vasospam. To overcome this vasospasm, maternal BP increases leading to pre-eclampsia.

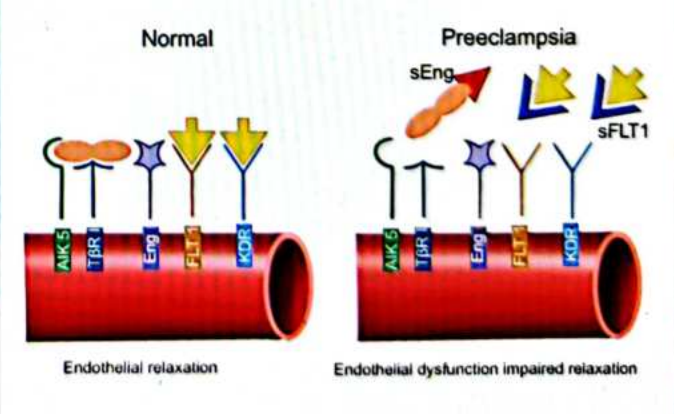
Immune factors

- Normal immune mechanisms: T- helper cells 1 mediated secretion of inflammatory CK like TNF alfa, gamma INF, or IL-2. These form macrophages, NK cells which work against intracellular pathogens. T- helper 2 cells are responsible for humoral immunity
- In a normal pregnancy, there is a T2 bias
- In pre-eclampsia: T-helper 1 cells function increases, causes poor placental vascularization, which causes vasospasm.

Maternal syndrome

- Endothelial activation: imbalance at 2 levels
  - o between vasodilator vs vasoconstrictors
    - → vasodilators (prostacyclin, NO) are less
    - → vasoconstrictors (Thromboxane A2, endothelin-1, angiotensin II) are increased
    - → Prostacyclin: thromboxaneA2 ratio is reduced.
  - o Between angiogenic vs anti-angiogenic factors
    - → Angiogenic (VEGF, PLGF, TGF) are reduced
    - → Anti-angiogenic factors: s-FMS like tyrosine kinase and s-endoglin are increased

- All these factors (poor placentation/ vasospasm/ endothelial activation) occur after 20 weeks, hence diagnosis of pre-eclampsia is made only after 20 weeks.



Important Information

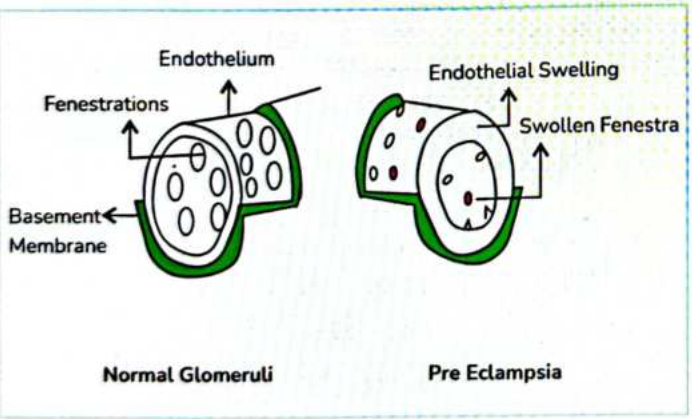
- As Furosemide increases vasospasm, which is the main pathology in PIH, it is contraindicated as an anti-hypertensive in pre-eclampsia
- Salt restriction is not done in pre-eclampsia
- Pathology of PIH is Vasospasm, mother increases her BP to overcome vasospasm, therefore do not give anti-HTN drugs too soon. Anti-hypertensive drugs have to be started only is BP is 150/100 mmHg

Pathological Changes in Various Organs

Kidneys

- In normal pregnancy, GFR increases by 50%, increase in renal blood flow, while in PIH, there is increase in renal afferent arteriolar resistance, thus reduced perfusion
- Glomerular endotheliosis: basic renal pathology: glomerular capillaries have fenestrations through which exchange takes place, in pre-eclampsia, the endothelium become swollen and the diameter of fenestrations reduces, reducing renal flow and excretion. This causes
  - decreased urine output
  - increase in creatinine and uric acid
  - decreased urinary calcium
  - proteinuria

RBC hemolysis



- due endothelial cell activation causing microangiopathic hemolysis
- anemia
- raised LDH
- reduced haptoglobin: increased free Hb causes oxidative damage
- schistiocytosis (fragmented RBCs)

Diagnosis of HELLP syndrome

Hemolysis

- Abnormal peripheral blood smear: burr cells, schistiocytes
- Elevated bilirubin >/= 1.2 gm/dl
- Low serum haptoglobin
- Increased LDH > twice the upper limit (>600 U/L)

Elevated liver enzymes

- Elevated AST, ALT >/= twice the upper limit of normal (>72 IU/L)

Low platelets

- < 1,00,000 /cu.mm

Liver

- Transaminitis: increased transaminases
- Periportal hemorrhages, may expand to form a subcapsular hematoma, stretching of Glisson's capsule: causes epigastric pain. This hematoma may even rupture.
- Liver function is normal (vs AFLP where there is marked liver dysfunction)

Brain

- Intracerebral hemorrhages
- Cortical and subcortical petechiae
- Microscopy: fibrinoid necrosis of blood vessels and perivascular microinfarcts
- If all these are seen in frontal cortex can cause severe headache
- If in occipital cortex, may lead to visual scotoms, blindness
- Vasogenic edema
- Release of neuroexcitatory neurotransmitters like glutamate which causes convulsions.

Other Associates of PIH

- Seen in 5-8% of all pregnancies
- Seen in 1st exposure to Villi: Primigravida
- More exposure to Villi: Twins, Molar pregnancy
- Repeated exposure to villi: grand multigravidas
- Pre existing endothelial damage: Renal Disease , DM, obesity
- Genetic Predisposition
  - Methyl Tetra Hydrofolate Reductase (MTHFR) gene deficiency
  - Factor V leiden deficiency
  - Decreased Nitric Oxide production from endothelium by L. Asparginase
- APLA
- SLE
- ART pregnancies
- Previous H/O pre-eclampisa

- Chronic HTN
- Malnutrition and anemia

Prediction of HTN

- Roll over Test: done at 28-32 weeks of pregnancy: > 20 mm Hg increase in BP from lateral to supine position
- Isometric exercises eg Persistent Hand grip
- increased Uric Acid
- Reduced urinary Calcium: <12 mg/dl in 24 hours
- urinary calcium: creatinine ratio (normal: 0.44, lower than 0.03 is predictive of pre-eclampsia
- increased Homocysteine
- Micro albuminuria
- Uterine artery doppler: diastolic notching, pulsatality index >95%ile

Prevention

- Low dose Aspirin (75-150 mg): causes selective inhibition of platelet thromboxane production
- Fish oil capsules: rich in omega3 fatty acids, these compete with platelet's arachidonic acid, thus less thromboxane A2
- Calcium supplementation: reduces PTH: reduces intracellular calcium : reduces membrane excitability and smooth muscle contractility
- Antioxidants (Vit C/E)

Primary prevention

- Control DM, renal disease
- Avoid pregnancies at extremes of age

Secondary prevention

- Knowledge of pathophysiology: aspirin, fish oil, calcium, antioxidants

Tertiary prevention

- Treatment to prevent complications

PREVIOUS YEAR 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

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

Q. First sign of MgSO4 toxicity is? (FMGE 2020)

A. Decrease in BP
B. Loss of deep tendon reflexes
C. Breathing difficulty
D. Asystole

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

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

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

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

Q. A woman on antihypertensive drugs comes for pre-conceptional counselling. Which of the following drugs will you advice to stop? (NEET 2021)

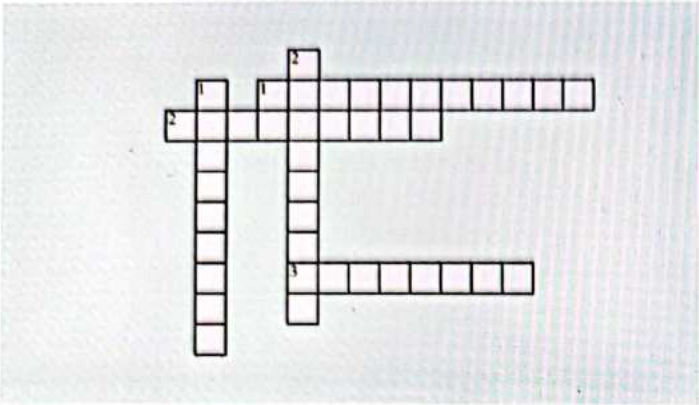
A. Methyl dopa
B. Atenolol
C. Lisinopril
D. Nifedipine

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Hypertension occurring first time in pregnancy at 26 weeks, without proteinuria is _____hypertension
2. Drug of choice for treatment of hypertensive emergency in pregnancy is _____
3. Severe headache occurring in a woman with pre-eclampsia is a sign of _____ eclampsia

Down

1. Main pathology of hypertension in pregnancy is _____
2. Drug commonly used for PPH which is contraindicated for use in pre-eclampsia is _____

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37 DIABETES IN PREGNANCY

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

1. **Type 1 Diabetes :** (Previously called **Insulin dependent) :** due to destruction of Pancreatic Islets , such that reduced Insulin is available

2. **Type 2 :** (Previously called **Insulin independent) :** Insulin is available but there is insulin resistance

Gestational DM 00:04:18

- 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 resistance

↓↓ Insulin → ↑ Cortisol
↓
↑↑ Sugars

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 → could be 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
> 200	Tolerance)
	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

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, 3. Maternal ketoacidosis, 4. Diabetic vasculopathy

Secondary to villous edema → ↓ → Compromises blood supply of fetus leading to sudden death

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 00:35:40

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 o Fasting sugar value < 95 o Post prandial sugar value < 120
Monitor Fetus	• Antepartum surveillance o DFMC (Daily Fetal Movement Count) o NST o BPP (Biophysical profile) o Umbilical Artery Doppler • Fetal lung maturity is delayed in DM pregnancy o Steroids are given for lung maturity o 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

PREVIOUS YEAR 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

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

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)

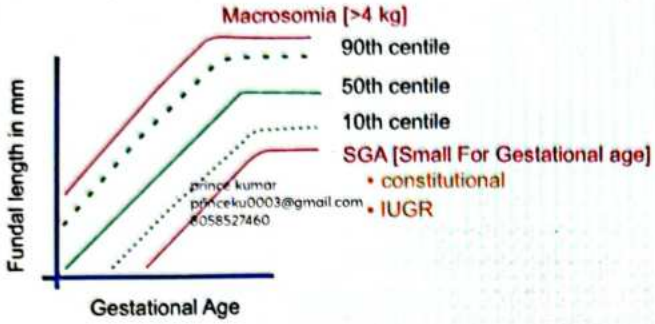
a. Intake of phenetoin
b. Gestational diabetes
c. Intake of ACE inhibitors
d. Intake of sodium valproate

38 INTRA UTERINE GROWTH RESTRICTION

Intra-Uterine Growth Restriction

Definition

- 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
• Causes
  ○ Infections
  ○ Chromosomal disorders
  ○ Congenital anomalies
• Ponderel Index (PI)
PI = Estimated fetal weight/FL^3
(FL- Femur Length)
Normal value = 8.3
• HC/AC: 1 Ⓝ
• Poor Prognosis
	• Late onset
	• Causes
	  ○ HTN
	  ○ Renal Disease
	• Ponderel Index: < 7
	• HC/AC: > 1
	• 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

Complications

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 can increase fetal weight): decreases vena caval compressionincreases fetal blood perfusion
  - Increase in antenatal Surveillance to ensure timely intervention
  - 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.

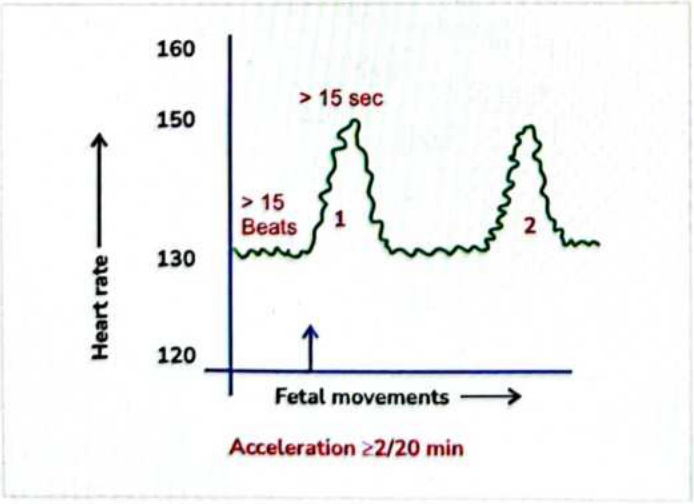
Tools

Daily Fetal Movement Count (DFMC)

- > 10 movements /12 waking hours (Normal)

Non-Stress Test

- Sympathetic Vs Para sympathetic system well being is established at 28 wks, hence the test is of most value when done 32 wks onwards. It tests the increase in fetal heart rate with movements
- Reactive Non stress Test is defined as 2 accelerations of > 15 Beats from baseline lasting for > 15 seconds in 20 minutes. A reactive NST is indicative that the chance of IUD is less than 1% in the next 1 week.



- 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

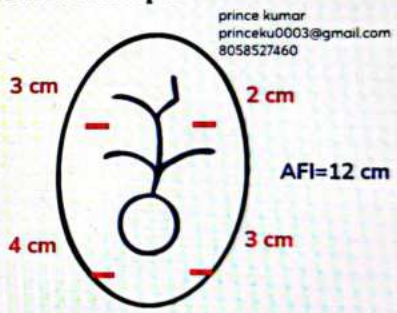
Parameter	Points
Fetal movement	2
Fetal tone	2
Fetal breathing	2
Reactive NST	2
AFI	2

- Total Score = 10 (Good Biophysical Profile: 10/10)
- BPP 8/10 is good BPP 6/10 or less needs action

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 example

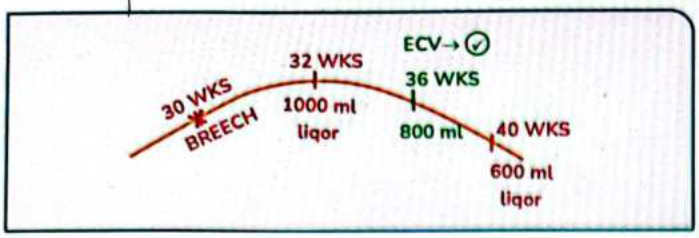


Absolute Amount of Liquor	Single Pocket
• Normal: 1000 ml cm • Oligoamnios: 500 ml • Polyhydramnios: > 2000 ml	• Oligoamnios: < 2 cm • Polyhydramnios: > 8 cm

Important Information

External Cephalic Version Done At

- For Primigravida at: 36 wks
- For Multigravida at: 37 wks



Modified Bio Physical Profile 00:51:51

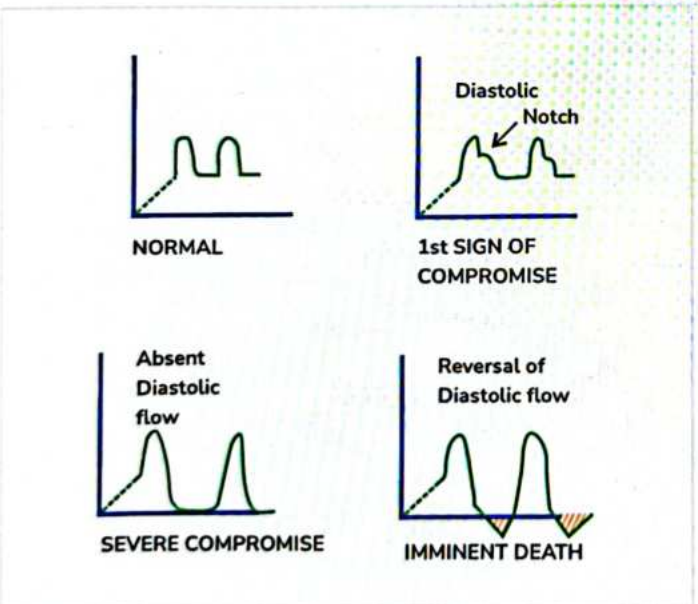
- Includes AFI & NST

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
- Note that this test is 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 contractionless likely to tolerate labour

Intrapartum Surveillance 01:02:34

Tools

Fetal Heart Rate

- By Stethoscope
- By Doppler

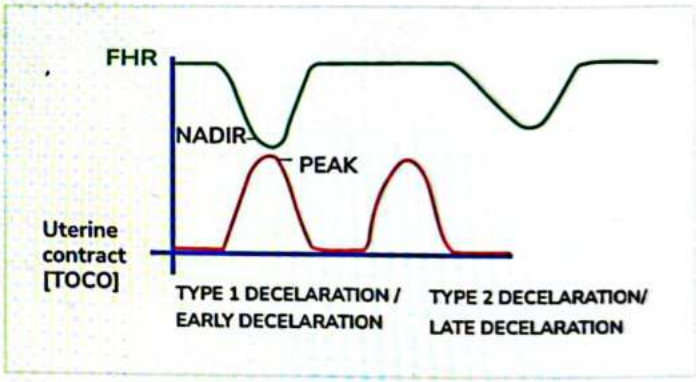
Fetal Scalp Blood PH: > 7.2

Fetal ECG

- 1 Probe ECG – ST wave analysis (STAN)
- 2 Probe ECG

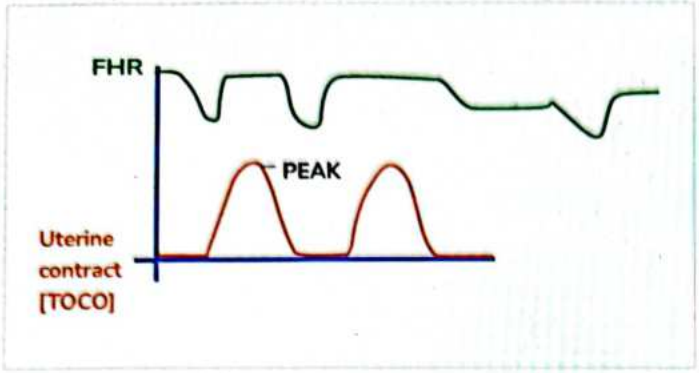
Cardiotocography 01:05:09

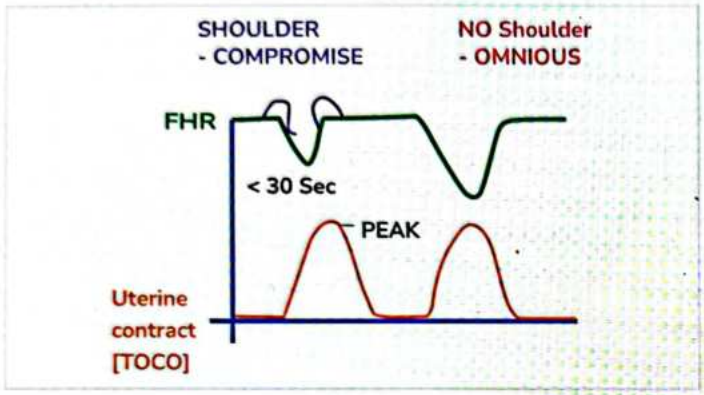
- Single best test for monitoring labor
- **Type 1 / Early Deceleration**
  - The Nadir of FHR & Peak of Uterine contraction coincide
  - Seen in Normal Pregnancies, and occurs due to fetal head compression in labor
  - Onset of deceleration & coming back to normal is > 30 sec

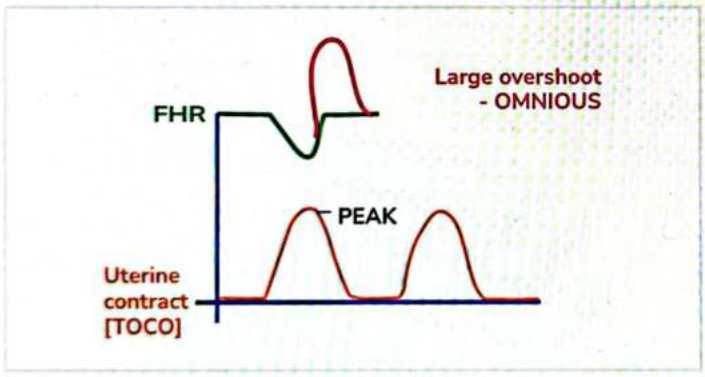


- **Type 2/ Late Deceleration**
  - The Nadir & Peak are away from each other
  - Seen in placental insufficiency
  - Onset of deceleration & coming back to normal → > 30 sec

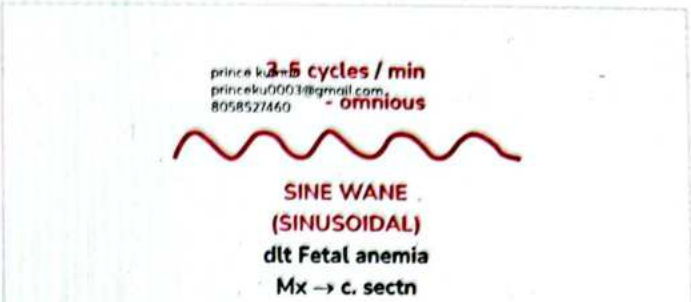
- **Variable Deceleration**
  - Most common deceleration
    → Due to Umbilical cord compression
    → More atypical patterns are as follows







- **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 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

Q. Not included in Biophysical profile? (AIIMS 2020)
A. Non stress test
B. Fetal body movement
C. Fetal breath
D. Contraction stress test

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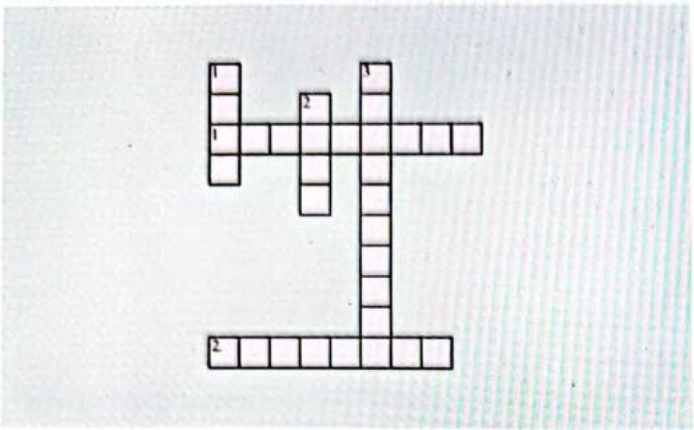
CROSS WORD PUZZLES

Crossword Puzzle



Across

1. First parameter to be effected in asymmetrical IUGR is ___ circumference
2. Contraction stress test can be performed by giving uterine stimulation with injection __

Down

1. Most common cause of early decelerations in labor is due to compression of __
2. Most common cause of variable decelerations in labor is due to compression of __
3. Most common cause of IUGR is __

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41 BASIC DEFINITIONS, CARDINAL MOVEMENTS, ECV

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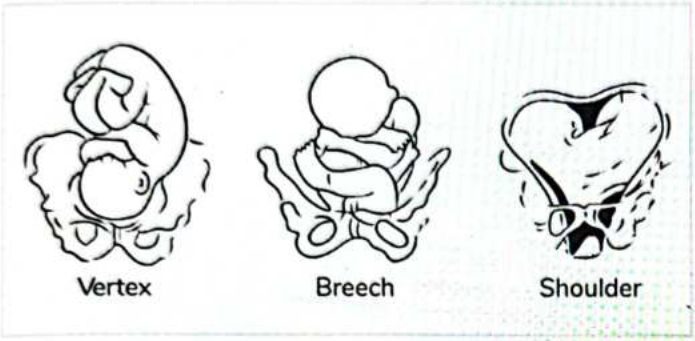
Basic Definitions

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)



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

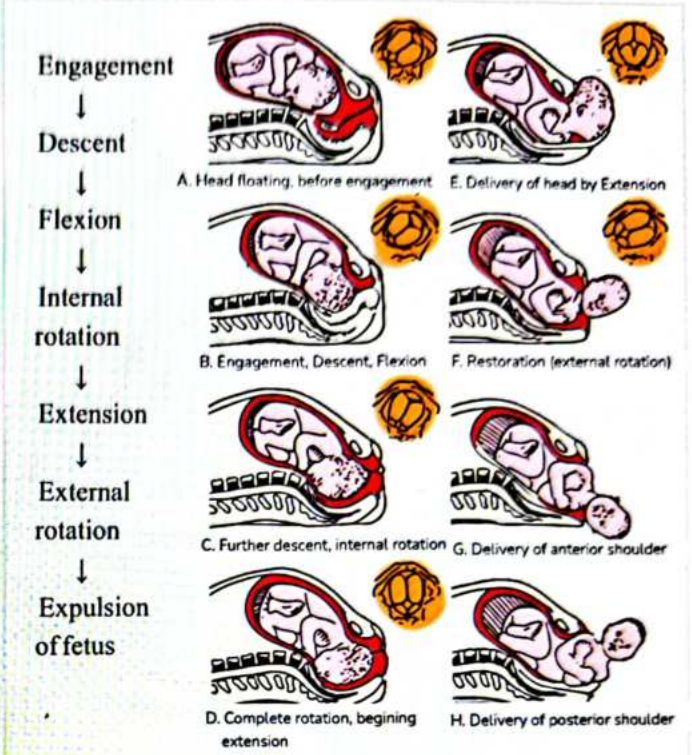
- The lowest bony part of presenting part.
- Occiput for vertex

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)

Cardinal Movements of Labor

00:07:41



- 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.
- It is known as Anterior Asynclitism, when sagittal suture is inclined posteriorly such that more of anterior parietal bone is seen. This is seen more in Multigravida
- It is known as Posterior Asynclitism when sagittal suture is inclined anteriorly such that more of posterior parietal bone is seen. This is seen more in Primigravida, due to increased abdominal tone.

Posterior Asynclitism Anterior Asynclitism

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 is a ring that forms between the contracting and retracting parts of uterus and is seen in normal labor, which can be felt by P/V examination
- Pathological Retraction ring (Bandl's ring) is seen in Obstructed labor, while physiological ring moves upwards, this can be felt both internally (P/V) as well as externally

Management of Various Presentations

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

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 weeks in a Multigravida
- ECV for breech or transverse lie is NOT done in labour : can cause rupture of uterus

Internal Podalic Version

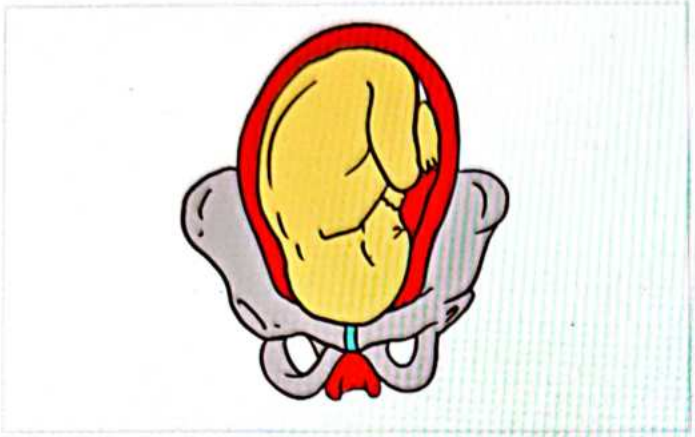
- Not done in Transverse Lie of a singleton pregnancy for the risk of uterine rupture

Important Information

- IPV can be done in only in Transverse Lie of 2nd baby in Twin pregnancy
- Reason: Uterus is relaxed

PREVIOUS YEAR QUESTIONS

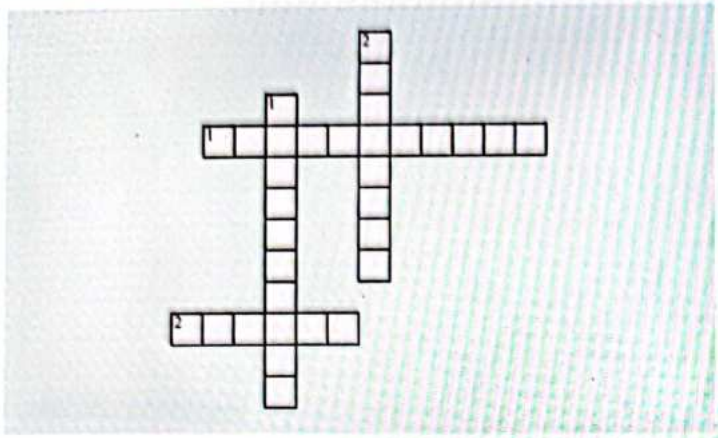
Q. What is the position of the fetus in the image shown below?
(INICET 2020)



A. ROA
B. ROP
C. LOA
D. LOP

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Bony prominence of the fetal presenting part which is used to assess the rotation is known as __
2. Most common malpresentation is __

Down

1. First cardinal movement of labor is __
2. The relation of fetal parts to one another is known as __

48 MEDICAL ILLNESS COMPLICATING PREGNANCY

Heart Diseases

Rheumatic Heart Disease (RHD) 00:00:58

- This is the most common heart disease in India, out of which Mitral stenosis is the most common presentation.

Heart failure

- Heart diseases in pregnancy are associated with an increased risk of precipitation of heart failure. Timing of heart failure in pregnancy :
  - Antenatal : occurs most commonly at around 30-32 wks, as the cardiac output increases by 50% at this time
  - Postnatal: failure occurs most commonly within the first 24 hrs after delivery. This is the time of pregnancy associated with maximum chances of failure as cardiac output increases by 70-75%.

Management

- Antenatal failure is managed by Balloon Mitral Valvotomy (Non invasive Surgery preferable done in 2nd trimester
- Postnatal failure Management : Keep the patient in High risk ward/ ICU for observation for first 24 hrs and give Inj. Lasix immediately after delivery to decrease preload on heart.

Important Information

- Observation Period Required Postnatally For Heart Disease : first 24 hrs
- Observation Period Required Postnatally For PPH : first 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 in heart disease 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 in heart disease 00:07:58

- Less IV Fluids
- Position for delivery : Semi Recumbent
- Adequate pain relief to be given by opioids or epidural Analgesia
- Avoid straining in 2nd stage by cutting it short by forceps / vacuum
- Inj. Furosemide to decrease preload, given immediately after delivery
- IV/IM Oxytocin given as drug of choice for prevention of PPH
- Methyl Ergometrine is contraindicated, as it suddenly increases preload and may precipitate heart failure
- Observation in High Risk ward for 24 hrs and discharge after 5 – 7 days

Delayed Complications 00:11:25

- Arrythmias
- Cardiac rupture
- Infective Endocarditis
- Thromboembolic Phenomenon
- Mitral Valve Prolapse

Heart diseases which are contraindications 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

Hypothyroidism 00:15:03

Diagnosis

- Normal value of TSH should be, < 2.5, however if the value is 2.5 to 4.0, then we must check Anti thyroid peroxidase, if positive ten start Eltroxin replacement.

Complications

Maternal Complications 00:16:29	Neonatal Complications 00:17:10
• 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

- Drug of choice for management of hyperthyroidism in pregnancy is propylthiouracil ; Dose = 100 - 150 mg TID
- Methimazole is associated with fetal congenital anomalies when given in first trimester, however can be used second trimester onwards.

Epilepsy 00:20:02

- Rate of convulsions can be increased, decreased or stay unchanged in pregnancy, around 30% women have increased risk of, convulsions 20% have decreased risk while, 50% have unchanged risk of convulsions.

Management

- Phenobarbitone is not given in pregnancy.
- Phenytoin and carbamazepine can be given but are category D drugs and can cause fetal Hydantoin syndrome
- Lamotrigine and levetiracetam are category C drugs and can be used in pregnancy, lamotrigine is the drug of choice.

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

- If any female is on Phenytoin/ Carbamazepine (Category D Drugs) & is planning to Conceive, we must 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
- A female presents in first trimester & is already taking Phenytoin for epilepsy , we must continue the drug (Phenytoin) for rest of pregnancy as there is no benefit of changing drug as most of organogenesis has occurred & effects of Phenytoin have already taken place

Malaria 00:27:58

- Malaria has poor prognosis in pregnancy as there is increased risk for fulminant hepatic failure & intrauterine fetal death
- Drug of choice for malaria in pregnancy is Chloroquine
- Complicated Malaria is treated by Artesunate, which is the drug of choice, Quinine, while Mefloquine can be used only after first trimester (> 12 wks)

Other Diseases

Rheumatoid Arthritis

- Rheumatoid arthritis has better prognosis in pregnancy as pregnancy is an immunocompromised state.

Sarcoidosis

- Sarcoidosis also has better prognosis in pregnancy.

Ulcerative Colitis

- Prognosis is unchanged if patient already has disease, however prognosis is worse prognosis if it is presenting first time in pregnancy.

Appendicitis

- Appendicitis in pregnancy has poor prognosis as it is associated with increased risk of abortion, sepsis, preterm labor & IUD, hence early surgery advised

Tuberculosis:

- TB has worse prognosis in pregnancy, which is worst in puerperium as compared to 1st, 2nd & 3rd trimester because of increased nutritional and energy demand and decreased supply and its association with ongoing Immuno suppression, low socio economic status, over crowding in families, poor ventilation, heat and humidity

PREVIOUS YEAR 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

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

40 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

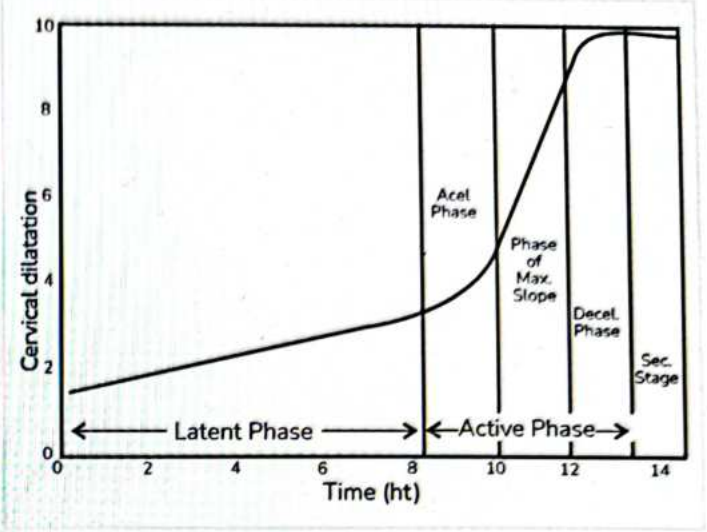
00:04:49

First	From onset of true labour pains to full cervical dilatation
Second	Full cervical dilatation to delivery of baby
Third	Delivery of baby to delivery of placenta
Fourth	Stage of observation, till 1 hour after delivery of placenta

First stage is further divided into

Latent phase	Cervical dilatation ≤ 3 cm	• Lasts around 8 hours • Tocolytics in preterm labour given only in this phase

Active phase	Cervical dilatation ≥ 4 cm	• Lasts around 4-6 hours
		• ocolytics in preterm labour cannot be given in active phase
		• Future divided into
		  ○ Acceleration phase
		  ○ Phase of maximum slope
		  ○ Deceleration phase



- Latent Phase + Acceleration Phase (of Active Phase) constitutes preparatory division of labor
- Phase of maximum slope constitutes Dilatational division of labor
- Deceleration Phase + 2nd stage of labor constitutes Pelvic division of labor

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

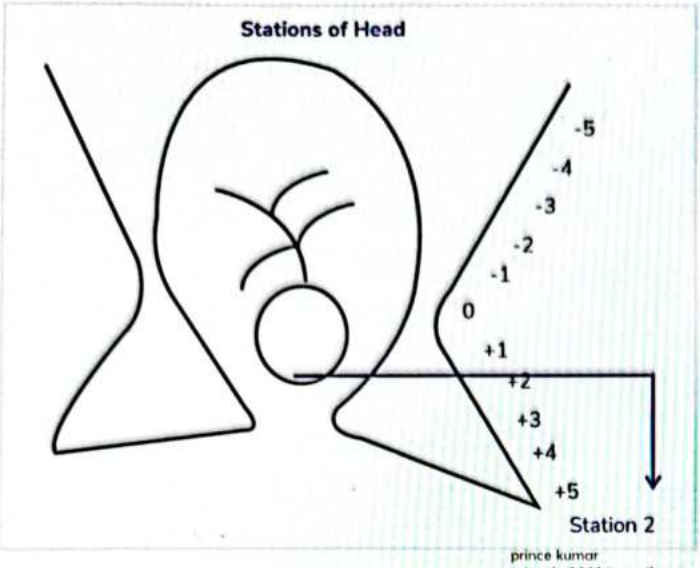
Maximum duration (Stage I & Stage II of labor combined):

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 presenting part is assessed with Ischial spine is the reference point, which is the 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
  - Decision to transfer to a better center if labor progression is not going well
  - Augmentation of labor (intervention to augment by Oxytocin etc.)
  - Termination of labor by cesarean→ If suggestions of obstruction have started coming in Partograph

Refer graph 40.1

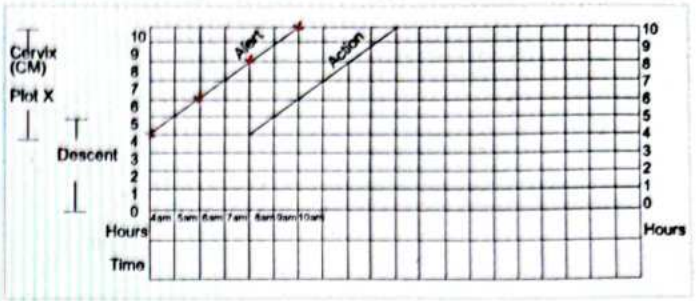
Alert line and action line : Reference lines 4 hours apart to check the progress of labor, intervention is warranted when plotted line crosses action line

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

Understand with example

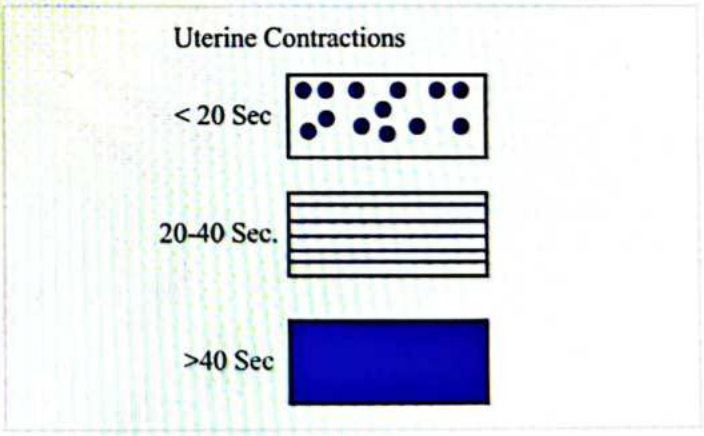
- Suppose cervical dilatation at 4 am is 4cm, at 6 am is 6 cm, at 8 am is 8 cm and at 10 am is 10 cm



- 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 00:25:35

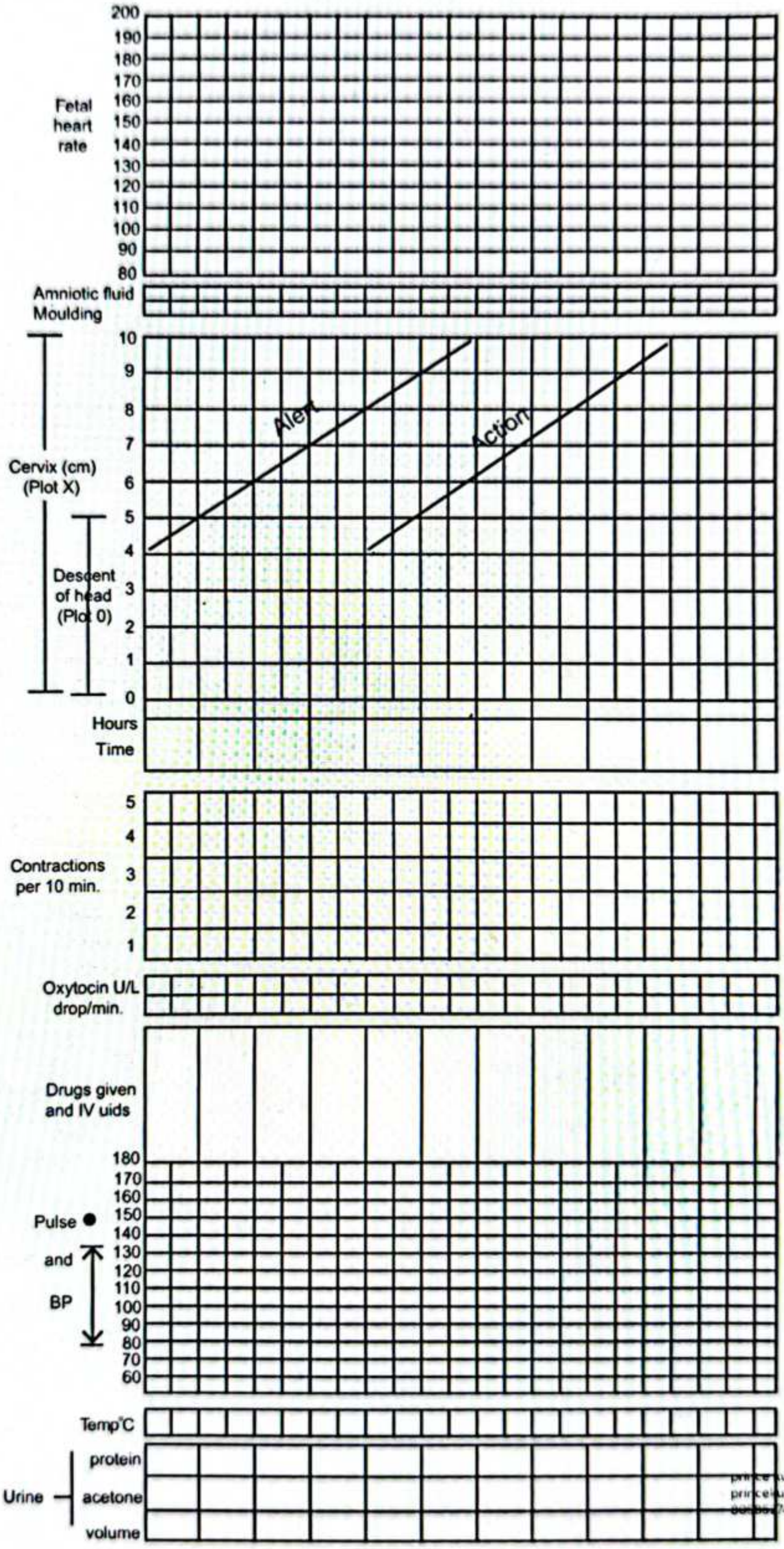
- ↓Prolonged labor
- ↓Chances of Obstructed labor
- ↓chances of Uterine rupture
- ↓chances of Sepsis
- ↓PPH

} Reduction in MMR is ultimate goal

Graph 40.1

Name Gravida Para Hospital number

Date of admission Time of admission Ruptured membranes hours



PREVIOUS YEAR QUESTIONS

Previous Year's Question

Q. midwife was plotting a partograph. After how much dilatation she must start plotting the partograph? (INI CET 2020)

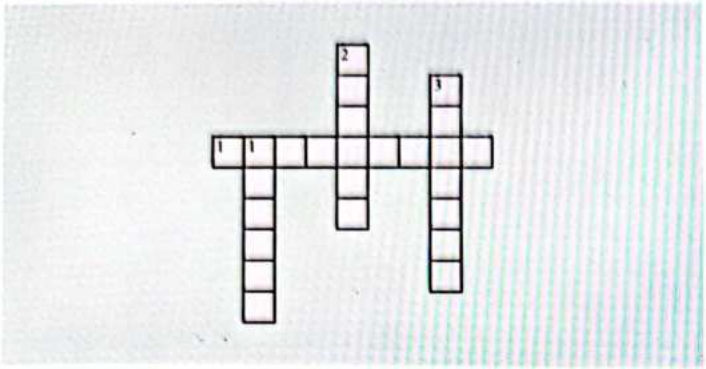
a. 4 cm
b. 5 cm
c. 7 cm
d. 2 cm

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Best tool for monitoring progress in active labor is by plotting a __

Down

1. Cervical dilatation of 4 to 9 cms constitutes __ phase of first stage of labor
2. Delivery of fetus constitutes __stage of labor
3. Position of fetal head with respect to ischial spines is known as __of fetal head

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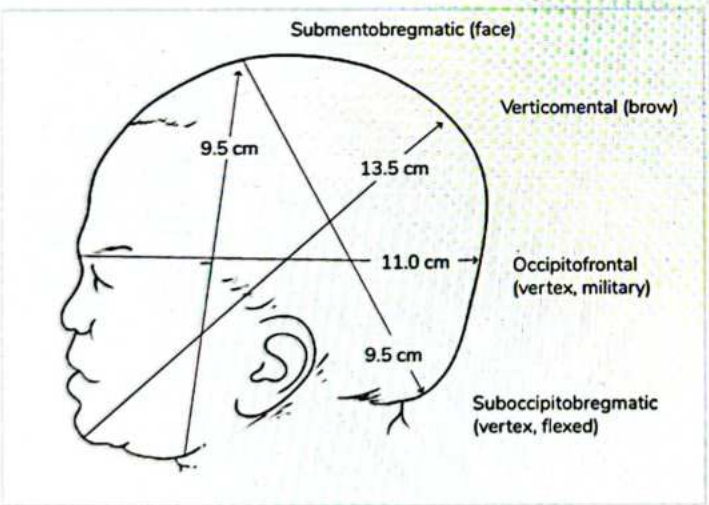
42 FETAL SKULL, MATERNAL PELVIS, IMPORTANT DIMENSIONS

Fetal Skull Diameters

AP 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

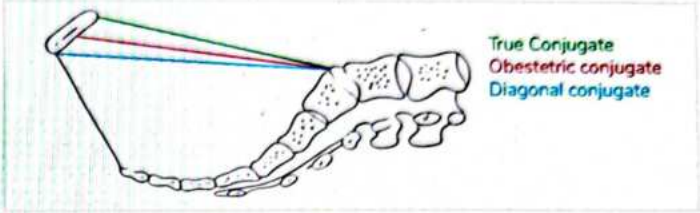
Transverse Diameters

- Biparietal diameter: 9.5 cm
- Bimastoid diameter: 7.5 cm
- Bitemporal diameter: 8 cm

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

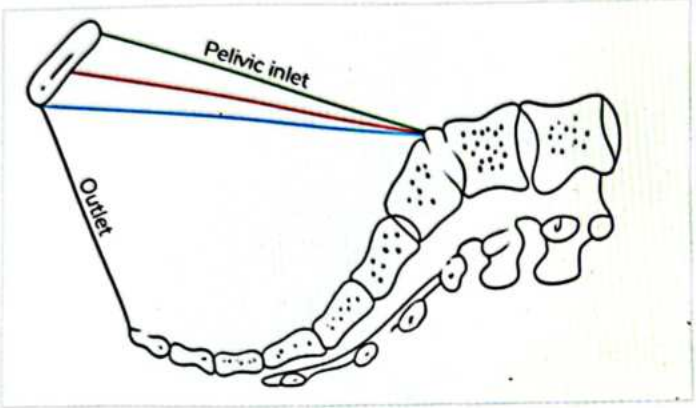
Diameters	Contracted Pelvis
Diameters of pelvic inlet	
True conjugate (DC-1) = 11cm	
Obstetric conjugate (DC-2) = 10cm	<10 cm
Diagonal conjugate (AP diameter) = 12cm	<11.5 cm
Transverse diameter = 13cm	<12 cm
Oblique diameter = 12cm	

Diameter of the mid pelvis	
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: occurs due to childhood deficiency of Vit. D. The shape of inlet is Reniform
- Osteomalactic Pelvis: occurs due to deficiency of Vit. D in adulthood. The shape of inlet – triradiate pelvis
- One Ala of Sacrum missing: Naegele's Pelvis
- Both Ala of Sacrum missing: Robert's Pelvis

PREVIOUS YEAR 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)

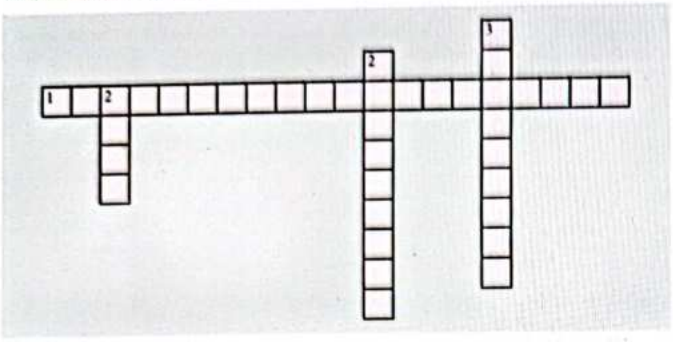


A. Anatomical (True conjugate)
B. Obstetric conjugate
C. Diagonal conjugate
D. Interspinous diameter

Q. Presenting diameter of a fully flexed head is? (NEET 2019)
A. Suboccipito-bregmatic
B. Suboccipito-frontal
C. Occipito-frontal
D. Occipito-posterior

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Anteroposterior diameter of engagement in fully flexed fetal head is _____

Down

1. Mentovertical diameter engages in _____ presentation
2. A line drawn from the mid part of the posterior surface of the symphysis pubis to the tip of sacral promontory is _____ conjugate
3. Smallest transverse diameter of fetal head is _____

43 MALAPOSITIONS, MALPRESENTATIONS

Most Commons

- *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 00:03:02

Important Information

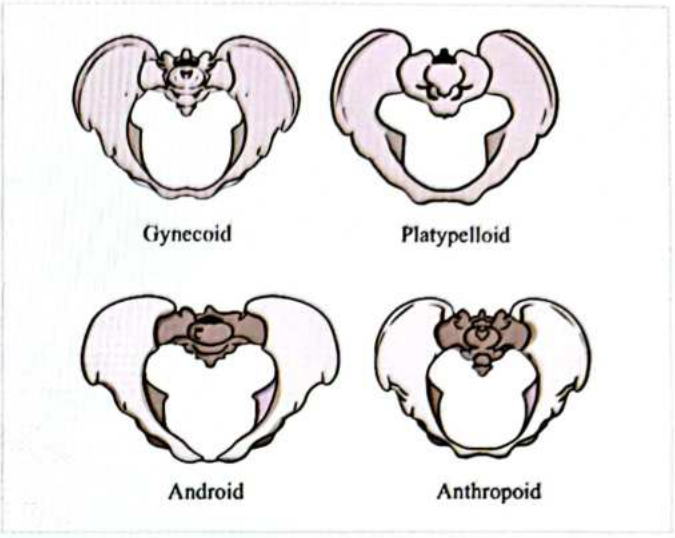
- Occiptio-posterior mostly delivers. If a patient in labour presents with OP position: wait and watch

80% becomes Occipitoanterior

- Mode of delivery → Normal

15-16% becomes persistent Occipitoposterior

- Short (1/8th) posterior rotation
- Occurs in Anthropoid Pelvis
- Mode of delivery → Face to Pubis delivery



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

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

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 (deflected)		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

Breech Presentation 00:19:30

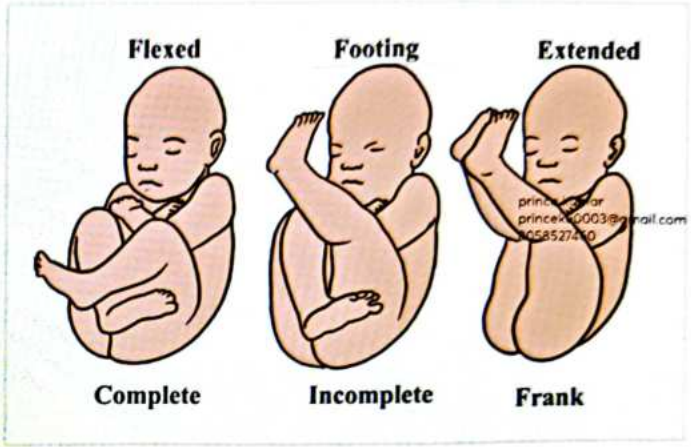
- Incidence: 3% at term
- 10% in next pregnancy, 30% in third pregnancy

Associations

- Prematurity (MC)
- Twins
- Polyhydramnios
- Anomalies
  - Mother: Bicornuate Uterus, Unicornuate Uterus
  - Baby: Hydrocephalus
- Placenta previa
- Pelvic tumors

Variations in Breech Presentation

- **Complete Breech (Flexed)**: can be delivered vaginally
- **Incomplete Breech (Footing)** can't be delivered vaginally & is delivered by Cesarean section, due to high risk of cord prolapse and arrest of aftercoming head due to delivery through incompletely dilated cervix
- **Frank Breech (Extended):** it is the most common type and best breech for vaginal delivery.
- **Breech with Extended head** : shows a Star Gazing Sign on USG and is delivered only by Cesarean section



Important Information

- MC breech and breech best for vaginal delivery : FRANK breech

Breech Vaginal Delivery 00:27:27

- Take Consent of mother before planning Breech vaginal delivery
- Give Epidural analgesia, this relaxes pelvic muscles and gives anaesthesia to pelvic floor & skin in perineum, this prevents premature bearing down through an incompletely dilated cervix.
- MC position of breech presentation is LSA (Left sacro-anterior)
- When fetal attitude is Flexion (Flexed Breech), the fetal legs come out first, while if the attitude is extended (frank breech), buttocks come out first

Breech Extraction

- When the breech is seen, pull the baby out, however this can cause injuries.
- It is done only in dead babies

Spontaneous Breech Delivery

- Entire delivery occurs on its own spontaneously
- Not done these days, only done for dead babies

Assisted Breech Vaginal Delivery

- This is the recommended method of conducting a breech delivery, wherein no touch is done till umbilicus is delivered, after which the delivery is assisted
- For extended legs, do Pinard's Maneuver. In this, reach popliteal fossa, with two fingers, flex the knee and then pull out the feet.
- Hold sacrum anteriorly and ASIS on sides with both hands and pull (don't hold by abdomen)
- Always keep back anterior
- For flexed breech, one can just pull out legs
- For Extended arms, do Lovset's Maneuver. In this, turn baby sideways such that shoulders are in AP diameter → pull out posterior arm → turn again → deliver other arm)

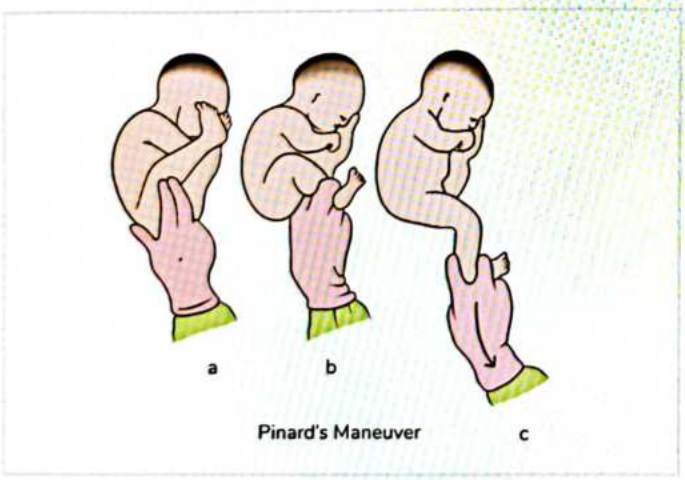
Delivery of after coming head

- It is done only when nape of neck is visible
- Can use various methods like

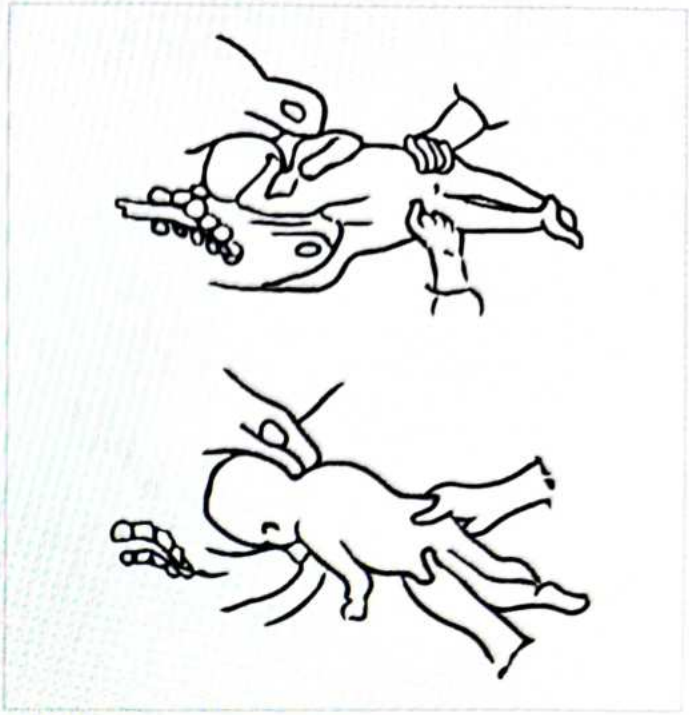
a. Piper's Forceps: only has cephalic curve, no pelvic curve. Easiest and safest

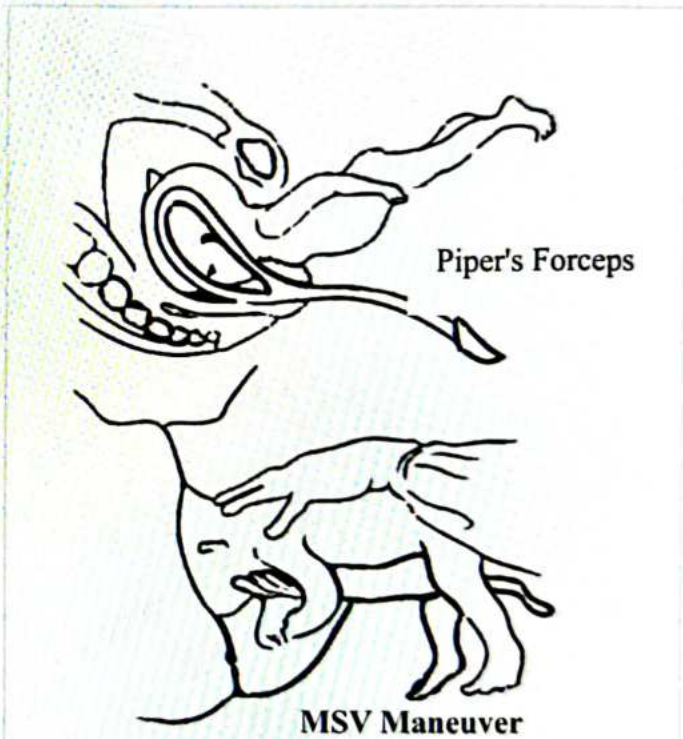
b. Mariceau-Smellie-Viet Maneuver: put two fingers on shoulders and one on nape of neck → promote flexion→ other hand hold malar bones (malar flexion and shoulder traction). Can injure eyes, so, can also do jaw flexion instead.

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



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

PREVIOUS YEAR 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)

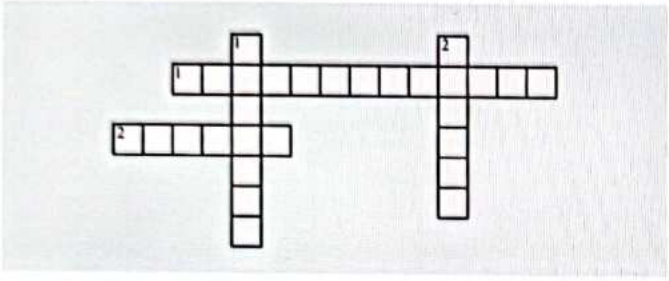
A. Right dorso-anterior
B. Occipito-posterior
C. Brow
D. Occipito-anterior

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Diameter of engagement in brow presentation is __
2. ___forceps is used to deliver aftercoming head of breech

Down

1. Deep transverse arrest is seen in __ pelvis
2. Manouver used to deliver extended legs in breech vaginal delivery is known as __ manouver

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44 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)

Common Indications

- Fetal distress
- To shorten second stage of labor
  - Cardiac disease
  - Hypertensive crisis
  - Spinal cord injury
  - Prolonged second stage
  - Maternal exhaustion
  - Epidural analgesia

Common pre-requisites

- Adequate Pelvis
- Consent
- Empty bladder
- Good contractions
- Station +2 or lower: Head <1/5[th] palpable per abdomen
- Membranes ruptured
- Adequate anaesthesia
- Facility of emergency LSCS available

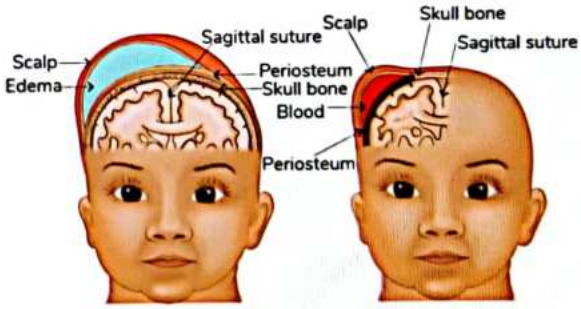
Specific Pre-requisites and contraindications

Forceps	Vacuum
• Fully rotated head or <45° remaining • Vertex • After coming head of breech • Mento-anterior face • Fully dilated Cervix • Station → +2 & below • Can be used in preterm • Can be used in presence of Caput	• Rotated head or Non rotated head • Used for Cephalic presentation only • Not used for breech or face • >6 cm dilated Cervix • Station → +2 & below • Cannot be used for preterm fetus / fetal coagulopathy • Cannot be used in presence of Caput

Complications

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

Caput succadeneum	Cephalhematoma
• 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	• 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

- Induction of labor implies induction of contractions before spontaneous onset of labor
- Augmentation of labor implies enhancement of labor 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
  - PROM
  - Severe gestational HTN
  - Oligohydramnios

- Non-reassuring Fetal Heart pattern
- Post term pregnancy
- 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 or 0-30%	3-4 or 40 - 50 %	1-2 or 60 - 70 %	0 or ≥ 80%
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

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), however if Bishop score is not good, we can first ripen the Cervix with Prostaglandins
- >20 mIU/min Oxytocin (High dose), is associated with water intoxication secondary to ADH action of Oxytocin, this may lead to convulsions.

2. Misoprostal (PGE_1) (Off label use)

- Dose = 25µg vaginally or 100µg orally
- Used for induction of labor as well as cervical ripening
- Avoid PGE_1 in previous C-section as it causes vigorous contractions

3. Dinoprostone (PGE_2)

- Dose = 0.5mg gel (Cerviprime) → Applied Intra-Cervical
- 20mg Suppository → given per rectum
- 10mg 'Insert' ; Ideally taken out after 12hrs / after labor starts whichever is earlier , we may have to pull the 'Insert' out if there is Tachysystole that is >5 Uterine contractions / 10 mins

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: This releases endogenous PG, which causes labor induction.
2. Artificial rupture of membranes (using KOCHERS forceps) : This also releases endogenous PG, which causes labor induction or augmentation

- Early Amniotomy can be done at 1-2cm dilation, while Late Amniotomy is done 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, this is used to give traction causing constant mechanical pressure to dilate cervix
2. Laminaria tents: These are made of dry sea weeds, which have hygroscopic action, they imbibe fluids & swell up (in 10-12 hrs) and open up Cervix

Risks of IOL

- Increased chances of C-section
- Chorio-amnionitis
- Uterine rupture
- PPH (may require Emergency Obstetric Hysterectomy)

PREVIOUS YEAR 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

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)

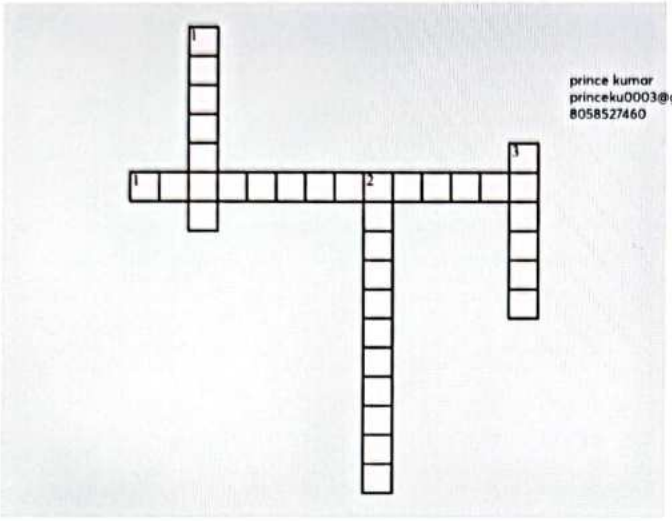
A. Oxytocin
B. Methyl ergometrine
C. Laminaria tent
D. Carboprost

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. A subperiosteal hemorrhage, limited by suture lines seen after a traumatic vaginal delivery is __

Down

1. ___ score is used to assess inducibility of cervix for labor
2. PGE1 used for cervical ripening is sold in the name __
3. ___ can be applied in a non rotated fetal head for instrumental delivery

45 EPISIOTOMY

- Episiotomy involves widening of birth canal to facilitate delivery however it is not to be given electively for all deliveries
- Routine episiotomies increase risk of Rectal Incontinence; flatal and fecal incontinence

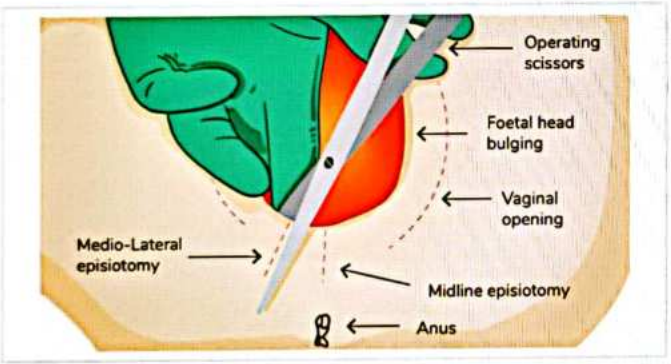
Important Information

- Episiotomies are not to be given routinely, unless indicated. They are associated with increased risk of rectal incontinence

Indications

00:01:11

- Breech
- Instrumentation
- Large Baby
- Persistent Occipito posterior
- Shoulder dystocia



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

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 QUESTIONS

Q. Episiotomy extended posteriorly beyond perineal body, can injure which of the following structures? (NEET 2020)

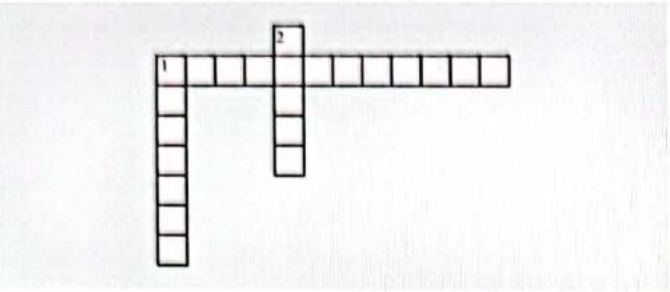
A. External anal sphincter
B. ischiocavernosus
C. Bulbospongiosus
D. urethral sphincter

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. The most preferred episiotomy site is _____

Down

1. _____ episiotomy heals the fastest
2. Episiotomies are given under _____ anaesthesia

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46 PUERPERIUM

Normal Puerperium

Definition

- It is the time required to get back to pre-pregnant physiology, size and shape. It is the period from delivery till 42 days or 6 weeks. The woman is still in Immunocompromised state and hence the period requires monitoring.

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 after delivery and 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)

Abnormal Puerperium

Puerperal Fever 00:10:40

- Any fever in 1st to 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 endometritis 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 of this treatment regime

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 in Puerperium 00:18:45

Colostrum

- Deep lemon yellow liquid that comes for the first few days of breast milk which is rich in IgA, provides protection against enteric pathogens, has host resistance factors like Complement, Macrophages, Lymphocytes, Lactoferrin, Lactoperoxidase and lysozymes
- Colostrum has more protein and less sugar and fat than mature milk that comes in later and persists for 5 days to upto 2 weeks. This converts to mature milk by 4-6 weeks

Mature Milk

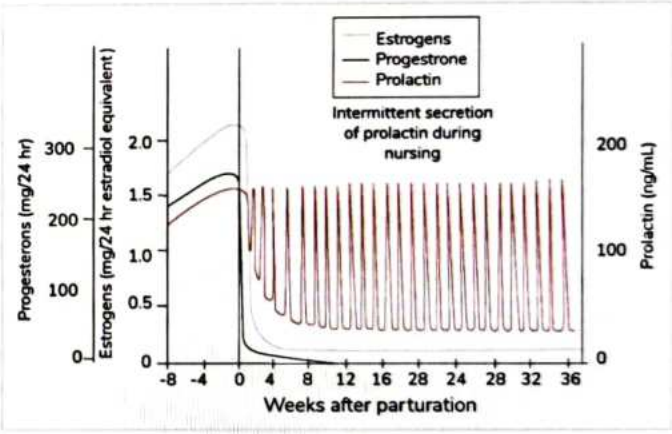
- Colostrum converts to mature milk by 4-6 weeks, which has more fats, carbs, minerals, vitamins
- The production is around 600 ml/day and is isotonic with plasma
- Vit K is absent (inj Vit K is given to newborn)
- Vit D is low (supplementation is recommended)

Milk Delivery

- Progesterone and estrogen decline abruptly after delivery removing progesterone mediated inhibition on alfa-lactalbumin. Prolactin is allowed to act unopposed in its stimulation of alfa-lactalbumin production, causing milk production.
- Prolactin is essential for lactation. Absent prolactin in Sheehan's syndrome causes 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 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 returns 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

- Most common cause is infection with Staphylococcus aureus and source of infection is 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

Urinary Tract Infection 00:32:35

- Most common cause is infection with E. Coli

Management

- Cephalosporins
- Penicillins
- Nitrofurantoin

Post-Partum Thyroiditis: Acute Destructive Lymphocytic Thyroiditis 00:32:52

- **First phase:** It comprises of thyrotoxicosis induced by gland destruction and symptoms result from excessive release of hormones, hyperthyroidism is seen in 1-4 months. This is treated with Propanolol
- **Second phase:** Here hypothyroidism results from thyroiditis and is seen between 4-8 months post partum. It is treated with thyroxine supplementation, 25-75 mcg for 6-12 months

Sheehan's Syndrome 00:34:13

- Post partum pituitary necrosis occurs usually due to torrential hemorrhage during pregnancy or childbirth as pituitary is very sensitive to hypoxia. This leads to lactational failure as well as global reduction in production of pituitary hormones

Psychiatric Disorders in Puerperium 00:24:57

Post Partum Blues

- These occur within first few days and resolve by 2 weeks (50-60%) and are primarily 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

Post Partum Psychosis

- This occurs in first 2-3 months (<1%) and is characterized by severe Insomnia, rapid mood swings, psychomotor restlessness, delusions, hallucinations and is associated with cognitive impairment
- This usually presents as a psychiatric emergency
- This occurs within first 3-6 months and is characterized by insomnia, anxiety, low self worth. The woman is unable to care for or bond with the baby and is associated with excessive guilt, suicidal tendencies
- This usually follows a prolonged course

PREVIOUS YEAR QUESTIONS

Q. A patient presented with smelly greenish vaginal discharge 5 days after delivery. What is the next line of management?
(FMGE 2020)

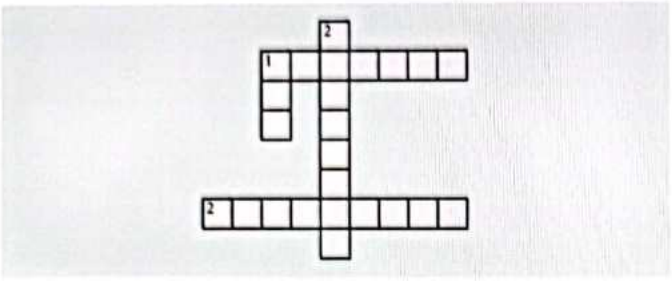
A. Antibiotics
B. USG
C. Urine analysis
D. Per vaginum examination

Q. 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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. _____ syndrome is associated with failure of lactation
2. First milk secreted from breast is known as _____

Down

1. Puerperium is a period of _____ weeks after delivery
2. Levels of prolactin _____ after delivery

47 CESAREAN SECTION

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

- Lesser number of children preferred by a woman
- Increased age at pregnancy
- More use of electronic Fetal monitoring
- Decreased 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

- 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

Maternal - Fetal Indications 00:12:37

- Cephalopelvic Disproportion
- Failed Operative Vaginal delivery
- Placenta Previa
- Abruption with fetal distress

Fetal Indications 00:13:47

- Non-assuring fetal heart pattern / Fetal distress
- Mal-presentation
- Congenital anomalies
- Abnormal Doppler studies (REDF
- Reverse End Diastolic Flow)
- Prior Fetal birth trauma

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 of caesarean section

Advantages for Mother 00:16:10

- Much less incidence of Prolapse
- Much less incidence of Urinary incontinence

Advantages to Baby

- ↓ Neonatal Morbidity [≤1%]
- ↓ Skin lacerations (MC problem)
- ↓ Cephalohematoma
- ↓ Skull & clavicle fracture
- ↓ Brachial plexopathy
- ↓ Facial nerve injury

- Failed Forceps f/b C-section is most problematic for Neonate

Procedure of C-section

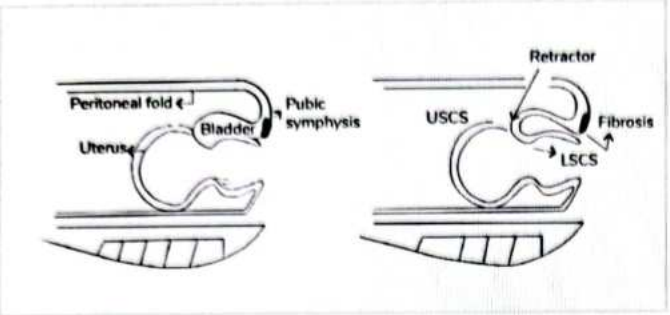
Preparation

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 in case of emergency cesarean

Abdominal Incision

- Easy & fast incision: Vertical
- Preferred incision: Low Transverse / Bikini incision / Pfannensteil incision / Maylards incision

- **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

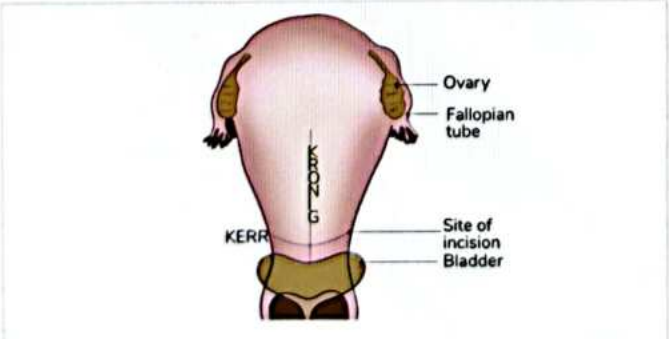
LSCS	Classical CS 00:39:57
• Easy to repair • Less bleeding • Heals faster • Passive lower segment (retracts in labor) • Trial of labor is possible in next pregnancy (VBAC) (for 1 previous LSCS only) • Rupture rate → 0.5 - 2%	• Difficult to repair • More bleeding • Slow healing • Trial of NVD is C/I due to risk of rupture of Uterus • Rupture rate → 8-10%

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 1 LSCS only, not two

Incision on Uterus 00:44:20

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

Cesarean Section Complications 00:50:08

Early Complications	Late Complications
• Hemorrhage • Sepsis, Peritonitis • Endometriosis • Thromboembolism • Anaesthesia complications • Visceral Injuries • Fetal Injuries • Hysterectomy	• 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 1 LSCS

- Rupture of Uterus can happen 00:54:48
  - Partial rupture/ 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 and 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 QUESTIONS

Previous Year's Question

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

Q. Instruments used in a cesarean section are? (Multiple correct options)? (INI CET 2021)

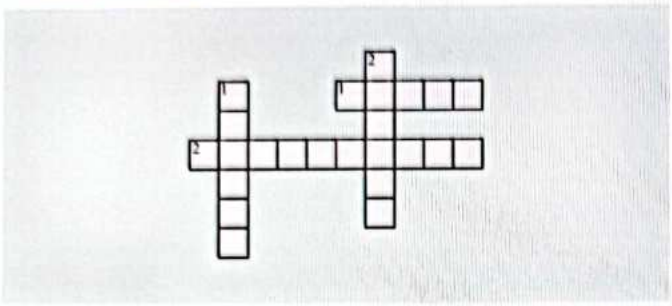
A. Doyen's retractor
B. Allis forceps
C. Bard parker handle and blade
D. Green armytage forceps
E. Karma's canula
F. Cusco's speculum

Q. Which of the following surgeries is this instrument commonly used? (AIIMS 2019)

A. LSCS
B. Vaginal hysterectomy
C. Fothergill's repair
D. Manchester repair

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. In an LSCS, the uterine incision is given in __ segment of the uterus
2. Malpresentation which is an absolute indication for cesarean section is __ lie

Down

1. Classical cesarean may be preferred in cases of advanced cancer of __
2. Retractor used in LSCS is known as __ retractor

51 INFECTION IN PREGNANCY

Transmission of Infections

Vertical Transmission

00:00:46

- Refers to passage of an infectious agent from mother to her fetus through the placenta, during labor, 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 in Pregnancy

Cytomegalo Virus

00:01:50

- It is a DNA Herpes virus and is te most common 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

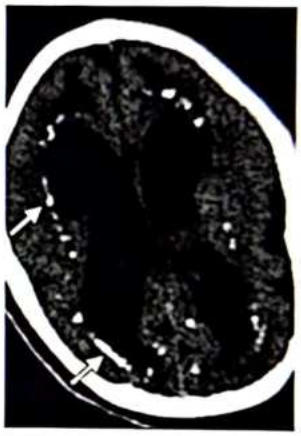
- 30-36% in 1st Trimester
- 30-40% in 2nd Trimester
- 40-72% in 3rd Trimester

Fetal Infection 00:04:07

- **(Only 5-10% neonates demonstrate this syndrome)**

Features	Complications
• Growth restriction, Microcephaly • Intracranial calcifications • Chorioretinitis • Mental retardation, Sensorineural 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

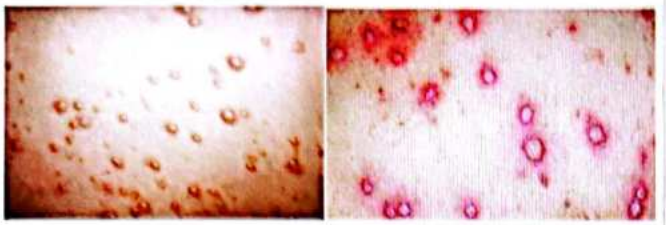
- Despite the high infection rate with primary infection in the 1st half of pregnancy, most Fetuses develop normally.
- If recent infection is confirmed → Offer Amniotic fluid CMV
- Pregnancy termination may be an option for some
  - Oral Valacyclovir 8gm daily is tried on mother
  - No Vaccine for CMV is available

Varicella Zoster Infections

00:07:35

- 90% of adults have serological evidence of immunity to VZV
- The primary infection presents as Varicella or Chickenpox. This is transmitted by direct contact with an infected individual and the incubation period is 10 to 21 days
- 1 to 2 days flu like prodrome is 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
  - Growth restriction
  - 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

- Exposed pregnant women who are seronegative should be given VZIG
  - Best given with in 96 hrs of exposure
  - Can given up to 10 days
- Women with established varicella infection are treated with IV ACYCLOVIR therapy (at 10-15 mg/kg every 8 hrs) with hospitalization.

Influenza 00:13:44

- Pregnant women more susceptible to serious complications especially due to pulmonary Involvement.
- This is an Orthomyxoviridae family 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.
- **Diagnosis:** 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.
  - Rubella is the most complete Teratogen, and its effect is worst during period of 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. Low avidity (loose bond) implies recent infection, while high avidity (strong bond) implies remote infection. This is done to differentiate Recent positive IgG from Remote positive IgG. If IgG is positive for long time (Remote positive IgG), it means that the mother is immune to Rubella & problems in fetus are not likely to happen, while if there is a recent positive IgG (Both IgG & IgM positive), the 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 of congenital rubella syndrome

- 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

Contraindicated	Safe
• Measles • Mumps • Rubella • Varicella • BCG	• Tetanus & Diphtheria toxoids (Tds) • Hepatitis B • Influenza • Meningococcal • Rabies

- Anthrax, Hepatitis A, Japanese Encephalitis, Polio IPV, Yellow Fever are given on special recommendation

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

- Toxoplasma has feline stage in cats and non feline stage in Humans. Infection occurs with contact with cat faces or infected meat ingestion

MTCT of Toxoplasmosis

- Rises with increasing gestational age
  - 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

- If IgG is present before pregnancy, there is no risk if antenatal infection
- 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 ,24 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
    +
  - 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

- If a woman taking ART gets pregnant, she must continue all her current drugs
- All women diagnosed with HIV positive must get ART as soon as possible, monitor CD_4 count at initial and then 3 monthly visits
- ART Naive women should receive
  - 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

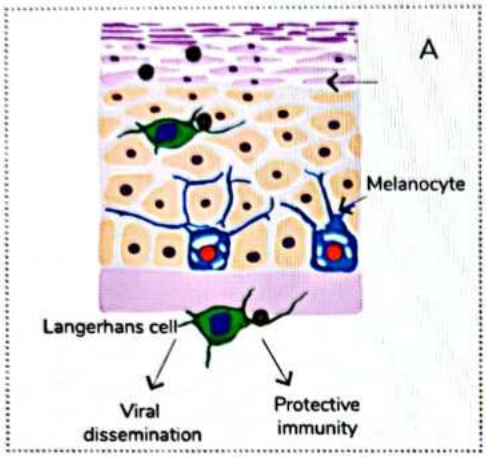
- Ideal strategy to suppress viral load & minimize Vertical transmission includes
  - Preconceptional ART
  - Ante-partum ART
  - Intra-partum continuation of Ante-partum Oral ART regimen plus IV Zidovudine
  - New born ART prophylaxis

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.

PREVIOUS YEAR QUESTIONS

Q. Which of the following viruses has the following pathophysiology and causes microcephaly in the fetus?
(INI CET 2020)



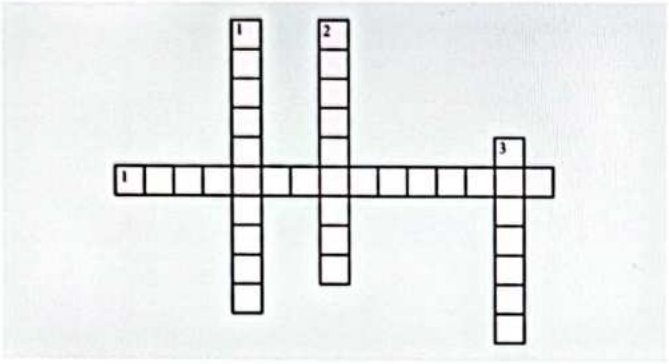
A. Parvovirus
B. Rubella
C. Zika
D. CMV

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Periventricular calcifications are seen in fetal infection with _____

Down

1. Drug of choice for toxoplasmosis in pregnancy is _____
2. The risk of mother to child transmission in toxoplasmosis _____ with gestational age
3. _____ virus is the most complete teratogen

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52 ECTOPIC PREGNANCY

Ectopic pregnancy

Location 00:00:30

- 1-2% of all pregnancies are ectopic, the most common site of which is the 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, 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

- Most common type of 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
- **Treatment** is by wedge resection of ovary

Important Information

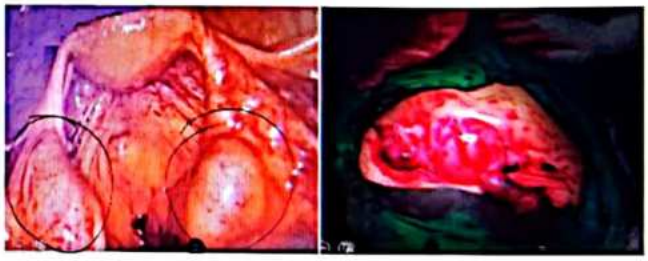
- MC ectopic: Tubal
- MC site of tubal ectopic: Ampulla
- MC non-tubal ectopic: Ovarian
- Primary Ovarian & Abdominal ectopic are much rarer as compared to secondary Ovarian & Abdominal ectopic
- Rarest: Cervical

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

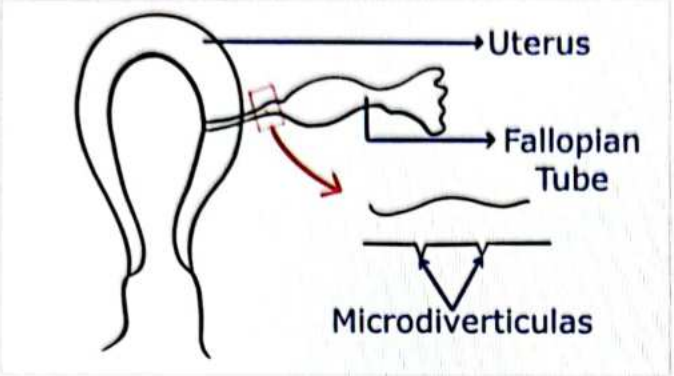


Time of Rupture 00:13:10

- 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: this is the most common cause, microdiverticulas are present which form a 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

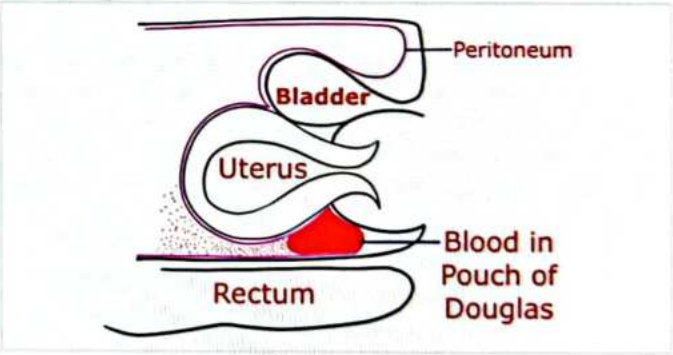
Presentation of Ectopic Pregnancy 00:28:33

Symptoms

- Amenorrhea followed by pain abdomen
- Bleeding PV: in a normal pregnancy, the placenta makes HCG which maintains corpus luteum of pregnancy, which inturn makes progesterone and maintains the pregnancy. In ectopic pregnancy, however the placenta is in the tube and thus there is Vascular insufficiency, which is the most common fate of ectopic pregnancy, the embryo degenerates, there is no HCG production, thus no progesterone to maintain this pregnancy, hence there is shedding of decidua which causes bleeding from Vagina
  - Other fate of ectopic: Tubal abortion or rupture
- Triad of symptoms in a ruptured ectopic: 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
  - LaparOscopy (not done in shock)
  - Laparotomy

- Procedure
  - No repair/ resection-anastomosis
  - Total Salpingectomy (No partial salpingectomy : can lead to another ectopic)

Unruptured Ectopic

1. Medical Management 00:46:25

- 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 00:50:12

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

Early Diagnosis of Ectopic 00:56:25

- TVS can see a gestational sac sooner than TAS

Type of Scan	Gestational SAC	Cardiac Activity
TVS (Tans Vaginal Sonography) (Preferred)	4+ weeks	5 + weeks
TAS (Trans abdominal Sonography)	5 + weeks	6 + weeks

- 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

PREVIOUS YEAR 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

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

Q. What is the criteria for diagnosis of abdominal pregnancy? (AIIMS 2020)

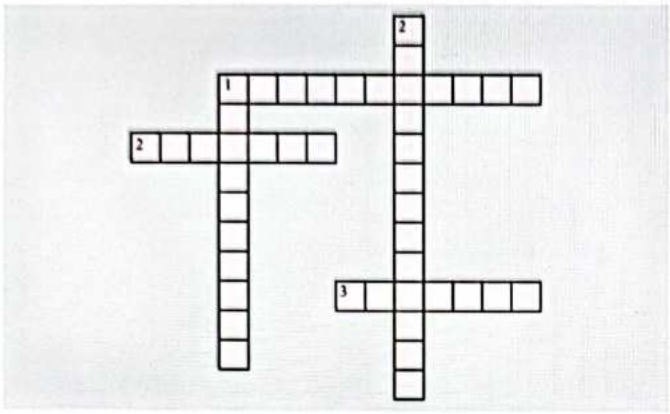
A. Studdiford
B. Palman's
C. Speilberg's
D. Rubin's

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

CROSS WORD PUZZLES

Crossword Puzzle



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Across

1. Criteria for diagnosis of ovarian ectopic is known as _____
2. Most common site of tubal ectopic is _____
3. First to rupture amongst tubal ectopic pregnancy is if ectopic sac is in _____

Down

1. Criteria for diagnosis of primary abdominal ectopic is known as _____
2. Surgical treatment of ruptured ectopic is _____

53 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
- It has low molecular weight and readily crosses placenta to cause embryotoxic & fetotoxic effects. Exposure at 6-9 weeks causes Warfarin Embryopathy
- Features
  - Stippling of vertebrae & femoral epiphysis
  - Nasal hypoplasia
  - Depression of Nasal bridge

Leflunomide 00:12:21
- It is a Pyrimidine synthesis inhibitor, used for treatment 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. This is followed by verification of serum levels of Leflunomide, which should be undetectable on 2 tests performed 14 days apart, after which the patient may plan to conceive.

Fetal Hydantoin Syndrome 00.13.58

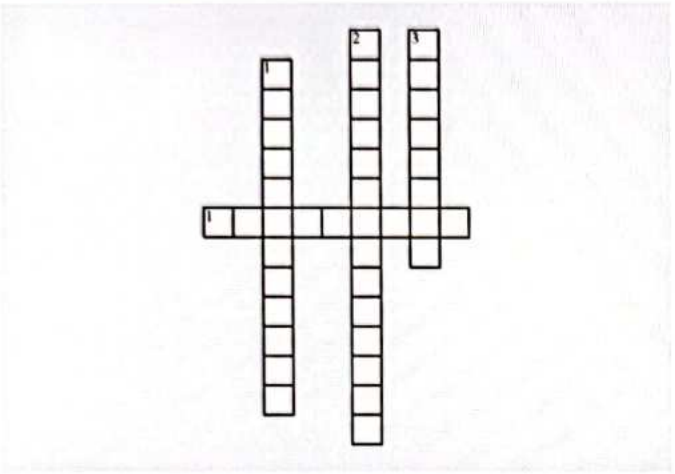
- Due to intake of antiepileptics like Phenytoin, Carbamazepine
- Facial features include
  - Upturned nose
  - Mild mid facial hypoplasia
  - Long upper lip with thin Vermilion border
  - Distal digital hypoplasia

Important Information

- At least 3 months washout period for phenetoin is required before planning Pregnancy. If woman presents with pregnancy and is already on phenetoin → do not discontinue

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Drug that causes fetal hydantoin syndrome is _____

Down

1. Premature ductus arteriosus is caused by _____ used for treatment of polyhydramnios
2. Drug used to washout leflunomide before patient can try for conception is _____
3. Anticoagulant contraindicated in first trimester of pregnancy is _____

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54 ANAEMIA IN PREGNANCY

Anemia in Pregnancy

Important Information

- MC cause of Anemia in pregnancy in India: Nutritional Anemia

Causes of Anemia 00:01:10

1. Decreased Production
   - Iron Deficiency Anemia
   - Megaloblastic Anemia
   - Folic Acid Deficiency Anemia
2. Increased Lysis
   - Hemolytic Anemia
   - Chronic Blood Loss

Definitions of Anemia 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 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 like Fe Sulphate, Fe Ascorbate, Carbonyl iron are all better Absorbable forms
- Every patient with anemia must be dewormed with MEBENDAZOLE (100 mg Tab BD x 3 Days)
- Injectable Preparations: The rate of increase of Hb with oral and injectable is same, thus the only indication for injectable iron use is Intolerance or Malabsorption. Stop oral Iron at the time of giving injectables as both use same gut receptors for absorption. Injectable forms available are
  - Fe Dextran (IM/IV)
  - Fe Sorbitol [IM]
  - 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 increases Hb by 0.8 - 0.9 gm%
  - Packed cells increase Hb by 0.8 - 0.9 gm %. This however gives lesser volume load than whole blood, thus preferred over whole blood.

Indices in Fe deficiency

- Serum Ferritin
  - 1st parameter to change
  - Ⓝ: 40-160 ng/ml
  - IDA: < 20 ng/ml
- Hb: ↓
- MCV: ↓
- MCH: ↓
- Serum total Iron: < 50 µg/dl
- Total Iron binding capacity: > 400 µg/dl
- Red cell distribution width (RDW): ↑

Thalassemia Indices

- RDW: Normal
- MCH: < 27 pg [Normal – 29 pg]
- Hb: Normal
- MCV/RBC: < 13 [Mentzer Index)
- On HPLC: HbA2 levels > 3.5
  - Do not overload patient with iron
- Peripheral smear of both IDA Thalassemia shows: Microcytic, Hypochromic, Anemia

Megaloblastic Anemia 00:23:00

Causes

1. **Folic Acid deficiency**

- ↑ demand
- ↓ Supply
- Malabsorption
- Intestinal Sx or resection

2. **Vit B_{12} Deficiency**

- ↓ Absorption: malabsorption syndromes
- ↓ Intrinsic factor
- Achlorhydria

Features

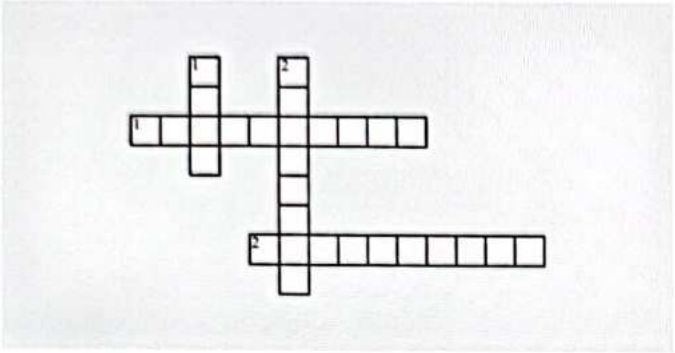
- Slow onset
- Hb ↓
- MCV: > 100 fL
- Requirement of folic acid: 0.4 to 0.5 mg/day
- Supplementation of Folic acid: 5 mg / day in Megaloblastic anemia
- Vitamin B_{12} (Cobalamin) requirement is only met by non veg diet so Inj. cynocobalamin can be given in vegetarian females

Nutritional Anemia / Dimorphic Anemia

- IDA (Microcytic hypochromic RBCs) + Megaloblastic Anemia (Hypersegmented neutrophils)
- This is the most common type of anemia in pregnant women in India

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most common type of anemia in Indian pregnant women is _____ anemia
2. Iron deficiency shows __ hypochromic type of blood picture

Down

1. The rate of rise of hemoglobin with injectable iron preparations is _____ compared to oral iron :
2. First parameter to derange in iron deficiency anemia amongst iron indices is serum _____

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55 VOMITING IN PREGNANCY

Vomiting in Pregnancy

- Vomiting in pregnancy is a common complain usually early in pregnancy and is referred to as morning Sickness, however it can occur at anytime of the day.
- From the onset of pregnancy until 16 weeks the vomiting continues, after that it usually subsides.

Reason of Excessive Vomiting

- ↑HCG
- ↑Estrogen
- ↑Progesterone
- ↑Leptins
- ↑Ghrelin
- Placental growth hormone

Hyperemesis Gravidarum 00:02:25

- Hyperemesis is a severe form of vomiting in pregnancy associated with unrelenting nausea, almost no intake of food and fluids
- Environmental and Psychological factors may also be 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

Important causes of late pregnancy vomiting

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]
  - o 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
- Promethazine
- 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

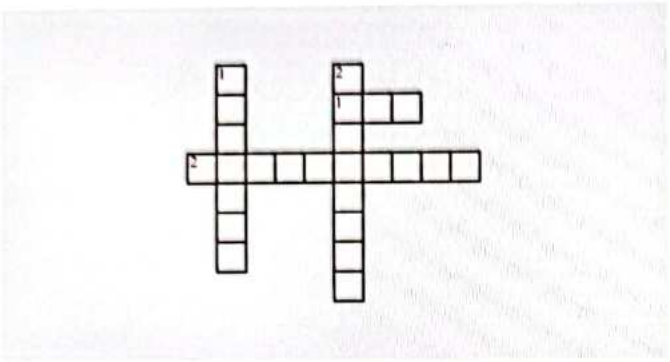
4. Intractable Vomiting

A. Parentral Nutrition

B. Enteral Nutrition

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Most important pregnancy hormone responsible for hyperemesis is __
2. A first line drug commonly used for treatment of vomiting in pregnancy is -__

Down

1. Amongst first biochemical changes suggesting dehydration secondary to excessive vomiting is elevation of urine __
2. A triad of opthalmoplegia, ataxia and confusion may occur secondary to loss of this vitamin due to excessive vomiting

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57 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

First Trimester Abortion
00:06:56
- Methods of abortion vary from In 1st Trimester (upto 12 weeks) to 2nd Trimester (12-24 weeks). Age of viability: 28 weeks: babies born before 28 weeks are not salvageable

Medical Abortion
Success rate
- Abortion done with drugs is 99% successful if done within first 7 wks of pregnancy (approved in India) and up to 95% successful if done within 9 wks of pregnancy

Drugs used
- **Tab Mifepristone Orally**: It is an antiprogestin, which is responsible to withdraw pregnancy support and hence kills the fetus. The dose used is 200 - 600 mg
- **Tab Misoprostol (PGE1) Vaginally:** Mifepristone is followed 24 to 48 hours later by misoprostol. Misoprostol is a prostaglandin, causes uterine contractions to expel products. The dose used is 800 µg, best given vaginally.

Pre-requisites
- USG to locate the fetus and rule out ectopic
- Counsel regarding the drugs
- Counsel regarding bleeding
- Repeat USG to check for completion

Surgical Abortion
Suction Evacuation
- In this method an electrical vacuum aspirator is attached to a Karman's canula, used to suction out products of conception. This can be done up to 8-10 wks of last periods

Manual Vacuum Aspirator
- Here a 60 mL syringe is taken and vacuum is built manually, up to a pressure of 610-660 nnHg, to suction out the contents.
- This method is cheaper, does not require OT and can be done in OPD, and can be done from 5-12 weeks

Dilatation & Curettage
- Can be done up to 12 wks of last periods

Second Trimester Abortion
Dilatation and evacuation
- Dilate with Hegar dilator or laminaria tent
- Evacuate with ovum forceps

Prostaglandins
- This is the method of choice for second trimester abortion

Drugs used
- Misoprostal [PGE 1]: can be given orally, Rectally or Vaginally
- Dinoprostone [PGE 2] is used in gel form inserted vaginally. It induces uterine contractions & causes expulsion of fetus.
- Carboprost [PGF_2]: this is used IM only

Laminaria Tents: These are dried sea weeds, which have hygroscopic action, they imbibe fluids & swell up causing cervix to dilate. This is then taken out after 12-24 hours : take out

Dilapan rods: These absorb fluids from the cervix, gradually swell up and cause cervical dilaltion, they work within 6 hours, faster than laminaria tents

Hysterotomy

- In case of failure of above procedures, this surgery (similar to LSCS) is performed. Hysterotomy is however different from LSCS as the uterine incision in LSCS is given on the lower segment, however in the case of hysterotomy, done at early gestations, the lower segment is not formed. The isthmus lies between anatomical and histological internal os (measures around 1 cm) which, later in pregnancy, forms lower uterine segment (enlarges to 7 cm),
- Hysterotomy scar, in the next pregnancy, becomes a scar in upper segment, this is a contraindication to VBAC, so a repeat cesarean section is done.

Complications of MTP

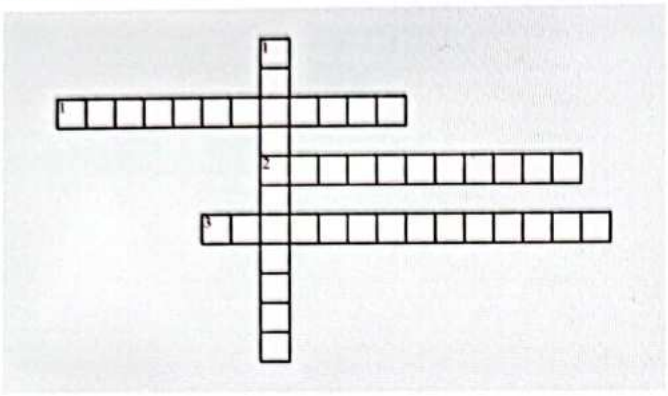
- **Retained bits of conception**: Most of these surgical procedures are done blind and thus present with retained products, this would require repeat surgery, repeated D and Cs can lead to infections, blockage of tubes leading to infertility. This can be prevent retained bits by doing procedure under USG guidance.
- **Lacerations** of cervix, vagina
- **Uterine perforation**: A small perforation occurs usually during sounding, can observe for vitals. A large perforation occurs with ovum forceps/ dilator/ sponge holder and may be associated with bowel injury. This would need a laparoscopy/ laparotomy. Small or large perforations are NOT a contraindication to complete the procedure

Important Information

- Who can consent for MTP: Woman alone; husband's consent is not required

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Antiprogestin used for termination of pregnancy is _____
2. Woman presenting with acute abdominal pain and distension immediately after a D and C procedure most likely has ____
3. Method of choice for second trimester abortion is use of ____

Down

1. Prostaglandin most commonly used for termination of pregnancy is _____

58 PHYSIOLOGICAL CHANGES OF PREGNANCY

Uterus 00:00:50

Weight

- Non Pregnant Uterus: 60 grams
- Pregnant Uterus at term: 1100 grams
- Uterine Hypertrophy in pregnancy is due to Estrogens mainly, with some role of Progesterone

Shape and growth

- The uterus is globular and almost spherical till 12 weeks, after which it becomes abdominal. Sometimes if the uterus is retroverted, it doesn't grow into abdomen, rather gets fixed in pelvis, which may lead to urinary retention or can form sacculations.
- The fundal height is at the following levels through pregnancy:
  - Level of umbilicus: 24 weeks
  - At xiphisternum: 36 weeks
  - Comes down with full flanks: 40 weeks

Uteroplacental blood flow

- The blood flows from the two uterine arteries to placenta, the rate increases progressively throughout pregnancy and reaches to about 550-650 ml/min (450-650 ml/min) near term. The uterine artery flow/ min is around 500 ml /min in each.

Cervix 00:06:30

- Estradiol stimulates growth of columnar epithelium on the cervical canal so it becomes violet & is called ectropion

Signs of Pregnancy

Chadwick sign (Jacquemier's sign)

- Bluish discoloration of vagina & Cervix. This sign is demonstrable at 6-8 weeks

Hegar sign

- There is softening of isthmus, such that on a p/v, the abdominal & vaginal fingers seems to oppose below the body of Uterus. This sign is demonstrable at around 6th week

Hartmans sign

- There may be mild vaginal spotting, which is due to implantation bleeding

Placental sign

- Occurrence of spotting P/V on expected date of periods 1 month later from LMP

Osiander (Vaginal sign)

- There is pulsatality in the lateral fornices, seen at around 8th week

Palmers sign

- Rhythmic uterine contractions felt in early pregnancy

Goodell sign

- Softening of the cervix seen at 6-8 weeks

Braxton Hicks contractions

- These are painless contractions, around 16-18 weeks (5-25 mmHg, once in 20 mins)

Breast 00:13:20

Growth of breasts in pregnancy

- Estrogen increases no. of glandular ducts, while Progesterone causes proliferation of glandular epithelium of alveoli
- Breast enlarges, along with tenderness & parasthesias
- Areolas become broader along with appearance glands of Montgomery. These are no. of small elevations, which are actually hypertrophic sebaceous glands

Milk production

- Prolactin leads to active secretion of milk after birth. For the initial few days a thick, yellowish fluid known as colostrum is secreted.

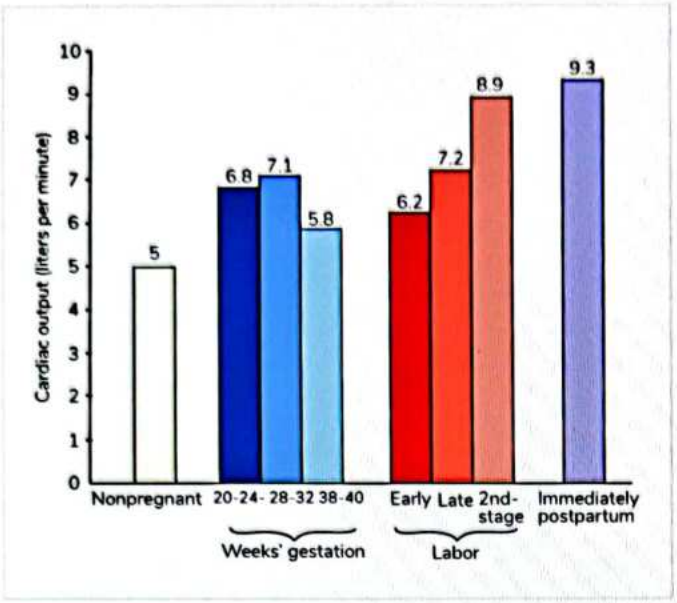
Cardio Vascular System 00:14:39

Heart

- It moves upwards & outwards due to hypertrophy of cardiac muscle

Cardiac output

- Cardiac output starts increasing by as early as 5th week, it is increased by 30% (6 Ltr /min). This reaches to peak at 32nd - 34th week (50% increase)
- Maximum cardiac output is at immediate postpartum (70% increase), thus max chances of heart failure are immediately after delivery



Cardiac parameters in pregnancy

- 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→ > 95% develop it, disappears after delivery
- Continuous murmur → 10% develops it, d/t ↑ in mammary blood flow

Hematology 00:20:30

Blood volume

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

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 • Hb concentration • Hematocrit • Plasma folate concentration	• White cell count • ESR • Fibrinogen concentration

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)

Urinary System 00:26:53

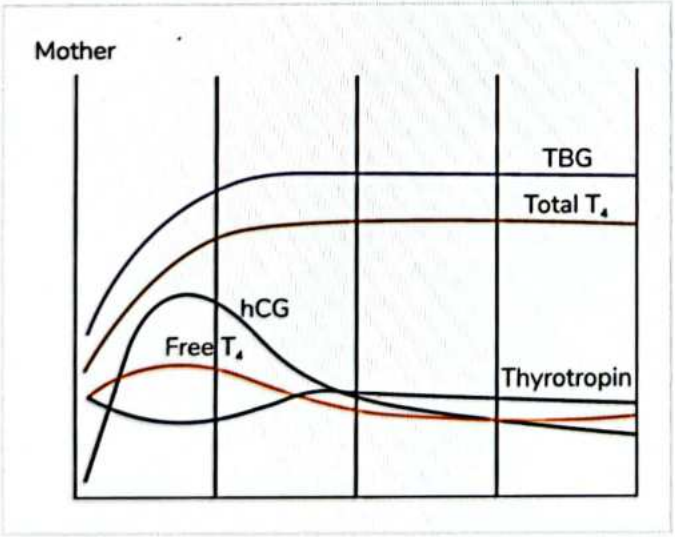
- Kidney size → ↑ by 1.5 cm
- GFR → ↑ (50%). This Hyperfiltration is due to hemodilution, there is less protein & decreased oncotic pressure and increased renal plasma flow
- Glucosuria → may be seen as renal glucose threshold in pregnancy decreases to 155-160 mg/dL (Ⓝ-180 mg/dL)
- Proteinuria → 300 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 Retained Bile Salts

Endocrine System 00:32:20

- Pituitary (Hypertrophy): Pituitary enlarges by approximately 135%. There is 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
  - $Free T_3$, $Free T_4$ unchanged



Investigations of Pregnancy 00:35:00

HCG tests

- **Urine pregnancy Test:** This usually becomes positive on the day of missed period, and is 70% sensitive
- **Serum b HCG by ELISA:** > 95% sensitive
- **Radio Immune Assay (RIA):** It is 100% sensitive, can detect even 5 mIU of HCG, and is thus positive since day 7th of ovulation

Ultrasound

- Transvaginal scan (TVS) is much more sensitive than transabdominal scan (TAS).

G-SAC	Cardiac Activity
• TVS 4+Weeks • TAS 5+ Weeks	• 5+ weeks • 6 + weeks

Fetal heart sounds evaluation

- After 12 weeks FHS can be heard with fetal Doppler, and after 24 weeks FHS can be heard with Stethoscope

Signs for 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

PREVIOUS YEAR QUESTIONS

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

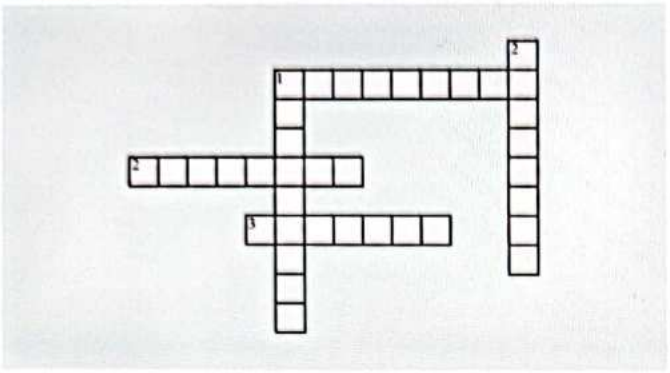
A. Albumin
B. Fibrinogen
C. Platelets
D. Anti-thrombin

Q. 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

CROSS WORD PUZZLES

Crossword Puzzle



- Residual lung volume _____ in pregnancy
- Prolactin level_____ immediately after delivery
- A continuous murmur may be heard in pregnancy, which is due to increase in _____blood flow
- Heart in pregnancy moves upwards and _____.
- Glandular proliferation in breast in pregnancy occurs due to increase in _____.

59 DIAGNOSIS OF PREGNANCY

HCG Tests for Diagnosis of Pregnancy

Urine Pregnancy Test

- It tests HCG in urine and is its sensitivity is 60-70% [sensitive to 150 mIU of HCG]

Serum HCG by ELISA

- This test is positive in > 95% cases [sensitive to 5 mIU of HCG]

Radio Immune Assay

- RIA is positive in 100% [sensitive to 1-2 mIU of HCG]
- This can even diagnose pregnancy on 7th day of ovulation and is thus extremely sensitive.

Immuno Radiometric Assay

- This test is positive in 100% cases [sensitive to 0.5 mIU of HCG]
- This can thus diagnose pregnancy from 7th to 10th day of Ovulation

Calculation of Period of Gestation

- Period of gestation is calculated from first day of LMP

Q. A patient has LMP - 20th August & missed her period on 20th September; what was the period of Gestation on 16th September?

Ans. Here it is: 4 weeks and 3 days of POG and EDD is 27 May 2019 (add 9 months + 7 days from LMP)

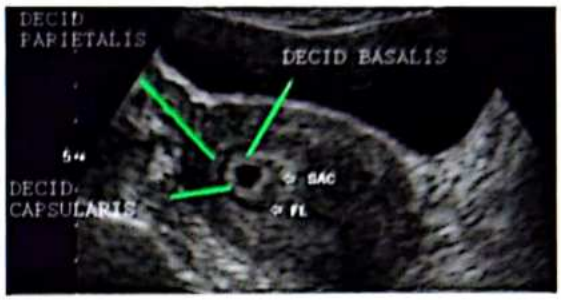
Ultrasound

- Transvaginal scan (TVS) is much more sensitive than transabdominal scan (TAS).

	Gestational Sac	Cardiac Activity
TVS (Trans Vaginal sonography] (Preferred)	4 + weeks	5 + weeks
TAS [Trans abdominal sonography]	5 + weeks	6 + weeks

Double decidual sac sign on USG

- Intrauterine sac (Eccentrically placed)
- Outer Layer: Decidua Parietalis
- Inner Layer: Decidua Capsularis
- Indicates: Intrauterine pregnancy



HCG Levels in Pregnancy

- 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

Signs and Symptoms

Symptoms of early pregnancy

- Bloating
- Morning Sickness: Nausea and vomiting
- Increased urinary frequency
- Constipation

Signs of pregnancy

- **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 } around 24 weeks
  - Funic (umbilical) souffle
  - 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)

PREVIOUS YEAR 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)

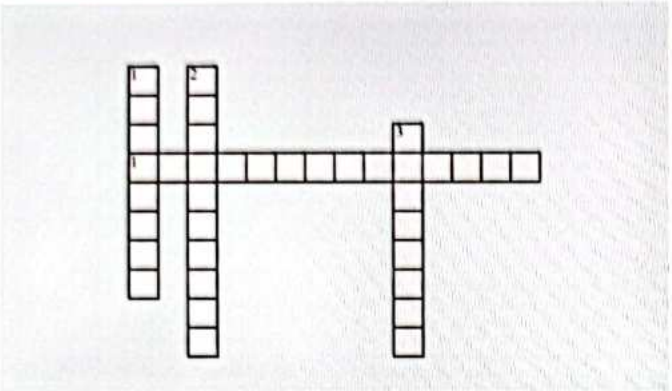
A. 280 days from LMP
B. 256 days from LMP
C. CRL by USG
D. Abdominal girth on USG

Q. Double decidual sac sign is seen in? (FMGE 2019)

A. Uterine gestational sac
B. Pseudo-gestational sac
C. Threatened abortion
D. Ectopic pregnancy

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. HCG level beyond which we must see a sac is known as __ zone

Down

1. Softening of the cervix seen at 6-8 weeks is known as __ sign
2. The inner layer of decidua on double decidual sac sign seen in early pregnancy is decidua __
3. Implantation bleeding is known as __ sign

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60 PRENATAL DIAGNOSIS

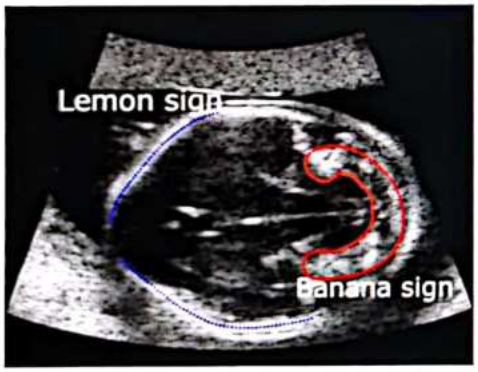
USG 00:01:51

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 bone thickness > 6mm, after 14 weeks: Suggestive of Downs
- Absent Nasal bone: Suggestive of Down Syndrome



Trisomy Screening

- **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
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

Integrated screening (1st + 2nd trimester screening)

- Includes 1st + 2nd trimester screen which makes it 94-96% sensitive and is thus the best screening test

Trisomy Confirmatory Diagnosis 00:15:34

- This is done when screening tests are positive or may be opted in cases of women with past history of Downs syndrome baby or a strong family history
- This can be done in the 1st Trimester by Chorionic Villus Sampling and in the 2nd Trimester by Amniocentesis

Cell free fetal DNA assessment / Non - invasive fetal trisomy testing (NIFTY)/ Non invasive pre-natal testing (NIPT)

00:16:15

- The principle of this test is that after 12 weeks some cell free Fetal DNA may be seen in maternal circulation. This test is 98% sensitive
- However it is still not a diagnostic test, it has a better negative predictor value, such that if this test is negative, Down's syndrome can be safely ruled out, but if it is positive, then a confirmatory test must be done.

Chorionic Villus Sampling (CVS)

- This test is done at 1st trimester (10-13th week): here we put a needle by Trans abdominal method or most commonly by Trans vaginal method and fetal villi (Chorionic frondosum) are taken out while maternal villi are discarded. Then karyotyping and genetic analysis is done on the fetal cells.

- CVS gives early diagnosis, but risk of abortion is upto 2%, hence is not preferred.
- If CVS is done at less than , < 10 weeks it can cause limb reduction and oro mandibular defects.

Amniocentesis 00:19:47

- This test is done at 16-18th weeks. Here we put a needle by Transabdominal method and take out Amniotic fluid around 20 ml, containing fetal skin cells, then a Karyotype & genetic analysis is done on these cells
- The risk of abortion is less than CVS, < 1%
- However the diagnosis gets delayed as compared to Chorionic villus sampling
- Karyotype results come after 7-10 days in both CVS & Amniocentesis
- **Early Amniocentesis:** it is done between 13-15 weeks, however this has abortion rate equivalent to Chorionic villus sampling

Per cutaneous umbilical blood sampling (PUBS)/ Cordocentesis 00:25:54

- Umbilical blood sampling is done after 18 weeks, usually for
  - The assessment of Fetal anemia
  - Blood transfusion to the fetus
  - Diagnosis of fetal problems
- This is an invasive procedure, here umbilical blood is taken from umbilical vein near its insertion into into placenta, and karyotyping is done in blood lymphocytes. It gives result in 24-48 hours

Important Information

- Assessment of Middle Cerebral Artery Velocity is better to assess fetal anemia

α Feto Protein 00:30:09

- It is a glycoprotein produced by fetal yolk sac initially and from fetal liver & gut later.

AFP Levels

- AFP levels increase till 13th weeks in fetal circulation and then reduces gradually. In Maternal circulation α FP starts increasing after 12th week. This increase in AFP seen in amniotic fluid, retrieved by amniocentesis is very sensitive for NTD, however being an invasive test, this is now replaced by USG.
- Confirmatory test for NTD is amniotic fluid Acetylcholinesterase
- AFP levels vary in various fetal conditions as:

αFP is higher	αFP is reduced
• 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**: this is the most common method used
- **Trophoectoderm Biopsy**: Trophoectoderm gives rise to placenta, and hence it is used for genetic diagnosis. This is a safer method
- **Polar Body Biopsy**: In a polar body, only maternal component present, hence does not give the complete genetic make-up of the fetus, hence it is not preferred

Pre implantation genetic screening 00:39:10

- It is a screening test (not diagnostic), thus indicated for high risk cases without H/O previous abortions/ genetic defects in previous babies

PREVIOUS YEAR 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

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

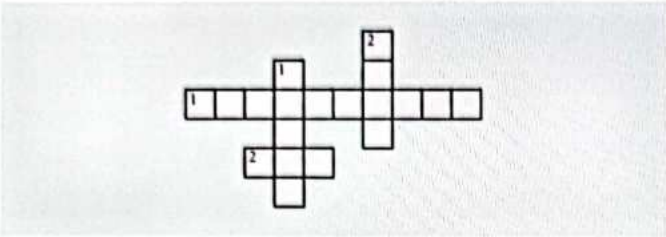
Q. Quadruple marker consists of all, EXCEPT? (INI CET 2021)
A. B HCG
B. Inhibin B
C. Unconjugated estriol
D. AFP

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

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Best method for Downs syndrome screening is __ screening
2. Levels of AFP are __ in Downs syndrome

Down

1. Scalloping of frontal bones seen in spina bifida is known as __ sign
2. HCG and PAPP-A are components of __ marker

61 PRETERM LABOR

Preterm Labour

Definitions

- 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

1. **Infections [20-40%]**: Pelvic inflammatory disease, UTI

- Causative Organisms
  - Chlamydia: Bacterioids
  - Gonorrhea: Gardenella Vaginalis
  - Ureaplasma: E. Coli
  - Mycoplasma: Streptococcus
- Chorioamnionitis Diagnosis
  - Any 2 of following are present
    → ↑ Total Leucocyte count
    → ↑ C reactive protein → > 2.7 mg/dl
    → Uterine tenderness
    → ↑ Pulse rate
    → 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**

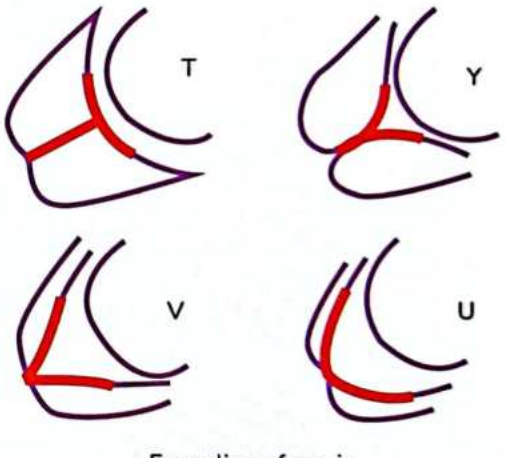
- Incompetent Cervix
- Cervical lacerations

7. **Interpregnancy interval**: If < 18 months or > 59 months, both increase incidence of preterm labor
8. **COVID in pregnancy**: Severe COVID in pregnancy is associated with increased risk of preterm labor

Prediction of PTL

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

3. **ACTIM Partus**: Detects presence of phosphorylated IGF binding protein-1 in cervical secretions (made in the decidua), indicator of integrity of decidua, damage in integrity

New Born Complications

- Respiratory Distress Syndrome (Hyaline membrane Disease)
- Intra Ventricular Hemorrhage

- Bronchopulmonary Dysplasia
- Necrotizing Enterocolitis
- Neonatal deaths

Maternal Complications
- Endometritis
- Puerperal sepsis

Management

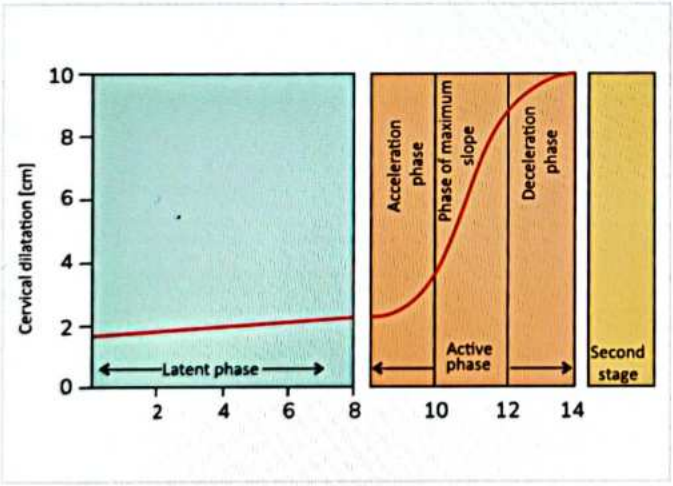
1. **For Lung Maturity**

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
  - o SURVANTA (Bovine) (Calf)
  - o AXOSURF
  - o 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
- βAgonists
  - o Salbutamol
  - o Ritodrine
  - o Isoxsuprine
  - o Terbutaline
  - o Side Effects
    - → Glycogenolysis
    - → Lipolysis
    - → Pulmonary edema

    } ↑ Sugar
- Calcium Channel Blockers: Nifedepine
  - o First line & safest drug
  - o Start 30 mg orally & maintain with 20 mg
- Calcium Antagonists: $MgSO_4$
  - o Side effect: Neonatal hypotonia, Hypocalcemia
  - o 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
  - o Neonatal morbidity & mortality of PTL shows No Benefit with it.
- Prostaglandin Synthetase Inhibitors
  - o NSAIDS: Indomethacin
  - o 25 - 50 mg, once or twice a day
  - o Side Effects
    - → Premature closure of Ductus Arteriosus
    - → Do not give beyond 32 weeks
- Progesterone
  - o Smooth muscle Relaxants
  - o Used for prophylaxis, not very effective for treatment
  - o Transvaginal route is preferred
- Nitric Oxide Donors: Nitroglycerine Patch
  - o Smooth muscle dilator
  - o Used in PTL & for prevention of IUGR
  - o Dose = 0.2 mg/hr to 0.4 mg/hr
- Diazoxide
  - o Smooth muscle relaxant
  - o S/E
    - → Hypotension in mother
    - → Fetal distress
    - → Prevented by pre loading mother with 500-1000 ml Ringer Lactate

Lung Maturity Assessment

Lung is Matured when
- Lecithin Sphingomyelin Ratio → > 2:1
- Phosphatidyl Glycerol (PG) present in Amniotic fluid: Final indicator of lung maturity
- Phosphatidyl choline present in Amniotic fluid
  - o Best part of surfactant
  - o ~ 70% of surfactant
  - o Starts forming at 24 wks
  - o Formed by Type II Alveolar Pneumocytes
  - o 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

- Rupture of membranes prior to onset of labour
- If rupture occurs < 37 weeks: PPROM (Preterm PROM)

Assessment

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

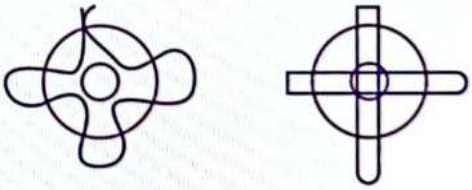
Prevention of Pre Term Labor

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



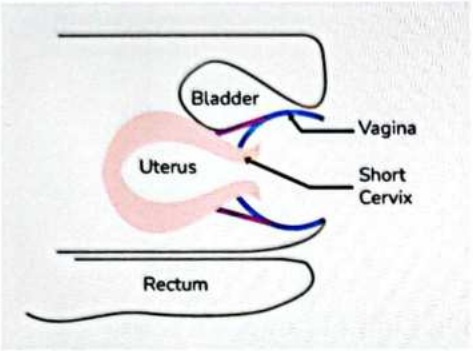
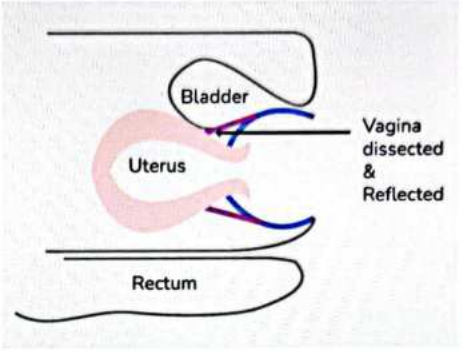
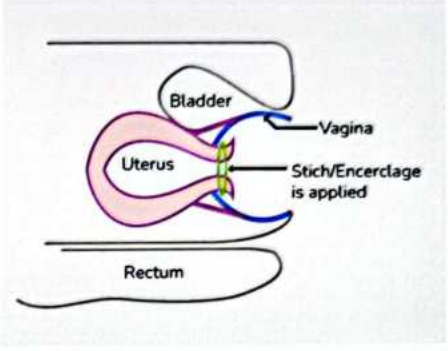
Mc donald's Cerclage (mc) Worm's Stich

- 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

Refer Table 61.1

- **Prophylactic antibiotics**: May cover undetected infections causing preterm labor,
- **Low dose aspirin**: Has role in prevention of pre-eclampsia as well as preterm labor
- **Progesterone supplementation**: First and only FDA approved method, drug used is 17-hydroxyprogesterone caproate (17-OHPC), it is better for prevention than treatment.

Table 61.1

		
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

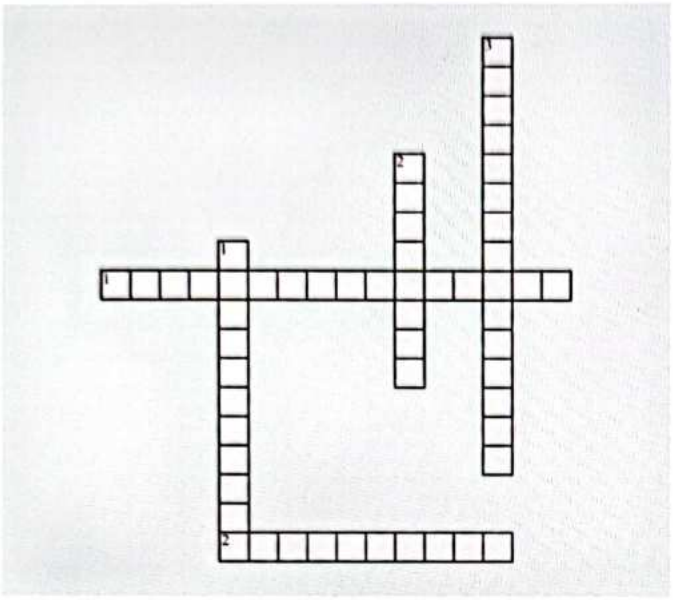
PREVIOUS YEAR QUESTIONS

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. In a woman with PPROM, a raised TLC and CRP along with tachycardia is suggestive of _____
2. Calcium channel blocker used for tocolysis is _____

Down

1. Presence of _____ in vagina secretions can predict occurrence of preterm pains in the next few days
2. _____ should be given for fetal lung maturity for patients with preterm labor
3. Additional benefit of MgSO4 as a tocolytic in preterm labor is_____

62 PNDT ACT

PCPNDT ACT

- Previously known as PNDT Act, this act was formulated in 1994 and came into effect on 1st Jan 1996. There were two amendments made in 2002 & 2003
- The act is intended to stop Female Feticide by Prohibition of Sex selection

Current Sex Ratio (Female : Male)

- India → 943/1000
- Haryana → 877/1000
- Daman & Diu → 618/1000

Basic purpose of the act 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:** Aborting a female fetus after sex determination is called female feticide. The problem with this is increased violence against women, abortion due to family pressure and poor sex ratio 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 and registered 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 appropriate 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

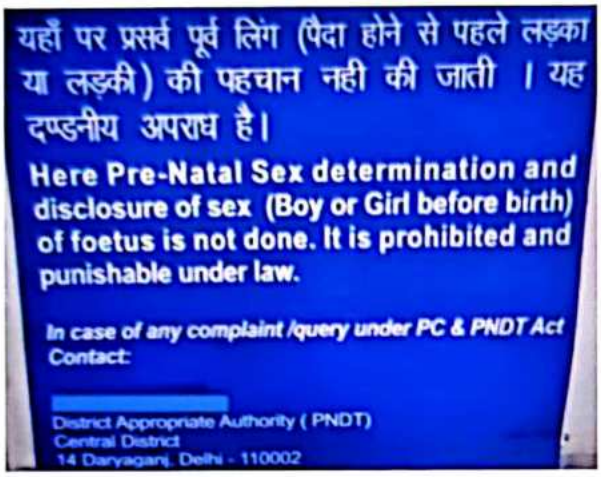
Prenatal diagnosis and techniques are Indicated When 00:11:44

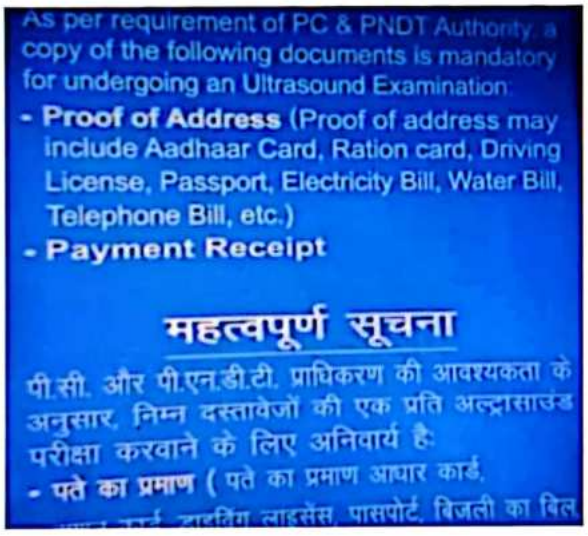
- Age of pregnant women is above 35 years
- 2 or more spontaneous abortions
- Pregnant women has been exposed to drugs, radiation, infection or chemicals
- Family history of Mental retardation or physical deformities in previous offspring

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

Documentation

Registration and renewal

- Both the centre and the doctor performing the prenatal diagnostic technique such as USG, must be registered under the Act
- **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 of registration 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 records

- **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 must also sign a declaration that he has neither detected nor disclosed the sex of the fetus to anybody

Submission of records and record keeping

- 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

Information about the changes to appropriate authorities

- Genetic laboratory, Genetic clinic / Genetic counseling center shall intimate of Change of employees, places or equipment within 30 days of such change

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.

63 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

Oxygen Exchange 00:02:08

- Oxygen exchange occurs in placenta. Two Umbilical arteries carry deoxygenated blood from fetus to placenta, while 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 and 1 Vein [Right vein obliterated, left vein persists;

How to remember

- Left Vein Left Behind

Refer Image 63.1

Blood Flow in the 00:03:33

Refer Flow chart 63.1

Events After Birth 00:09:48

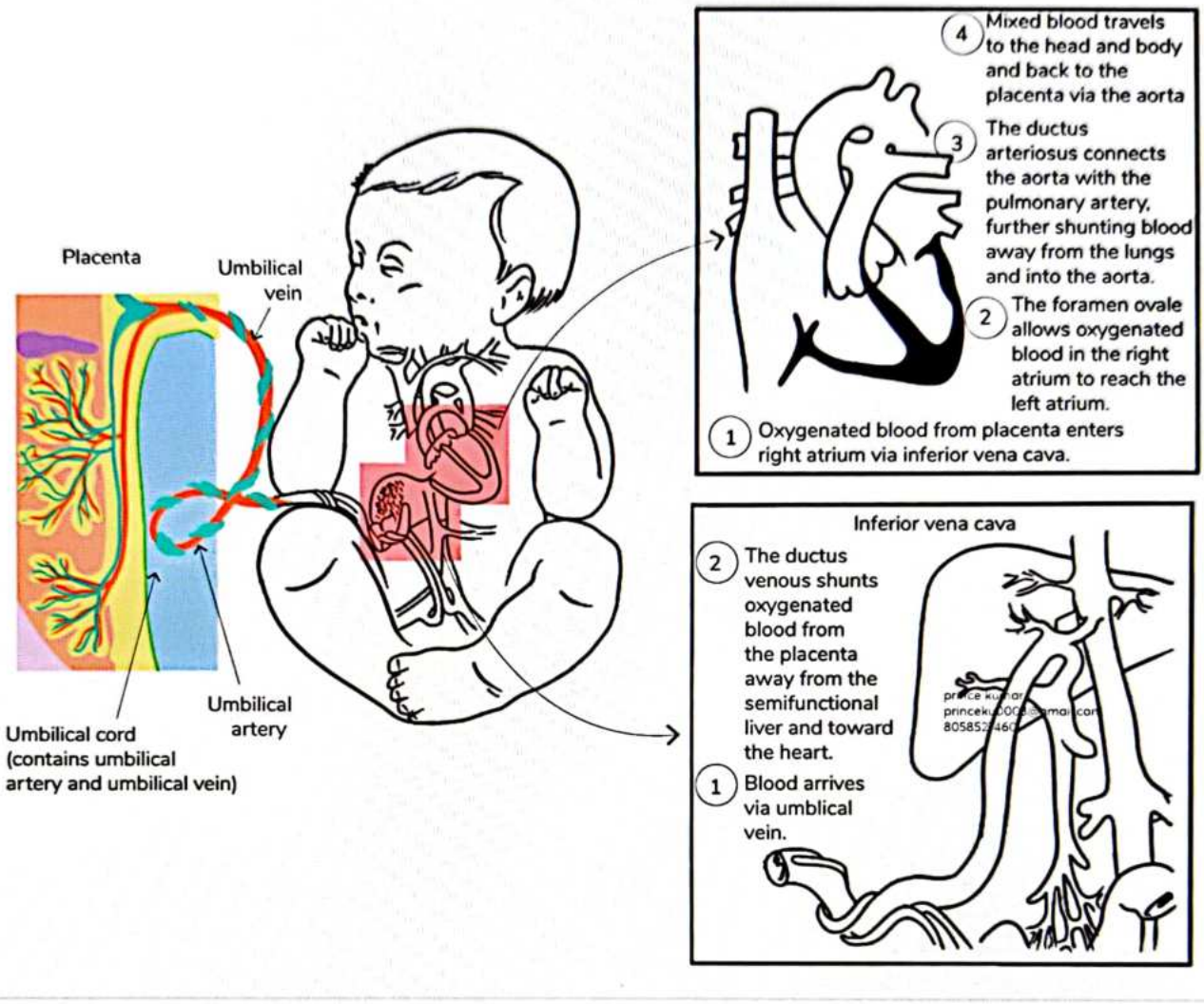
- First breath lungs expand resistance reduces majority blood goes to pulmonary arteries and lungs for oxygenation and very less blood goes to ductus arteriosus closes at birth
- Oxygenated blood comes back to left atrium pressure in left atrium increases immediate physiological closure of foramen ovale (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

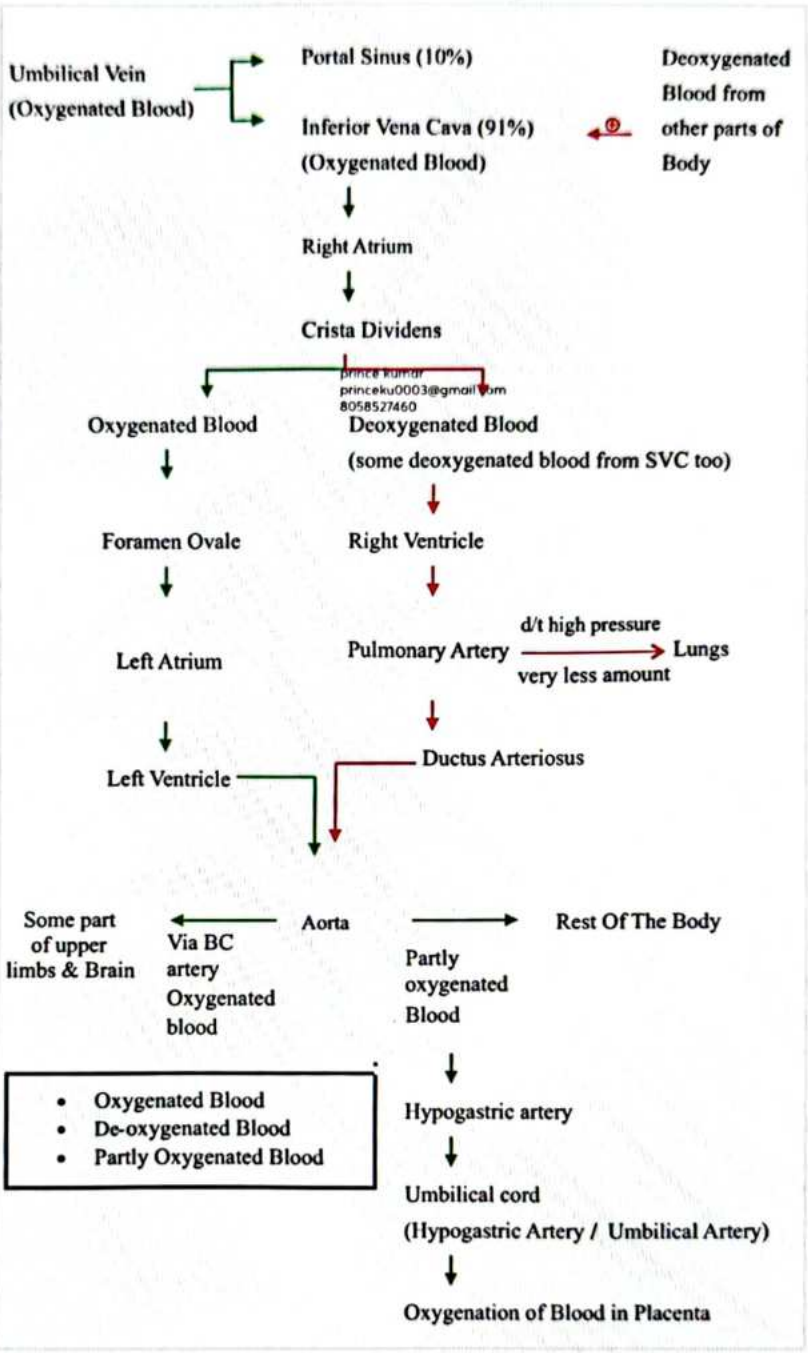
Fate of Fetal Structures 00:16:51

- Umbilical Vein: Ligamentum Teres (Round ligament of Liver)
- Umbilical Arteries/ Hypogastric artery: Umbilical Ligament

Image 63.1

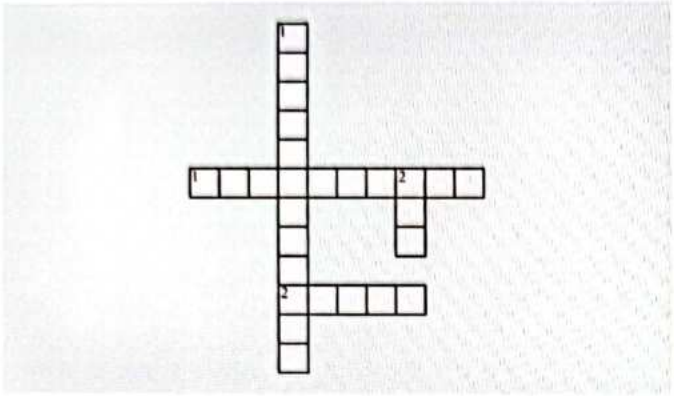

Placenta
Umbilical vein
Umbilical artery
Umbilical cord (contains umbilical artery and umbilical vein)
4 Mixed blood travels to the head and body and back to the placenta via the aorta
3 The ductus arteriosus connects the aorta with the pulmonary artery, further shunting blood away from the lungs and into the aorta.
2 The foramen ovale allows oxygenated blood 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 umblical vein.

Flow chart 63.1



CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Umbilical veins carry _____ blood
2. Umbilical vein obliterated after birth is known as ligamentum _____

Down

1. _____ blood goes from right atrium to right ventricle in the fetus
2. Umbilical vein contains _____ artery(-ies)

64 AMNIOTIC FLUID DYNAMICS

Amniotic Fluid 00:00:27

Maternal Contribution
- Formation of amniotic fluid in early pregnancy

Fetal Contribution
- It is from fetal skin and urine. Fetal urine is the major contributor of amniotic fluid after 20 weeks.

Circulation of amniotic fluid
- Urine - 1000 ml (+)
- Lung Secretion - 350 ml (+)
- Fetal swallowing - 750 ml (-)
- Intra membranous Fluid transport across fetal blood vessels on surface of placenta → 400 ml (-)

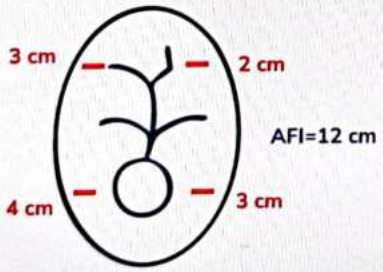
Amniotic Fluid Properties
- pH - Alkaline [7.4 - 7.6]
- Specific Gravity - 1.008 - 1.010
- Color - Straw colored

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 measurement 00:05:47

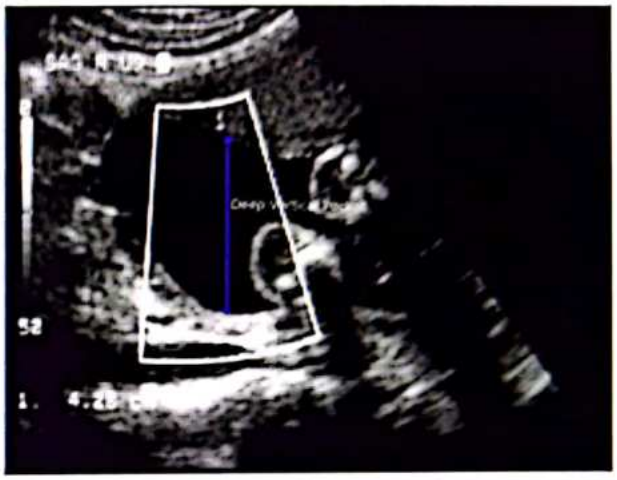
Amniotic fluid index (AFI)
- It is the sum of deepest vertical pockets of liquor in each of the four quadrants on USG

Understand with example



- Normal Amniotic Fluid Index: 10-15 (range 5-24) (1000 ml)
- Oligohydramnios: < 5 (< 500 ml)
- Polyhydramnios: > 25 (> 2000 ml)

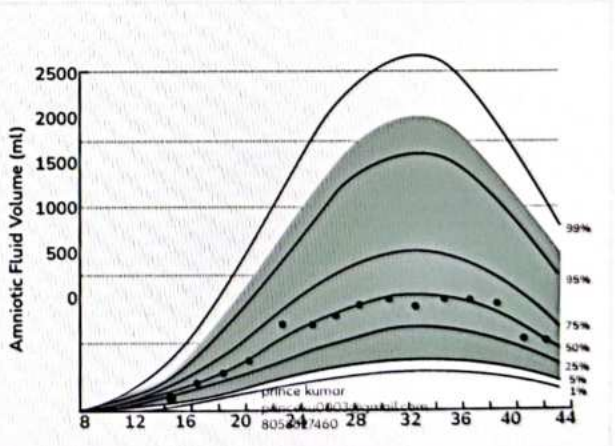
Single Pocket Criteria
- Cord free & limb free pocket is assessed in all quadrants and the single deepest pocket is measured



  - 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 is possible
- 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

- Oligohydramnios needs increased fetal Surveillance, with USG and Doppler to detect fetal compromise early and intervene timely.
- Early delivery may be planned after lung maturity
- Amnio - infusion can be done to increase amniotic fluid in labour, to reduce complications like cord compression, however it does not take care of pathology

Potter's Triad

- This is seen in severe Oligohydramnios, usually when the cause of Oligohydramnios is renal anomalies. The triad consists of:
  - Pulmonary hypoplasia
  - Renal anomalies
  - Contracted & malfigured limbs & flat / compressed face

Potter Sequence

- The cause of Oligohydramnios is other than Renal anomalies. The sequence consists of
  - Pulmonary hypoplasia
  - Contracted & malfigured limbs & flattening of Faces

Polyhydramnios 00:19:30

- It is defined as Liquor: >25 AFI or > 2 liters of Amniotic fluid
- Acute Polyhydramnios is polyhydramnios seen at less than 24 weeks of gestation

Grading

- > 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

Management

- **Indomethacin:** It is given in the dose 25 mg TID and acts by reducing urinary output of fetus. However it should not use beyond 32 weeks as it causes premature closure of Ductus Arteriosus
- **Therapeutic Amniocentesis:** In a single setting, 1500 ml of Amniotic Fluid can be aspirated over 30 mins. This is commonly used for polyhydramnios causing respiratory distress, while the fetal lung maturity is not achieved.
- **Management of labour and delivery**: labour can be induced with controlled Artificial Rupture of Membranes in Labor, as sudden release of a large quantity of amniotic fluid can cause abruption or cord prolapse. Polyhydramnios is Not an indication for LSCS

PREVIOUS YEAR 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?

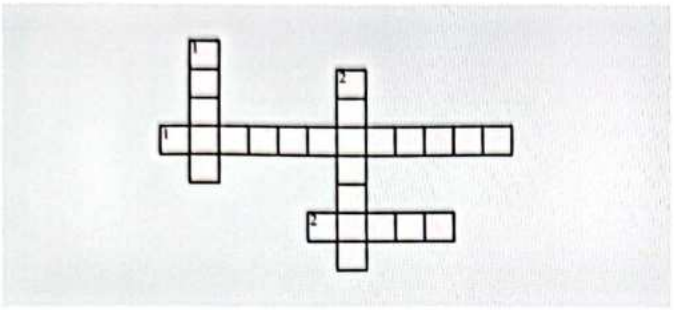
A. Ultra-filterate of maternal plasma
B. Fetal urine
C. Fetal lung fluid
D. Fetal skin

Q. A woman with 18 weeks pregnancy presented to OPD, on per abdomen uterine size was 16 weeks. On USG oligohydramnios was found, which of the following is suspected? (NEET 2020, FMGE 2019)

A. Renal agenesis
B. Fetal anemia
C. Fetal jaundice
D. Anencephaly

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Drug used for treatment of polyhydramnios is __
2. Meconium stained liquor is __ in color

Down

1. Major contributor of amniotic fluid at 30 weeks is fetal __
2. Severe oligohydramnios secondary to fetal renal agenesis is known as __ triad

65 STERILIZATION SURGERIES (TUBECTOMY AND VASECTOMY)

Female Sterilization

Timing of Female Sterilization

Puerperal/postpartum ligation

- Uterus involution: just after delivery the uterus is at or just below the umbilicus
- Immediate postpartum sterilization can be done and is the most common timing of sterilization.
- This is best done within 2-3 days after delivery, upper limit is 7-10 days (not 6 weeks). This is done while uterus is still an abdominal organ as uterus becomes pelvic organ in 10-14 days, and back to its normal size in 4-6 weeks

Interval Sterilization

- This is done after 6 weeks of delivery, commonly done by Laparoscopic methods

Concurrent Sterilization

- This is done along with MTPs or cesarean section

Site of Ligation of Fallopian Tube

- Site of tubal ligation of Fallopian Tube is the Isthmus as it has uniform diameter (not isthmo-ampullary junction)
- Also, Isthemo isthmic reanastamosis has up to 80% success : thus prefer to ligate at isthmic area

Entry Into Abdomen

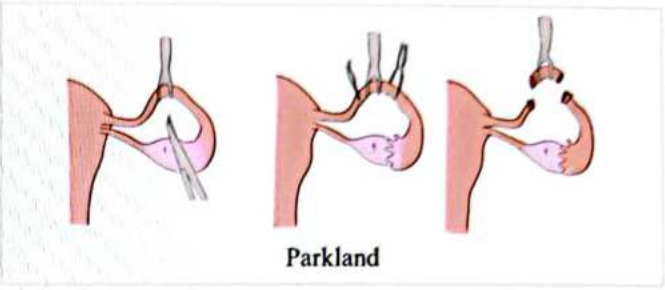
- **Laparotomy** [Minilap (1.5 to 2 inch incision, Most common)]
- **Laparoscopy**
  - mostly for interval sterilization, but never do in puerperium as it can cause injury
  - Failure chances are more: as the tube is edematous & the falope ring may slip from the tube

Techniques of Tubectomy

- **Pomeroy Technique**: This is most commonly done, wherein a single ligature is used, and ends are cut. However, the tube cut end are together, which can lead to fistula formation leading to failure.

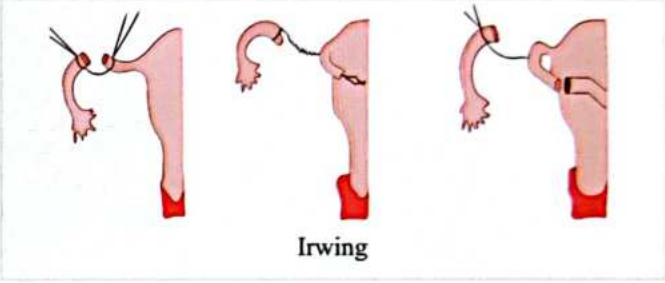
Refer Image 65.1

- **Parkland Technique:** Double ligature is used such that tubes are ligated separately



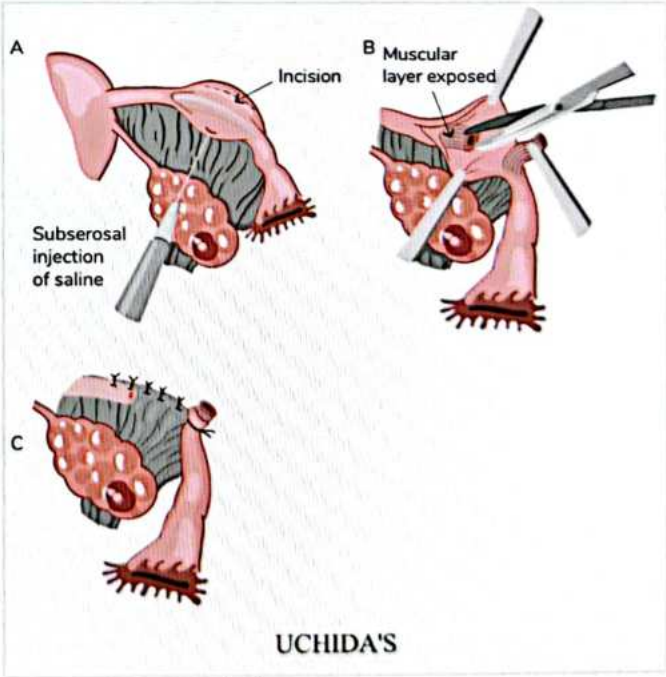
Parkland

- **Irwing Procedure**: One end of tube is buried into uterine musculature and the other end of tube is buried into mesosalpinx



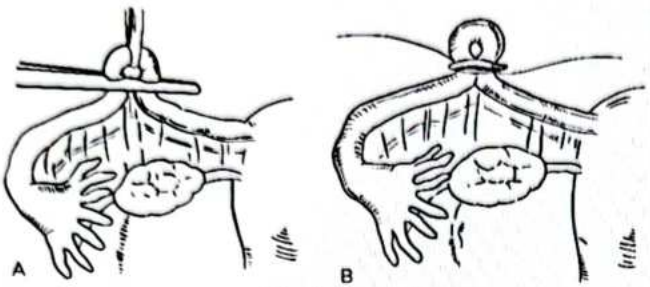
Irwing

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



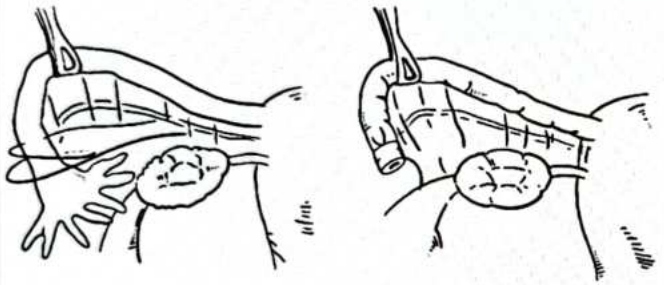
UCHIDA'S

- **Madlener's Method**: The tubes are crushed, not resected. This procedure is not done these days due to high failure rates.



Madlener

- **Kroner's Fimbriectomy**: Fimbria are excised, however this procedure is also not done these days as no reversal is possible.


kroners fimbriectomy

Laparoscopic clips/ rings
- Best reversibility: laparoscopic clips application

Cauterization of tube
- Worst reversibility

Wrong Ligations
- **Structures ligated by mistake**
  - Round ligament (MC)
  - Small bowel
  - Ovarian ligament
  - Ureter and uterine artery: can't be ligated by mistake as they are retroperitoneal
- **Incomplete ligation**

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

Male Sterilization

Non-Scalpel Vasectomy

Procedure
- Stabilize with ring forceps
- Pull out the vas deferens with sharp artery forceps and ligate it.

Completion
- 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. At least 2 semen analysis should show azoospermia.

Reversibility
- Around 30%
- Drawback compared to tubectomy

Hysteroscopic Sterilization: Essure Ring
- Implant of Essure Ring is placed in bilateral fallopian tubes hysteroscopically under LA or GA.
- This Causes Fibrosis & blockage of tube and takes 3 months to completely block the tube.
- Made up of Nitinol (Alloy of Nickel & Titanium)
- Hysterosalpingography done to confirm blockage after 3 months.

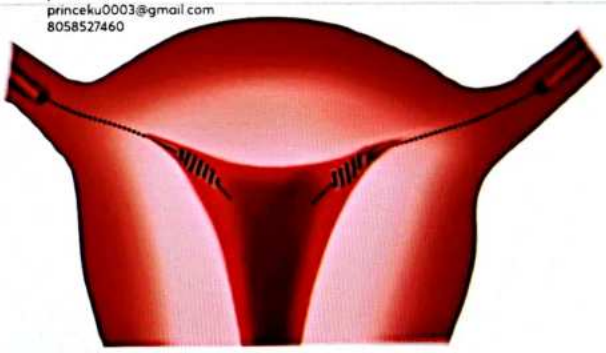
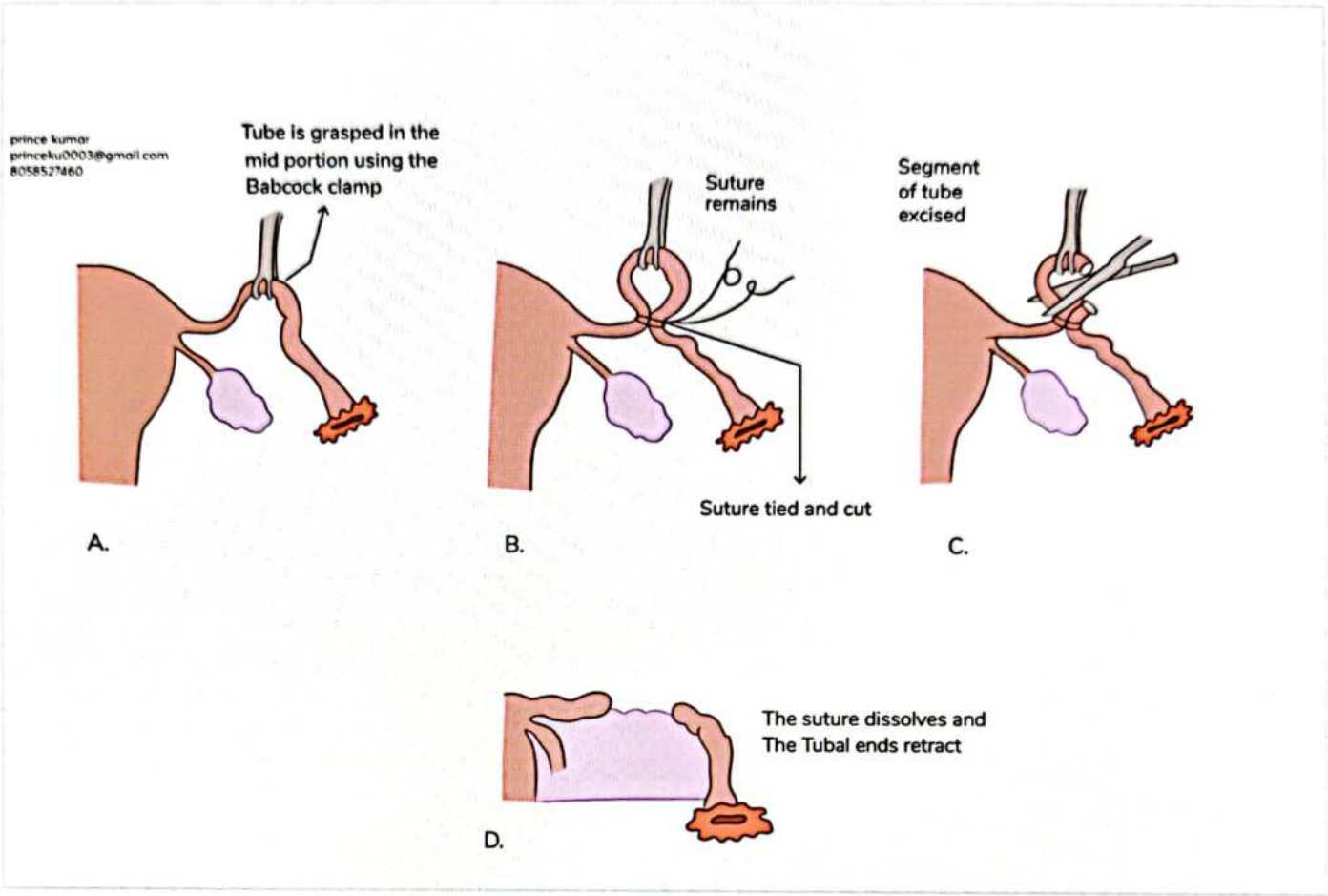

Essure Ring

Image 65.1



66 SPECIAL SITUATIONS IN OBSTETRICS

Umblical Cord Prolapse 00:00:34

- Incidence is less than 1% of all pregnancies, but it is a very serious labor complication as there is very high fetal morbidity & mortality

Presentation 00:02:32

Overt / obvious cord prolapse: cord is visible in the vaginal canal

Occult prolapse: cord is felt on a P/V examination on the side of presenting part

Cord/ funic presentation: cord is felt just under fetal head/ presenting part

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 in
  - Funic presentation
  - High presenting part
  - Non-fixed presenting part

Management 00:06:19

- Call for help!!
- Prepare for immediate delivery in O.T. by cesarean section, unless cervix is fully dilated and imminent delivery can be done within minutes by Forceps application.
- Do not touch or push the cord as it can lead to fatal vasospasm in the umbilical vessels
- One can attempt to push the presenting part upwards, to reduce obliteration of the umbilical cord by giving a knee chest position or left lateral position. One can also fill the bladder retrograde to push up the presenting part
- Tocolysis can be done till cesarean is arranged for.

Shoulder Dystocia 00:11:47

- Anything that comes in the way of delivery is known as Dystocia. After the delivery of the fetal head, if the shoulders fail to deliver with easy pulling within 60 seconds, it is called shoulder dystocia. Shoulders should normally deliver within 20-25 seconds of fetal head. Its incidence is around 1% of all deliveries. This can lead to significant neonatal morbidity & mortality.

Associations

- Large babies >4Kgs
- Post term pregnancy
- Diabetic mothers
- Anencephaly → large baby

Important Information

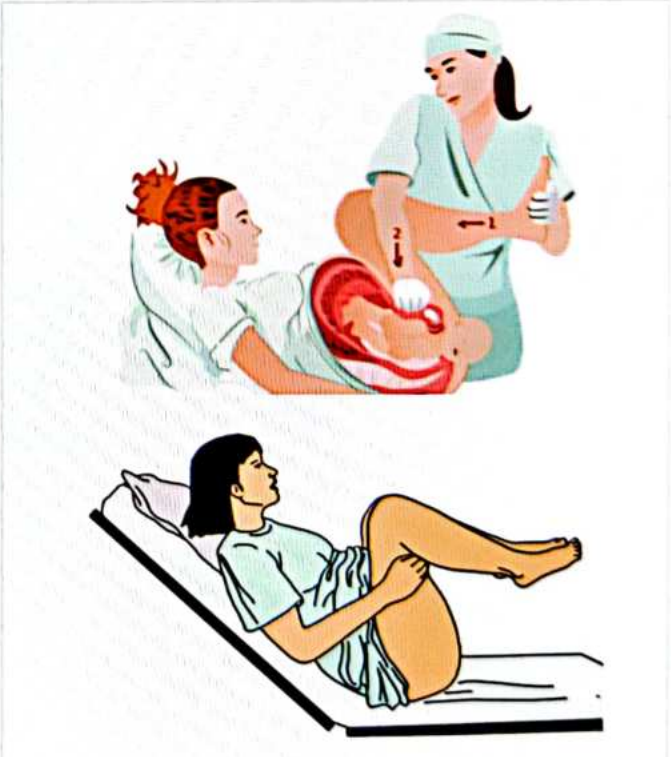
- Reason of shoulder dystocia in anencephaly is the absence of pituitary delayed onset of labour post term pregnancy large baby)

Complications 00:16:25

- Pulling the head too much on a stuck shoulder can cause ERB's paralysis : C_5 - C_6 or KLUMPKE's Paralysis : $C_8 - T_{11}$

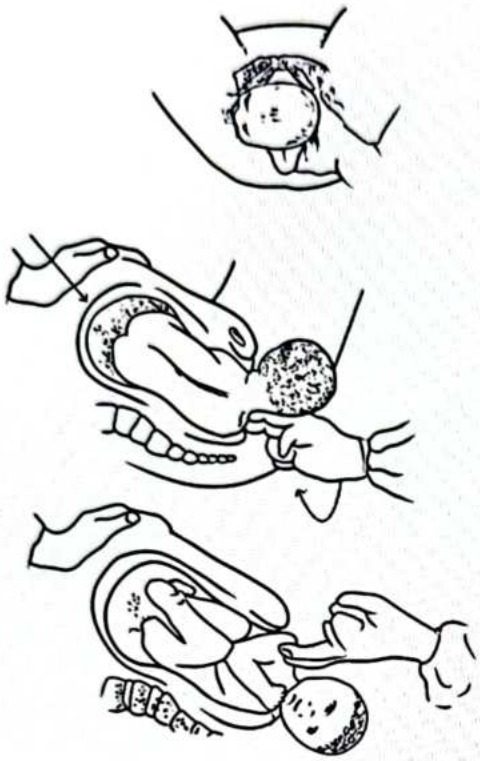
Management 00:17:10

- Call for help !!
- Suprapubic pressure: Rubin's maneuver or suprapubic pressure is the first step, it can release an impacted anterior shoulder.
- Mc Roberts manouver: > 90°, Hyperflexion & Abduction of hip joint is done by an assistant with opens up the pelvis in AP diameter, and unhinges the shoulder.



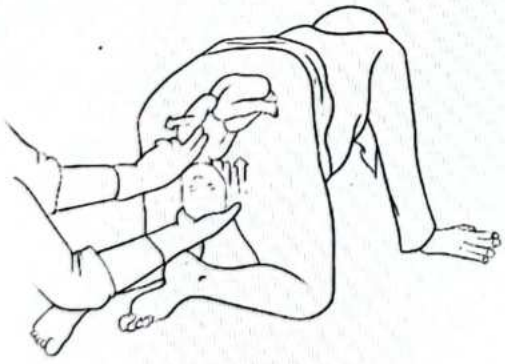
MC Roberts Maneuver

- Wood's 'Cork Screw' maneuver: turn baby like a screw, the obstetrician places a hand on the anterior aspect of the posterior shoulder and rotate the shoulder towards the fetal back up to 180 degrees, and the posterior shoulder is freed.



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: the head is restituted back into the pelvis and then the baby is delivered by cesarean, however the manouver is extremely difficult and 70% babies are already lost by this time.

Precipitate Labour 00:26:43

- Precipitate labor is labour wherein the time taken from onset of contractions to delivery of baby is less than 3hrs. Its incidence is upto 3% of all deliveries

Associations

- PIH/HTN
- Abruption

Etiology 00:28:05

- Very less resistance from soft pelvic parts
- Very strong uterine & abdomen contractions
- Less pain perception

Complications 00:02:20

- 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 occur, such that within 30 min. more than 50% women die, while of the few survivors, 75% life will have long neurological deficit

Obstructed Labor 00:38:03

Definition

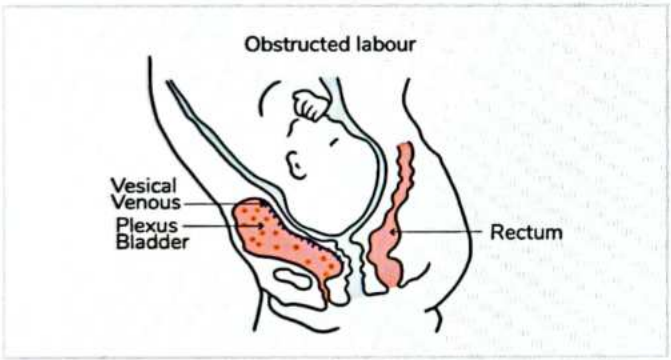
No progress of labor inspite of good Uterine contractions (i.e. there is no descent of the Presenting Part)

Causes

- **Neglected Cephalopelvic disproportion (MC)**
  - Large baby
  - Contracted Pelvis
- **Malpresentation**
  - Transverse Lie with shoulder presentation
  - Neglected Brow presentation
- **Malpositions**
  - Occipito-posterior

Signs

- Failure of progress of labor and decent of fetal presenting part
- Hematuria: presents early and occurs due to pressure of fetal head on bladder which results in damage of Vesical venous plexus
- Maternal exhaustion
- Tachycardia
- Dehydration
- Edematous vulva
- Fetal distress/ death



Management

- Management of Obstructed labor is always cesarean section, even if the baby is dead, as destructive procedures are obsolete now.

Important Information

- Mitral valve prolapse has late systolic murmur
- Chronic mitral regurgitation has Pan systolic murmur
- Acute mitral regurgitation has early systolic murmur

Maternal Complications

- Chorioamnionitis
- Puerperal Sepsis, shock
- Ruptured Uterus
- Bladder & Rectal Injuries: Stress Urinary incontinence, VVF and Rectovaginal fistula : these are late complications.

Fetal Complications

- Still birth (Born Dead)
- Hypoxic Brain damage
- Neonatal Death

Important Information

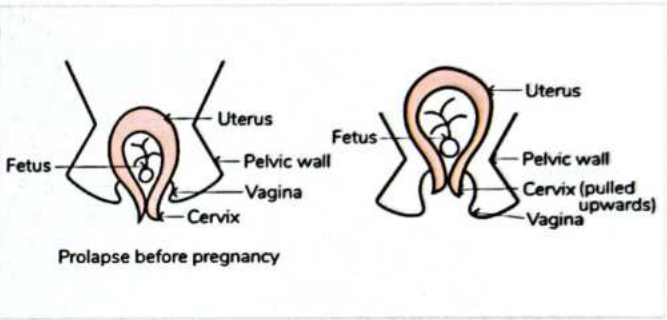
- In case of ischemic injury to Vagina & Bladder, 5-7 days later, Vesico Vaginal Fistula presents
- VVF is prevented by Urinary catheterization for 14-21 days

Prolapse In Pregnancy

00:47:22

Timing of prolapse presentation

- Prolapse that existed before pregnancy may become better or may even reduce by end of 2nd Trimester



- Prolapse happening first time in pregnancy usually presents in 3rd trimester

Complications and management according to period of pregnancy

	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	• A/G packing reduces edema & helps in Dilatation	• Antibiotics • Avoid weights

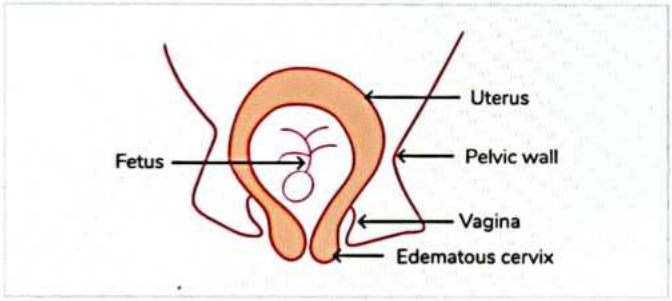
• Local Antiseptics to maintain hygiene (A/G Packs)	• Manual Stretching & pushing up of Cervix	• Reduce workload
• Pessary Continuously	• Duhrssen's incision (2 & 10 O' clock) • Avoid Fundal Pressure	• Corrective surgery after 6 weeks

Mechanism of Spontaneous Abortion in prolapse

- The cervix becomes edematous and compressed from the sides which reduces venous return, the edema worsens such that the arterial supply to lower portion of uterus also decreases. This leads to ischemia to uterus and fetal death

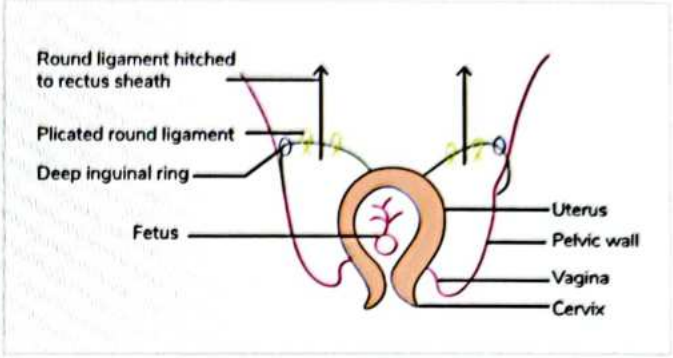
Management

- **Trendelenberg position** is a head Low position which reduces edema
- **Bed rest** → Reduces edema
- **A/G packs:** Acriflavin is a local antiseptic while glycerine is a hygroscopic agent which reduces edema

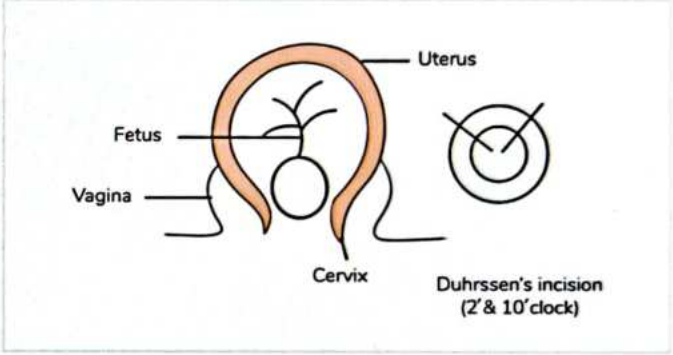


- **Pessary for Antenatal Prolapse:** this should be used continuously till delivery. The largest pessary which can be comfortably kept without pain & which does not allow the uterus to come out and does not come out with valsalva

- **Modified Gilliian Sx** → Pulling up the Uterus inside by
  a) Plicating Round Ligaments
  b) Hitch the Round Ligaments to Rectus sheath



- **Duhrssen's Incision**



PREVIOUS YEAR QUESTIONS

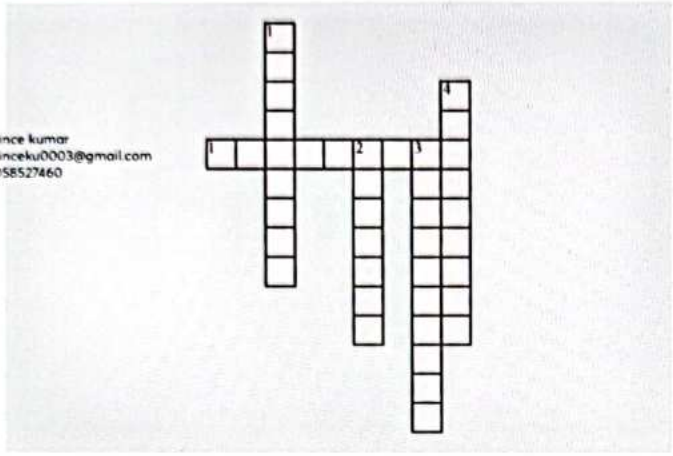
Q. A midwife was examining a pregnant woman. Suddenly she noticed umbilical cord prolapse. What is the next line of management?

(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

CROSS WORD PUZZLES

Crossword Puzzle



Across

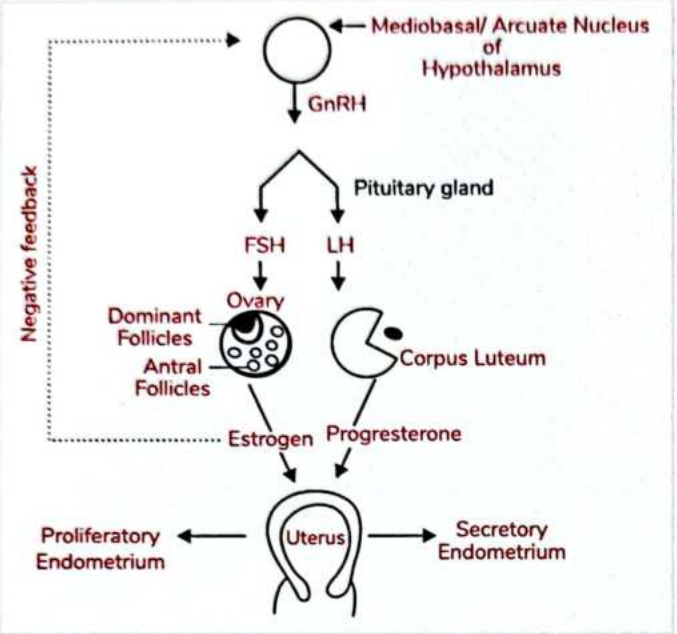
1. Handling the cord in a cord prolapse can lead to _____.

Down

1. Head can be delivered in prolapse uterus by giving __ incision on the cervix
2. Method of choice for prolapse in pregnancy is use of a _____.
3. First step in shoulder dystocia is giving _____ pressure
4. Pressure of fetal head on bladder in obstructed labor can lead to _____.

67 DRUGS USED IN GYNAECOLOGY AND OBSTETRICS

Basics of Menstrual Physiology 00:00:36



Drugs for Ovulation Induction 00:02:02

- Basic purpose of using ovulation induction drugs is to cause ovulation in women who are not ovulating or for superovulation, that is recruitment of multiple oocytes for the purpose of IVF and to improve chances of success

1. Metformin 00:02:51

- Oral biguanide, causes reduction in sugars, but doesn't cause hypoglycemia
- Dose: 500-1000 mg B.D
- Insulin sensitizer: Reduces insulin resistance, increases peripheral uptake of insulin in tissues such as ovary, so that follicles get the required amount of glucose for their optimal growth and maturation. It also reduces hepatic gluconeogenesis
- Used for ovulation induction

2. Clomiphene Citrate (SERM) 00:05:13

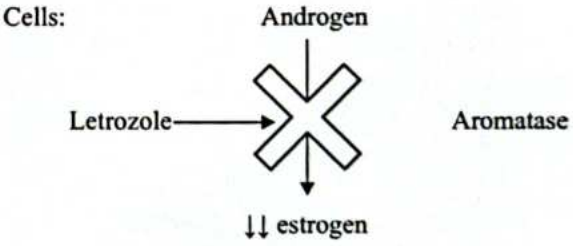
- It is a SERM (Selective Estrogen Receptor Modulator), which is a racemic mixture of Enclomiphene 62% (Anti Estrogenic) and Zuclomiphene 38% (Mild Estrogenic)
- In case of PCOD, multiple small follicles, produce excess of estrogens which give negative feedback to hypothalamus to decrease production of FSH, hence there is less follicular growth. Clomiphene, being a hypothalamic estrogen receptor blocker, blocks this negative feedback to hypothalamus, inturn increasing pituitary stimulation to produce more FSH, and hence more follicular growth. This drug is therefore used in Type II anovulatory infertility (normogonadotropic hypogonadism)
- Dose: 50mg-100mg, from 2nd to 6th day of periods.
- Ovulation rate is 80%, while pregnancy rate is 40%

Side Effects

- Vasomotor flushing
- Mood swings
- Pelvic discomfort
- Nausea, vomiting
- Visual scotomas
- Chances of twin pregnancy: 10%
- Risk of OHSS
- Anti-endometrial effect: does not allow good endometrial growth required for implantation due to its anti-estrogenic effect on endometrium, when given in higher doses.

3. Letrozole 00:10:00

- Aromatase inhibitor: In fat cells, androgens are converted to estrogens by aromatase enzyme. Letrozole inhibits this enzyme, thereby decreasing production of estrogens and thus reducing negative feedback on hypothalamus, which thus increases FSH production and subsequently follicle maturation.



- As compared to clomiphene citrate, it has less side effects, less incidence of OHSS and multiple pregnancy. Although it may rarely be associated with locomotor defects and cardiac defects in the fetus.
- Drug of choice for ovulation induction
- Dose: 2.5 to 5 mg/day, given from 2nd to 6th day of periods. Letrozole does not have anti-endometrial effect, which thus makes it better than clomiphene on endometrium.

4. Inj. FSH

- FSH can directly be used, which would cause follicle development and ovulation.
- Purified FSH (obtained from menopausal urine) or Recombinant FSH can be used

5. **Inj HMG**

- HMG is obtained from urine of post-menopausal women, as in menopausal women, lack of estrogen and progesterone, leads to absent negative feedback on brain to increase both FSH and LH in circulation & in urine.
- The injection is available as 75 IU FSH + 75 IU LH

Invitro Fertilization

- Superovulation is done with ovulation inducing drugs to achieve ideally 6-15 eggs, or atleast 3 eggs, to improve chances of fertilization and implantation. FSH is used to cause superovulation. However there may be an premature LH surge if we give Inj. FSH from the beginning of the cycle till 14th day, as multiple follicles will grow in size releasing estrogen, such that LH surges much earlier (<14 days) while the follicles are still small and there is no ovulation and the cycle gets wasted. To prevent this early LH surge suppression of pituitary is done by GnRH analogues in the previous cycle.

Important Information

- GnRH: normal pulsatile release of pituitary hormones
- GnRH depot preparations: continuous release → desensitize pituitary

GnRH analogues 00:29:24

- These are given as a continuous depot form, constantly stimulates pituitary and later desensitizes its receptors, if given in the previous cycle, puts pituitary to sleep, such that premature LH surge does not happen.

Drugs

- Leuprolide acetate: 20-40 times more potent than native GnRH
- Triptorelin: 130 times
- Buserelin: 80 – 100 times

Uses

- IVF: Suppression of pituitary to prevent premature LH surge by long/ short/ flare protocols
- Ovulation induction
- Suppressing hormone – based tumor – prostatic cancer
- Precocious puberty

GnRH antagonists

- Competitive inhibition of pituitary receptors of GnRH, directly suppress pituitary, thus they act faster than agonists.

Drugs

- Cetorelix and Ganirelix, given around 6th day till 14th day a cycle (not started in previous cycle, unlike agonists), will also suppress pre-mature LH surge.

Advantages

- Risk of OHSS is much less compared to agonists, also are cheaper than agonists

Oxytocin

- It is a nano peptide, released from posterior pituitary with a half life of 2-3 minutes and duration of action of 20-25 min

Uses

- **Abortion**: For augmenting abortion process, can be used in 2nd trimester along with PG's, but not in 1st trimester, as there are no oxytocin receptors in the first trimester.
- **Induction and augmentation of labour:** 5 IU is dissolved in 500 ml R.L and started at 8 drops/minute, and titrated till good contractions are achieved. This can be used with an infusion set – pump, the dose for multigravida is usually half the dose for primigravida
- **PPH prevention and treatment:** It is the drug of choice
  - Dose for prevention: 5-10 IU I.M/I. V bolus , after delivery of anterior shoulder
  - Dose for Rx: 10-20 IU IV infusion
- **Contraction stress test**: Induce contraction when patient is not in labor & see response of F.H.R & this gives indication if women can have normal delivery or not

Side effects

- **Water intoxication**: water retention due to its anti diuretic effect.
- **Sudden hypotension**: If oxytocin given suddenly as a bolus shot, can even lead to cardiac failure in patients with heart disease.
- **Rupture of uterus** can occur in multigravidas in higher doses due to hyperstimulation
- **Hyper stimulation** – normally good contractions are defined as 45 sec contraction once in every 3 minutes, while hyperstimulation means contractions lasting more than 45 seconds or more frequent than 1 min, this decreases perfusion to the fetus in between contractions as there is hardly any period of uterine relaxation.
- **Fetal distress/ death** due to hypertonic contractions

Methylergometrine 00:49:45

- It is an ergot derivative, made from fungus claviceps purpurea
- Vial: 0.25 mg inj. Given IM/IV
- Tab: 0.5 to 1 mg

Uses

- **Prevention of PPH**: 0.25 IV/IM (D.O.C oxytocin)
- **Treatment of PPH:** IV. injection acts within 90 seconds, while IM takes about 10 mins to act. However this if given IV may cause sudden hypertension, therefore give it as a slow

IV push & not as a sudden bolus shot. Up to 3-4 inj. can be given in 24 hrs, and maintenance can be done by tablet 0.5 mg T.D after 24 hrs. it can also be used for intraoperative bleeding in a cesarean section.

- **Post abortal bleeding**

Methylergometrine is never used for

- Induction of abortion
- Induction of labour: It causes tonic uterine contraction

Contraindications

- Not given in before 2nd twin is delivered
- Hypertensive disorders
- Heart diseases
- Rh iso immunization

Side effects

- 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: can be used throughout pregnancy at any gestation in different doses according to gestation
  - 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.O.L.

- **Dinoprostone**: PGE_2 In gel form: 0.5 mg , intravaginal or intracervical
- **PROPESS** (Dinoprostone pessary) :Dose:10 mg, put in the cervix, as the contractions start, the pessary can be pulled out with the thread attached to it.
- **PGE1 :** misoprostol can also be used for induction of labor

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)

Side effects of 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

Methyl dopa 01:16:51

- Pro drug, which converts to α methyl norepinephrine . This stimulates α_2 adrenergic system and decreases BP by reducing sympathetic outflow. It also inhibits, dopa carboxylase , which reduces dopamine and thus adrenaline
- **Dose**: 250 mg QID and can be given upto 500 mg QID

Side Effects

- Drowsiness
- Depression
- False +ve coomb's test

Hydralazine 01:20:04

- It is an arteriolar dilator, used in doses of 25 mg. up to 100 mg orally, given in 4 doses /day
- I.V dose is 5 to 10 mg

Side Effects

- Hypotension
- Tachycardias
- Arrhythmias

Important Information

Labetalol is DOC in

- In chronic hypertension
- Hypertension of pregnancy (BP increasing after 20 week pregnancy)

Labetolol 01:21:37

- 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.

Side Effects

- Headaches

- CHF
- Bronchial asthma

Nifedepine 01:24:41

- Ca ++ channel blocker that causes vasodilatation
- Dose: 5 mg to 10 mg q.i.d. up to 80 mg

Side Effects

- Sudden Hypotension
- Tachycardia
- Headaches

Nitroglycerine 01:27:43

- **Drip**: Infusion pump
- **Dose**: 5 g/min Up to 80 g/min

Side Effects

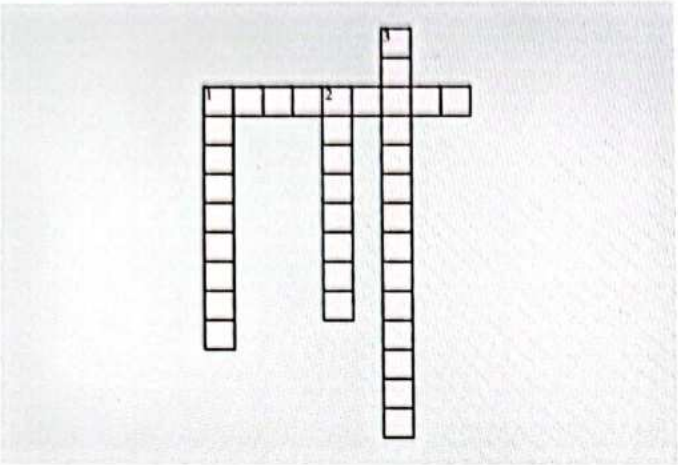
- Hypotension
- Tachycardia
- Meth hemoglobinemia
- Headaches

Sodium Nitroprusside 01:29:37

- Can be used in hypertensive emergency situations
- The major drawback is cyanide toxicity to the fetus, and thus if used, it should be given for short period only and preferably avoided.

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. First line drug for ovulation induction

Down

1. First line drug for hypertension in pregnancy
2. First line drug for PPH prevention
3. First line drugs for second trimester abortions

68 INSTRUMENTS IN GYNAECOLOGY AND OBSTETRICS

Sims Speculum

00:01:01

- It is used for inspection & examination of vagina and cervix
- Examination of obstetric trauma or vaginal trauma, cervical lesions, cancers, vaginal wall lesions, cysts, cystocele
- Used for procedures like D and C, conization, amputation, copper T insertion/ removal
- 2 blades of different sizes, blades have a trough, to drain down the secretions.

Sims Anterior Vaginal Wall Retractor

00:03:18

- Retraction of vagina to expose the cervix, after the posterior wall is retracted with a Sims speculum.
- Also can be used as a curette for a curettage, immediately after delivery when the cervix is well dilated.
- Spoon shaped ends with transverse serrations

Cuscos Speculum

00:04:56

- 2 blades connected by a Hinge, it works just like sims, but is self retaining
- Can be sued for inspection as well as for procedures like Colposcopy, Cervical Biopsy, IUCD insertion & Removal, Embryo transfer, paps smear
- Disadvantage is that it take up too much space in the vagina, and one cannot visualize anterior and posterior walls
- Not useful for doing surgical procedures such as D and C

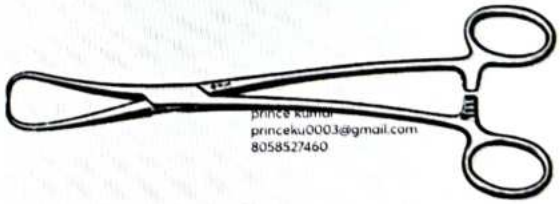
Teale's Vulsellum

00:07:27

- It has '2 by 3' teeth, providing better grip and is used to hold anterior and posterior cervical lips. Anterior cervical lip is held for traction in surgeries like D and C, while posterior lip is held for traction in surgeries like Colpocentesis, Colpotomy, where POD access is required
- Used for Surgeries like Biopsies, Amputation, Electro and Cryo Cauterization
- Endometrial Biopsies and Curettage

Jarcho Tenaculum

00:12:44

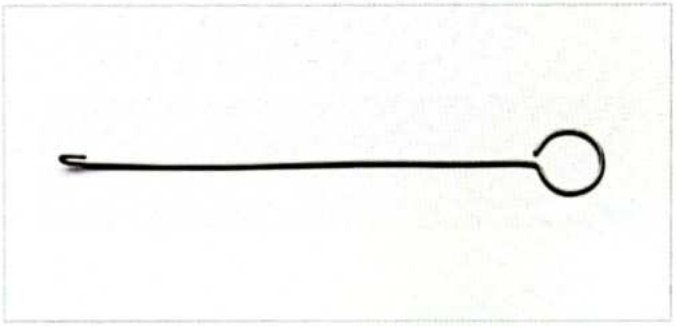


- Single Tooth at the end of each blade, more secure as the bite is deeper, but again more traumatic.

Simpsons Uterine Sound 00:13:56

- To find out the depth of the uterus and measure utero-cervical Length
- It has an angle of 15°, similar to anteversion of uterus
- Find if uterus is Anteverted or Retroverted
- For Situations like Missing IUCDS, asses malformations of the uterus, Stress incontinence diagnosis

IUCD Removing Hook 00:18:01



- For lost IUCD's, because the thread is missing, can hook out the IUCD

Hegars Dilator 00:19:18

- Single or Double ended, used serially to dilate the cervix for intrauterine procedures like
- Numerous Procedures
  - Cervical stenosis
  - Removal of IUCD's
  - Suction evacuation, DNC
  - Intra Uterine radiations source application
  - Drainage of Hematometra, Pyometra

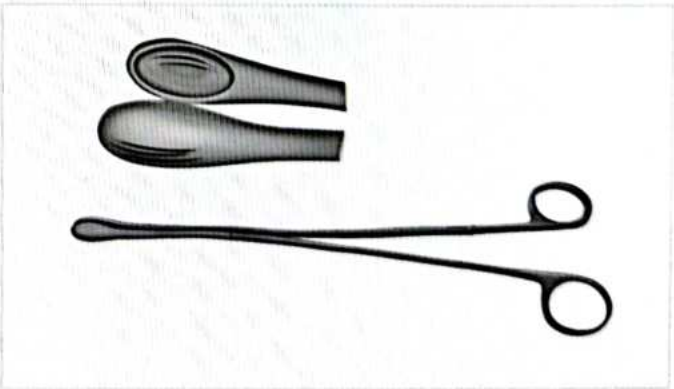
Hawkin Amblers Dilator 00:20:49

- Better than Hegar's dilator
- It has got a holder & causes less injuries

Sponge Holding Forceps 00:22:23

- It is used for application of Betadine before surgeries for preparations of abdomen, vulva, vagina
- It has a ratchet catch
- Pressure for Hemostasis
- Blunt Dissection
- Hemostatic Clamp, to hold cut edges of uterus, clean the uterus form inside in cesarean
- Cervix Examination
- To Hold the cervix for Encerclage (Ring forceps is better)

Haywood Smiths Ovums Forceps 00:26:26

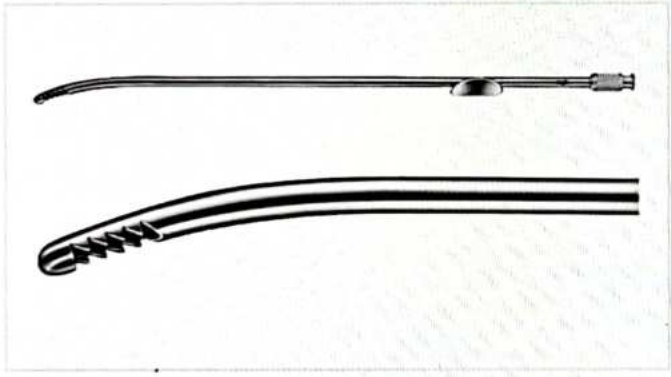


- Similar to sponge holding forceps but does not have a lock
- The blades are cupped, to pull out contents from inside the uterus, during a surgical MTP or evacuation for RPOCs

Blakes Uterine Currette 00:28:18

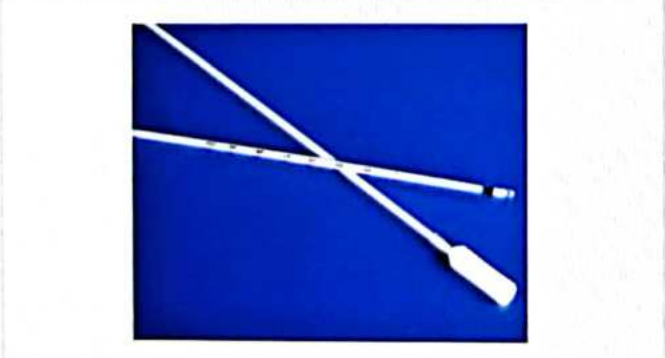
- Used for taking endometrial curettings for histopathology, indicated in AUB not responding to treatment, diagnosis of endometrial TB, cancer
- Curettage in MTP
- Diagnosis of Infertility cause
  - Endometrial Dating

Randall's Endometrial Biopsy Currette 00:29:55



- Has got serrated top, can be used to obtain curettings for endometrial biopsy, similar to uterine curette, but cannot be used for MTP

Pipelle Endometrial Sampling Device 00:31:08



- Used for Sampling of Endometrium, and can easily take endometrial fluid for cytology or even tissue for biopsy, through a minimally dilated cervix, due to its thin calibre.
- Is used for endometrial sampling in OPDs as it does not require anesthesia

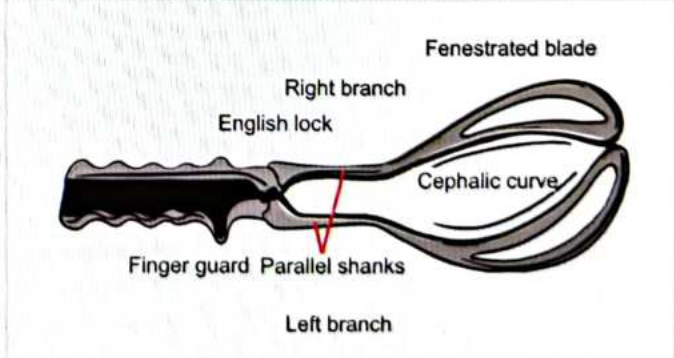
Tischlers Cervical Biopsy Forceps 00:32:37

- Has got teeth at the top, and punches out a piece of cervical tissue for biopsy
- Used for OPD procedures

Cardiac Tocography 00:33:54

- It has 2 probes , one for charting of fetal heart rate called cardiac probe and another for measuring uterine contractions , called toco probe.
- If only cardiac probe is used in a patient with no contractions, it is called NON STRESS TEST

Simpsons Forceps 00:35:54



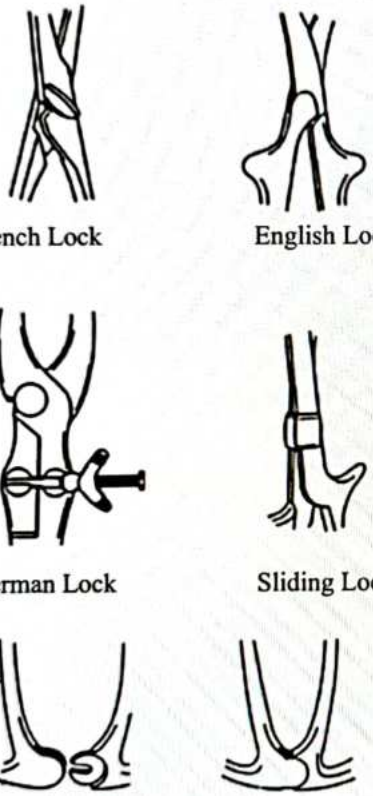
Wrigleys Forceps

00:39:11

- Smaller forceps, used for outlet procedures for stations > + 3

Forceps locks

00:39:49



Vacuum

00:40:46

- Contraindicated in preterm delivery
- Suction cup is applied on fetal head, and a pressure of up to 0.8kg/cm or 80 kpa is build slowly over 2-8 minutes at least
- Swelling on head formed after vacuum 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

Q. 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

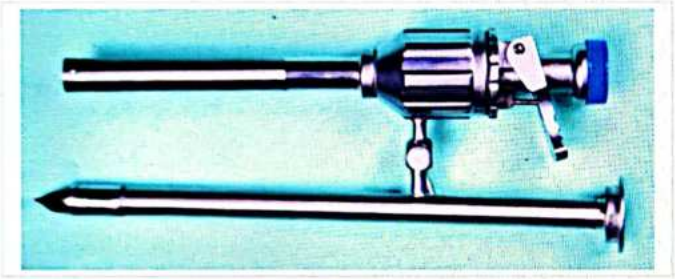
00:47:45

Metallic Needle Disposable Plastic

- Metallic needle can be reused after sterilizing
- Held in pen holding fashion and inserted into the abdomen for laparoscopy, the abdomen is then distended with CO_2 gas at a flow rate of 1-2 l/min to a total of 2.5 – 3 liters
- The working pressure for most gynae surgeries is 13-15 mmHg and never > 20 mmHg

Trocar & Cannula

00:52:28



- After the abdomen is entered with the veress needle and abdomen is distended with gas, this trocar and canula is used to give access to laparoscopy instruments.
- Trocar has the sharp part, it is inserted into the canula, both of which are then inserted into the abdomen through a tiny port, after which the trocar is withdrawn and the laparoscope or other instruments are inserted through the canula.

Laproscope

00:53:28

- Diameter = 10mm while small scopes = 5mm
- End of the scope can be:
  - 0°
  - Angulated: Usually 30 degrees, we can see finer details by turning it around

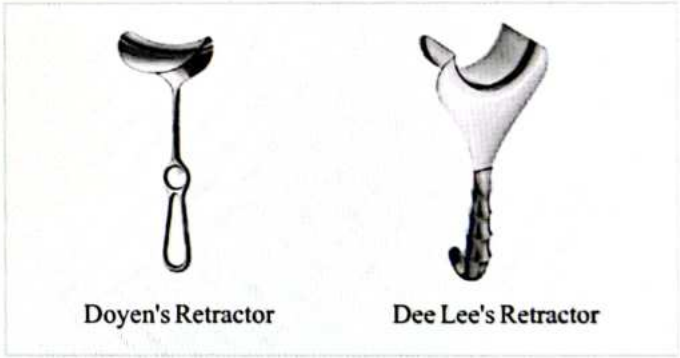
Episiotomy Scissors (Busch's)

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 for retraction of the lower abdominal wall and bladder away from the field
- Dee Lee's is lesser traumatic, but is not so deep

Deaver's Retractor

01:01:25

- Deeper retractor used for deep abdominal surgery, pelvic surgeries

Pinard's Fetoscope 01:02:09

- Much less used now-a-days, conical scope, one end goes over maternal abdomen, and with the other placed next to our ear, we can hear the fetal heart.
- It is primitive, and now relaced with stethoscope and doppler.

Bonney's Myomectomy Clamp 01:02:47

- Used to reduce blood loss during myomectomy by clamping the uterine arteries
- Two atraumatic clamps can be used to clamp the ovarian arteries also.
- These clamps can be intermittently released to check for site of bleeding.

Myoma Screw 01:05:13

- Screwed into the fibroids & upward traction is applied for myomectomy and hysterectomy.

PREVIOUS YEAR QUESTIONS

Previous Year's Question

Q. Identify the instrument used in gynaecological surgeries? (INI CET 2021)

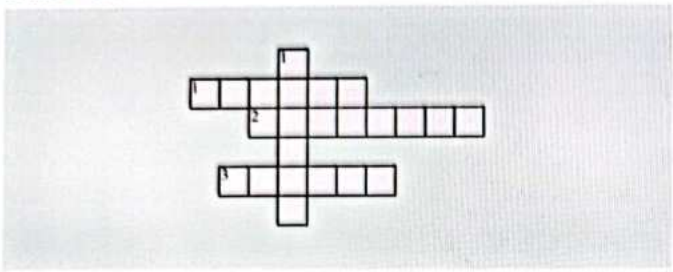
A. jamshedi needle
B. tuhoys needle
C. veress needle
D. oocyte aspiration needle

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

CROSS WORD PUZZLES

Crossword Puzzle



Across

1. Retractor for bladder retraction in LSCS
2. Outlet forceps
3. Bivalved self retaining speculum for cervical examination

Down

1. Metallic needle for creating pneumoperitoneum

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