

## OBSTETRICS

### POSTPARTUM HAEMORRHAGE

- MMR → around 130/100,000 Women
- mcc - OBSTETRIC HAEMORRHAGE

#### OBSTETRIC HAEMORRHAGE - TYPES

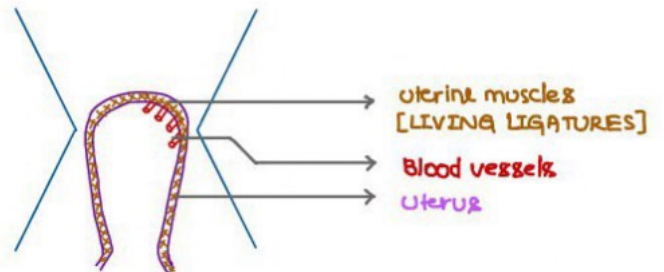
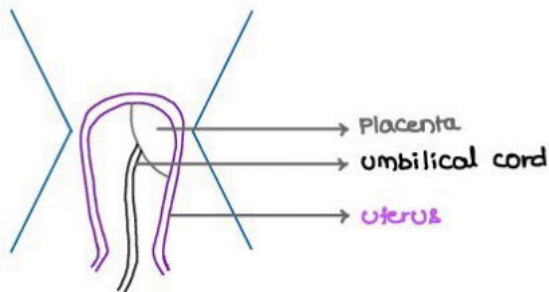
- ① Antepartum Haemorrhage → Any bleed in genital tract after 28 WK
- ② Postpartum Haemorrhage → Any bleed in genital tract after delivery  
→ mcc of MMR in India

### POST PARTUM HAEMORRHAGE [PPH]

#### DEFINITIONS

- > 500 ml in normal Delivery
- > 1000 ml in a cesarean Section
- Mild PPH → 500 ml to 1000 ml
- Moderate PPH → 1000 ml to 2000 ml
- Severe PPH → > 2000 ml
- Massive Obstetric Haemorrhage → > 1500 ml
- Any Haemorrhage which can reduce Hb by 1 gm% → PPH
- IF Hb drops by > 4 gm% → massive Obstetric Haemorrhage

#### ACTIVE MANAGEMENT OF 3rd STAGE OF LABOUR



AFTER Removing Placenta [CONTROLLED CORD TRACT<sup>n</sup>]

- controlled cord traction
  - Uterine massage
  - Oxytocin
- 
- Incidence of PPH → 5%

#### CAUSES

1. ATONIC UTERUS [80%]
  - Large uterus → Big baby / Twins / ↑ liquor
  - Infections → PROM / Chorioamnionitis
  - Prolonged labour
2. INJURIES [TRAUMA] → uterus, cervical, vaginal

③ COAGULOPATHY → von Willebrand's Disease  
Idiopathic Thrombocytic Purpura [I.T.P]

④ Retained Tissues → 2° PPH [ > 24 Hrs , Uptill 12 weeks]

→ CAUSES → 4-T's  
T → Poor Tone  
T → Trauma  
T → Thrombin Deficiency  
T → Tissues [Retained]

→ PRIMARY PPH → within 1<sup>st</sup> 24 Hrs [ 1<sup>st</sup> 1Hr is mc time]

SECONDARY PPH → > 24 hrs till 12 wks

### MANAGEMENT

→ Prevention - Prophylactic Im/IV Oxytocin [5-10 units] [DOC]

→ treatment

① IV Oxytocin [10-20 units drip] [DOC]

② IV Methyl Ergometrine 0.2mg [Peak act<sup>n</sup> at 90 sec]

- Im also can be given

- contraindications

• Heart Diseases

• PIH [Pregnancy induced HTN]

• Rh iso immunizat<sup>n</sup>

• Before 2<sup>nd</sup> twin is delivered

③ Tab MISOPROSTAL [PGE<sub>1</sub>] - 1000 µg per rectum

④ Inj CARBOPROST [PGF<sub>2</sub>α] - Im only

⊗ IV - sudden HTN

⑤ Recombinant VII - 90 µg/kg in 3-5 min IV infusion

⑥ FIBRINOGEN - Maintain > 1gm/Ltr [ >100 mg/dl ]

- cryoprecipitate [3ml/kg] - > 10 times fibrinogen vs FFP [30ml/kg]

• 10 units of cryoprecipitate or

• 1 Litre of FFP

⑦ UTERINE ARTERY EMBOLIZATION

- Prophylaxis for Placenta previa , Placenta accreta

- for Rx in acute conditions

⑧ INTRAVASCULAR AORTIC BALLOON COMPRESSION - Prophylactic

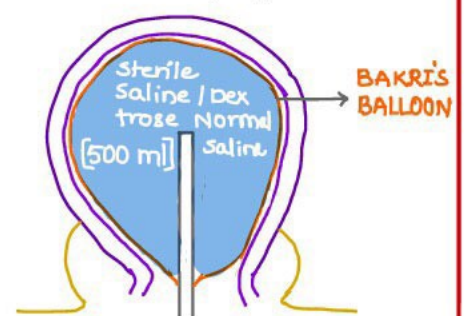
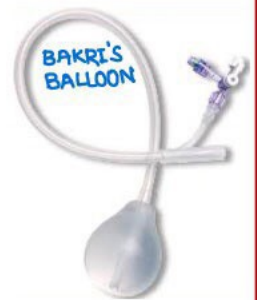
⑨ BALLOON TAMPONADE

- Bakri's balloon [ Now a days ]

- sengstaken tube

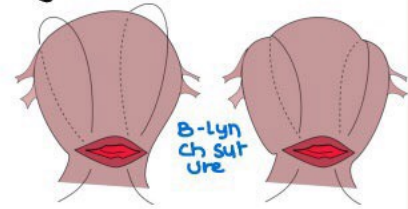
- Foley's cathetre [ upto 100ml ]

- condoms



## ⑩ SURGICAL METHODS :

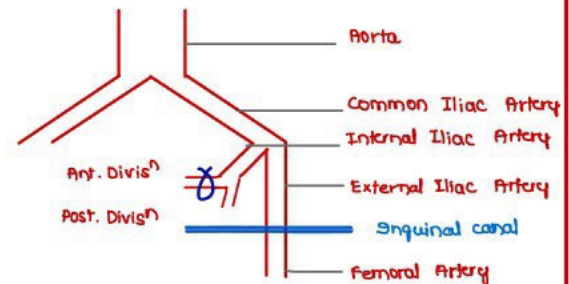
- compression / Brach Sutures → christopher B Lynch in 1997
- Heyman's Sutures
- uterine artery ligat<sup>n</sup>
- Ovarian artery ligat<sup>n</sup>
- Internal Iliac artery ligat<sup>n</sup>
- Hysterectomy



### → INTERNAL ILIAC ARTERY LIGATION

#### Ant. Divis<sup>n</sup> of Internal Iliac Branches :

- uterine
- obturator
- Superior vesical
- Inferior vesical
- Internal pudendal
- Middle rectal
- Inferior Gluteal
- vulval
- clitoral



#### Posterior Division Internal Iliac Artery Branches

- Superior Gluteal Short G
- Iliolumbar IL
- Lateral sacral LS

#### PRINCIPLE

- Using a Snug ligature we reduce the Pulse pressure [from an Artery to vein] → sluggish flow → Induces Thrombosis

#### THERAPEUTICAL GOALS

- |                                       |                      |
|---------------------------------------|----------------------|
| → Hb                                  | → > 8 gm/dl          |
| Fibrinogen                            | → > 100 mg/dl        |
| Prothrombin Time                      | → < 1.5 times of (N) |
| Activated Partial Thromboplastin time | → < 1.5 times of (N) |
| Platelet count                        | → > 75000            |

- Immediate O -ve Blood Transfusion can be given
- 4 units of Group matched blood through @ 14 gauge IV cannulas



## PLACENTA

### UTERINE INVERSION

- Inversion causes
  - Neurogenic shock
  - Haemorrhagic Shock
- Mcc of death dlt invers<sup>n</sup>
  - Haemorrhagic shock

### CAUSES

- Fundal Implantat<sup>n</sup> of Placenta
- Uterine atony
- Badly adhered placenta
- Sudden cord tract<sup>n</sup>

### MANAGEMENT

- IV Access
- Fluids, Blood
- Try & Reposit ASAP
  - ① Manual Reposition
  - ② Hydrostatic Reposition → O' SULLIVAN'S
    - Give Inj Terbutaline → Relaxer Uterus

↓

Reposit

↓

Give Inj. Oxytocin  
Inj. Methylergometrine
- Surgical Methods
  - HUNTINGTON'S METHOD → Atraumatic clamp
  - HAULTIAN METHOD → Resect<sup>n</sup> of The constricting Bands

### SEPARATION OF PLACENTA

#### METHODS

- Controlled cord Traction [BRANDT & ANDREW'S]
- CREDES METHOD [Obsolete Now → causes RETAINED PLACENTAL BIT]

#### SIGNS

- Lengthening of cord
- Fresh bleeding
- Supra pubic bulge [Most specific sign]

#### RETAINED PLACENTA

- Separat<sup>n</sup> of placenta → > 30 min
- Management
  - Manual Removal of placenta UNDER GENERAL ANESTHESIA
  - FOR RETAINED PLACENTAL BIT → 2<sup>o</sup> PPH
  - Mx by curettage → complicat<sup>n</sup> → Ashermann Syndrome



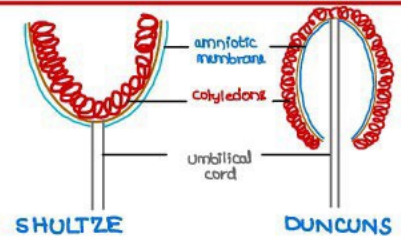
## MODES OF SEPERATION

### CENTRAL SEPARATION / SHULTZE SEPARATION → SHINY

- membranes comes first ; More common

### MARGINAL SEPARATION / DUNCANS SEPARATION → DIRTY

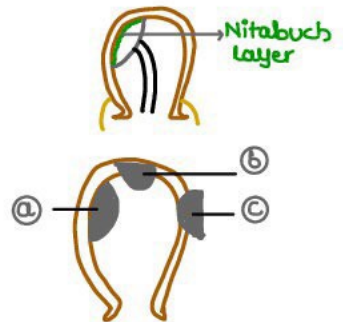
- cotyledons comes first



## NITABUCH LAYER

- Fibrinoid layer at which placental separat<sup>n</sup> happens
- Absence of layer → Morbidly adherent Placenta

- ① PLACENTA ACCRETA
  - ② PLACENTA INCRETA
  - ③ PLACENTA PERCRETA
- } can cause Severe PPH



## Management

- Laparotomy + Obstetric Hysterectomy
- If able to save the uterus

↓

Post Op → Methotrexate  
Actinomycin } to prevent the persistence of trophoblastic tissues.

## Predisposing conditions

- Previous cesarean sect<sup>n</sup>
- Previous curettage
- Placenta Previa [Low Lying placenta] - mc
- chronic infections

## BATTLEDORE PLACENTA

- Marginal Insertion
- detached in delivery



## ACCESSORY / SUCCENTURIATE LOBE

- form placental Retained Bit



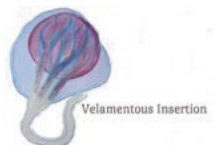
## CIRCUMVALLETE PLACENTA

- central clearing
- doubled up membranes on the periphery
- may be associated w IUGR & APM



## VELAMENTOUS CORD

- Splitting of cord present
- VASA PREVIA → velamentous cord at os
  - can have fetal bleeding [50% fatal]
  - Painless bleeding



- Diagnosis

- Doppler [Best]

- APT TEST [Alkaline denaturat<sup>n</sup> test]

- Addit<sup>n</sup> of NaOH to vaginal blood in a test tube  
colourless → Maternal blood [Alkaline denaturat<sup>n</sup>]  
stays red → Fetal RBC

- Helps to distinguish between maternal & fetal RBC's

- Qualitative test

[KLIEHAUER BETKE TEST - Quantitative test]

- SINGER'S TEST

- Qualitative test

- Alkaline denaturat<sup>n</sup> test

## RH INCOMPATIBILITY

### RH ISOIMMUNIZATION

- $\cong$  Rh Alloimmunization → Antibodies made in one human body acts against Red cells of another human body

### RH FACTOR

- Present on Chromosome 1

- Antigens in Rh factor

- RHD / RHCE

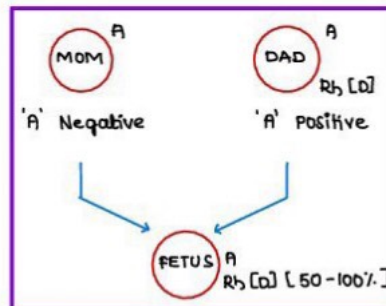


- main antigen → D

→ **DAD** **MOM**  
Ⓚ Ⓚ    - -



Ⓚ Ⓚ    Ⓚ Ⓚ



→ **DAD** **MOM**  
Ⓚ -    - -



Ⓚ    Ⓚ

→ **DAD** **MOM**  
Ⓚ -    Ⓚ -



- 25%

→ **DAD** **MOM**  
- -    - -



- -    - -

mother blood gets **MIXED** w fetal blood at the time of →

- Delivery [ 5-30 ml ] [ mc ]
- Abortion
- molar pregnancy
- Ectopic pregnancy
- Abruptio
- Injury of abdomen
- Amniocentesis
- chorionic villi sampling

- ① Rh Negative mother + Rh Positive Baby

- Sensitization of mother
- 1st Baby will be safe

- ② Rh sensitized mother + Rh positive Baby

- Rh Incompatibility occurs
- Baby is not safe



## Antigen/Antibody Reaction On fetal RBCs →

- Hemolysis
  - Anemia
  - ↑ Bilirubin → Jaundice, kernicterus [ $> 20 \text{ mg/dl}$ ]
  - ↑ 3rd space collections → Ascites, Pleural effusion  
Pericardial effusion, Edema
  - ERYTHROBLASTOSIS FETALIS
- } HYDROPS FETALIS

## PREVENTION

- Mortality → 20 - 30%
- ANTI - D, 300  $\mu\text{g}$  within 72 hrs
  - will neutralize 30 ml blood [15 ml RBCs]
  - can be given upto 4 wks

## ANOTHER SITUATION

- 1st PREGNANCY → Rh Negative Mother & Rh Positive Baby

↓  
ANTI - D GIVEN in 72 Hrs

- 2nd PREGNANCY → Baby dies d/t Hydrops fetalis

## → PROBABLE CAUSES

### ① NON IMMUNE HYDROPS FETALIS

- m/c of Hydrops fetalis

#### CAUSES

- |                  |                             |
|------------------|-----------------------------|
| → cardiac [m/c]  | → congenital Heart Block    |
| → infectious     | → Parvo virus B-19          |
| → GI causes      |                             |
| → Haematological | → $\alpha$ Thalassemia      |
| → Renal          | → Polycystic kidney disease |
| → Genito urinary | → Posterior urethral valve  |
| → cystic hygroma |                             |

### ② ABORTION

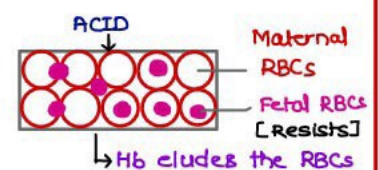
### ③ MIXED - MATCHED BLOOD TRANSFUSION

### ④ INADEQUATE ANTI - D

#### KLIEHAUER BETKE TEST [Acid Elution Technique]

- measures fetomaternal Haemorrhage
- Quantitative test

$$\text{FMH} = \% \text{ Contamination} \times \text{Maternal Blood Volume} \times \frac{\text{Maternal Haematocrit}}{\text{Fetal Haematocrit}}$$



## CASE 1

→ Rh Negative & 1st visit

### INDIRECT COOMB TEST

1st visit → Negative  
 20 weeks → Negative  
 24 weeks → Negative  
 28 weeks → Negative  
 32 weeks → Negative  
 36 weeks → Negative  
 40 weeks → Delivered

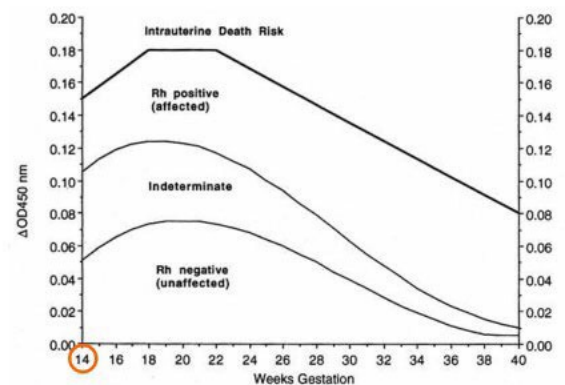
## CASE 2

→ Rh Negative & 1st visit

### INDIRECT COOMB TEST

1st visit → Negative  
 20 weeks → Negative [1:16 +ve]  
 24 weeks → Positive [1:8 safe]  
 25 weeks → 1:16 Positive  
 26 weeks → 1:16 Positive  
 27 weeks → 1:16 Positive  
 28 weeks → 1:1024 Positive

- DO Amniocentesis & DO Spectrometry in the Amniotic fluid [Bilirubin] & Plot **LILLEY'S GRAPH** - Plot **QUEENAN'S CHART** [more sensitivity]



- Q Optical Density at 28 weeks increased from 0.5 to 0.8 [upper 3rd zone]. MANAGEMENT should be ?
- A Intra Uterine Blood Transfusion into the cord or intra peritoneal transfusion

## PREVENTIVE MEASURES

→ Rh Negative & 1st visit

### INDIRECT COOMB TEST

1st visit → Negative

20 weeks → Negative

24 weeks → Negative

28 weeks → Negative

34 weeks → Negative

At Delivery → Positive

Negative

→ Inj ANTI - D 300 µg [work for 6 wks]

→ Inj ANTI - D 300 µg

→ Inj ANTI - D 300 µg

→ Nothing to be done



## ANTE PARTUM HAEMORRHAGE

→ Any bleeding in the genital tract after >28 weeks of gestation

### PLACENTA PREVIA [PP]

#### CLASSIFICATION

- |     |                                 |                |
|-----|---------------------------------|----------------|
| I   | → Dips into the Lower segment   | } Minor degree |
| II  | → in the LS but do not cover OS |                |
| III | → Partially covering the OS     | } Major degree |
| IV  | → Fully covering the OS         |                |



PRIMARY MANAGEMENT IN ALL THESE CASES IS RESUSCITATION

- CASE 1** → PP → Painless bleeding at term [>37-40 wks], Management ?  
**Mx** → Cesarean Section

MOST CASES OF PP DOES NOT BLEED AT THE TIME OF PRESENTATION

- CASE 2** → PP at term [not bleeding], Management ?  
**Mx** → ① **TYPE IV [complete / total]** → Cesarean Section

② **TYPE III [Incomplete]**

- DOUBLE SET UP EXAMINATION / Examination under anaesthesia  
under anaesthesia,

Drape the patient, keep another surgeon ready  
DO per vaginal examination



Placenta moved away → Normal vaginal delivery  
Placenta not moved away → Cesarean Section

③ **TYPE II**

- |                                 |                           |
|---------------------------------|---------------------------|
| a. Anterior low lying placenta  | → Normal Vaginal delivery |
| b. Posterior low lying placenta | → Cesarean Section        |
- [Dangerous Placenta Previa]

④ **TYPE I**

→ Normal vaginal delivery

- CASE 3** → PP Bleeding, <34 wks [Lung not matured]. Management ?  
**Mx** → 1. Resuscitation  
2. Steroids to the baby  
3. Sedate

**McAFEE JOHNSON REGIME**  
BLEEDING STOPPED IN 90% OF CASES

→ Bleeding does not stop [10%] → Cesarean section

→ NO TOCOLYTICS

## ABRUPTIO PLACENTA / ACCIDENTAL HAEMORRHAGE

### ASSOCIATED WITH

- Hypertension, Pre eclamptic Toxemia
- Smokers
- Multiparous women
- Twins
- Pre Mature Rupture of membranes
- Chorioamnionitis
- Previous abrupt<sup>n</sup>
- Thrombophilias
- Elderly women

### SHER & PAGE CLASSIFICATION

#### TYPE I

- Bleed seen only after delivery
- No uterine tenderness
- fetus is alive & FHR is (N)

#### TYPE II

- Bleed seen during labour
- associated w/ uterine tetany
- Fetal Heart Rate - Normal

#### TYPE III

- most severe
- FHR Problem, distress
- A → Without DIC
- B → With DIC

### PRESENTATION

- Painful bleeding
- Protract<sup>n</sup> of labour
- PPH

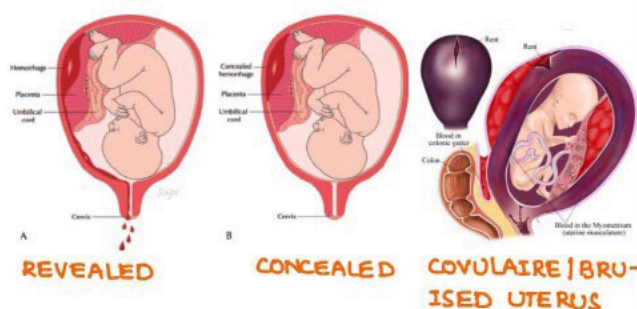
### MANAGEMENT

#### I. AT TERM

- Resuscitat<sup>n</sup>
- IF fetal distress +nt
  - FHR <110 on doppler
  - fetal scalp blood PH is <7.2

→ cesarean sect<sup>n</sup>

- Abrupt<sup>n</sup> per se is not a indicat<sup>n</sup> for cesarean section → NORMAL DELIVERY
- loss of fetal movements  
Inability to localize FH sounds } NOT FETAL DISTRESS



## NORMAL DELIVERY IN ABRUPTION

→ By Artificial Rupture of membranes

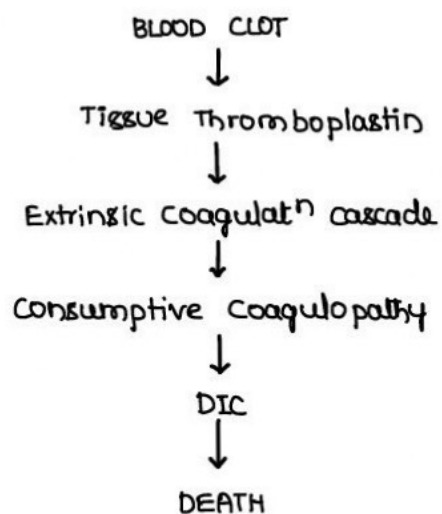
- Local prostaglandins are released → Induce labour
- The compression stops the bleeding

→ can also add OXYTOCIN → Augment labour

## 2. AT 32 WEEKS

1. Resuscitation
2. Steroids to baby
3. Sedation

→



4 DO ARM & Deliver the Baby

→ NO TOCOLYSIS

### NO TOCOLYSIS IN APH

Placenta Previa  
Abruptio Placenta  
Vasa Previa

Only condition in APH where conservative Mx is useful, <34wk → Placenta Previa

### EXCEPTIONS/CONTRA INDICATIONS

- Intra Uterine Death
- Anomalous Baby
- Severe shock of mother

Q Placenta Previa, 32 weeks of Gestation → Pre term labour.

- A Tocolysis can not given
- B Tocolysis can be given



## PREGNANCY INDUCED HYPERTENSION

### HYPERTENSIVE IN PREGNANCY

- After 20 weeks of gestation, in a previously normotensive, BP  $> 140/90$ , in  $> 2$  occasions  $> 6$  hrs apart.

### PRE ECLAMPTIC TOXEMIA [PIH - earlier name]

- Hypertension with Proteinuria  $> 300$  mg/24 hr urine or  $1+$  in dipstick  
Protein: Creatinine Ratio  $\geq 0.3$

### ECLAMPSIA

- Pre Eclamptic Toxemia with Generalized Tonic clonic convulsions
- PREDISPOSING FACTORS FOR SEVERE HTN or IMMINENT ECLAMPSIA
  - Headache
  - Nausea/vomiting
  - Blurring of vision
  - $\uparrow$  Knee jerks
  - Epigastric Pain
  - Proteinuria  $\rightarrow > 2$  gms/24 hrs urine [ $> 3.5$  g - nephrotic range]
  - BP  $\rightarrow > 160/110$  mm Hg

### PRE EXISTING HTN

- $\rightarrow$  Essential HTN
- $\rightarrow$  Chronic HTN
  - Renal Artery Stenosis
  - Pheochromocytoma
- $\rightarrow$  Acute on chronic HTN
  - Platelets  $\rightarrow < 100,000$
  - Creatinine  $\rightarrow > 1.1$
  - New Onset Proteinuria
  - Transaminases  $> 2$  times
- $\rightarrow$  Delta HTN
  - BP is normal through out the pregnancy and it reaches high normal values in the later stage of pregnancy
  - Can be associated  $\bar{c}$  convulsions

## ECLAMPSIA MANAGEMENT

- DOC →  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$  → IM + IV [PRITCHARD'S REGIME - MOC]  
→ IV only [ZUSPAN REGIME]

### → PRITCHARD'S REGIME

- IV  $\text{MgSO}_4$  4 gms  
IM  $\text{MgSO}_4$  10 gms [5gms in each buttock]  
IV  $\text{MgSO}_4$  2 gms added if no relief
- Follow up  $\pm$ 
  - IM  $\text{MgSO}_4$  for 24 hrs after the last convulsion or the delivery whichever is later
  - monitor knee jerks → +  
Respiratory Rate →  $> 14/\text{min}$   
Urine output →  $> 100 \text{ ml} / 4 \text{ hrs}$

- DELIVERY is the most important step in the Mx of Eclampsia  
90% or more are normotensive  $\pm$  in one week of delivery

- Add IV LABETELLOL → DOC of Hypertensive emergencies in pregnancy

- 20 mg IV over 10 min

↓

another 20/40 mg

↓

80 mg in 10 min

⋮

Upto 220 mg

- $\alpha + \beta$  Blocker [LABETALLOL]

### → IV HYDRALAZINE

- 5 to 10 mg IV Bolus
- Alternative to Labetalol

### → GUEDEL'S AIRWAY

- Prevents the tongue bite
- maintaining the oxygenation
- Do not use mouth gags, etc

## HYPERTENSION MANAGEMENT

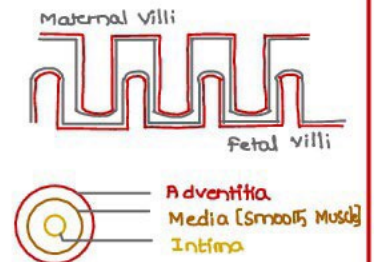
- Tab. LABETELOL
  - 1st line drug
  - 100 - 200 mg TID
  - $\alpha + \beta$  blocker
- Tab. METHYL DOPA
  - Prodrug
  - Active form →  $\alpha$  Methyl Norepinephrine
  - 250 - 500 mg QID.
- Tab. HYDRALAZINE
  - 25 - 50 mg BD or OD
  - Arteriolar dilator
- Tab. NIFEDIPINE
  - S/L Nifedipine is C/I
  - 10mg TID [upto 80 mg/day can be given]
- Tab. PRAZOSIN
  - $\alpha$  Blocker
  - 2.5 - 5 mg/day

## CONTRA INDICATED DRUGS

- - FRUSEMIDE
  - $\beta$  Blockers
  - ACE INHIBITORS } cause Intra Uterine Growth Restrict<sup>n</sup>
- ACE Inhibitors can cause
  - Hypocalvaria
  - Renal Agenesis
  - Oligoamnios

## → ETIOLOGY OF HTN

- > 20 wks, Trophoblastic invasion & Replacement of smooth muscle layer } (N)
- Persistence of smooth muscle layer or inadequate trophoblastic invasion } Vaso-Spasm
- VASOSPASM [Pathology] → HTN [PIH]
- As Furosemide → ↑ VASOSPASM → Contraindicated
- Normal SALT DIET



- Anti hypertensive drugs have to be started →  $\geq 150/100$



### OTHER ASSOCIATIONS OF PIH

- 1st exposure to villi [Primi]
- more exposure to villi [Twins, molar Pregnancy]
- Pre existing endothelial damage
  - Renal Disease
  - DM
- Genetic Predisposition
  - Altered Methyl Tetra Hydrofolate gene
  - Factor V leiden abnormality
- ↓ Nitric Oxide Production from L. Asperginase by endothelium

### PREDICTION OF HTN

- ROLL OVER TEST - >10mm Hg increase
- ISometric Exercises
- ↑ Uric Acid
- ↓ Calcium
- ↑ Homocysteine
- Micro albuminuria

### PREVENTION

- calcium Supplementat<sup>n</sup>
- Fish oil capsules
- Low dose Aspirin [75-150 mg]
- Antioxidants [vit c/D/E]

## GESTATIONAL DIABETES MELLITUS

### WHITES CLASSIFICATION

#### GESTATIONAL DM [A]

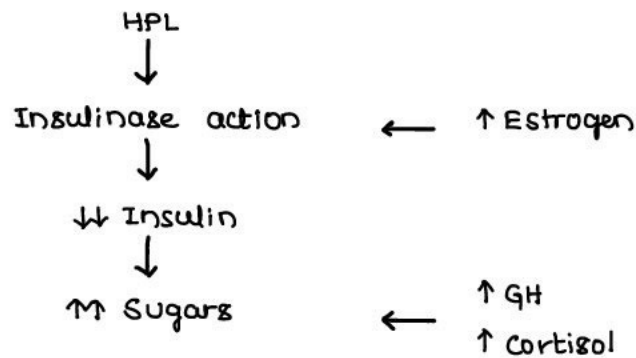
- A<sub>1</sub> → sugar controlled w diet
- A<sub>2</sub> → Sugar controlled w insulin

#### PRE GESTATIONAL DM

- B → <10 yrs of duration
- C → 10-19 yrs of duration
- D → >20 yrs of duration
- F → associated w nephropathy
- R → associated w Retinopathy
- H → associated w Heart disease

### GESTATIONAL DM

- At 24 WKS, Human Placental lactogen made from Placenta



- No Anomalies [Organogenesis over]
- Screening of GDM
  - After 24 weeks
  - Glucose challenge Test w 50gms of sugar in a non fasting women  
Screening Test [obsolete now]
  - Glucose Tolerance Test w 100gms of sugar in a fasting women  
Diagnostic test [obsolete now]
  - 1 STEP TEST [Screening & Diagnostic test Now]
    - Glucose Tolerance Test w 75gms of sugar in a fasting women
    - |            |   |       |  |
|------------|---|-------|--|
| • Fasting  | → | < 92  | } Any one abnormal value<br>is Dx of GDM |
| • At 1 hr  | → | < 180 |  |
| • At 2 hrs | → | < 153 |  |

### PRE GESTATIONAL DM / OVERT DM

- 1st Trimester Sugars  $\propto$  Anomalies
  - Screening for DM should be done in 1st trimester itself  
Screening done by
    - Glycosylated Hb → <6.5
    - Serum fructosamine → 258 - 288  $\mu$ mol

## MATERNAL COMPLICATIONS

- Large Baby → ↑ cesarean sect<sup>n</sup>  
→ ↑ Instrumentat<sup>n</sup>  
→ ↑ Birth Canal Injuries  
Shoulder dystocia
- Polyhydramnios → PROM → chorioamnionitis
- Puerperal sepsis
- Preterm labour
- Association ↑
  - PIH [25%]
  - Abruption
  - Sudden intra uterine Death at term

## NEWBORN COMPLICATIONS

- Hypoglycemia
- Hypomagnesemia
- Hypocalcemia
- Polycythemia
- Hyperbilirubinemia
- Anomalies
  - cardiac [mc]
    - Transposit<sup>n</sup> of Great vessels [mc & most specific]
    - VSD
    - PDA
  - Neural tube defects
    - Anencephaly
    - Spinal Bifida
    - Facial defects - cleft palate, cleft lip
  - Sacral Agenesis / Caudal Regression syndrome [most specific]

## FETAL COMPLICATIONS

- ↑ SUGARS → ↑ Insulin from Pancreas → hypoglycemia  
[β cell Pancreatic Hyperplasia]

## MANAGEMENT

- Diet → 25-30 K.cal / Kg/D [Ⓝ requirement → 35-40 K.cal / Kg/D]
- Monitor sugars → Fasting / Post breakfast / Post Lunch / Post Dinner
- Monitor Fetus → Antepartum Surveillance
- Plan Delivery → by 38WKS & Give Steroids
- DOC → Insulin
- OHA → GLYBURIDE [Glibenclamide]  
[oral Hypoglycemics] METFORMIN
- Fundus EXAM → Look for Retinopathies
  - Background [80%]
  - Proliferative [20%] → c. section  
[Neovascularizat<sup>n</sup>]

## HEART DISEASES

### RHEUMATIC HEART DISEASE [RHD]

- MC heart disease in INDIA
- Mitral stenosis [MC Presentat<sup>n</sup>]
  - Failure → Antenatal [around 30-32 wks] [mjc] → CO ↑ by 50%
    - Postnatal → 1st 24 hrs → CO ↑ by 70-75%
  - Balloon Mitral valvotomy in 2nd trimester can be done antenatally
  - Post natally → Keep in High Risk ward [for 1st 24 hrs]
    - enj. Lasix → ↓ Preload

OBSERVATION PERIOD REQUIRED POST NATALLY FOR HEART DISEASE → 1<sup>st</sup> 24 hrs  
 OBSERVATION PERIOD REQUIRED POST NATALLY FOR PPH → 1<sup>st</sup> Hour

- Labour Induct<sup>n</sup> is safe in most of the Heart Diseases
- Normal Delivery can be done.

### Cesarean Sect<sup>n</sup> Indications

- Obstetric Indications
- Aortic root dilatations → > 4cm
- Aortic Aneurysms
- Severe Aortic stenosis
- Recent MI
- Congestive Heart failure
- Warfarin Rx in previous 2 wks

### LABOUR MANAGEMENT

- ↓ IV Fluids
- Position → SEMI RECUMBENT
- PAIN RELIEF
  - Opioids
  - Epidural Analgesia
- Avoid straining in 2nd Stage
  - cut short it by forceps/vacuum
- Inj fentanyl → ↓ Preload } Given
- IV/IM Oxytocin
- Methy Ergometrine → Contraindicated
- observat<sup>n</sup> in High Risk ward for 24 hrs
- Do not discharge for 5 days

### DELAYED COMPLICATIONS

- Arrhythmias
- cardiac rupture
- Infective Endocarditis
- Thrombo Embolic Phenomenon
- Mitral valve Prolapse



## CONTRA INDICATIONS TO PREGNANCY

- Eisenmenger Syndrome
- Severe Aortic Stenosis
- Primary Pulmonary HTN
- Marfan Involving Aortic Root

COARCTAT<sup>n</sup> OF AORTA IS NOT A CONTRA INDICATION → C. Sect<sup>n</sup> indicated

## HYPOTHYROIDISM

### VALUES

- TSH → < 2.5
- [ 2.5 - 4.0 ] → Check Anti Thyroid Peroxidase
- If +ive → Start ELTROXIN

### MATERNAL COMPLICATIONS

- Abortion
- Preterm labour
- Preeclamptic toxemia
- Abruptio
- PPH

### NEONAL COMPLICATIONS

- Morbidity & Mortality ↑
- Cretinism
- ↓ IQ
- Neuro Psychiatric illness
- Poor Cognitive development
- Deafness & Growth Restriction

## HYPERTHYROIDISM

### MATERNAL COMPLICATIONS

- Pre Eclamptic Toxemia
- Thyroid storm
- Preterm labour
- High output cardiac failure
- Intra Uterine Growth Restrict<sup>n</sup>
- Intra Uterine Death

### MANAGEMENT

- DOC → PROPYLTHIOURACEL 100 - 150 mg TID
- METHIMAZOLE [ from 2nd Trimester ]

## EPILEPSY

- 30% have ↑ convulsions
- 20% have ↓ convulsions
- 50% have unchanged convulsions

### MANAGEMENT

- |                   |   |
|-------------------|---|
| → PHENOBARBITONE  | → not given   |
| PHENYTOIN         | } Given, but CATEGORY D Drugs → FETAL HYDANTOIN SYND. |
| CARBAMAZEPINE     |   |
| LAMOTRIGINE [DOC] | } CATEGORY C Drugs                                    |
| LEVITRACETAM      |   |

## PREGNANCY & DRUGS

### CATEGORY A

- Safe in humans
- THYROXINE
- MULTI VITAMINS

### CATEGORY B

- Safe in Humans
- Teratogenic in animals
- DIDANOSINE
- METRONIDAZOLE

### CATEGORY C

- Teratogenic in animals
- Safe in limited Human Studies
- Majority of Drugs
- Acyclovir
- chlorquine
- Antibiotics

### CATEGORY D

- Human Teratogens
- Benefits > Risk
- Phenytoin

### CATEGORY X

- TERATOGENS
- Totally contra indicated
- ANDROGENS
- ALCOHOL
- LITHIUM
- VITAMIN A
- WARFARIN

## MALARIA

- Poor Prognosis
- ↑ Risk for fulminant hepatic failure  
Intra Uterine Death

## MANAGEMENT

- DOC → CHLOROQUINE
- complicated Malaria
  - ARTESUNATE
  - QUININE
  - MEFLOROQUINE [ $> 12$  wks]

## RHEUMATOID ARTHRITIS

- Better Prognosis

## SARCOID

- Better Prognosis

## ULCERATIVE COLITIS

- UNCHANGED
- WORSE PROGNOSIS → IF 1st time Presentat<sup>n</sup> in Pregnancy

## APPENDICITIS

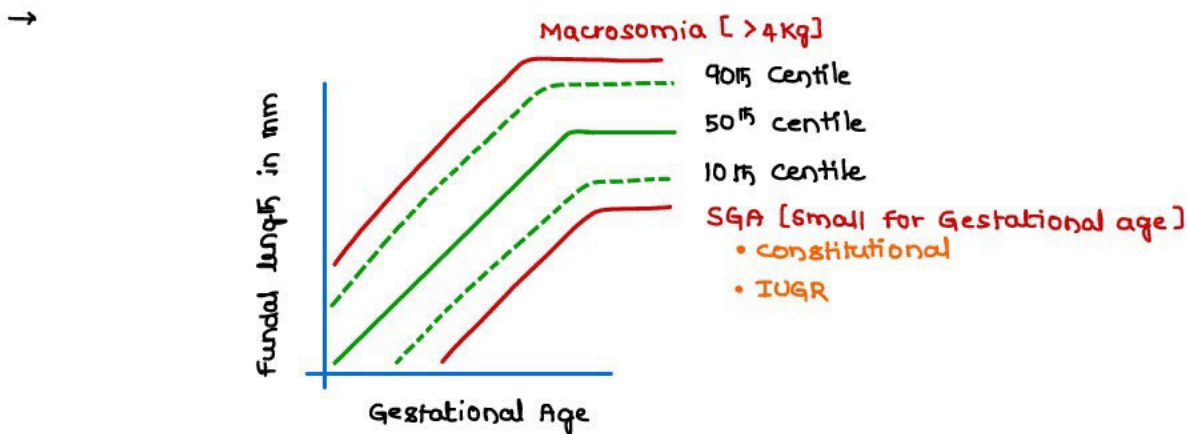
- Poor Prognosis
- ↑ed abort<sup>n</sup>, Sepsis, Preterm labour & IUD
- Early Surgery advised

## TUBERCULOSIS

- Worse Prognosis
- WORST IN PUERPERIUM
  - ↑ed demand
  - ↓ed supply
  - Ongoing Immuno Suppression
  - Low Socio Economic status
  - Over crowding, Poor ventilat<sup>n</sup>
  - Heat, Humidity

## INTRA UTERINE GROWTH RESTRICTION

→ clinical Lag of 2-3 weeks fundal height corresponding to Gestational age



→ Weight < 2.25 Kgs [ 2.3 Kgs] &  
Femoral length [FL] : Abdominal circumference Ratio  $\cong$  22 after 21 weeks (N)  
→ > 23.5 → S/o IUGR

→ 1st Parameter affected during Growth restrict<sup>n</sup> → Abdominal circumference  
2nd Parameter affected during Growth restrict<sup>n</sup> → Upper & Lower limbs  
last Parameter affected during Growth restrict<sup>n</sup> → Brain [dlt preferential circulation]

SYMMETRICAL IUGR / TYPE I	ASYMMETRICAL IUGR / TYPE 2
<p>→ Early onset</p> <p>→ dlt Infections chromosomal disorders congenital anomalies</p> <p>→ PONDEREL INDEX → 8.3 (N) Estimated fetal weight / FL<sup>3</sup></p> <p>→ HC/AC → 1 (N)</p> <p>→ Poor Prognosis</p>	<p>→ Late Onset</p> <p>→ dlt HTN Renal Disease</p> <p>→ PONDEREL INDEX → &lt; 7</p> <p>→ HC/AC → &lt; 1</p> <p>→ Better Prognosis</p>

### ETIOLOGY

→ IDIOPATHIC [65%]

#### Maternal causes

→ chronic Kidney Disease, HTN, Infections, Connective tissue disorders, Heart Disease [III, IV], Smoking, Drugs, Alcohol, BURNT OUT DM [angiopathy]

#### Placental causes

→ Placental Infarcts, Abnormal Placentas, Abnormal Placentation

#### fetal causes

→ Inborn Errors of metabolism, chromosomal abnormalities, infections



## FETAL COMPLICATIONS

### Antepartum

- Oligoamnios
- Hypoxia
- Still Birth

### Intrapartum

- Hypoxia
- Acidosis

## NEONATAL COMPLICATIONS

- Limp, Loose skinned, Thin, Poor tone
- Respiratory Distress Syndrome
- Intra ventricular Haemorrhage
- Neonatal Death
- Persistence of Primitive circulat<sup>n</sup>

## MANAGEMENT

### → NOT THE TREATMENT

- ↑ Diet
- Protein Powders
- Stopping to smoke
- Stopping to Drink
- Stopping Using Drugs

## TREATMENT

- RESTING IN A LATERAL POSITION [Only Proven method, which ↑ the weight]
- ↑ SURVEILLANCE
- ADEQUATE DIET for required women
  - calories → 35 - 40 Kcal / Day
  - carbohydrates → 50%
  - Proteins → 30%
  - fats → 20%

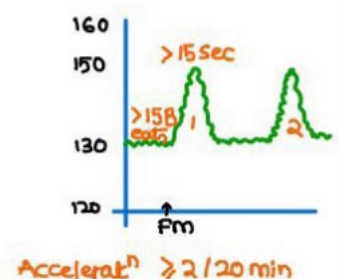
## ANTEPARTUM FETAL SURVEILLANCE IN HIGH RISK PREGNANCY

### TOOLS

Daily fetal Movement count [DFMC] → > 10 / 12 waking hours

### Non Stress Test

- Sympathetic VS Parasympathetic system well being
  - established at 28 WKS
  - Test will be done 32 WKS onwards
- REACTIVE NON STRESS TEST
  - ≥ 2 accelerations, > 15 Beats from base line, > 15 seconds in 20 minutes
  - chance of IUD → < 1% / next 1 week



## → FREQUENCY OF NST

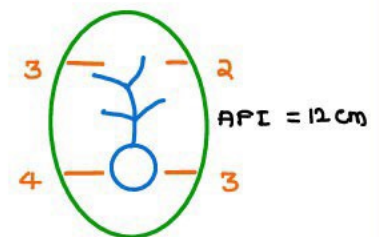
- Weekly after 32 wks, for all pregnant ♀
- Biweekly for high risk pregnancies
- 1/48hrs for controlled DM & Severe HTN
- Daily for uncontrolled DM

## BIO PHYSICAL PROFILE / MANNING SCORE

→ Done by USG	
→ fetal movements	→ 2
fetal tone	→ 2
fetal breathing movements	→ 2
Adequate NST	→ 2
Amniotic Fluid Index	→ 2
GOOD BIOPHYSICAL PROFILE	→ <u>10</u>

## AMNIOTIC FLUID INDEX

- Arithmetic sum of 4 cord free pockets
- Normal → 10 - 15 cm
- Oligoamnios → < 5cm
- Polyhydramnios → > 24 cm



## ABSOLUTE AMOUNT OF LIQOR

- Normal → 1000ml
- oligoamnios → 500ml
- Polyhydramnios → 2500 ml

## SINGLE POCKET

- oligoamnios → < 2cm
- Polyhydramnios → > 8cm

## EXTERNAL CEPHALIC VERSION DONE AT

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



## MODIFIED BIO PHYSICAL PROFILE → Includes AFI & NST

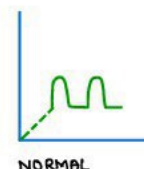
## VIBRO ACOUSTIC STIMULATION TEST

### DOPPLER OF

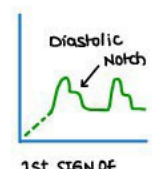
- umbilical arteries
- uterine arteries
- Ductus venosus

- Most important Doppler for assessment of uteroplacental flow

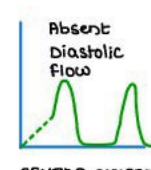
} UMBILICAL ARTERY DOPPLER



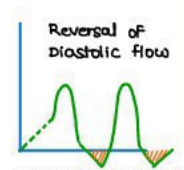
NORMAL



1st SIGN OF COMPROMISE



SEVERE COMPROMISE



IMMINENT DEATH

- Which of the following flow patterns done by Doppler assessment will best signify Perfusion to the baby → DUCTUS VENOSUS FLOW PATTERNS > UMBILICAL ARTERY DOPPLER

## CONTRACTION STRESS TEST / OXYTOCIN STIMULATION TEST

→ Tells us the plausibility of doing a normal vaginal delivery

## INTRAPARTUM SURVEILLANCE

Fetal HR → by stethoscope  
→ by Doppler

Fetal scalp Blood PH →  $> 7.2$

Fetal ECG

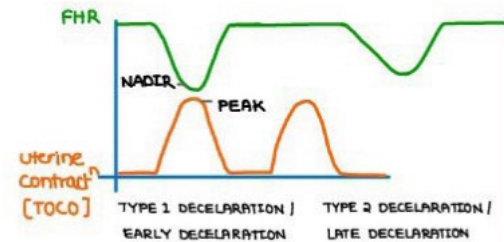
- 1 Probe ECG → ST wave Analysis [STAN]
- 2 Probe ECG

## CARDIOTOCO GRAPHY

→ Single best test for monitoring labor

→ TYPE 1 / EARLY DECELERATION

- The Nadir of FHR & Peak of uterine contract<sup>n</sup> close to each other
- Seen in Normal Pregnancies
- onset of decelerat<sup>n</sup> & coming back to normal →  $> 30\text{sec}$

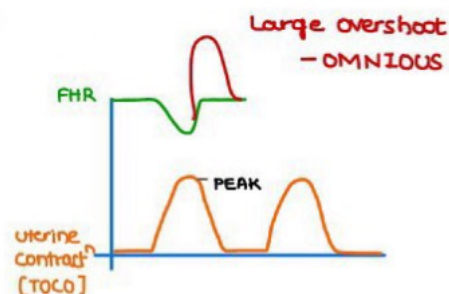
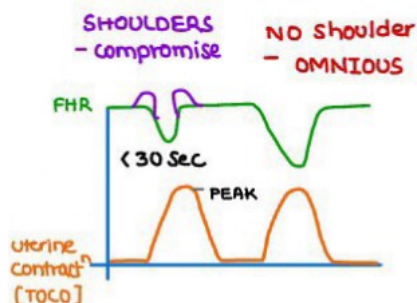
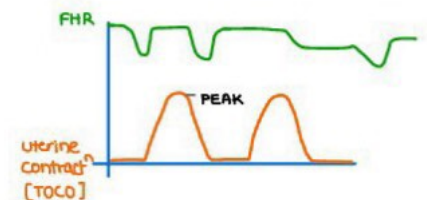


→ TYPE 2 / LATE DECELERATION

- The Nadir & Peak are away from each other
- Seen in Placental insufficiency
- onset of decelerat<sup>n</sup> & coming back to normal →  $> 30\text{sec}$

→ VARIABLE DECELERATION

- Most common deceleration
- d/t umbilical cord compression
- More Patterns



3-5 cycles / min  
- ominous  
SINE WAVE  
[SINUSOIDAL]  
d/t Fetal anemia  
Mx → C. Sect<sup>n</sup>



## PRE TERM LABOUR

- Labour starting before 37 weeks
- 37 - 42 wks → TERM
- 40 wks → EDD [Expected Date of Delivery] → 4% of total Deliveries
- > 42 wks → POST TERM
- > 40 - 42 wks → PAST DATES
- > 37 wks → PRE TERM LABOUR
- < 32 wks → SEVERE PTL
- 32 - 34 wks → USUAL PTL
- > 34 - 36 [+6D] wk → LATE PRE TERM LABOUR

## DIAGNOSIS

- uterine contractions
  - 4 times in 20 min
  - 8 times in an hour
- On PV Exam<sup>n</sup>, if cervix
  - > 1cm dilated
  - > 80% effaced
  - > 3cm dilated, > 80% effaced → Advanced Pre Term Labour
  - < 3cm dilated, < 80% effaced → Early Pre term Labour
  - 1 cm dilated, < 80% effaced → DO Cervical Exam<sup>n</sup>
    - TVS Cx → > 2.5 cm → False labour
    - TVS Cx → < 2.5 cm → Threatened labour
- INCIDENCE OF PTL → 6-15% [~10%] of ALL pregnancies

## CAUSES

- ① Infections [20-40%] → Pelvic Inflammatory Disease, UTI

### causative organisms

Chlamydia	Bacteroides
Gonorrhea	Gardnerella vaginalis
Ureaplasma	E. coli
Mycoplasma	Streptococcus

## CHORIOAMNIONITIS DIAGNOSIS

Any 2 of following

- ↑ Total Leucocyte Count
- ↑ C Reactive Protein → > 2.7 mg/dL
- uterine tenderness
- ↑ Pulse Rate
- foul smelling discharge

IF SUB CLINICAL [CRP > 1.6] → DO Amniocentesis & culture sensitivity testing



## ② UTERINE OVER DISTENTION

Polyhydramniotic

Twins

Large Baby

## ③ UTERINE ANOMALIES

Septate uterus

Bi Cornuate uterus

## ④ BLEEDING IN CHORIO RESIDUAL SPACE

## ⑤ MATERNO FETAL STRESS

## ⑥ CERVICAL ABNORMALITIES

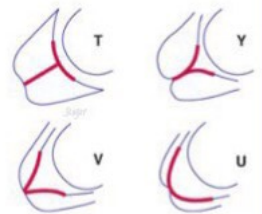
Incompetent Cervix

Cervical lacerations

## PREDICTION OF PTL

### 1 USG

- at 12-13 wks → Short cervix →  $< 2.5\text{cm}$
- around 29 wks → Funneling of cervix



FUNNELING OF CERVIX

### 2 FETAL FIBRONECTIN

- Presence is Normal →  $< 22\text{wks}$  &  $> 37\text{wks}$
- If Seen b/w 22-37w → Predictive OF PTL
  - 30% PTL in 1 week
  - 41% PTL in 2 weeks

## NEW BORN COMPLICATIONS

- Respirative Distress Syndrome [Hyaline Membrane Disease]
- Intra ventricular Haemorrhage
- Bronchopulmonary Displasia
- Necrotizing Enterocolitis
- Neonatal Deaths

## MATERNAL COMPLICATIONS

- Endometritis
- Puerperal Sepsis

## MANAGEMENT

### ① FOR LUNG MATURITY

#### a. STEROIDS

- DEXAMETHASONE 4 mg 6 hourly 4 Doses
- BETAMETHASONE 12 mg 24 hourly 2 Doses

#### b. ARTIFICIAL SURFACTANTS

- Post natively & by intra tracheal route
- SURVATA [Bovine]
- AXOSURF
- ALEC

## ② TOCOLYSIS

- Tocolytics acts only in latent phase
- TIMING → < 3cm & < 34 wks
- PURPOSE → To get time for lung maturity

### DRUGS

#### a. $\beta$ Agonists

SALBUTAMOL  
RITODRINE  
ISOSUPRINE

#### Side Effects

Glycogenolysis } → ↑ Sugar  
Lipolysis  
Pulmonary edema

#### b. Calcium channel Blockers

NIFEDEPINE

- First line & Safest drug
- Start 30 mg orally & maintain  $\bar{c}$  20 mg

#### c. Calcium Antagonists

MgSO<sub>4</sub>

- Side Effects → Neonatal hypotonia  
hypocalcaemia
- Benefits → Neuroprotective

ABOVE 3 CLASSES OF DRUGS CAN CAUSE PULMONARY EDEMA. Safest is NIFEDEPINE

#### d. OXYTOCIN Antagonist

ATOSIBAN

- Neonatal morbidity & Neonatal mortality shows NO BENEFIT  $\bar{c}$  it

#### e. PROSTAGLANDIN SYNTHETASE INHIBITORS

NSAIDS : INDOMETHACIN

25 - 50 mg , Once or twice a day

G/E - Premature closure of Ductus Arteriosus

Not give beyond 32 weeks

#### f. PROGESTERONE

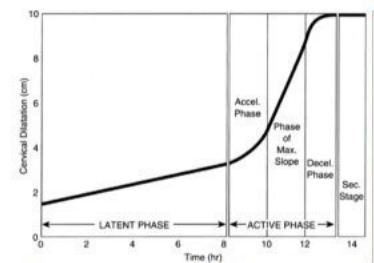
Smooth muscle Relaxants

used for Prophylaxis

Transvaginal route is preferred

#### g. NO DONARS : NITROGLYCERINE PATCH

0.2 mg/hr to 0.4 mg/hr



LABOUR - PHASES

## F. DIZOXIDE

Smooth Muscle Relaxant

SIE → hypotension in Mother  
Fetal Distress

→ Prevented by Pre loading mother  $\bar{c}$  500 - 1000ml Ringer Lactate

## LUNG MATURITY ASSESSMENT

→ Lung matured when

- Lecithin Spingomyelin Ratio →  $> 2:1$
- Phosphatidyl glycerol tnt in Amniotic fluid
- Phosphatidyl choline tnt in Amniotic fluid
  - Best part of Surfactant
  - $\sim 70\%$  of Surfactant
  - Starts forming at 24 wks
  - Formed by Type II Alveolar Pneumocytes
  - After Adequate format<sup>n</sup> → GLYCEROL starts producing

PHOSPHOTIDYL GLYCEROL IS THE FINAL INDICATOR OF PULMONARY MATURITY  
PHOSPHOTIDYL GLYCEROL PRESENT ONLY IN AMNIOTIC FLUID

- choline present in
  - Amniotic fluid
  - Maternal serum
  - Fetal serum

→ SHAKE TEST

→ Bubbles formed

→ TAP TEST

→ Bubbles formed

→ NILE BLUE PHOSPHATE TEST

- sediment of Amniotic fluid centrifuge is taken → contain skin cells
- skin cells are plated on a slide



Add Nile Blue Agent

Skin cells  $\bar{c}$  lipids

→ ORANGE colour

if  $> 50\%$  are orange → indicates MATURED LUNG

## 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 product<sup>n</sup> are simultaneous Processes.

NILE BLUE TEST

→ Lung maturity Assessment

NITAZINE PAPER TEST

→ PROM Assessment

## PREMATURE RUPTURE OF MEMBRANES ASSESSMENT

- a. NITRAZINE PAPER TEST - done for PROM [Pre Mature Rupture of Membranes]
  - PROM - ROM Prior to Onset of Labour
  - If ROM is before 37 wks → PRETERM PROM
  - Blue - if Amniotic Fluid [Alkaline] in vagina
  - Red - if vaginitis [acidic]
- b. FETAL FIBRONECTIN
- c. ↑ ALPHA FETO PROTEIN
- d. FERNING OF THE FLUID FROM VAGINA
- e. INDIGOCARMINE DYE TEST

## PREVENTION OF PRE TERM LABOUR

1. Prophylactic Antibiotics
2. Prophylactic Progesterone
3. CERCLAGE
  - Applied when cervix is  $< 2.5\text{cm}$
  - Applied  $> 12\text{wks}$
  - Removed  $\geq 37\text{wks}$

### METHODS

-



MC DONALD'S  
CERCLAGE [MC]



WORM'S  
STICH

-

### SHIROOKAR STICH

- For very short or mutilated Stich
- mode of delivery → Cesarean sect<sup>n</sup> mostly
- can be done transvaginally or transabdominal



## ECTOPIC PREGNANCY

### LOCATION

- ① FALLOPIAN TUBE [mc]
  - Ampulla [mc site - 90%]
  - Isthmus
  - Fimbrial area
- ② OVARY
- ③ ABDOMEN

### PRIMARY OVARIAN ECTOPIC

- SPIEGELBERG'S CRITERIA
- No evidence of attachment
- Ovarian tissues seen in the periphery of Ectopic
- Tube should be intact

### PRIMARY ABDOMINAL ECTOPIC

- STUDDIFORD CRITERIA
- No evidence of attachment to the tube or uterus
- Primary abdominal nidation is present

TERM ABDOMINAL PREGNANCY IS VERY RARE → Delivered by LAPAROTOMY

- ④ CESAREAN SCAR ECTOPIC
- ⑤ CERVICAL ECTOPIC

### TIME OF RUPTURE

- |                                  |             |
|----------------------------------|-------------|
| → Isthmic Ectopic                | → 4-6 wks   |
| → Ampullary Ectopic              | → 6-8 wks   |
| → Interstitial / Cornual Ectopic | → 12-16 wks |

### CAUSES

- ① PELVIC INFLAMMATORY DISEASES → Salpingitis Isthmica Nodosa
  - mc cause
  - microdiverticulae are present
- ② TUBAL SURGERIES
  - Recanalizat<sup>n</sup>
  - Previous Tuboplasty
  - fimbriostomy
- ③ ABDOMINAL / PELVIC SURGERIES
- ④ ENDOMETRIOSIS
- ⑤ TUBERCULOSIS

## ⑥ PREVIOUS ECTOPIC

- 15% chance, if previous pregnancy is ectopic

## ⑦ INFERTILITY TREATMENT

## ⑧ USE OF IUCD

## ⑨ USE OF POP

If a Normal woman conceives

- 98-99% are uterine Pregnancies
- 1-2% are Ectopic Pregnancies

If a woman under contracept<sup>n</sup> [IUCD/POP] conceives

- Actual Possibility of conception ↓↓ → No. of Pregnancies ↓↓  
→ No. of Ectopic Pregnancies ↓↓
- But in those pregnancies → 95% are uterine Pregnancies  
→ 5% are ectopic pregnancies

## MANAGEMENT OF PREGNANCY w/ IUCD INSITU

→ Remove the IUCD

- If can't locate

- USG, XRay Pelvis, hysteroscopy can be done
- Laparoscopy may be required

→ If Women,

- Wants the child → continue the Pregnancy [Risk of abort<sup>n</sup> is 25%.]
- Donot want baby → MTP

## PRESENTATION

### SYMPTOMS

- Pain abdomen [mc]
- Amenorrhea
- Bleeding d/t shedding of decidua
  - FATE OF ECTOPIC [Fallopian Tube]
    - vascular Insufficiency [mc]
    - Tubal abortion
    - Rupture of Tube [Rare]

VASCULAR Insufficiency	→	Death of Fetus	→	⊗ HCG product <sup>n</sup>	⌋
Bleeding from Vagina	←	Shedding of Decidua	←	⊗ Progesteron by corpus luteum	

→ Syncopal attacks

## SIGNS

- Shock
  - Lower abdominal tenderness
  - CULLEN SIGN → Bruising around the umbilicus
  - TURNER SIGN → Bruising at Flanks
- } d/t Intra-peritoneal collect<sup>n</sup> of blood
- On P/V Exam<sup>n</sup> → Cervical motion tenderness
  - Bogginess / fullness in Pouch of Douglas
    - can aspirate POD → Non clotting blood
    - d/t Peritoneal fibrinolysis

## MANAGEMENT

### RUPTURED ECTOPIC

#### ① Resuscitation

- 2 IV line of 14 Gauge
- Colloids, IVF
- Arrange for Blood [Think of O -ve]
- Plan the Surgery

#### ② SURGICAL MANAGEMENT

- can be done by Laparotomy
- Laparoscopy [Not done in Shock]
- TOTAL SALPINGECTOMY

### UNRUPTURED ECTOPIC → SAVE THE TUBE

#### ① MEDICAL MANAGEMENT

- METHOTREXATE [Local / systemic]
- ACTINOMYCIN
- KCL
- MIFEPRISTONE

#### ② SURGICAL MANAGEMENT

- LINEAR SALPINGOSTOMY [SxOC] [kept open]
- LINEAR SALPINGOTOMY
- RESECT<sup>n</sup> ANASTOMOSIS
- MILKING OF TUBE [↑ses Risk of Ectopic Pregnancy - OUTDATED]

### CRITERIA FOR Sx CONSERVATIVE MANAGEMENT

- Size of Ectopic → > 3.5 cm [4 cm]
- HCG → > 5000 IU
- Cardiac Activity → Present

## DIAGNOSIS OF PREGNANCY

- CASE 1**
- LMP 16<sup>th</sup> August & missed period & on 16<sup>th</sup> September Dx of Pregnancy
  - Urine Pregnancy Test →  $\oplus$  in 60-70%.
  - $\beta$  HCG →  $\oplus$  in > 95%.
  - Radio Immune Assay →  $\oplus$  in 100%.

- CASE 2**
- LMP - 16<sup>th</sup> August & missed Period. Period of gestat<sup>n</sup> on 16<sup>th</sup> September?

→ **PERIOD OF GESTAT<sup>n</sup> IS CALCULATED FROM 1<sup>st</sup> DAY OF LMP**

- 4 weeks & 3 days of POG
- Dx of Pregnancy on 4 wks 3 days POG by
- 

	Gestational Sac	Cardiac Activity
TVS [Transvaginal Sonography] [Preferred]	→ 4 + weeks	→ 5 + weeks
TAS [Transabdominal Sonography]	→ 5 + weeks	→ 6 + weeks

- MRI → Trouble Solver
- Laparoscopy [Best]
- HCG
  - Doubling in 48 Hrs → Intrauterine Pregnancy
  - Doubling in 5-7 Days → Ectopic Pregnancy
  - **DISCRIMINATORY ZONE**
    - HCG level beyond which we must see a sac
    - TVS → > 1500 IU
    - TAS → > 6500 IU
- Serum Progesteron
  - > 25 ng/ml → Intra uterine Pregnancy
  - < 5 ng/ml → Ectopic Pregnancy or Missed abort<sup>n</sup>



## ABORTIONS, SPONTANEOUS & INDUCED EMERGENCY CONTRACEPTION

### ABORTIONS

- Age of Abortus in
  - India → < 28 wks
  - UK → < 24 wks
  - USA → < 20 wks
- MTP can be done upto
  - India → ≤ 20 wks
  - UK → till 24 wks
  - USA → till 20 wks

### SPONTANEOUS ABORTIONS

- 50% of all human pregnancies

#### TYPES

- Embryonic [50%]
- Anembryonic [Blighted ovum [50%]]

### EMBRYONIC ABORTIONS

#### causes

- ① CHROMOSOMAL → usually present during 1st Trimester
  - Trisomies 16/18/21
  - monosomies 45 XO

mcc of Embryonic abortions	→ Chromosomal
mc chromosomal cause of abort <sup>n</sup>	→ Trisomies
- mc cause of abort <sup>n</sup> in Trisomies	→ Trisomy 16
mc chromosomal defect in Pregnancies	→ Monosomy 45XO

- ② ANATOMICAL → usually present during 2nd Trimester
  - Septate uterus
  - Bicornuate uterus
  - Incompetent OS [short cervix]
- ③ MATERNAL → usually present during any of the trimester
  - Syphilis
  - SLE
  - APLA Syndrome
  - DM
  - TORCH
  - TB
  - Cancers
  - Celiac Disease
  - hypothyroidism

## RECURRENT PREGNANCY LOSS

- Loss of  $\geq 2$  Pregnancy loss

### Causes

- chromosomal [mc]
- Anatomical
- Maternal [TORCH infect<sup>n</sup> does not cause Recurrent Pregnancy loss]

## ANATOMICAL CAUSES

### ① SEPTATE UTERUS

- mc mullerian defect
- causes 2nd Trimester abort<sup>n</sup>
- Mx → Hysteroscopic Resect<sup>n</sup>

### ② BICORNUATE UTERUS

- STRASSMAN'S METROPLASTY
  - unificat<sup>n</sup> Sx
  - only indicated in Recurrent Pregnancy Loss

### ③ INCOMPETENT OS [SHORT CERVIX [ $< 2.5\text{cm}$ ]]

- Mx by Encerclage → applied  $> 12$  wks, removed  $\geq 37$  wks
- Mc → Mc Donald's cerclage

## THROMBOPHILIAS

### ① INHERITED

- Factor V Leiden mutation
- Methyl Tetra Hydro folate reductase Gene mutat<sup>n</sup>
- Prothrombin Gene mutat<sup>n</sup>
- Protein C, S deficiency
- Antithrombin III deficiency

### ② ACQUIRED

#### ANTI PHOSPHOLIPID ANTIBODY SYNDROME

- APL Antibodies
  - Lupus Anticoagulants
  - Anti cardiolipin Antibodies
  - Anti  $\beta_2$  Glycoprotein Antibodies
- Hyper Homocystenemia
- Criteria
  - Clinical
    - $\geq 1$  venous / Arterial Thrombosis
    - $\geq 1$  morphologically normal baby lost after 10 wks
    - $\geq 1$  morphologically  $\textcircled{N}$  baby lost before 34 wks completed
    - $\geq 3$  Abortions before 10 wks
  - Lab
    - Anticardiolipin Antibodies  $\begin{cases} \text{IgG} \\ \text{IgM} \end{cases} \oplus$
    - Lupus Anti coagulant  $\oplus$

- Management
  - LMW Heparin
  - Anti Platelet Drugs

## TORCH INFECTIONS

### CYTOMEGALOVIRUS

- MC mother to child Transmitted infection → CMV
- IF CMV transmitted before 15 wks → 5-6% babies are affected
  - Features
    - microcephaly
    - Intra ventricular Haemorrhage
    - Mental Retardat<sup>n</sup>
    - Periventricular calcificat<sup>n</sup>
- Assessed by
  - AVIDITY TEST [Best]
  - viral culture of Amniotic fluid

### RUBELLA

- MTCT in 1st trimester → Upto 80-85%
  - in 2nd trimester → Upto 60-65%
  - at end of 2nd Trimester → Upto 25%
- IF Rubella vaccine is given → Pregnancy avoided at least for 1 month

### TOXOPLASMA

- MTCT in 1st trimester → Upto 10% [↑↑ Anomalies]
  - in 3rd trimester → Upto 60% [Congenital Toxoplasmosis Syn]
- congenital Toxoplasmosis Syndrome
  - Features
    - Intracerebral calcification
    - chorioretinitis
    - Microcephaly
  - Rx - SPIRAMYCIN 1gm, 2-3 times/day ; 3 weeks on, 1 week OFF

### CHICKEN POX

- congenital varicella Syndrome
  - max chance of transmission → 13-20 wks
  - Features
    - Microcephaly
    - cerebral calcificat<sup>n</sup>
    - IUGR
    - Limb hypoplasia
    - cortical atrophy

- IF transmitted around delivery time
  - in 5 days before delivery or } upto 30% Neonatal mortality
  - in 2 days after delivery
- R<sub>0</sub> in varicella zoster Immunoglobulin
- Diagnosed by
  - TZANK SMEAR
  - Direct fluorescent Antibody
  - Nucleic Acid Amplification Test

## HIV

- MTCT Rate → 25-30%
  - SF breast feeding ⊕ → 10-15% more chance
  - Breast feeding contraindicated Except in developing countries [NE-VIRAPIN SYRUP recommended]
- Management during Pregnancy
  - ZUDOVUDINE or TENOFOVIR
  - LAMIVUDINE [3TC]
  - NEVIRAPINE or EFFAVIRENZ
- METHOD OF DELIVERY
  - Normal vaginal Delivery
  - Cesarean Sect<sup>n</sup> only in Obstetric indicat<sup>n</sup>

## HEPATITIS B

- MTCT Rate
  - Antigen ⊕ → 90%
  - Antibody ⊕ → 10%
  - chronic carrier → 40%
- At birth, Active & Passive Immunizat<sup>n</sup> should be done

## PRESENTATION

- Pain abdomen
- Bleeding P/V
- PV Examinat<sup>n</sup>
  - OS closed, uterine size = POG → THREATENED ABORTION
  - OS open, Products are bulging → INEVITABLE ABORTION
  - OS open, Products are Prolapse & H/D Passage → INCOMPLETE
  - OS closed, H/D Passage, Normal Uterine size → COMPLETE



→ on USG,  
cardiac Activity + at 9 wks  
crumbled man } 12 wks → MISSED ABORTION  
NO pain & NO bleeding

→ BLIGHTED OVUM / ANEMBRYONIC GESTATION

- Normally around 7 wks of gestat<sup>n</sup>, Yolk sac is Pinched out
- Pregnancy not gone beyond the stage OF sac → BLIGHTED OVUM

### MEDICAL TERMINATION OF PREGNANCY [MTP]

→ MTP can be done, < 20 wks in India by

- Gynecologist
- Doctor who trained for 6 months in gynecology
- Doctor who performed at least 25 MTPs under supervision

→ IN 1ST TRIMESTER, Done by

#### MEDICAL ABORTION

- 99% Successful → IF done in 1st 7 wks
- 95% Successful → IF done in 1st 9 wks

#### DRUGS

##### MIFEPRISTONE

- Antiprogesterin
- Kills the fetus
- can be given orally
- 200 - 600 mg

↓ 24-72 hrs later

##### MISOPROSTOL [PGE1]

- vaginally
- 800 mg
- Expels the fetus

Do USG	→ to confirm the location
↓	
IF Intrauterine Pregnancy	→ Administer DRUGS
↓	
Wait for Bleeding to get over	
↓	
Do a check Sonography	→ to check complet <sup>n</sup>

MENSTRUAL REGULATION SYRINGE → can be done upto 45 Days

SUCTION EVACUATION → can be done upto 8-10 wks

DILATATION & CURETTAGE → can be done upto 8-12 wks

→ >12 wks , PROCEDURE OF CHOICE → PROSTAGLANDINS

### PROSTAGLANDINS

- MISOPROSTAL [PGE<sub>1</sub>]
    - Orally, rectally or vaginally
  - DINOPROSTONE [PGE<sub>2</sub>]
    - Gel form
    - vaginally
  - CARBOPROST [PGF<sub>2α</sub>]
    - IM only
  - INTRA AMNIOTIC PGs
  - EXTRA AMNIOTIC ETHACRIDINE LACTATE
  - EXTRA AMNIOTIC HYPERTONIC SALINE
  - EXTRA AMNIOTIC HYPER OSMOLAR UREA
- } OUTDATED

### LAMINARIA TENTS

- Dried sea weeds
- Imbibe fluid & swell up
- Hygroscopic Action

### SURGICAL METHOD → Hysterotomy

- In case of failure of above procedures

## INTERCEPTION / EMERGENCY CONTRACEPTION / POST COITAL CONTRACEPTION

- In 72 hrs of unprotected intercourse
  - Abortion
  - Thickening of cervical mucus
- } Not the methods of Intercept<sup>n</sup>

### ① LEVONORGESTREL [DOC, Preferred Drug]

- 0.75 mg x 2 Tablets
- Acts by ↓ ovulat<sup>n</sup>
  - ↓ Tubal motility
  - makes Endometrium out of Phase

### ② YUZPEE REGIME

- Combined OCP
- 2 Tabs at first & 2 Tabs after 12 hrs
- S/E - vomiting
- Acts by ↓ Ovulat<sup>n</sup>
  - Endometrial atretat<sup>n</sup>

### ③ MIFE PRISTONE [RU486]

- Anti Progestin
- Acts by ↓ Implantat<sup>n</sup>

④ IUCD

- Only method which will work upto 5 days
- most effective method

⑤ ELLA [ULLIPRISTOL ACETATE]

- Selective Progesterone Receptor Modulator
- 30 mg/ Day
- Also will provide contracept<sup>n</sup> upto 5 days [Recent Addit<sup>n</sup>]

## TWIN PREGNANCY

### HELLIN'S LAW

- Incidence
  - Twins → 1 in 80 Pregnancies
  - Triplets → 1 in  $(80)^2$  Pregnancies
  - Quadruples → 1 in  $(80)^3$  Pregnancies

### ↑ CHANCE

- ↑ Age
- ↑ Parity
- ↑ Weight
- Blacks > Caucasians
- Infertility Rx → CLOMIPHENE CITRATE, IVF

### MATERNAL COMPLICATIONS

- ↑ Abortions
- ↑ Hyperemesis
- ↑ Preterm Labour
- HTN / PET
- DM
- PPH

### PLACENTAL COMPLICATIONS

- ↑ Placenta Previa
- ↑ Abrasions
- Cord entanglement
- PROM

### FETAL COMPLICATIONS

- IUGR
- Growth Discordancy
- Single fetal Demise
- Congenital abnormalities
- malpresentat<sup>n</sup>
- Twin to twin transfus<sup>n</sup> syndrome



## FORMATION OF TWINS

### MONOZYGOTIC / IDENTICAL TWINS

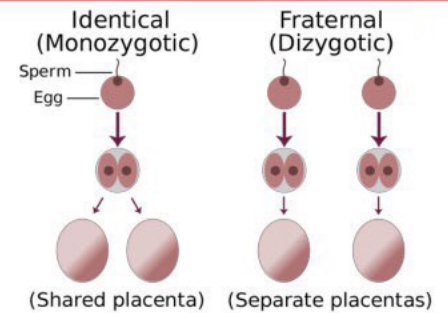
→ Incidence →  $1/250$  pregnancies

### DIZYGOTIC / NON IDENTICAL / FRATERNAL TWINS

→ Incidence →  $1/60 - 1/80$  Pregnancies

### SUPERFECUNDITY

- 2 oocytes in 1 cycle
- more common type of Dizygotic twins

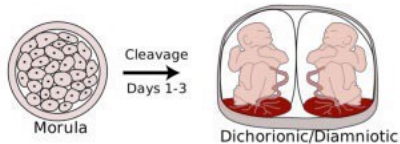


### SUPER FETATION

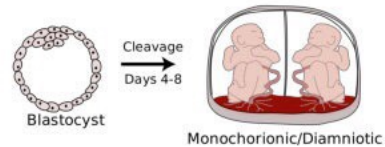
- 2 oocytes in 2 cycles
- Rare in humans, common in cattle & horses

### FATE OF MONOZYGOTIC TWINS

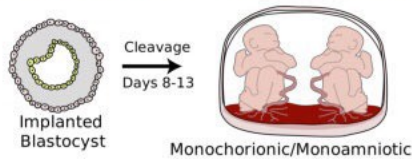
1 Dichorionic Diamniotic [35%]



2 Monochorionic Diamniotic



3 Monochorionic Monoamniotic



4 conjoined / Siamese



FATE OF DIZYGOTIC TWINS → mclly Dichorionic Diamniotic

**BEST / LEAST COMPLICATED → DICHORIONIC DIAMNIOTIC**

### MONOZYGOTIC TWINS COMPLICATIONS

1 TWIN TO TWIN TRANSFUSION SYNDROME

- d/t deep AV anastomosis
- Hb difference →  $\geq 5\text{gm/dL}$
- wt difference →  $> 20\%$

2 DISCORDANT TWINS

- Abdominal circumference →  $> 15\%$
- wt difference →  $> 20\%$

3 cord entanglement

4 Single fetal demise

5 Abrupt<sup>n</sup>

6 PROM

7 Sepsis

8. IUD of one or Both fetuses

Terminal<sup>n</sup> of Pregnancy at 34 wks or even 32 wks [  $\bar{c}$  steroids] By CESAREAN SECTION is advisable

## CHORIONICITY SCAN

### ① Dichorionic Diamniotic

- 2 Placentas, 2 Sacs
- 2 Different sexes
- **TWIN PEAK / LAMBDA SIGN**
- Inter twin membrane thickness →  $> 2\text{mm}$



### ② Monochorionic Diamniotic

- **T SIGN**

## TWIN TO TWIN TRANSFUSION SYNDROME MANAGEMENT

- Mortality d/t TTTS, if present at 26 wks or before → 100%
- Assess Deep AV Anastomosis by Fetoscopic / Doppler



Ablate the AV anastomosis ASAP

## MODE OF PRESENTATION & DELIVERY

- Both Cephalic [ $>60\%$ ]
  - First cephalic, and breech
  - First Breech, 2nd breech
- } Normal vaginal delivery can be done
- Elective cesarean sect<sup>n</sup>
  - Interlocking of twins is rare

## MOLAR PREGNANCY

### PARTIAL MOLE

- Non viable beyond 12-16 wks
- Almost no chance or 2-4% of choriocarcinoma
- can be 69,XXX [mc], 69,XXY, but never 69,YYY

### COMPLETE MOLE

#### TYPE 1

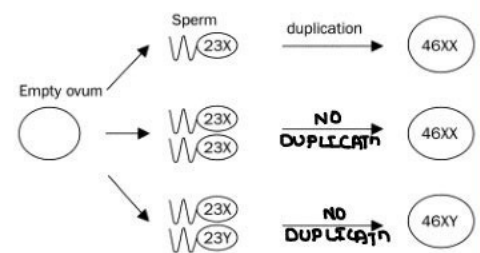
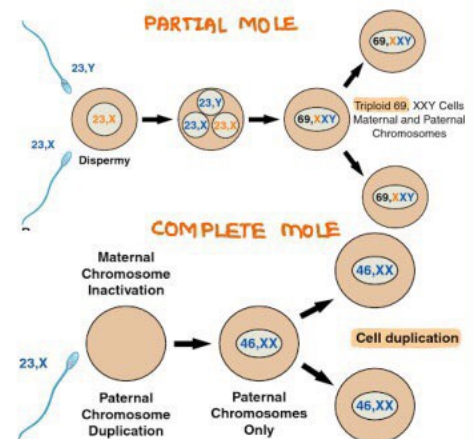
- Always happens if a Sperm of 23X
- Endoduplicat<sup>n</sup> occurs
- Both chromosomes are of Paternal Origin
- AKA Vesicular mole → SNOW STORM APPEARANCE in USG

#### TYPE 2

- Empty ovum fertilized by 2 Sperms of 23x each
- No duplicat<sup>n</sup> occurs

#### TYPE 3

- Empty ovum fertilized by 2 Sperms of 23X & 23Y
- NO duplicat<sup>n</sup> occurs
- Never be 23YY



COMPLETE MOLE - TYPES

### PARTIAL MOLE

- Fetus present
- focal Trophoblastic hyperplasia
- focal chorionic villi swelling
- scalloping of villi +nt
- Trophoblastic stromal Invas<sup>n</sup> +nt
- chance of choriocarcinoma is 2-4%

### COMPLETE MOLE

- No fetus
- Diffuse Trophoblastic hyperplasia
- Diffuse chorionic villi swelling
- scalloping of villi absent
- Trophoblastic stromal Invas<sup>n</sup> -nt
- chance of choriocarcinoma is 20%

### ASSOCIATED MORE WITH

- Asian / South East Asians [Rice eaters]
- vit A deficiency
- elderly Pregnancy

### DIAGNOSIS

- 1 USG
  - 2 Flow cytometry
  - 3 Immuno histochemistry
- } more specific tests
- SF P57 is -ve → complete mole

### PRESENTATION

INCOMPLETE MOLE → Missed Abort<sup>n</sup>

### COMPLETE MOLE

- ↑↑ HCG
- Thyrotoxicosis [Thyroid storm [↑PR, ↑Temp]
  - keep β blocker ready at evacuati<sup>n</sup>
- Hyperemesis

- Passage of grape like vesicles [Rare]
- Bleeding PV [mc Presentat<sup>n</sup>]
- Uterus size → > POG
- Empty uterus [DOUGHY]
- Trophoblastic Embolizat<sup>n</sup>
- Theca lutein cysts
- Early onset HTN

### MANAGEMENT OF VESICULAR MOLE / COMPLETE MOLE

- Suct<sup>n</sup> Evacuati<sup>n</sup> [also do a Gentle curettage & a sharp curette]

↓

DO USG after a week to Rule out Retained Bits

DO CXR to Rule out metastasis [mc site of metastasis → Lung]

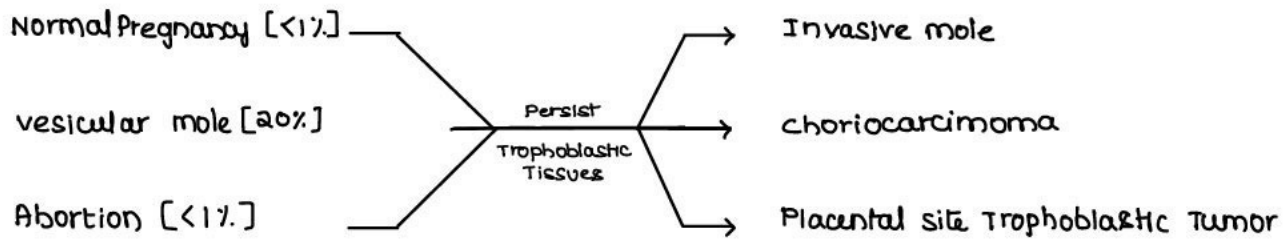
HCG follow up

- weekly HCG estimat<sup>n</sup> till negative  
[vesicular mole takes 9 wks & partial mole takes 7 wks]
- weekly HCG till 3 more wks
- Once in a month for 6 months [NO Pregnancy at this time]



## BENIGN TROPHOBLASTIC CONDITIONS

## GESTATIONAL TROPHOBLASTIC NEOPLASMS



**EXCEPTION** → Invasive mole does not follow a normal pregnancy

**INVASIVE MOLE / CHORIOADENOMA DESTRUENS** → produces HCG

- villi are preserved
- Sx is preferred Rx

**CHORIOCARCINOMA** → produces HCG

- NO villi
- chemotherapy preferred
- Sx Rx if age is > 40 yrs

**Placental Site Trophoblastic Tumor**

- Made by intermediate trophoblasts [cytotrophoblast] → Produces HPL
- Sx management should be done
- Human Placental Lactogen follow up done

## CHORIOCARCINOMA

- ↑ 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 choriocarcinomas follow vesicular mole  
 25% OF choriocarcinomas follow Normal Pregnancy [WORST PROGNOSIS]  
 25% OF choriocarcinomas follow Abortion

## → WHO PROGNOSTIC SCORE

- Antecedent Pregnancy
- HCG
- Size of Tumor
- Chemotherapy [No. of Drugs]
- Age
- Metastasis
- Metastasis
- Time Interval after m<sub>x</sub> of vesicular mole
- Blood Group

## BAD PROGNOSIS

- Normal pregnancy
- $10^5$  or more
- > 5cm
- > 2
- > 39 years
- at the time of diagnosis
- in Liver & Brain
- Longer
- B



- score  $\geq 7$  → Poor Prognosis
- Management
  - $< 7$  → Single Agent [Methotrexate / Actinomycin]
  - Combo [MTX + Actinomycin + cyclophosphamide]
  - $\geq 7$  → ETOPOSIDE
  - MAC [MTX + Actinomycin + cyclophosphamide]
  - ONCOVIN

### STAGING OF MOLAR DISORDERS

- Stage I → within uterus
- Stage II → In Pelvis, vagina [Do not take biopsy until HCG done]
- Stage III → Lung
- Stage IV → Distant Metastasis

### CONTRACEPTION

#### FAILURE RATES

- Vasectomy → 0.1%
- Tubectomy → 0.2%
- IUCD → 0.5%
- COCP → 0.6 - 0.7%
- POP → 1-2%
- condoms → 14-20%

#### PREFERRED CONTRACEPTION

- Molar pregnancy follow up
- Heart Disease
- DM
- uncontrolled DM
- Newly married couples
- couples in separate cities
- Lactational Amenorrhea
- 6wks after delivery
- STDs
- combined OCPs [NO IUCDs - Perforation]
- IUCD [NO OCPs - water retention]
- combined OCPs, IUCDs
- Barrier + Spermicidal jelly
- combined OCPs
- IUCD
- POPs
- IUCDs
- Barriers + Spermicidal jelly

## STERILIZATION SURGERIES

### TUBECTOMY

#### PUERPERAL [POST PARTUM] STERILIZATION

- mclly done method in India
- Best done in 2-3 days after delivery  
Upper limit → 7-10 days

## INTERVAL STERILIZATION

- Done after 6 wks of delivery
- Done by Laparoscopic methods.

## CONCURRENT STERILIZATION

- Done along L MTPs or Cesarean section
- SITE OF LIGATION OF FALLOPIAN TUBE → ISTHMIC
  - Because the isthmo isthmic reanastomosis is upto 80% success
- Entry in Abdomen is by
  - ① LAPAROTOMY [MINILAP (1.5 to 2 inch incision)]
  - ② LAPAROSCOPY
    - generally for interval sterilization
    - Never do in Puerperium
      - can cause injury
      - failure chances is more

## TECHNIQUES

### ① POMEROY TECHNIQUE

- mchly Done
- Single ligature is used
- can lead to fistula formation

### ② PARKLAND TECHNIQUE

- Double ligature is used

### ③ IRVING PROCEDURE

- One end of tube is anastomosed into uterine musculature
- Other end of tube is anastomosed into mesosalpinx

### ④ SUBMUCOSAL DISSECTION OF TUBE [UCHIDA'S PROCEDURE]

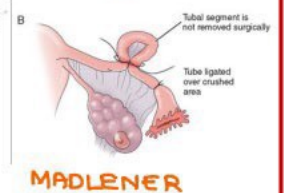
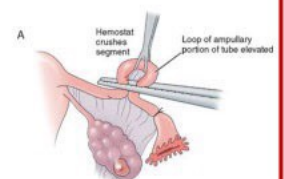
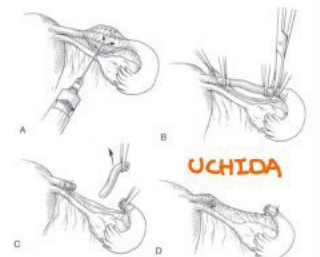
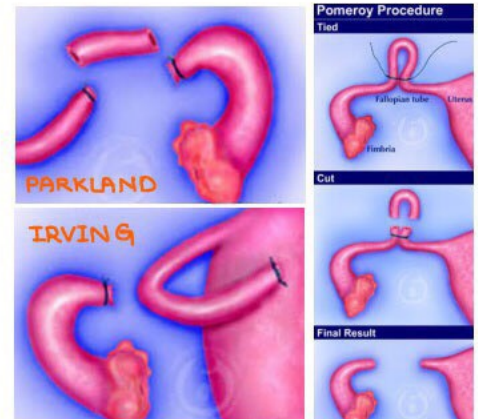
- Serosa is lifted by needle & saline is injected
- Then serosa is incised & Tube is resected
- Serosa is sutured again

### ⑤ MADLENER'S METHOD

- Tubes are crushed, not resected
- High failure rates

### ⑥ KRONER'S METHOD

- fimbriectomy
- NO reversal is possible



### ⑦ LAPAROSCOPIC CLIPS & RINGS

→ clips has best reanastomosis chance



### ⑧ CAUTERIZATION OF THE TUBE

→ worst Reanastomosis chance



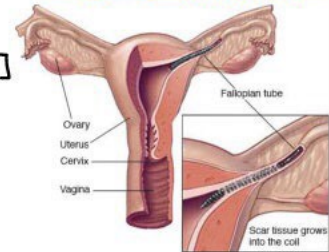
### ⑨ ESSURE RING

→ Hysteroscopic implant of ESSURE RING

→ made up of NITINOL [Alloy of Nickel & Titanium]

→ takes 3 months to completely block the tube

→ Hysterosalpingography done to confirm blockage



### WRONG LIGATED STRUCTURES

→ causes of failure

- wrong ligated structures
- Incomplete ligat<sup>n</sup> or resect<sup>n</sup>

→ Wrong ligated structures

- Round ligament
- Small bowel
- Appendix
- ~~Ureter~~
- ~~uterine artery~~

### VASECTOMY

→ NON SCALPEL VASECTOMY

→ at least 3 months or 20 ejaculates are required to declare safe

→ confirmat<sup>n</sup> done by at least 2 semen analysis to declare azospermic

→ Reversibility is 30 - 40%.



## PHYSIOLOGICAL CHANGES OF PREGNANCY

### UTERUS

Non Pregnant Uterus	→ 70 grams
Pregnant Uterus at term	→ 1100 gms
Uterine Hypertrophy is due to	→ Estrogens [mainly] Progesterone
Uteroplacental Blood Flow	→ ↑ Progressively in pregnancy Range → 450ml to 650ml/min near the term
uterine artery flow/min	→ 500ml [each]
elemental Iron required	→ 1000 mg - 500 mg for Hb expansion - 300 mg for fetus & placenta - 200 mg is wasted

### CERVIX

After 1 month of pregnancy	→ Softening & Bluish discolourat <sup>n</sup> of cervix
Estradiol stimulates growth of columnar epithelium of cervical canal so it becomes violet	→ ECTROPION
CHADWICK SIGN	→ Bluish discolourat <sup>n</sup> of cervix
GOODELL SIGN	→ Softening of cervix
HEGAR'S SIGN	→ On a P/V, abdominal & vaginal fingers seem to Oppose below the body of uterus → seen from 6 wks
JACQUEMIER'S SIGN	→ Purplish discolorat <sup>n</sup> of mucus membrane of vagina early in pregnancy
HARTMANS SIGN [PLACENTAL SIGN]	→ Implantat <sup>n</sup> bleeding → Bleeding from expected date of Periods
PALMER'S SIGN	→ Rhythmic uterine contractions felt in early pregnancy

## BREAST

- oestrogen leads to → ↑ in no. of glandular ducts
- progesterone leads to → Proliferat<sup>n</sup> of ductal epithelium of the alveoli
- Prolactin leads to → Active secret<sup>n</sup> of milk after birth
- Levels ↑↑ in pregnancy
- (N) in puerperium

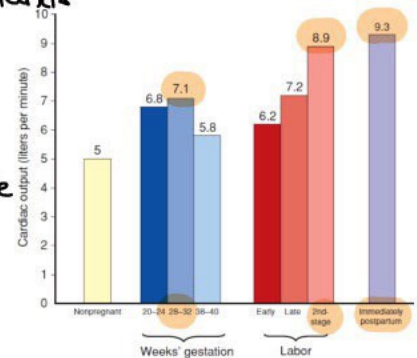
Breast tenderness & paresthesias ↑es

- Nipples → larger, more deeply pigmented & more erectile
- COLOSTRUM [yellowish fluid] expressed by gentle massage in few months

- Areola → Become broader
- GLANDS OF MONTGOMERY
  - no. of small elevations
  - Hypertrophic sebaceous glands

## CARDIO VASCULAR SYSTEM

- Heart → moves upwards
- Hypertrophy of cardiac muscle
- Apical impulse → lateralized
- cardiac output → Starts ↑ing by as early as 5th week
- increases by 30% [6 ltr/min]
- Reaches to peak at 32nd - 34th week



## BLOOD PRESSURE

- Early or mid pregnancy BP → ↓
- Late pregnancy BP → ↑
- Heart Rate → ↑ [10-20%]
- Stroke volume → ↑ [10%]
- Mean Arterial Blood pressure → ↓ [10%]
- Peripheral Resistance → ↓ [35%]

## Supine hypotensive 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
- ↑ed loudness of Both Components
- 3rd Heart sound → Loud & easily heard

## MURMURS

- Systolic murmur → >95% develop it, disappears after delivery
- Transient Diastolic murmur → 20% develop it
- Continuous murmur → 10% develop it, dlt ↑ in mammary blood flow

## HEMATOLOGY

- Blood volume → ↑ by 30 - 45% at 32nd - 34th wk [Peak]  
→ Relatively Diluted  
→ Contributing factors
  - ↑ Na retent<sup>n</sup>
  - ↓ thirst threshold
  - ↓ Plasma Oncotic pressure
- Red cells → ↓
- Hb → from 130 - 110 g/L
- HCT → from 38 - 31%
- Albumin → ↓ 35 g/L

### Decrease in

- Red cell count
- Hb concentrat<sup>n</sup>
- Hematocrit
- Plasma folate concentrat<sup>n</sup>

### Increase in

- White cell count
- ESR
- Fibrinogen concentrat<sup>n</sup>

## RESPIRATORY SYSTEM

- Diaphragm → rises about 4 cm
- The sub costal → 68° - 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]
- O<sub>2</sub> consumpt<sup>n</sup> → ↑ [20%]

## URINARY SYSTEM

- Kidney size → ↑ by 1.5 cm
- GFR → ↑ [50%]  
dlt Hemodilut<sup>n</sup>
  - ↓ protein & ↓ oncotic pressure
  - ↑ renal plasma flow
- Glucosuria → may not be abnormal
- Proteinuria → 300 mg/day
- Serum creatinine levels → ↓ [0.7 to 0.5 mg/dL]
- creatinine clearance → ↑ 30%, from 100 to 115 ml/min
- Ureter → Dilated [Gravid uterus pressure & progesterone]
- Bladder → frequent micturist<sup>n</sup> [↑ pressure & ↑ urethral length]

## GASTRO INTESTINAL SYSTEM

Pyrosis (Heart burn)	→ ↑
Gastric emptying time	→ unchanged
The motility of Large Bowel	→ diminished → constipation, Hemorrhoids ↑
Liver function	→ Alkaline Phosphatase doubled
	→ SGPT, OT, GGT all reduced
Sr. Albumin concentration	→ ↓
Total Albumin	→ ↑
Gall bladder contractility	→ ↓ : ↑ Residual volume
	→ Progesterone impairs GB contraction by inhibiting cholecystokinin - mediated smooth muscle stimulation
	→ Intrahepatic cholestasis & Pruritis gravidarum : Retained Bile Salts

## ENDOCRINE SYSTEM

Pituitary	→ Hypertrophy
	→ Pituitary glands enlarges by 135% [Estrogen stimulated hypertrophy & hyperplasia of lactotrophs]
	→ Maternal serum prolactin levels parallel the ↑ing size
	→ Gonadotrophs ↓ in number
	→ corticotrophs & Thyrotrophs remain constant
	→ Somatotrophs suppressed [ -ive feedback by Placental product <sup>n</sup> of GH]
LH / FSH	→ ↓
PRL	→ ↑
TSH & ACTH	→ ↑
THYROID	→ Enlarged [TSH & HCG ↑]
Thyroxine	→ ↑
TBG	→ ↑
Free T <sub>3</sub> T <sub>4</sub>	→ Unchanged

## PSYCHIATRIC DISORDERS

Blues	→ In 2-3 Days
	→ due to sudden withdrawal of progesterone
	→ mc psychiatric presentat <sup>n</sup> during pregnancy
Psychosis	→ In around 1 1/2 months
Depression	→ In around 3-4 months



## DIAGNOSIS OF PREGNANCY

Pregnancy tests detect HCG in mother urine or serum

URINE PREGNANCY TEST

→ 60 - 70% Sensitive

RADIO IMMUNE ASSAY [RIA]

→ 100% Sensitive

Sensitivity to 5 mIU

positive since day 7th of ovulat<sup>n</sup>

USG

	SAC	CARDIAC ACTIVITY
TVS	4 + wks	5 + wks
TAS	5 + wks	6 + wks

> 12 wks FHS heard  $\bar{c}$  fetal Doppler

> 24 wks FHS heard  $\bar{c}$  Stethoscope

Palpat<sup>n</sup> of fetal parts from 24th week

Fetal movement may feel during palpat<sup>n</sup>

BRAXTON HICK SIGN

→ Irregular painless contract<sup>n</sup> palpable after 20th week

## PUERPERIUM

1 week

→ uterus weighs approx. 500gms

2 weeks

→ about 300gms

4 weeks

→ 100gms

Involut<sup>n</sup> is complete

## LOCHIA

LOCHIA RUBRA

→ First few days of delivery, sufficient blood  $\oplus$  → RED

LOCHIA SEROSA

→ After 3 to 4 days, progressively become PALE

LOCHIA ALBA

→ After approx. 10th day

dlt mix of leukocytes → WHITE or  
YELLOW WHITE

## INVOLUTION

At Delivery

→ uterus is at the level of umbilicus [20-22 wks]

At 2 wks

→ in pelvis

At 6 wks

→ Normal organ

Rate of descent

→ 1-2 cm/day

## SUB INVOLUTION - CAUSES

→ Infect<sup>n</sup>

→ Retained Intrauterine Products

→ Fibroids

## DIAGNOSIS OF PREGNANCY

**CASE 1** → LMP 16<sup>th</sup> August & missed period & on 16<sup>th</sup> September Dx of Pregnancy

- ① Urine Pregnancy Test → ⊕ in 60-70%. [sensitive to 150 mIU of HCG]
- ② Sr β HCG by ELISA → ⊕ in > 95%. [sensitive to 5 mIU of HCG]
- ③ Radio Immune Assay → ⊕ in 100%. [sensitive to 1 mIU of HCG]  
→ can Dx pregnancy on 7<sup>th</sup> day of ovulat<sup>n</sup>
- ④ ImmunoRadiometric Assay → ⊕ in 100%. [sensitive to 0.5 mIU of HCG]  
→ can Dx from 7<sup>th</sup> to 10<sup>th</sup> day of ovulat<sup>n</sup>

**CASE 2** → LMP - 16<sup>th</sup> August & missed Period. Period of gestat<sup>n</sup> on 16<sup>th</sup> September?

→ **PERIOD OF GESTAT<sup>n</sup> IS CALCULATED FROM 1<sup>st</sup> DAY OF LMP**

- 4 weeks & 3 days of POG
- Dx of Pregnancy on 4-wks 3 days POG by

⑤ USG

	Gestational Sac	Cardiac Activity
TVS [Transvaginal Sonography] [Preferred]	→ 4 + weeks	→ 5 + weeks
TAS [Transabdominal Sonography]	→ 5 + weeks	→ 6 + weeks

⑥ MRI → Trouble Solver

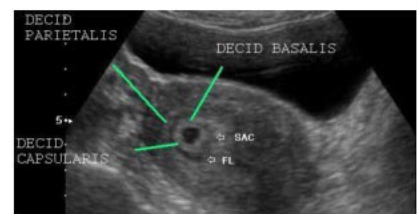
⑦ Laparoscopy [Best]

⑧ HCG

- Doubling in 48 Hrs → Intrauterine Pregnancy
- Doubling in 5-7 Days → Ectopic Pregnancy
- **DISCRIMINATORY ZONE**
  - HCG level beyond which we must see a sac
  - TVS → > 1500 IU
  - TAS → > 6500 IU

→ **DOUBLE DECIDUAL SAC SIGN ON USG**

- Intrauterine sac [Eccentrically placed]
- outer layer → decidua parietalis
- inner layer → decidua capsularis
- indicates → Intrauterine Pregnancy



### SYMPTOMS

- Bloating
- Morning sickness
  - Nausea
  - vomiting
- ↑ Urinary frequency
- constipat<sup>n</sup>

## SIGNS

### BREAST CHANGES

- oestrogen leads to → ↑ in no. of glandular ducts
- progesterone leads to → Proliferat<sup>n</sup> of ductal epithelium of the alveoli
- Prolactin leads to → Active secret<sup>n</sup> of milk after birth
- Levels ↑↑ in pregnancy
- (N) in puerperium

Breast tenderness & paresthesias ↑s

- Nipples
- larger, more deeply pigmented & more erectile
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- Areola
- Become broader
  - GLANDS OF MONTGOMERY
    - no. of small elevations
    - Hypertrophic sebaceous glands

### In 2nd trimester

Quickening [22-24 wks in Primis]

Uterine souffle } around 24 wks

Funic [umbilical] souffle }

Internal Ballotment → around 16-18 wks

External Ballotment → around 22-24 wks

### In 3rd Trimester (> 28 wks)

Fetal Heart sound by fetoscope / Stethoscope

Fetal parts can be felt

Fetal movements can be felt

## DIAGNOSTIC SIGNS OF A NON VIABLE PREGNANCY BY TVS

- ① Gestational Sac →  $\geq 25$  mm size
- ② crown Rump length →  $\geq 7$  mm
- ③ No cardiac Activity
- ④ G. Sac Present →  $\geq 2$  wks later → No embryo, no cardiac activity
- ⑤ G. Sac + Yolk Sac + nt →  $\geq 11$  days later → No embryo, no cardiac activity
- ⑥ Yolk sac →  $\geq 7$  mm



## ANEMIA IN PREGNANCY

MC cause of Anemia in pregnancy in India → NUTRITIONAL ANEMIA

### CAUSES OF ANEMIA

#### 1 ↓ Production

- a Iron Deficiency Anemia
- b Megaloblastic Anemia
- c Folic Acid deficiency Anemia

#### 2 ↑ LYSIS

- a Hemolytic Anemia
- b Chronic Blood loss

### DEFINITIONS

- WHO → Hb →  $< 11 \text{ gm\%}$ .
- CDC → Hb →  $< 11 \text{ gm\%}$  or  
Hb →  $< 10.5 \text{ gm\%}$  in 3rd trimester
- Mild → Hb →  $> 10 \text{ \& } < 11 \text{ gm\%}$ .
- Moderate → Hb →  $7 - 10 \text{ gm\%}$ .
- Severe → Hb →  $< 4 \text{ gm\%}$ .

### IRON DEFICIENCY ANEMIA

#### IRON REQUIREMENT IN PREGNANCY

- 1000mg elemental Iron [per day =  $4 - 6 \text{ mg/day} \times 280 = 1120 \text{ mg}$ ]
  - 500mg → for Hb expansion
  - 300mg → for fetus, Placenta
  - 200mg → wasted

#### MANAGEMENT

- 100 mg/day elemental Iron Tab in (N) pregnancy
- 200 mg/day elemental Iron in mild to moderate anemia
- oral Iron Supplementat<sup>n</sup> forms
  - Fe Sulphate
  - Fe ascorbate
  - Carbonyl Iron } Better absorbable forms

Deworm the patient with MEBENDAZOLE (100mg Tab BD x 3 Days)

#### → Injectable Preparations

- only indicat<sup>n</sup> → Intolerance or Malabsorpt<sup>n</sup>
- STOP ORAL IRON at the time of giving injectables
- Injectable forms → Fe dextran [im/iv], Fe Sorbital [im]  
Fe sucrose [iv] - NO anaphylaxis [No testing done]



→ Rate of Rise of oral & injectable preparation is same [1gm% over 2½-3wks]

REQUIREMENT →  $2.21 \times \text{wt in kg} \times (\text{Targeted Hb} - \text{Pt Hb}) + 1000 \text{ mg (stores)}$   
→  $\approx 200 \text{ mg / Hb deficiency}$

→ Requirement of Blood for Rx of Anemia

- Hb → < 7 gm% or severely anemic in Late in pregnancy
- whole blood ↑ Hb by 0.8 - 0.9 gm%
- Packed cells ↑ Hb by 0.8 - 0.9 gm% [lesser volume load] [So Better]

→ IDA INDICES

① SERUM FERRETIN

- 1st parameter to change
- (N) - 40 - 160 ng/ml
- IDA - < 20 ng/ml

- |   |               |
|---|---------------|
| ② Hb  | → ↓           |
| ③ MCV   | → ↓           |
| ④ MCH   | → ↓           |
| ⑤ Serum Iron                                  | → < 50 µg/dl  |
| ⑥ Total Iron Binding capacity                 | → > 400 ng/dl |
| ⑦ Red cell Distribut <sup>n</sup> width [RDW] | → ↑           |

→ THALASSEMIA INDICES

- |           |                         |
|-----------|-------------------------|
| ① RDW     | → Normal                |
| ② MCH     | → < 27 Pg [(N) - 29 ng] |
| ③ Hb      | → Normal                |
| ④ MCV/RBC | → < 13 [MENTZER INDEX]  |

## MEGALOBLASTIC ANEMIA

### CAUSES

1. FA Deficiency

- ↑ demand
- ↓ Supply
- Malabsorpt<sup>n</sup>
- Intestinal Sx or resect<sup>n</sup>

2. vit B<sub>12</sub> Deficiency

- ↓ Absorpt<sup>n</sup>
- ↓ Intrinsic factor
- Achlorhydria

- Slow onset
- Hb↓
- MCV → > 100 fl
- Requirement → 0.4 to 0.5 mg/day
- Supplementat<sup>n</sup> → 5 mg/day in megaloblastic anemia
- Inj. Cyanocobalamin can be given

**NUTRITIONAL ANEMIA**

→ IDA + Megaloblastic Anemia

**DIMORPHIC ANEMIA**

→ microcytic hypochromic + megaloblast

## LABOUR

### LABOUR

#### STAGES OF LABOUR

- STAGE 1 → From onset of contractions to full Dilatation of Cervix
- STAGE 2 → From full dilatation of cervix to Delivery of baby
- STAGE 3 → From Delivery of baby to removal of Placenta
- STAGE 4 → Observat<sup>n</sup> for 1 Hour

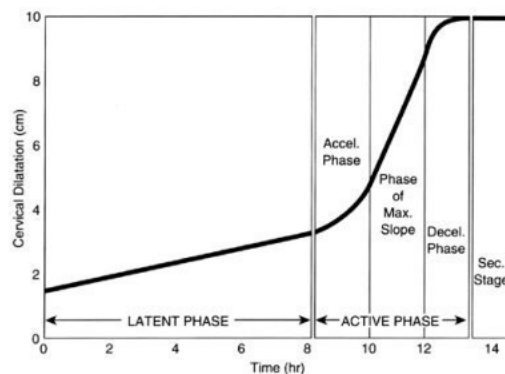
#### PHASES OF LABOUR

##### LATENT PHASE / PREPARATORY PHASE

- 20 hrs in Primigravida
- 14 hrs in multigravida

##### ACTIVE PHASE / DILATATIONAL PHASE

- 10 - 14 hrs in primigravida
- 6 - 8 hrs in multigravida
- 12 hrs is the upper limit in most cases



- includes
  - Accelerat<sup>n</sup> Phase
  - Phase of max. Slope
  - Decelerat<sup>n</sup> phase
  - Second stage

#### MONITORING OF LABOUR

STATION OF LABOUR [Ischial spine is the reference point]

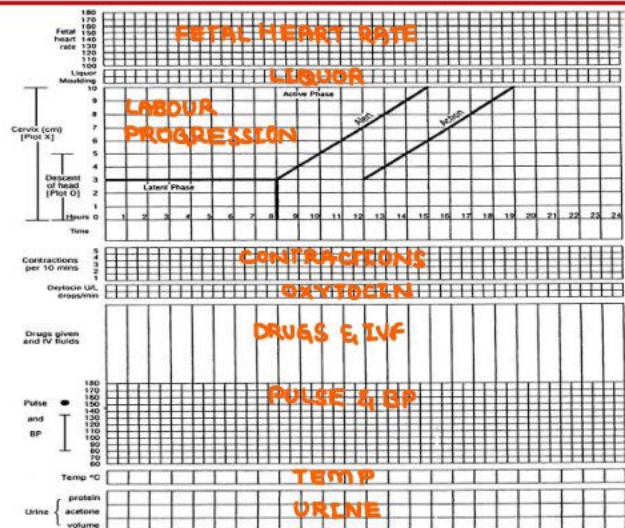
##### TIMING OF PER VAGINAL EXAMINATION

- When the cervix is dilated > 4cm & regular contractions + nt
- 2 Hourly PV exam in active phase
- PARTOGRAM [WHO]



- Alert line } Reference lines to check the progress of labour
- Action line }
- In partogram, we can monitor the Progress of labour

- We can monitor
  - cervical dilatations } Progression of Labour
  - Descent of head }
  - Fetal Heart Rate
  - Liquor
  - contractions
  - Oxytocin administration
  - Drugs & IVF administration
  - Pulse Rate, BP
  - Temperature
  - Urine output etc



### ACTIVE PHASE DISORDERS

#### → PROTRACTION DISORDERS [slowing down]

- Dilatation of cervix →  $< 1.2 \text{ cm/hr}$  in primigravida  
→  $< 1.5 \text{ cm/hr}$  in multigravida
- Descent of Head →  $< 1 \text{ cm/hr}$  in primigravida  
→  $< 2 \text{ cm/hr}$  in multigravida

#### → ARREST DISORDERS [Total stoppage]

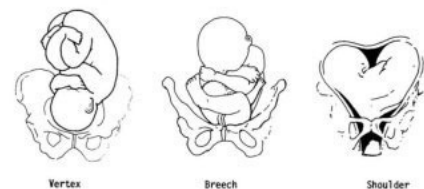
- Dilatation of cervix → No change in last 2 hrs
- Descent of Head → No change in last 1 hr

### BISHOP SCORE

BISHOP SCORE = ..... (total)		Date of Bishop Score: ...../...../.....		
Score	0	1	2	3
Dilation	Closed	1 - 2	3 - 4	5
Length / Effacement	$> 4$	3 - 4	1 - 2	0
Consistency	Firm	Medium	Soft	—
Position	Posterior	Midline	Anterior	—
Head: station	-3	-2	-1, 0	+1, +2

### PRESENTATION

- Part of fetus in the lower segment is Presentation
- Cephalic is the mc presentation
- Breech is the mc malpresentation [3%]



### Management

#### Presented at the time of Labour

- Cephalic Presentation → can be delivered normally
- Breech Presentation → Trial of  $\textcircled{N}$  delivery in an institutional set up under the guidance of experienced gynecologist
- Shoulder Presentation → Delivered by cesarean section



Presented at 36-37 wks

Cephalic Presentation	→	Normal Delivery	
Breach Presentation	→	Ext. Cephalic version	→ Normal Delivery
Shoulder Presentation	→	Ext. cephalic version	→ Normal Delivery

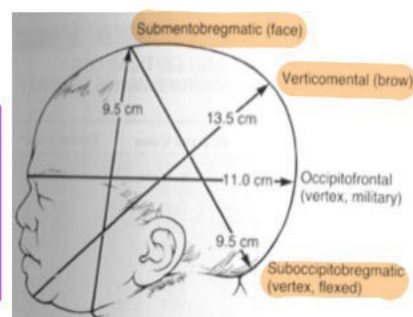
### INTERNAL PODALIC VERSION

- Not done in transverse lie [Risk of uterine rupture] of singleton pregnancy
- can be done in transverse lie of 2nd baby in twin pregnancy
  - Reason → Uterus is relaxed

LIE → Relat<sup>n</sup> b/w the vertical axes of both mother & baby

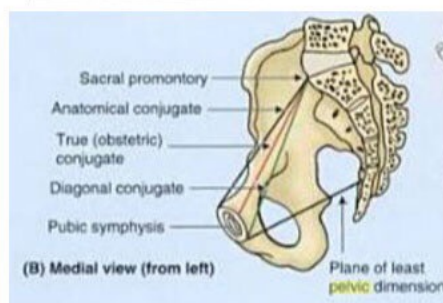
### PRESENTING PARTS

Presentation	Engaging diameter	Mode of Delivery
vertex	sub occipitobregmatic (9.5cm)	Normal
Face	Submento bregmatic (9.5cm)	Normal
Brow	verticomenal (14cm)	Cesarean sect <sup>n</sup>



### FEMALE PELVIS

- 55° inclined to horizontal
- ANATOMICAL CONJUGATE → 10 cm
- TRUE (OBSTETRIC CONJUGATE) → 11 cm
- DIAGONAL CONJUGATE → 12 cm
- ANATOMICAL CONJUGATE → top of pubic symphysis to sacral promontory
- TRUE (OBSTETRIC CONJUGATE) → back of pubic symphysis to sacral promontory
- DIAGONAL CONJUGATE → bottom of pubic symphysis to sacral promontory
- BISPINOUS / INTER SPINOUS DIAMETER → 10.5 cm
- Distance b/w Ischial tuberosities → 10.5 cm
- → < 8 cm → CONTRACTED OUTLET
- POSTERIOR SAGITAL DIAMETER → 7.5 cm
- CONTRACTED INLET / PELVIS
  - If obstetrical conjugate is < 10 cm
  - If interspinous diameter is < 8 cm
  - If the summat<sup>n</sup> of Posterior sagittal diameter & interspinous diameter is < 15.5 cm

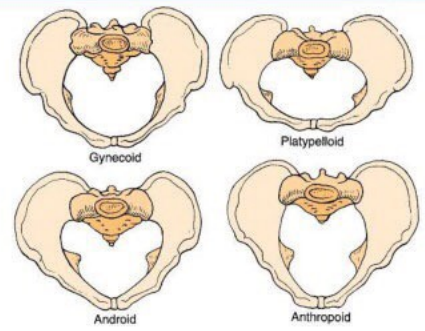


### VERTEX PRESENTATION

- mc position of vertex → LOT [40%] > LOA
- mc malposit<sup>n</sup> of vertex → ROP [Right occipito posterior]

## OCCIPITO POSTERIOR POSITION PROBABILITIES

- ① 80% becomes OccipitoAnterior  
→ Mode of delivery → Normal
- ② 15-16% becomes Persistent OccipitoPosterior  
→ occurs in Anthropoid pelvis  
→ Mode of delivery → Face to Pubis delivery
- ③ 2-4% undergoes deep transverse arrest  
→ occurs in android pelvis  
→ Mode of delivery → Manual Rotat<sup>n</sup> & forceps Extract<sup>n</sup>  
(Sagittal suture of baby should be in AP plane of pelvis)  
or  
→ Cesarean Sect<sup>n</sup>



## BROW PRESENTATION

- Diameter of engagement → vertico mental
- Mode of Delivery → Cesarean Section

## FACE PRESENTATION

- common PLATYPELLOID PELVIS

## LT. mento anterior Position

- mc posit<sup>n</sup> of face presentat<sup>n</sup>
- Diameter of engagement → Submento bregmatic [9.5cm]
- Delivery occurs in flexion [Normal]

## DIRECT Mento Posterior

- Rotat<sup>n</sup> posteriorly [unfavourable rotat<sup>n</sup>]
- Diameter of engagement → sternobregmatic [17.5cm]
- Mode of Delivery → Cesarean section

## MENTO POSTERIOR

- Becomes mento anterior by rotating 3/8th of the circle [favourable rotat<sup>n</sup>]
- Mode of delivery → Normal in flexion

## BREECH PRESENTATION

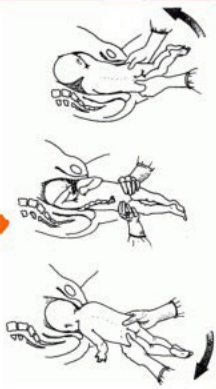
### LEFT SACRO ANTERIOR POSITION

- mc posit<sup>n</sup> of breech presentation
- Attitude - Flexion
  - Legs comes out first
- Attitude - Extension
  - Buttocks comes out first
  - Deliver the extended legs by PINARD'S MANEUVER →



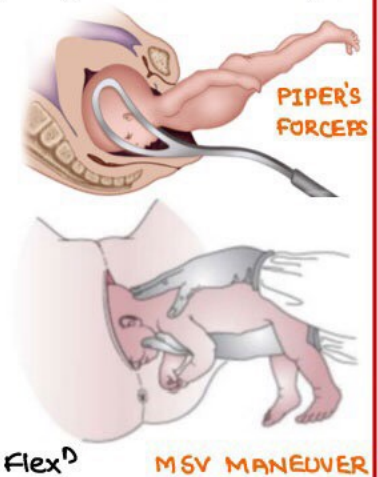


- Hold the baby at pelvic bone & pull the baby down
- FLEXED UPPER LIMBS
  - hold the upper limb from cubital fossa & pull it down
- EXTENDED UPPER LIMBS → delivered by LOVESET'S MANEUVER →
  - pull the baby as low as possible
  - rotate the baby to one side
  - Hold the arm & pull it out from posterior roomy vagina

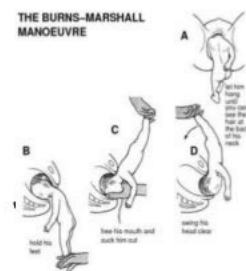


### AFTER COMING HEAD DELIVERY BY

- ① PIPER'S FORCEPS [safest method]
- ② MAURICEAU-SMELLIE-VEIT MANEUVER
  - One hand
    - one finger on back of the head for Flex<sup>n</sup>
    - others on shoulders for tract<sup>n</sup>
  - Other hand
    - Two fingers on malar bones or Jaw for Flex<sup>n</sup>



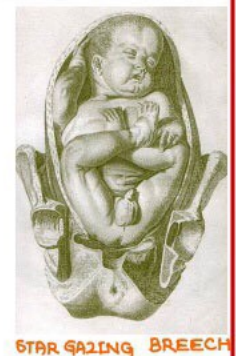
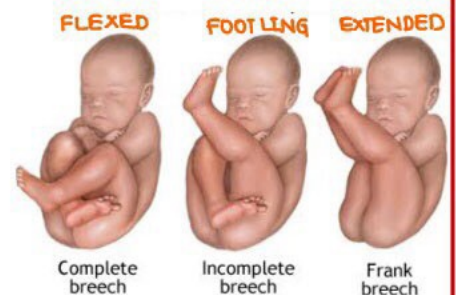
- ③ BURNS - MARSHALL MANEUVER
  - Let hang the baby till the nape of neck is visible
  - hold the feet
  - Swing the baby head upwards [in a circle of arc] & the head pops out in flexion



### BREECH DELIVERY

#### VARIATIONS IN BREECH PRESENTATION

- complete Breech [Flexed]
- Incomplete Breech [Footling]
- Frank Breech [Extended]
- mc breech
  - Best breech for vaginal Delivery
- complete Breech can be delivered vaginally
- Footling Breech can be delivered by cesarean section
- Breech in Extended head → STAR GAZING SIGN on USG
  - indicat<sup>n</sup> of cesarean sect<sup>n</sup>



## BREECH VAGINAL DELIVERY

→ Always prefer the breech in anterior position

- ① BREECH EXTRACTION
  - ② SPONTANEOUS BREECH DELIVERY
  - ③ ASSISTED BREECH VAGINAL DELIVERY
- } Done only for dead babies

- No touch till umbilicus delivered
- For Extended legs → DO PINARD'S MANEUVER
- For Extended arms → DO LOVESET'S MANEUVER
- Delivery of after coming head
  - ① PIPER'S FORCEPS
  - ② MAURICEAU-SMELLIE-VEIT MANEUVER
  - ③ BURNS - MARSHALL MANEUVER

## FORCEPS DELIVERY

- Forceps can be applied when head is fully rotated → The sagittal suture of the head lies in anteroposterior axis of pelvis
- Forceps can also be applied even if the rotation of head is partial [ $\leq 45^\circ$ ]

FORCEPS	VACUUM
APPLIED ON	APPLIED ON
→ fully rotated head or $< 45^\circ$ remaining	→ Rotated head or Non rotated head
→ fully dilated cervix	→ $> 6\text{cm}$ dilated cervix
→ stat <sup>n</sup> → +2 & below	→ stat <sup>n</sup> → +2 & below
→ membranes should be absent	→ membranes should be absent
→ Good contractions should present	→ Good contractions should present

## SHOULDER DYSTOCIA

### CAUSES

- Large babies [ $\geq 4\text{kgs}$ ]
- Post term pregnancies
- Diabetes
- Anencephaly [Net amount of oxytocin is ↓ed → post term pregnancy]

### COMPLICATIONS

- Erb's Paralysis [ $C_5, C_6$  injury]
- Klumpki's Paralysis [ $C_8, T_1$  injury]
- Fetal Hypoxia
- Neonatal morbidity & mortality

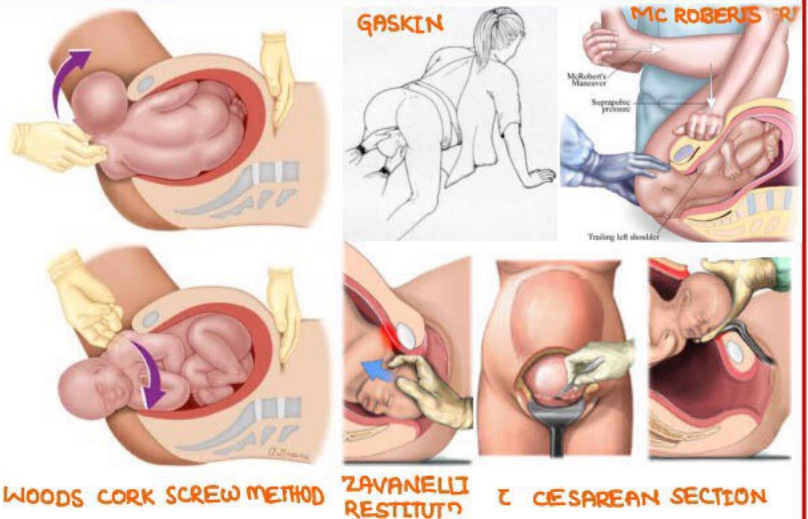
### MANAGEMENT

- CALL FOR HELP



## MANAGEMENT

- ① SUPRA PUBIC PRESSURE
- ② MC ROBERT'S MANEUVER  
→ Flex the hip joint  $>90^\circ$
- ③ WOODS CORK SCREW METHOD
- ④ ZAVANELLI RESTITUTION
- ⑤ GASKIN MANEUVER  
→ in a knee chest posit<sup>n</sup>



## CESAREAN SECTION

### LOWER SEGMENT INCISIONS

- KERR'S INCISION      → Transverse incis<sup>n</sup>
- KRONIG INCISION      → vertical incis<sup>n</sup>

### UPPER SEGMENT INCISION      → CLASSICAL INCIS<sup>n</sup>



### ABDOMINAL INCISION & UTERINE INCISION HAVE NO CORRELATION

- Abdominal incisions are meant for cosmetic purposes
- BIKINI / PFANNENSTIEL INCISION      → Incis<sup>n</sup> on lower part of abdomen

- Lower segment incisions are Safer [ Lower segment retracts (not contracts) ]
  - Lower Segment cesarean section [LSCS]
    - chance OF rupture      → 0.5 to 2%.
    - Bleeds less
    - Heals quickly
    - We can give TRIAL OF SCAR | TRIAL OF LABOUR | VAGINAL BIRTH AFTER CESAREAN

### TRIAL OF SCAR | TRIAL OF LABOUR | VAGINAL BIRTH AFTER CESAREAN CAN BE DONE IN

- Previous 1 LSCS
- in an institutional set up
- ̄ NO Cephalopelvic Disproportion

### TRIAL OF LABOUR

- done in primigravida
- ̄ borderline cephalopelvic disproportion
- can be given Trial of normal vaginal delivery in an institutional setup

## INDICATIONS OF CESAREAN SECTION

- Brow Presentation
- Major Placenta Previa
- Contracted Pelvis
- Transverse lie in labour
- Complicated Breech
- Previous hysterotomy, myomectomy
- FETAL DISTRESS [mc indicat<sup>n</sup>]

## CLASSICAL CESAREAN SECTION INDICATIONS

- Bladder fibrosis
- Old vesico vaginal fistula repair
- Lower segment tumor
- Ca cervix
- Post mortem Cesarean Section

## EPISIOTOMY

### INDICATIONS

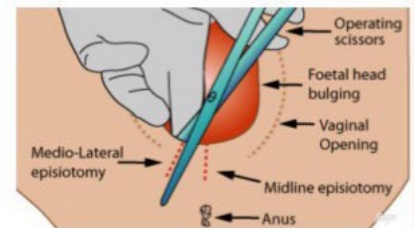
- Breech
- Instrumentat<sup>n</sup>
- Large baby
- Persistent Occipito posterior
- Shoulder dystocia

### COMPLICATIONS

- Rectal Incontinence
  - Flatal incontinence
  - Fecal incontinence

### TYPES

- MEDIAN
- LATERAL [mostly avoided]
- MEDIOLATERAL



### STRUCTURES RESECTED

- Skin
- Sub cutaneous tissues
- Superficial, Deep transverse perineal muscles
- Bulbospongiosus, Levator ani
- Transverse perineal branches of pudendal nerves & vessels
- Posterior vaginal wall

	MIDLINE EPISIOTOMY	MEDIO LATERAL EPISIOTOMY
REPAIR	more Easier	Easier
HEALING	Faster & better	Later
BLOOD LOSS	Minimal	more
SCAR WOUND	Even	Uneven
DYSPARUNIA	Rare	occasional
POST OP PAIN	Lesser	more
WOUND EXTENS <sup>n</sup>	More common	Less common

## PUERPERIUM

- from immediately after delivery to 4-6 wks of time
- Immuno compromised state

### CHANGES DURING PUERPERIUM

- ① REPRODUCTIVE ORGAN CHANGES
- ② SYSTEMIC CHANGES
- ③ ABNORMAL CHANGES
  - Endometritis
  - Wound infections
  - mastitis
  - Deep venous Thrombosis

### REPRODUCTIVE ORGAN CHANGES

#### UTERUS

- 1000gms of uterus returns to 100 to 200 gms
- size
  - immediately after delivery → just below the umbilicus
  - Best time to do Puerperal sterilizat<sup>n</sup> → 2-3 days
  - uterus becomes a pelvic organ in → 10-14 days
  - maximum time to do puerperal sterilizat<sup>n</sup> → 7-10 days
  - uterus becomes a normal organ in → 4-6 wks

#### CERVIX

- becomes firm
- Epithelium starts to regrow
- Transform<sup>n</sup> zone starts to reform [more susceptible to CA cervix]
- Cervix closes by 3 wks

#### VAGINA

- Starts shrinking
- Rugae starts to reform from 2<sup>nd</sup> to 3<sup>rd</sup> week
- Epithelium starts to grow from 4 to 6 wks

#### BREAST

- Sudden drop of Hormones [Estrogen] } LACTOGENESIS  
Increase in Prolactin
- COLOSTRUM
  - produced in 1st 2-3 days
  - rich in Ig A & Ig G, proteins fats
- after 3 days, milk product<sup>n</sup> starts to increase
- If the women doesn't breastfeed, Breast will be normal in 3 wks



## LOCHIA

- LOCHIA RUBRA → 1st to 4th day , RED [mostly blood]
- LOCHIA SEROSA → 5th to 9th day , YELLOW [mostly mucus , some RBC]
- LOCHIA ALBA → 10th to 14th day , WHITE [mostly epithelial cells]

## ABNORMAL CHANGES

### PUERPERAL FEVER

- any fever in 1st 10 days after delivery
- Temp →  $> 38^{\circ}\text{C}$  [ $100.4^{\circ}\text{F}$ ]
- mc cause → Endometritis

## ENDOMETRITIS

### Causes

- Enteric bacteria [mc]
- Local commensals
- Group A  $\beta$  hemolytic Streptococci [mc]
- E. coli, Klebsiella [Gram -ive]
- Chlamydia [mc cause of late endometritis]

### Clinical features

#### Symptoms

- Fever
- Pain abdomen
- Dirty , foul smelling discharge
- Fatigue , weakness

#### Signs

- Lower abdomen tenderness
- on P/V Examination
  - Uterine & adnexal tenderness
  - Fullness of Pouch of Douglas

## INVESTIGATIONS

- $\uparrow$  leucocytes on CBC
- $\uparrow$  ESR ,  $\uparrow$  CRP

## TREATMENT

- CLINDAMYCIN + GENTAMYCIN [Gold standard] [90-97% Success Rate]

## MASTITIS

- mc cause → Staphylococcus aureus

### Clinical Features

- Engorged breast
- Tender breast
- Fluctuant mass + nt

## TREATMENT

- stop breast feeding
- express milk in moist heat
- Oxytocin
- Analgesics
- Antibiotics
  - cephalosporins
  - Pencillins

## URINARY TRACT INFECTIONS

- mc cause → E.coli
- culture sensitivity should be done

## Management

- cephalosporins
- Pencillins
- Nitrofurantoin

## DEEP VENOUS THROMBOSIS

- accompanies the endometritis

## Clinical features

- Pain
  - in Abdomen or in Pelvis
  - Radiating to thigh
- ↑ Pulse Rate
- fever

## INVESTIGATIONS

- ↑ WBC
- ↑ ESR
- ↑ CRP
- DO CT Scan/MRI → to localise the thrombus

## TREATMENT

- Bed Rest
- Limited physiotherapy
- IV antibiotics [clindamycin + Gentamycin]
- Heparin 5000 IU - 10000 IU BID
  - INR should be > 2

## ENDOCRINE DISORDERS

- Post Partum Thyroiditis
- Graves disease
- Sheehan Syndrome [Post Partum Pituitary Necrosis]

## POSTPARTUM THYROIDITIS

- d/t Acute destructive lymphocytic thyroiditis
- Hyperthyroidism
  - in first 1-4 months
  - Rx:  $\bar{c}$  PROPRANOLOL
- hypothyroidism
  - in later 4-8 months
  - Rx:  $\bar{c}$  Thyroxine Supplementat<sup>n</sup>

## SUB INVOLUTION

- Normal rate of reduct<sup>n</sup> of size of uterus → 1-2 cm/Day

## Causes

- Retained bits of placenta & membranes
- infect<sup>n</sup>
- Blood clots
- Fibroids

## Clinical features

- Bloomy or flabby uterus
- Palpable beyond 10 days per abdomen
- Tender
- Fever + nt

## TREATMENT

- Empty the uterus by Gentle curettage after doing USG
- IV Antibiotics
- Methyl Ergometrin Tablets
  - 0.2 mg TID x 5-7 Days

## PSYCHIATRIC DISORDERS

- |            |                     |  |
|------------|---------------------|--|
| Blues      | → in 1st 2 weeks    | [50-60%] [d/t sudden loss of Progesterone] |
| Psychosis  | → in 1st 2-3 months | [<1%]                                      |
| Depression | → in 1st 3-6 months | [10-15%]                                   |

POST PARTUM HAEMORRHAGE is also the part of abnormal puerperium

## GYNECOLOGY

### MENSTRUATION, MENOPAUSE, CONCEPTION, CONTRACEPTION, INFERTILITY

#### MENSTRUATION

##### PRIMORDIAL FOLLICLES

- 6-7 millions at 20 weeks
- 1-2 millions at birth
- 3-4 lakhs at Puberty
- 400-500 utilized

##### CASE 1 → Women in whom fertilizat<sup>n</sup> occurs

- FIMBRIA OVARICA → Extra long fimbria which takes up oocyte
- Life of oocyte → 24 hrs to 48 hrs
- Sperm fertilize oocyte in ampulla
- Embryo reaches the uterine cavity on 3rd day of ovulat<sup>n</sup>
- IMPLANTATION WINDOW
  - Implantat<sup>n</sup> on secretory or ripened endometrium on 6th to 9th day
  - Progesterone is responsible for secretory endometrium
    - source → corpus luteum [follicle]
- Estrogen is responsible for Proliferatory endometrium
- Source → follicle

##### CASE 2 → Women in whom fertilizat<sup>n</sup> does not takes place

##### CORPUS LUTEUM

- start to degenerates [max funct<sup>n</sup>] at → 9th to 10th day
- Complete degenat<sup>n</sup> at 14th to 15th day → SHEDDING OF ENDOMETRIUM
- Progesterone withdrawal is responsible for Shedding of endometrium
- Length of cervix → 3.5 to 4cm
- short cervix →  $\leq 2.5$  cm

MITTLESHMERZ / MID CYCLE PAIN → dlt blood & debris [from follicle] collected into POD  
AT THE TIME OF OVULATION

DYSMENORRHEA → dlt uterine contractions  
Prostaglandins are responsible

##### CASE 3 → ANOVULATORY CYCLES

- No MITTLESHMERZ / mid cycle pain
- Irregular [dlt intermittent recoil of uterus]
- Painless [dlt No/Less Prostaglandins]
- OVULATORY CYCLES ARE REGULAR & PAINFUL



## DYSMENORRHEA

### TYPES

#### PRIMARY / SPASMODIC DYSMENORRHEA

- Pain starts 30 min before onset of periods & stays 10 hrs post onset
- Seen in Normal woman & 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 → endometrium shed like CAST OF ENDOMETRIAL CAVITY

### TREATMENT

#### ① NSAIDS

- IBUPROFEN
- NAPROXEN
- MEFENAMIC ACID

#### ② Antispasmodics

- DICYCLOMIN
- DROTAVARINE
- HYOSCINE

#### ③ combined Oral contraceptives

#### ④ Surgical Dilatation of cervix [Parous women has lesser spasmotic dysmenorrhea]

#### ⑤ Pre Sacral Nerve ablation → Laser or thermal resect<sup>n</sup> of Hypogastric plexus

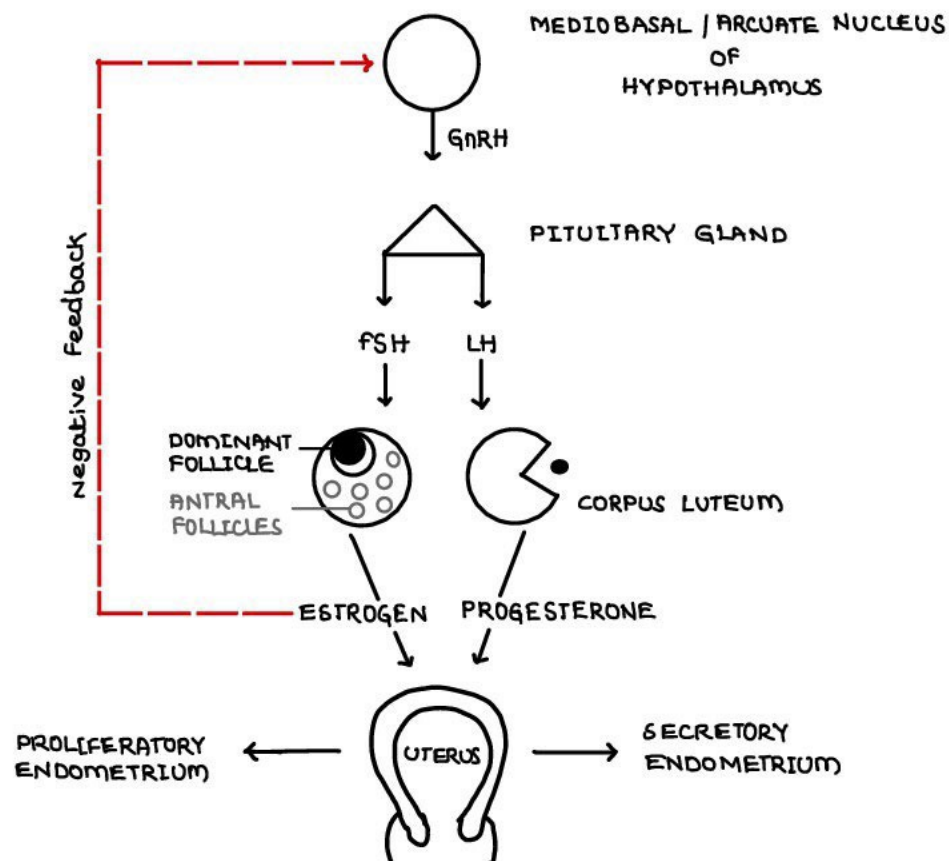
#### ⑥ GnRH Analogues → will stop the periods

### BASIC DEFINITIONS OF MENSTRUAL CYCLE

- Length of menstrual cycle
  - $28 \pm 7$  Days
  - Polymenorrhea →  $< 21$  Days
  - Oligomenorrhea →  $> 35$  Days
- Duration
  - 2-7 Days
  - Hypomenorrhea →  $< 2$  days
  - Menorrhagia →  $> 7$  days
- Amount
  - 30-50 ml per cycle
  - Excessive blood loss →  $> 80$  ml
- POLYMENORRHAGIA →  $< 21$  days &  $> 80$  ml of blood loss

- **METORRHAGIA**
  - Irregular cycles superimposed on Regular cycles
  - Intermenstrual bleeding [Spotting]
- **MENOMETORRHAGIA** → Irregular acyclical bleeding
- **METEROPATHIA HEMORRHAGICA**
  - Prolonged amenorrhea followed by heavy withdrawal
  - amenorrhea → 2 1/2 - 3 months
  - in a women > 40 yrs
  - Anovulatory cycle
  - Hyperplasia of endometrial glands + nt
  - Non Secretory Endometrium
  - Diagnosed by curettage & microscopic Examinat<sup>n</sup>
    - cystic glandular Hyperplasia [SWISS CHEESE ENDOMETRIUM]
    - ↓ stroma
  - self limited condition
  - curettage is also curative

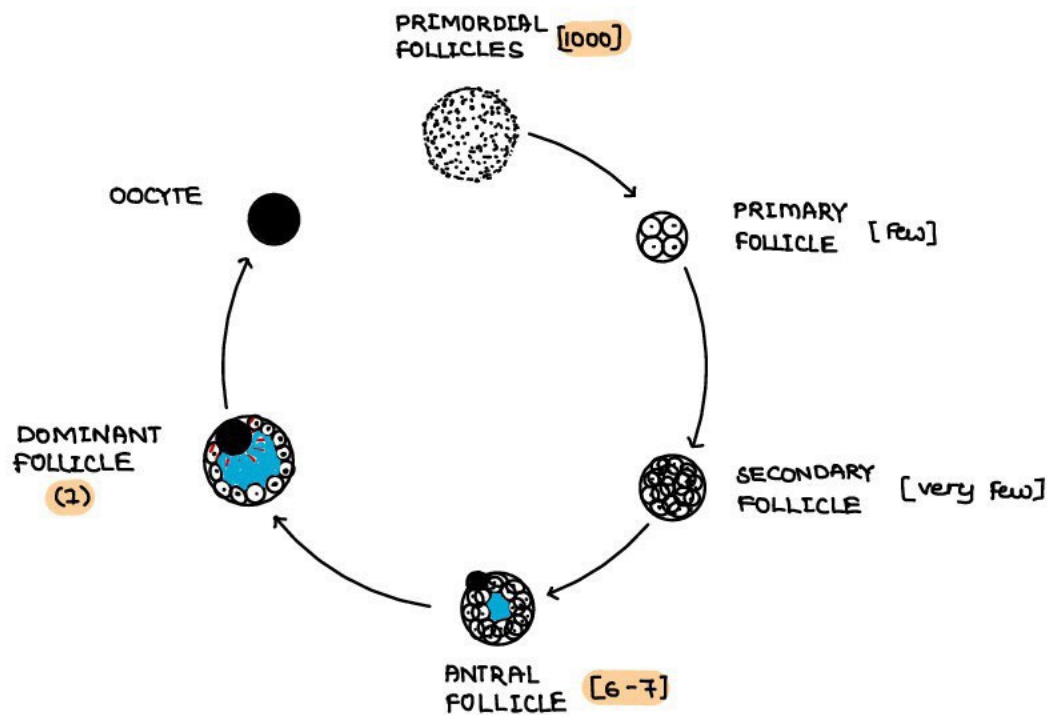
## PHYSIOLOGY



- **GnRH Releases in pulsatile fashion**
  - 60 minutes in follicular Phase [Faster [60min] in follicular phase]
  - 90 minutes in Luteal Phase [Longer [90min] in Luteal phase]
- **GRANULOSA CELL OF FOLLICLE**
  - sex cord cells
  - produce estrogen

## → ANTRAL FOLLICLES

- Fluid Filled follicles
- 6-7 made every month



→ Perimenopausal women have irregular cycles d/t OLD follicles

Fall of reproduct<sup>n</sup> during perimenopausal period

- 1 Anovulatory
- 2 poor oocytes
- 3 No fertilizat<sup>n</sup>
- 4 Poor embryos
- 5 Abort<sup>n</sup> [40% after 40 years]

→ > 35yrs Pregnancies → ELDERLY GRAVIDAS

indicated for

- Level II scanning
- Triple markers, dual markers
- Amniocentesis

## OVARIAN RESERVE

### QUANTIFICATION

- ① ↓ ANTRAL FOLLICULAR COUNT [young - 6 to 7, older - 1]
- ② ↓ OVARIAN VOLUME [young -  $3.5 \times 2.5 \times 3$  cm, older -  $1 \times 1.5 \times 1$  cm]
- ③ ↑ AGE
- ④ ↓ ESTROGEN
- ⑤ ↑ FSH → [younger - 2 to 6 IU, older - > 15 IU]
- ⑥ ↓ ANTI MULLERIAN HORMONE → made from granulosa cell of ovary

OVARIAN  
RESERVE

→ ↓  
→ ↓  
→ ↓  
→ ↓  
→ ↓  
→ ↓

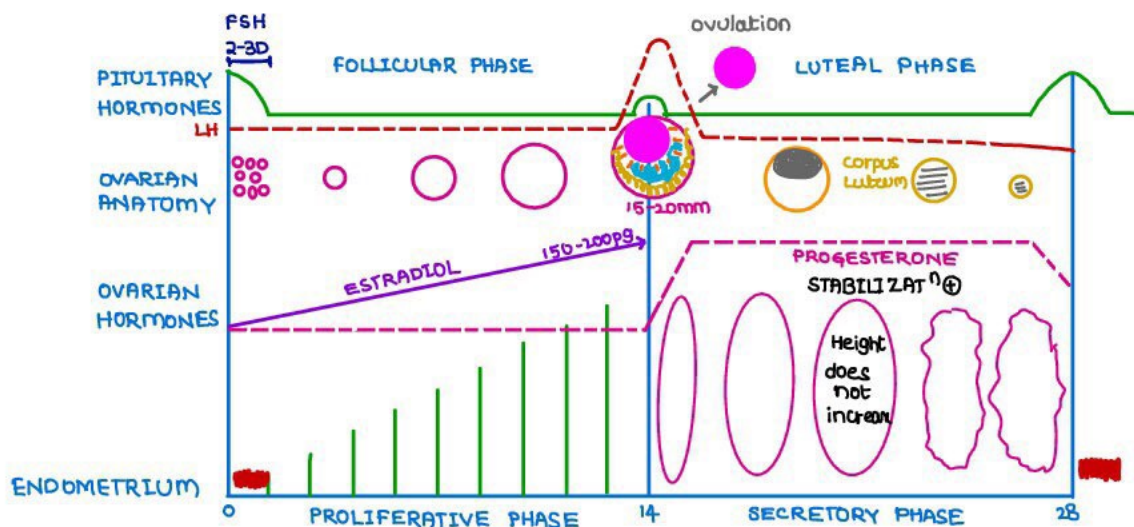
## GOOD INDICATORS

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

Purpose of FSH → Estrogen Product<sup>n</sup>

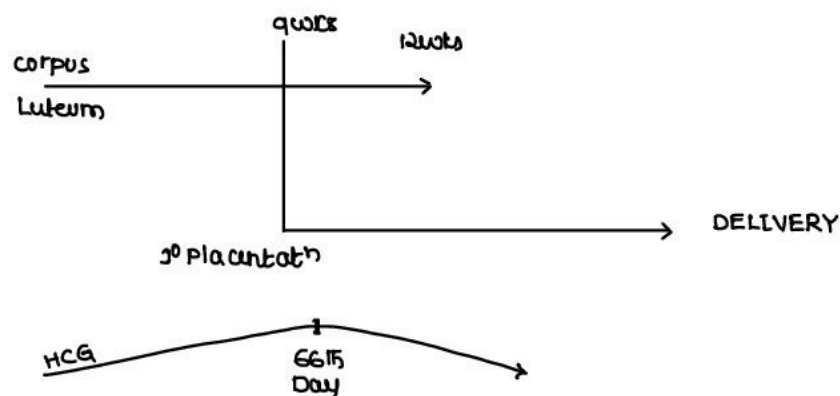
Purpose of LH → Progesteron Product<sup>n</sup>

- (N) FSH → 2-6 IU
- >10 IU → Suggestive of Menopausal women
- >40 IU → Diagnostic of Menopause



## MAINTAINANCE OF PREGNANCY

- Exclusively maintained by CORPUS LUTEUM upto 9 wks
  - corpus luteum remains upto 12 wks in pregnancy
- By corpus luteum & placenta → from 9-12 weeks
- only by placenta → after 12 weeks



- Hyperemesis is maximum at 66th day [9 1/2 weeks]
- Abort<sup>n</sup> can be R<sub>y</sub> by → Progesterones  
HCG



→ SPINBARKIET STRECHABILITY On 14<sup>th</sup> day

↓  
on drying  
↓

FERNING / ARBORISING PATTERN [Nad crystals]



→ FERTILE PERIOD → 11<sup>th</sup> to 16<sup>th</sup> day

- Life span of sperm → 72 hrs
- Life span of Ovum → 24-48 hrs

CASE → On 24<sup>th</sup> day of cycle  
→ Cervical mucus is thick } fertilizati<sup>n</sup> doesn't occur  
→ No oocyte  
→ SAFE PERIOD → Before 11<sup>th</sup> day & after 16<sup>th</sup> day

### BILLING METHOD

- Natural method of contracept<sup>n</sup>
- Based on cervical mucus physiology

### PROGESTERONE ONLY PILLS [POP]

#### Mechanism of Action

- Cx mucus on 14<sup>th</sup> day → thick & vici<sup>d</sup>
- Anovulation [No oocyte]
- Unfavourable for implantation → Hypersecretory Endometrium [OUT OF PHASE ENDOMETRIUM - Pinopods are Internalized]
- Failure Rate → 1 to 2%

- 1<sup>st</sup> line hormonal management of abnormal uterine bleeding → PROGESTERONE
  - stabilizes endometrium in a physiological way
- Next line of management → ESTROGEN
- First line of Drug in Acute SEVERE Menorrhagia → ESTROGEN

- CONTROLLED OVARIAN HYPERSTIMULATION
- FROZEN EMBRYO TRANSFER
- 1<sup>st</sup> IVF Baby → LOUISE BROWN [1978]
- 1<sup>st</sup> IVF done by → STEPTOE & EDWARDS
- In 2010, Noble prize given to EDWARDS

## OVARIAN HYPERSTIMULATION SYNDROME

### CONTROLLED OVARIAN HYPERSTIMULATION

- 200x15 eggs → 3000 pg of Estradiol
- 200x40 eggs → 8000 pg of Estradiol
- > 3500 pg of Estradiol leads to
  - Vascular Endothelial Growth factor
  - Renin, Pro renin
  - Angiotensin } ↑ VASCULAR PERMEABILITY
- ↑ VASCULAR PERMEABILITY
  - ↓
  - Fluid shifts
  - ↓
  - Third space collections
    - Ascites
    - Pleural effus<sup>n</sup>
    - Pericardial effus<sup>n</sup>
    - edema } death
  - Haemoconcentration → >45 or >55  
② Packed cell volume [Hct] - 33  
↓  
Thrombo embolic phenomenon  
↓  
Renal Emboli  
Cerebral Emboli  
Hepatic Emboli  
Limb Emboli } death
- Torsion  
Rupture of ovary  
Haemorrhage } death
- COH may lead to → OVARIAN HYPERSTIMULATION SYNDROME

### OVARIAN HYPERSTIMULATION SYNDROME

#### PRE DISPOSING FACTORS

- 9ng HCG [Initiating factor] [used for rupturing the follicle]
- Vascular Endothelial Growth factor
- Renin, Pro renin
- Angiotensin

#### MATHUR CLASSIFICATION

- MILD <8cm NO Ascites
- MODERATE 8-12 USG Ascites
- SEVERE >12cm Clinical Ascites HCT → > 45
- CRITICAL Tense Ascites HCT → > 55

→ No pregnancy is advised in severe & critical OHSS

→ Frozen embryos are transferred on 6th day of ovulation

## MANAGEMENT

### 1. Rx of OHSS

- Avoid pregnancy in severe & critical forms
- Remove fluids → Tap Ascites & effusion
- Give Oral fluids [mild, moderate forms]
  - IVF → NaCl, DNS [crystalloids]
  - Albumin, Dextran, Starch [colloids]

→ mchly → 13-15% of Pts on **clomiphene citrate**

Severe forms → **gonadotropins**

- 90% HMG [Human menopausal gonadotropins]
- 90% FSH Recombinant

### → **COMBINED ORAL CONTRACEPTIVE PILLS**

→ Tab Estradiol + Tab. Progesterone

→ Painless 'Regular' anovulatory cycles

→ Tab ESTRADIOL & Tab. PROGESTERONE are responsible for menses

#### **ARTIFICIAL PERIODS**

→ ETHINYLESTRADIOL → 0.03 mg → 30 µg

#### → **ADVANTAGES OF COCPs**

- ↓ Bleeding
- ↓ Anemia
- ↓ Ca Endometrium
- ↓ Ca Ovary
- ↓ Ca colon
- ↓ Fibroids
- ↓ Benign Breast Disease
- ↓ Ovarian cysts
- ↓ PID

#### → **DISADVANTAGES OF COCPs**

- ↑ Ca cervix [Adeno carcinoma type]
- ↑ Chlamydia PID [Quite / Indolent]
- ↑ Gallstones

→ NO Effect on incidence on CA BREAST

→ ↑ GALL STONES → GALL BLADDER CANCER ???

→ COCP causes Smooth type of Gall stones [Not predisposed for CA]

→ Gall Bladder cancer is caused by mixed & pigment gall stones

→ HEPATIC ADENOMA caused by COCPs

HEPATOCELLULAR CARCINOMA is not caused by COCPs

→ Generally COCPs are started on the 1st day of menstrual cycle  
can be started at any time of menstrual cycle → QUICK START

→ CONTRA INDICATIONS

Breast feeding

Post Partum

Uncontrolled HTN [ >160/100 ]

Active Breast cancer

Uncontrolled Diabetes mellitus

Severe cirrhosis

Active hepatitis

on Anticonvulsants

Hyperlipidemia

Earlier DVT

Earlier Pulmonary embolism



## TESTS OF OVULATION

### TESTS OF OVULATION

- ① BBT → ↑ 0.5°F
- ② Sr LH → > 15 IU
- ③ Sr Progesterone on day 21 [ $>3\text{ng/ml}$ ]
- ④ Serial USG → follicular monitoring [OPD - usual]
- ⑤ Premenstrual Endometrial Biopsy on day 21
  - to check secretory changes
  - When the difference b/w observed & expected changes is  $\geq 2$  days  
→ LUTEAL PHASE DEFECTS

### ⑥ CERVICAL MUCUS STUDIES

- Spinnbarkeit & ferning is dit estrogen
- Serial cervical mucus studies
- LOSS OF SPINBARKEIT & FERNING → OVULATION

### ⑦ DIAGNOSTIC LAPAROSCOPY

## ENDOMETRIOSIS

- RETROGRADE MENSTRUATION by SAMPSONS
- 70-80% of all women have retrograde menses
- 5-10% of all women have poor immunity & ↑ estrogenicity

### CLINICAL FEATURES

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

### DIAGNOSIS

- ↑ CA125
- USG, MRI
- Best → Laparoscopy

### SITES OF PREDILICTION

- mc site → ovary
  - 2nd mc site → POD
  - Bowel
  - Lung
  - Nose
  - Eyes
- } VICARIOUS  
MENSTRUATION
- POWDER BURN LESIONS / BLUE SPOTS
  - CHOCOLATE CYST OF OVARY

- Scarring & Adhesions i fallopian tube → INFERTILITY

### SYMPTOMS & SIGNS

- Chronic pain
- Acute monthly exacerbation → Severe congestive dysmenorrhea
- Deep dyspareunia
- Menorrhagia
- Infertility [dit altered tubo ovarian relat<sup>n</sup> by adhesions]
- ↓↓ intercourse
- Poor ovulation
- Embryotoxic endometriotic deposits
  - poor quality embryos
  - ↓ implantat<sup>n</sup>
  - ↑ abort<sup>n</sup>

## TREATMENT

### SURGICAL Rx

- ADHESIOLYSIS for adhes<sup>n</sup>
- CYSTECTOMY for chocolate cysts
- ABLAT<sup>n</sup> for deposits → FULGRATION OF DEPOSITS
  - Thermal or laser
- 60 - 70% RECURRENCE

### MEDICAL MANAGEMENT

- ① **Eng Depo Medroxy Progesterone Acetate** 150mg Once in 3 months
  - Pseudo pregnancy state
  - Atrophy of endometrium in 3-4 months of Rx
- ② **Tab Danazol**
  - Androgen → Anti estrogenic action
  - Faster atrophy
  - **S/E** → Hirsutism  
virilizat<sup>n</sup>
    - Breast atrophy
    - Hoarseness of voice
    - clitomegaly

} Irreversible

1st sign to stop Rx → Hoarseness of voice
- ③ **Combined oral Contraceptive Pills**
  - Anovulatory cycle → Painless
  - Limits endometriosis
- ④ **GnRH ANALOGUES** → DEPOT or CONTINUOUS FORM
  - LEUPROLIN
  - NAFERELIN
  - GOSERLIN
  - down regulat<sup>n</sup> / Desensitizat<sup>n</sup> of pituitary Receptors
  - Atrophy of endometrium

### STOP THE PERIODS

- 25yrs ± chocolate cyst. Sx Rx done → what next → Medical Management
- Medical Management till Conception
  - Pregnancy
  - COCPs
    - 21 x 4 Packs → 84 Days continuously
    - Periods ≅ Once in 90 days

→ GnRH Analogues

→ > Gmoneix → Estrogen dependent osteoblastic act<sup>n</sup> will stop } OSTEO  
→ Osteoclastic act<sup>n</sup> will continue } POROSIS

→ ADD BACK REGIME

Low dose Estrogens

RALOXIFENE [selective Estrogen Receptor Modulator]



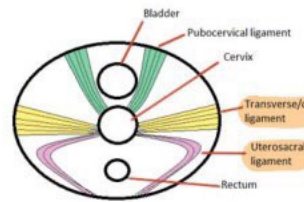
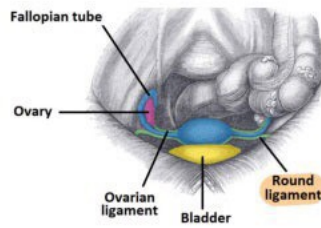
## HORMONAL REPLACEMENT THERAPY

### EFFECTS OF ESTROGENS

- 1 SKIN → SIC collagen ↓ → Lax-Loose skin
- 2 HAIR → ↓ vellous hair → Soft thin & light in color  
→ ↑ Terminal hair → Hard, thick & Dark in color
- 3 VOICE → Hoarsness of voice
- 4 BONES → ↑ fractures
  - vertebral compression fractures [mc]
  - wrist fractures
  - femur fractures
- 5 BRAIN → Mood swings
  - Depression
  - Anger threshold ↓
  - Anxiety  
→ Insomnia  
→ Hot flushes [coincides i LH Fluxh]
- 6 HEART → Coronary Artery Diseases ↑
- 7 PELVIS → ↑ fractures  
  
→ (N) PH of vagina → Acidic  
Glycogen  $\xrightarrow{\text{Lactobacillus}}$  monosaccharides  
↑ Anaerobes  
ESTROGENS → pH → Alkaline → ↓ Lactobacillus → ↑ Infections
  - vaginitis
  - Vulvitis
  - Urethritis
  - PID [Pelvic Inflammatory Diseases]  
→ Dry vagina → ↓ Intercourse  
  
→ Pelvic Organ Prolapse
  - Abnormal conduct of labour is the main reason

## SUPPORTS OF UTERUS

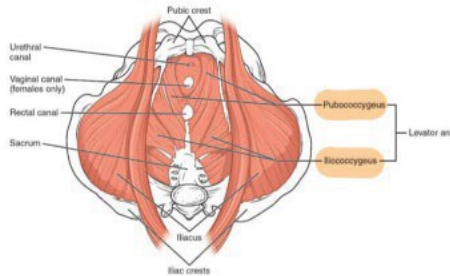
### LIGAMENT SUPPORT



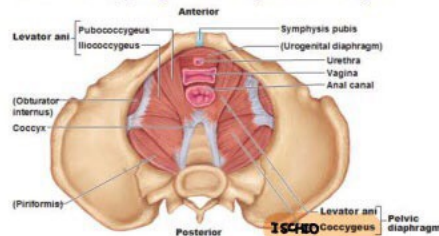
**Macburnod's ligament**

← most important among ligaments

### MUSCULAR SUPPORT



The Pelvic Diaphragm = the deepest muscle layer



### INVESTIGATIONS

- CBC
- mammography
- Pap smear
- USG → Endometrium →  $\leq 4\text{mm}$
- 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)]
- ECG

### HORMONE REPLACEMENT THERAPY

- ① Tab ESTRADIOL 1-2 mg / Day
  - ② Tab CONJUGATED EQUINE ESTROGENS 0.625 to 1.25 mg / Day
  - ③ Tab TIBOLONE
    - Synthetic estrogen
    - Progestational metabolite + nt
    - 2.5 mg / Day
- } Add Progesterone
- ④ SERS [selective Estrogen Receptor Modulators]  
RALOXIFENE
    - 60 mg / Day
    - Estrogenic on bone
    - Anti estrogenic on brain [CI for hot flashes]

### ⑤ PLANT ESTROGENS

- Safer
- ↓ Effective

### ⑥ BISPHOSPHONATES

- non hormonal Rx of osteoporosis
- ALENDRONATE Daily
- RISEDRONATE Weekly
- IBANDRONATE Monthly

### ⑦ CALCITONIN

- ↓ Osteoclastic Action

#### PARATHORMONE EXTRACT

##### TERIPARATIDE

Induces new bone format<sup>n</sup>

### CONTRA INDICATIONS

- undiagnosed vaginal bleeding
- H/O Breast cancer
- H/O Endometrial cancer
- Liver Dysfunct<sup>n</sup>
- Thrombo embolic Diseases
- Endometriosis
- Fibroids
- Porphyrias

### Rx OF HOT FLUSHES

- DOC → ESTROGENS  
Takes 20-25 Days to act
- CLONIDINE HYDRO CHLORIDE  
Acute Relief  
100µg OD/BD  
↓ vasomotor Flushing
- ALPRAZOLAM  
0.25 mg  
For Acute Relief
- SSRI [ Selective Serotonin Reuptake Inhibitors ]  
FLUOXETINE  
Takes 6-7 Days

## Coronary Artery Disease

- Estrogens are cardioprotective
- HRT IS NOT CARDIO PROTECTIVE
  - initial few years → cardioprotective
  - Long term → Detrimental to heart
- Local Estrogens are better



## ENDOMETRIAL CARCINOMA

### RISK FACTORS

- ↑ ESTROGENS
- HRT
- TAMOXIFEN
- Anovulatory conditions → PCOD
- Estrogen Producing Ovarian cancers → Granulosa cell tumor
- Early menarche
- Late menopause
- Abnormal Liver Funct<sup>n</sup> Tests
- Obesity → Fats  $\left\{ \begin{array}{c} \text{Androgens} \\ \downarrow \text{Aromatase} \\ \text{Estrogens} \end{array} \right\}$
- corpus cancer syndrome  
DM - HTN - Obesity
- Familial Predisposition ★
  - Ca Breast
  - Ca Endometrium
  - Ca Ovary1st degree female relatives can have either of these
- Nulliparous women
- 80% of this Etiology associated i CA Endometrium → TYPE 1
- 20% of this etiology NO association → TYPE 2

- **ETIOLOGY** → HYPERPLASIAS → CANCER
- Age group → 45-55 yrs

### → **HYPERPLASIAS** [Premalignant]

Simple Hyperplasia without atypia	→ 1%	} Give PROGESTERONE THERAPY
Complex Hyperplasia without atypia	→ 3%	
Simple Hyperplasia with atypia	→ 8%	} DO SIMPLE HYSTRECTOMY
Complex Hyperplasia with atypia	→ 29%	

### SYMPTOMS

- Irregular Acyclical Bleeding [mc]
- Postmenopausal bleeding
- Pyometra → Dirty foul smelling vaginal Discharge
- Loss of wt

~~Loss of Weight~~

~~Loss of appetite~~

~~CA cachexia~~

~~CA Pain~~ → Late presentation

## HISTOPATHOLOGY

- Endometrioid Adenocarcinoma [mc] [80%]
- Papillary / villoglandular
- Squamous
- Secretory

## DIAGNOSIS

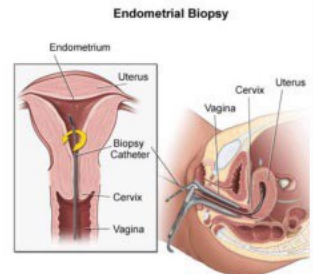
- 1st Management

PIPELLE ENDOMETRIAL BIOPSY [in OPD]

Paracervical block may be required in few cases

90-95% sensitive

Biopsy taken from anterior wall



- FRACTIONAL CURETTAGE [DNC]

95-99% sensitive

done in OT

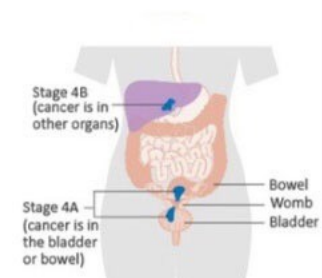
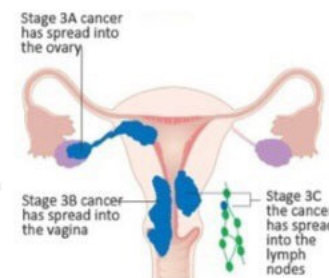
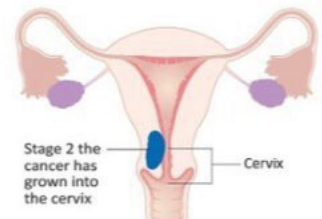
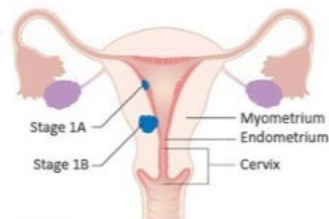
- HYSTEROSCOPIC BIOPSY

100% sensitive

## STAGING OF CA ENDOMETRIUM

Table 1: 2009 FIGO staging system for carcinoma of the endometrium

Stage I <sup>a</sup>	Tumor contained to the corpus uteri
IA	No or less than half myometrial invasion
IB	Invasion equal to or more than half of the myometrium
Stage II	Tumor invades the cervical stroma but does not extend beyond the uterus <sup>b</sup>
Stage III <sup>a</sup>	Local and/or regional spread of tumor <sup>c</sup>
IIIA	Tumor invades the serosa of the corpus uteri and/or adnexas
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 with or without positive pelvic lymph nodes
Stage IV <sup>a</sup>	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



FIGO = International Federation of Gynecology and Obstetrics

<sup>a</sup> Includes grades 1, 2, or 3

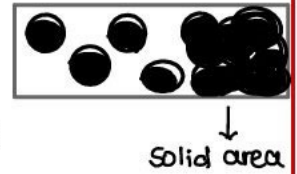
<sup>b</sup> Endocervical glandular involvement only should be considered as stage I and no longer as stage II.

<sup>c</sup> Positive cytology has to be reported separately without changing the stage.

All cancers in Gynecology staged surgically except CA cervix [clinical staging]

## PROGNOSTIC FACTORS

- Hysterectomy → Staging
- Pelvic lymphadenectomy
- **Grading**
  - solid areas on histopathology slides
  - Grade I → < 5% solid areas
  - Grade II → 5-50% solid areas
  - Grade III → > 50% solid areas



Single best Prognostic marker → Staging > Grading

- Age
- Type
- Estrogen Receptor & Progesterone receptor status
- Previous Rx taken

## TREATMENT

- **Hysterectomy** is already Done
- **Stage I/II**
  - Grade I, myometrium < 1/2 involved → Nothing required
  - Grade II, myometrium > 1/2 involved → vaginal irradiat<sup>n</sup>
  - Grade III, serosa involved → Pelvic irradiat<sup>n</sup>
  - Adnexal or cervical involved → whole abdominal irradiat<sup>n</sup>
- **Stage III/Stage IV**
  - Radiotherapy
  - Surgical Therapy
  - chemotherapy
  - Hormonal Therapy } INDIVIDUALIZED
- **VAULT OF THE VAGINA**
  - Left over vagina after hysterectomy
  - 1st site of recurrence
  - 1st line mx of recurrence → HIGH PROGESTERONE [200-250 mg/day]
  - Prevent<sup>n</sup> of recurrence → VAGINAL IRRADIATION

## POST MENOPAUSAL BLEEDING [> 1yr of menopause]

- mcc in India → CA cervix
- mccause → CA cervix
- mcc in western hemisphere → Endometrial Atrophy [60-70%]
  - CA endometrium → 10%
  - Hyperplasia → 10%
  - Polyps → 10% - 12%
  - HRT → 30%

- Post menopausal women      → No Estrogens [No Immunity]  
    ↑ vaginitis                      → Endometritis

Atrophic Endometrium



Endometritis [Senile Endometritis]



Bleeding



## OVARIAN TUMORS

- 3 x 3.5 x 2.5 cm
- Almond shaped
- Rough surface due to SCARS by ovulation
  - Nulliparous
  - Ovulation induction
  - Early menarche
  - Late menopause
  - Perineal talc
  - Asbestosis exposure

↑ SCARS

### ETIOLOGY

- ① SCARS → Epithelium → Healing  
↑ SCARS → Epithelium → Over Healing → Epithelial ovarian CA
- ② Association with
  - BRCA1 [on chromosome 17]
  - BRCA2 [on chromosome 13]
- ③ Familial Predisposition
  - ② 1st degree Relatives & cancers → 35-40% chance of
  - ② 1st degree Relative } 2 to 10 times chances
  - ① 2nd degree Relative

- 70% of all ovarian cancers → Surface Epithelial ovarian cancers
- Age group → 6th, 7th decades
- mostly bilateral
- Associated with ↑ CA 125
  - Significant values in a postmenopausal women → > 35
  - premenopausal women → > 200

### CLINICAL FEATURES

- BIG Abdominal mass → mostly benign

### DIAGNOSIS

- USG features of malignancy TVS > TAS
  - Bilateral
  - Surface irregularities
  - Cystic + solid areas together
  - Septated tumors - irregular, Septate
  - Ascites + nt

## TREATMENT

### → STAGING LAPAROTOMY + OPTIMAL DEBULKING

#### → STEPS OF STAGING LAPAROTOMY

- ① Midline Incision / Paramedian incision
- ② Assess Pelvis, Abdominal Organs
- ③ Washings / Ascites → for cytology [malignant cells]
- ④ Infra colic omentectomy
- ⑤ Peritoneal Biopsies
- ⑥ Retroperitoneal lymph node Sampling

#### → OPTIMAL DEBULKING

→ < 1.5 cm is what maximum amount can be left

## OVARIAN CANCER STAGING

### STAGE I → OVARY INVOLVEMENT

IA → One ovary involved

IB → Both ovaries involved

IC → A/B ±

C<sub>1</sub> → Surgical Spill

C<sub>2</sub> → Surface growth

C<sub>3</sub> → Malignant Ascites / washings

### STAGE II → PELVIS INVOLVEMENT

IIA → uterus, fallopian tubes

IIB → Other Pelvic Organs

### STAGE III → ABDOMINAL VISCERAL INVOLVEMENT

IIIA<sub>1</sub> Retroperitoneal lymph node involvement

A<sub>1</sub>(i) → < 10mm

A<sub>1</sub>(ii) → > 10mm

IIIA<sub>2</sub> microscopic Abdominal involvement

IIIB macroscopic involvement < 2cm

IIIC macroscopic involvement > 2cm

} Superficial  
Liver & Spleen  
involvement

### STAGE IV

IVA Malignant pleural Effusion

IVB Deep liver & spleen deposits

Inguinal lymphnode involvement

## CHEMOTHERAPY → PLATINUM BASED

### ① Epithelial ovarian tumor

① Cyclophosphamide

Adriamycin

Platin8  $\begin{cases} \rightarrow \text{cis} \\ \rightarrow \text{Carbo} \end{cases}$

② Platin8 } Better choice  
Taxol }

### ② GERM CELL TUMORS

① VINCRISTINE

BLEOMYCIN

PLATIN8

② BLEOMYCIN } Better choice  
ETOPSIDE }  
PLATIN8 }

### ③ SEX CORD TUMORS

→ Surgery alone will suffice mostly

## RADIOTHERAPY

→ Normal ovary radiosensitive

ovarian tumors radioresistant

- EXCEPTION → DYSGERMINOMA

## EPITHELIAL OVARIAN TUMORS

→ mc [75%]

→ older age group

→ Bilateral

→ TYPES

### ① SEROUS CYSTADENOMA [mc type]

→ uniloculated

→ B/L in > 50%

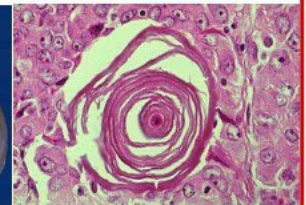
→ mostly malignant

→ Surface growth + nt

→ Psammoma Bodies + nt in 40-45%

→ cells are like fallopian tube

SEROUS CYSTADENOMA



PSAMMOMA BODY

### ② MUCINOUS CYSTADENOMA

→ Less malignant

→ B/L in 10%

→ multilocular

- Pseudomyxoma Peritonei → Severe hypoproteinemia
- mc cause in ovarian tumor → mucinous cystadenoma
- mc cause → Appendiceal cancer
- cells are like cervix

### ③ BRENNER TUMOR

- made of Transitional cells
- NESTS → WALTHARD INCLUSIONS
- PUFFED WHEAT TYPE
- Benign
- Rubbery in consistency
- cells are like bladder
- associated w post menopausal bleeding
- associated w Pseudomeig Syndrome
  - Pseudomeig syndrome is mly dlt Brenner Tumor

#### MEIG SYNDROME

Fibroma ovary  
Ascites  
Pleural effusion

### ④ ENDOMETRIOID TUMOR

- Endometrial type of collections
- 6-8% of epithelial ovarian tumors

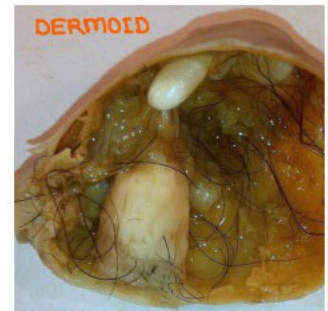
### GERM CELL TUMORS

- younger age group
- Unilateral

#### ① TERATOMAS [mc]

- Malignant [10% of teratomas]
- Dermoid / Benign cystic Teratoma [90% of teratomas]
  - All 3 germoid layers +nt
 

Endoderm	}	Bone, Teeth
Mesoderm		Sebaceous secretions
Ectoderm		Hair, Endocrine glands



- 10-15% are bilateral
- Dermoids can have malignant transform<sup>n</sup> → Sq. cell carcinoma
- Dermoids are mc tumors of pregnancy
- Dermoids are mc tumors of torsion

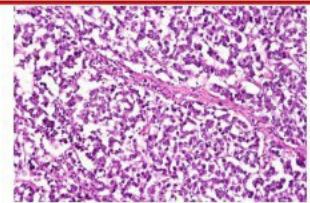
#### ② DYSGERMINOMA

- mc germ cell malignancy [40-45%]
- only BIL germ cell malignancy
- associated w Dysgermic gonads
- Large fleshy tumor
- mostly malignant → Poor prognosis



### → SEMINOMA TYPE CELLS

- Large polygonal cells
- clear cytoplasm & dark stained nuclei
- back to back arrangement



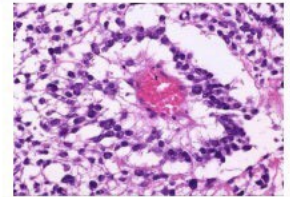
### → Associated

- ↑ LDH
- ↑ Placental Alkaline PO<sub>4</sub>
- Alpha feto protein → Not increased

## ③ YOLK SAC/ENDODERMAL SINUS TUMOR & EMBRYONAL TUMORS

### COMMON FEATURES

- Young women & girls
- Poor Prognosis
- ↑ Alpha feto protein



SCHILLER DUVAL BODY

### SPECIFIC FEATURES

#### YOLK SAC TUMOR

- α<sub>1</sub> anti trypsin
- SCHILLER DUVAL BODIES

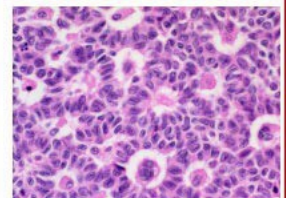
#### EMBRYONAL TUMORS

- HCG

## SEX CORD TUMORS

### ① GRANULOSA CELL TUMORS [mc]

- ↑ Estrogens
  - Precocious Puberty
  - Menorrhagia
  - Endometrial cancer



CALL EXNER BODIES

- Marker → Inhibin
- CALL EXNER BODIES
- Contralateral Ovarian Secondaries prior to systemic deliveries

### ② SERTOLI LEYDIG TUMORS / ARRHENOBLASTOMAS

- Hirsutism → male pattern baldness
- virilization → Permanent changes
  - Hoarseness
  - Breast Atrophy
  - Clitoromegaly

- Oligomenorrhea to amenorrhea
- Benign
- Rapid onset **hirsutism**

<b>HIRSUTISM</b>	→ 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]
	<b>MC CAUSE OF HIRSUTISM</b>	→ PCOS

### NON NEOPLASTIC OVARIAN CYSTS

- FOLLICULAR CYST
- CORPUS LUTEAL CYST
- THECA LUTEIN CYST → dit ↑HCG → seen in Molar pregnancy, twin preg
- HEMORRHAGIC CYST
- Resolve by themselves → CONSERVATIVE MANAGEMENT

- ➡ mc ovarian tumor of pregnancy → Dermoid > Serous cyst
- IF it is small (<5cm) & asymptomatic → NO Rx required
- IF it is large (>10cm) & asymptomatic → Remove it in 2nd trimester
- IF diagnosed in 3rd trimester → Remove 6 wks after delivery
- IF doing a cesarean section → Remove at the time of C. Sect<sup>n</sup>

Secondary to ovary

mcly from CA stomach > CA Breast

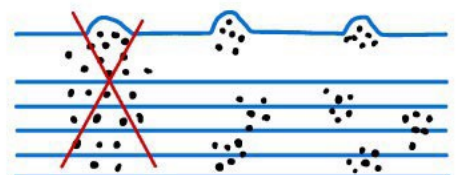
### KRUKENBERG TUMOR

- Secondary of ovary from CA stomach
- Bilateral
- Firm to Solid
- Signet Ring cells
- may have cystic degenerations
- ovary retains it's shape

### BORDERLINE EPITHELIAL OVARIAN TUMORS

#### Features

- Epithelial hyperplasia
- mitotic activity +nt
- Nuclear atypia +nt
- detached cell clusters +nt
- No destructive stromal invasion



## POLYCYSTIC OVARIAN SYNDROME

→ aka STEIN LEVINTHAL SYNDROME

### HEADINGS

#### FEATURES

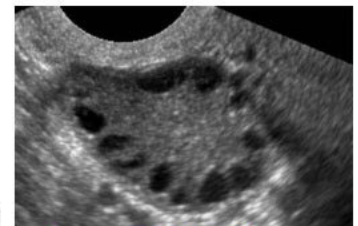
- Anovulation
- Infertility
- Hirsutism
- d/t Hyperandrogenesim
- Obese
- d/t insulin resistance
- oligomenorrhea
- Amenorrhea

#### LAB PARAMETERS

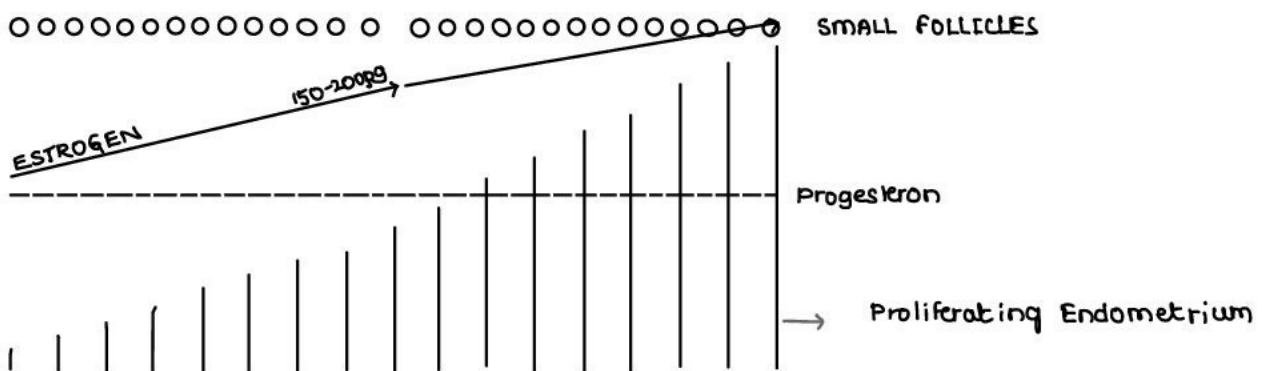
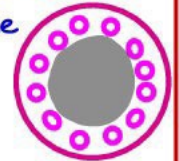
- LH : FSH
- Serum Testosterone
- Serum Androstenedione
- SHBG [Sex Hormone Binding Globulin]
- Serum Insulin

#### APPEARANCE → MISNOMER

- MULTIPLE SMALL FOLLICLES around the periphery of ovary
  - 2 - 6 mm [ $\leq 9$ mm]
  - 10 - 12 per each ovary
- THICK STROMA
- ovary is 2-5 times larger than Normal



Ring of Pearl/  
Necklace of Pearl  
Appearance



SHEDDING OF ENDOMETRIUM IS DUE TO ISCHEMIC WITHDRAWAL

## HIRSUTISM & ↑ Serum Testosterone & Androstenedione

- dit Hyperandrogenism
- Androgen  $\xrightarrow{\text{Aromatase}}$  Estrogens [Irreversible React<sup>n</sup>]

→ ↑ ESTROGEN

↓  
↓ FSH & ↑ LH

→ LH : FSH → 1:1 normal  
→ 3:1 > 2:1 in PCOD

- LH	→	STROMA	→	ANDROGENS	→	NORMAL
- ↑ LH	→	THICK STROMA	→	↑ ANDROGENS	→	HIRSUTISM

→ ↑ Androgens  $\begin{cases} \rightarrow \uparrow \text{Serum Testosterone} \\ \rightarrow \uparrow \text{serum Androstenedione} \end{cases}$

↓

↓ Sex Hormone Binding Globulins

↓

↑ Free ANDROGENS

↓

HIRSUTISM

INSULIN RESISTANCE → Less glucose uptake in ovary

↓

Less energy

↓

Follicles do not grow

→ ↑ Serum insulin

→ Obesity & IR



→ Dark  
Shiny  
velvety  
acral Deposits } **ACANTHOSIS NIGRICANS**  
- Cutaneous marker of Insulin Resistance

→ **HA IR AN Syndrome**

HA → Hyper Androgenesis  
IR → Insulin Resistance  
AN → Acanthosis Nigricans

→ **METABOLIC SYNDROME**

→ waist →  $\geq 35$  inches [ $\geq 89$  cm]  
→ Tri Glycerides →  $> 150$  mg/dl  
→ HDL →  $< 50$  mg/dl  
→ BP →  $> 130/85$  mm Hg  
→ fasting glucose → 110-126  
→ 75 gms OGTT 2hr values →  $> 140-199$   
  
→ At least 3 or more → metabolic syndrome

**TREATMENT**

**ANOVULATION TREATMENT**

- ① ↓ weight → ovulation [in 30% cases]
- ② Insulin sensitizers [metformin] → Ovulate [in 30% cases]
- ③ CLOMIPHENE CITRATE → Ovulate [in 80% cases]  
→ Pregnant [in 40% cases]

④ Inj Recombinant FSH

⑤ Inj Human Gonadotropins

⑥ Aromatase Inhibitor → **LETROZOLE** [1st Line Drug]

**IRREGULAR CYCLES TREATMENT**

① COMBINED ORAL CONTRACEPTIVE PILLS

② PROGESTERONE ONLY PILLS

for 10 days [from 14th day/mid cycle]

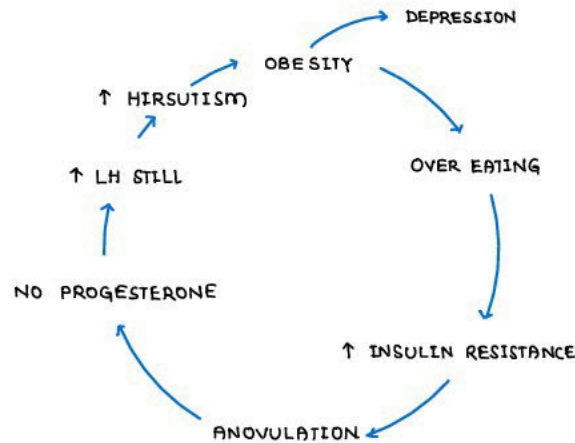
for 5 days [from 20th day]

## HIRSUTISM TREATMENT

### ① ANTI ANDROGENS

- CYPROTERONE ACETATE
- FINASTERIDE
- FLUTAMIDE
- SPIRANOLACTONE [1st line drug]

### ② COSMETIC TREATMENT for hair → Prevents Depression



15-20% Women in world have PCOS [1 in 5 females]

mc endocrinological disorder of reproductive age group → PCOS

mc cause of Hirsutism → PCOS

## ROTTERDAM / ESHRE / ANDROGEN EXCESS SOCIETY / ASRM CRITERIA

DIAGNOSTIC REQUISITES → Any 2 of the 3

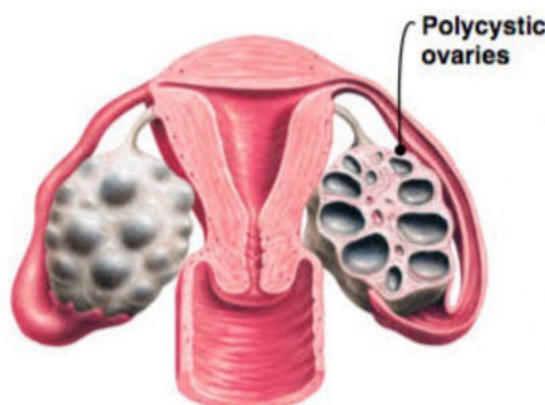
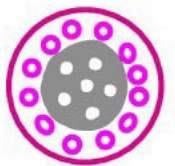
- ① Anovulation
- ② Hyperandrogenesim
  - clinical
  - Lab
- ③ +/- PCO Look On USG

LAPAROSCOPIC  
OVARIAN  
DRILLING

## SURGICAL TREATMENT

### ① LAPAROSCOPIC OVARIAN DRILLING

- THICK STROMA → ↑ Local Androgens → Harder follicles
- PURPOSE → ↓ Androgenic stroma → Better follicular growth



## CERVICAL CARCINOMA

- mc cancer of women in India → CA Cervix

### SCREENING

#### PAP SMEAR

- by Iyer's spatula
- Sensitivity → 47 to 62%.
  - ⊕ cytobrush → ↑ Sensitivity upto 90%.
- SITE → Transformat<sup>n</sup> zone (Squamo columnar Junction)
  - Endometrium → columnar
  - Vagina & cervix → Squamous
- Located at 1.7 to 2.3 cm from the External OS  
changes locat<sup>n</sup> i age group

### ETIOLOGY

- HPV
    - 16 → mc
    - 18 → most malignant
  - HSV 1 & 2
  - HIV 1 & 2
  - Commercial sex worker
  - women i many partners
  - Partner i STD
  - Early intercourse [ < 16 yrs]
  - Smokers
  - Low Socio Economic Status
- 
- Time to do pap smear
    - Any women > 21 yrs of age
    - Any women 3 yrs after 1st Sexual exposure in India
    - If negative → do yearly hence
    - If Pap smear & HPV DNA negative → do 3 yrly
    - > 65 yrs, no more pap smear is required  
if 10 smears are negative after menopause
- 
- SUSCEPTIBLE TIMINGS
    - at puberty
    - after delivery

→ SCREENING TEST → done on women at risk

### DYSPLASIA CLASSIFICATION

CIN I	→	1/3 rd abnormal	→	LOW GRADE LESION
CIN II	→	>1/3 rd to <2/3 rd abnormal	}	HIGH GRADE LESIONS
CIN III	→	>2/3 rd abnormal		
CIS	→	all cells are abnormal		

### MANAGEMENT

#### CIN I MANAGEMENT

→ CIN I  $\xrightarrow{\text{5yrs}}$  CIN III  $\xrightarrow{\text{10yrs}}$  CA CERVIX

→ 6 monthly pap smear  
Antivirals & Antibiotics given  
HPV DNA is done

→ CIN I & CIN II → 65-80% regress spontaneously

#### CIN III MANAGEMENT

→ conizati<sup>n</sup> not done

Problems w/ conizati<sup>n</sup>

→ short cx → incompetence → abortions  
→ stenosed → infertility

→ COLPOSCOPIC [vaginoscopic] BIOPSY DONE

→ Acetic Acid used

coagulate the proteins → make the area ACETO WHITE  
Biopsy is taken from Acetowhite areas

→ Schiller Iodine [LUGOL IODINE] can be used  
stains the glycogen rich areas → MAHOGANY BROWN  
Biopsy taken from Schiller NEGATIVE AREAS

→ VIAA → visual inspect<sup>n</sup> under Acetic Acid  
VILI → visual inspect<sup>n</sup> under Lugol's iodine } also be done

→ Results of colposcopic Biopsy

1. Invasive cancer cx → Rx by Radical hysterectomy

2. Biopsy Proven CIN III → Rx by LLETZ [LEEP]

LLETZ - large loop excis<sup>n</sup> of transmiss<sup>n</sup> zone } BEST  
LEEP - Loop electro surgical excis<sup>n</sup> Procedure } Rx

→ Rx LASER CONIZATI<sup>n</sup>

- expensive & Difficult



- $S_x$  CONIZATION [ if > 35 yrs ]
- HYSTERECTOMY [ if > 40 yrs ]

### SYMPTOMS OF CA CERVIX

- Abnormal bleeding
  - Post coital bleeding [mc]
  - Post menopausal bleeding
- foul smelling discharge
- cancer cachexia
- cancer pain
- Pyometra → Dirty vaginal discharge
- Uremic symptoms

### Mx OF POST COITAL BLEEDING

#### DO COLPOSCOPIC BIOPSY

- done in Post coital bleeding
  - CIN III [ Cervical Intra epithelial Neoplasia ]
  - CIS [ carcinoma in situ ]

### STAGING

- DO Local examinat<sup>n</sup>
  - Per Speculum examinat<sup>n</sup>
  - Per vaginal examinat<sup>n</sup>
- for cervical lesion
- Per rectal examinat<sup>n</sup> → for Parametrium
- cystoscopy → for bladder
- Proctosigmoidoscopy

### STAGE I

#### IA

- Limited to cervix
- microscopic cancer
  - A<sub>1</sub> Depth → < 3mm
  - A<sub>2</sub> Depth → 3-5mm
- < 7mm transverse spread

#### IB

- Macroscopic cancer
  - B<sub>1</sub> < 4 cm
  - B<sub>2</sub> > 4 cm

### STAGE IIA

#### IIB

- Upper vagina involved
- Parametrium involved, but short of Pelvic side wall

### STAGE IIIA

#### IIIB

- Lower 1/3 rd vaginal involvement
- Parametrium involved till pelvic side wall [Hydronephrosis +]

→ mc presentat<sup>n</sup> of CA cervix in India → IIB

STAGE IVA → Bladder & Bowel involvement

IVB → Distant metastasis

→ Cervix doesn't drain into inguinal group of lymph nodes  
inguinal group of lymph nodes are not involved

→ cervical cancer spreading to endometrium does not change staging

### TREATMENT

STAGE I - IIA → Radical hysterectomy

STAGE ≥ IIB → Chemo Radiation

Radiotherapy alone is effective & in all stages

STAGE I A <sub>1</sub>	→	< 4 cm
STAGE I A <sub>2</sub>	→	> 4 cm

Maximum radiat<sup>n</sup> given at

#### POINT A

- 2 cm above & 2 cm lateral to external os
- Ureter crosses the uterine artery [bridge over water] here  
ureter is under the uterine artery
- Parametrium seen here
- upto 4500 to 8000 RADs given here

#### POINT B

- 3 cm lateral to point A
- Obturator lymph nodes at the pelvic side walls  
Obturator LN → Sentinel group of LN
- upto 6000 RADs given here

### HISTOPATHOLOGY

1 Squamous cell carcinoma

a Large cell Keratinising variant [mc]

b Large cell Non Keratinising variant

c Small cell variant

→ mc cause of death in CA cervix

2nd mc cause of death

3rd mc cause of death

→ uremia

→ Haemorrhage

→ infect<sup>n</sup>

→ most common site of beginning of cancer → Anterior Lip

## VACCINES

### 1 GUARDASIL

quadrivalent

16, 18, 6, 11

### 2 CERVARIX

Bivalent

16, 18

→ chance of prevent<sup>n</sup> if given before exposure → Upto 90%.

chance of prevent<sup>n</sup> if given after exposure → Upto 40%.

→ Given after 9 yrs, upto 25 yrs

## VULVAR CARCINOMA

→ Age group →  $\cong$  65 yrs

### PRESENTATION

- Pruritis [mc]
- mass in perineum
- Lump in perineum
- Cancer cachexia
- cancer pain

### PREDISPOSING FACTORS

- HPV 6
- VIN [vulval intra-epithelial neoplasia]
- CIN
- Lichen sclerosis
- Smoking
- Alcoholics
- Immuno suppressants
- Squamous hyperplasia

### TYPES

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

### SQUAMOUS CELL CARCINOMA

BASALOID [WARTY]	KERATINIZING
<ul style="list-style-type: none"><li>→ younger age group</li><li>→ multifocal</li><li>→ Predisposing factors<ul style="list-style-type: none"><li>HPV</li><li>VIN</li><li>Smoking</li></ul></li></ul>	<ul style="list-style-type: none"><li>→ older age group</li><li>→ unifocal</li><li>→ Predisposing factors<ul style="list-style-type: none"><li>No a/w HPV</li><li>a/w Lichen sclerosis</li><li>a/w squamous hyperplasia</li></ul></li></ul>

### 5 YEAR SURVIVAL

- ca vulva w/ Inguino femoral LN involvement →  $> 90\%$
- ca vulva w/ Inguino femoral LN involvement →  $\leq 50\%$

→ Groin recurrence → POOR PROGNOSIS



## DIAGNOSIS

- Labia majora involved in 60%.
- Clitoris involved in 15%.
- IF lesion is
  - $\leq 1\text{cm}$  → excisional Biopsy
  - $> 1\text{cm}$  → Keys punch Biopsy



KEYS PUNCH

## INCIDENCE OF LN INVOLVEMENT

- Stage I 10%
- Stage II 30%
- Stage III 70%
- Stage IV 100%

## STAGING

STAGE I		Limited to vulva
	IA	Size → $< 2\text{cm}$ , Invasion → $< 1\text{mm}$
	IB	Size → $> 2\text{cm}$ , Invasion → $> 1\text{mm}$
STAGE II		Adjacent Organ involvement
		Lower 1/3 rd vagina Lower 1/3 rd of urethra, anus
STAGE III		Inguinal Femoral LN involvement
	IIIAi	one LN → $> 5\text{mm}$
	Aii	one or two LN → $< 5\text{mm}$
	IIIBi	two LN → $> 5\text{mm}$
	Bii	more than 3 LN → $< 5\text{mm}$
	IIIC	LN involvement (+), 2 extra capsular spread
STAGE IV		
	IVAi	upper urethra, upper vagina, rectal involvement growth stuck to pelvic bone
	Aii	fixed or ulcerated LN
	IVB	Distant metastasis Pelvic LN

- STAGE I } NO LN INVOLVEMENT
- STAGE II }

## TREATMENT

### STAGE I & II

→ Radical vulvectomy  
Sentinel LN Biopsy  
Superficial Inguinal  
Deep inguinal  
femoral

if negative → Radical vulvectomy alone

if positive → Radical vulvectomy + LN removal

### STAGE III & IV

→ Chemotherapy → follow w/ surgery  
Mitomycin  
5FU

Radiotherapy → follow w/ surgery

### STAGE IA

→ WIDE EXCISION

## FIBROIDS

- monoclonal tumors
- Pseudo capsule may be present
- always starts in intramural area → Pushes Fibroid  
either Submucosal or Subserosal

### ETIOLOGY

- incidence
  - 30% of women
  - >50yrs → 80%.
- 2.5 times of more chance if female relative has one
- a/w chromosomal abnormality [40%]
  - 12 - 14 Translocation
  - 12 Trisomy
  - 7 deletion
- obese women
- red meat eater
- nulliparous women
- Estrogens & progestogens
- Growth factors
  - Transforming growth factor  $\beta$
  - Platelet derived growth factor
  - Epithelial growth factor

### CLINICAL FEATURES

#### SYMPTOMS

- PAIN
  - d/t contraction  
compression  
compaction  
degeneration
- BLEEDING
  - d/t  $\uparrow$  endometrial recruitment  
poor contractility  
 $\uparrow$  vasodilator Prostaglandins
- INFERTILITY
  - d/t compression  
FB action

## → BOWEL & BLADDER SYMPTOMS

↑ Frequency [mc]

retent<sup>n</sup> of urine also present

## DIAGNOSIS

- USG → also used for mapping
- MRI [Best]

## R<sub>x</sub> OF FIBROIDS

- |   |                  |
|---|------------------|
| → Small [ $<5\text{cm}$ ] & No pain/bleeding/fertility  | → No Rx required |
| → Small [ $<5\text{cm}$ ] & pain/bleeding/fertility     | → Rx given       |
| → Large [ $>10\text{cm}$ ]                              | → Rx given       |
| → Large [ $>10\text{cm}$ ] & No pain/bleeding/fertility | → Rx given       |

## → Larger the fibroid $\propto$ DEGENERATIVE CHANGES

- Hyaline degenerat<sup>n</sup>
- Red degenerat<sup>n</sup>  
in pregnancy, in 2nd trimester  
mostly conservative Rx  
never operate
- Lipoid degenerat<sup>n</sup>
- calcific degenerat<sup>n</sup> → WOMB STONE
- sarcomatous degenerat<sup>n</sup> [ $<0.5\%$ , rarest]

## MEDICAL MANAGEMENT

- ↓ Bleeding
- ↓ Size

### ① NSAIDs

② GnRH Analogues by Depot form → Down regulate pituitary

③ GnRH Antagonists [CETROTIDE]

④ MIFEPRISTONE → antiprogesterone → ↓ Size

⑤ PROGESTERONE [IUCD Levonorgestrel] → ↓ Bleeding

### ⑥ UTERINE ARTERY EMBOLIZATION

- uses Poly vinyl Alcohol particles
- Upto 80% reduct<sup>n</sup> in pain & bleeding

### ⑦ HIGH FREQUENCY USG

- HIFU → High Frequency focussed USG
- MRGFUS → MR Guided focussed USG

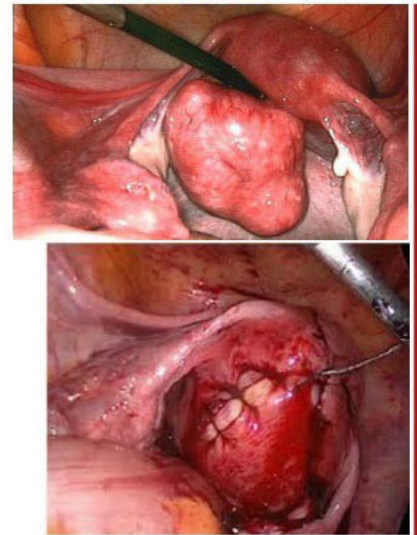


## SURGICAL MANAGEMENT

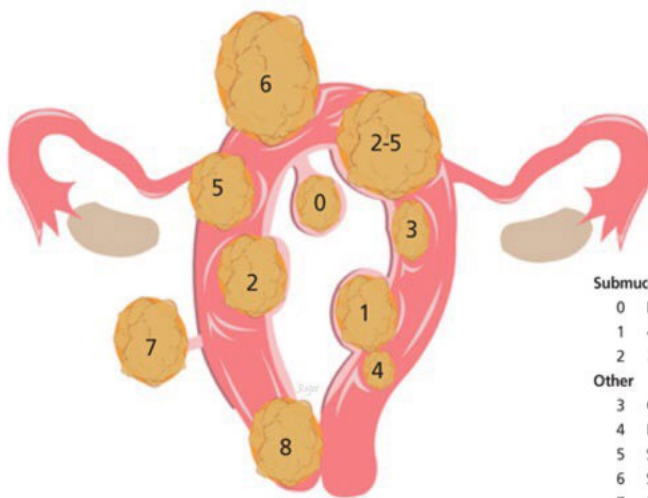
### PRE REQUISITES

- Hb → > 10gml.
- arrange blood
- minimize incision on uterus  
avoid posterior wall incision [S/E → Retroversion]
- Technique to ↓ blood loss
  - tourniquet usage
  - vasopressin usage
- ↓ handling of fallopian tube
- Semen Analysis
- FIBROID IN PREGNANCY → Rx is CONSERVATIVE
- in younger women → MYOMECTOMY
- in older women → HYSTERECTOMY

### MYOMECTOMY



### FIGO CLASSIFICATION



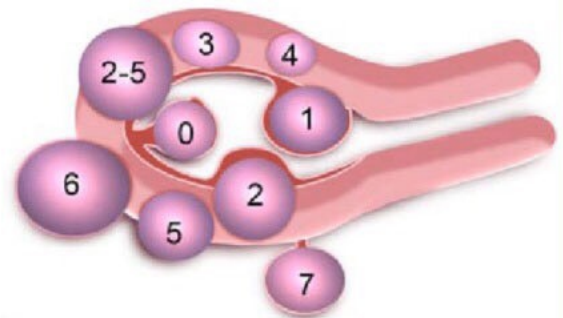
#### Leiomyoma subclassification system

##### Submucosal

- 0 Pedunculated intracavitary
- 1 <50% intramural
- 2 ≥50% intramural

##### Other

- 3 Contacts endometrium 100% intramural
- 4 Intramural
- 5 Subserosal ≥50% intramural
- 6 Subserosal <50% intramural
- 7 Subserosal pedunculated
- 8 Other (specify e.g., cervical parasitic)



- if a fibroid is impinging on 2 locations at once, then the mucosal relation should mention first

## CLASSIFICATION

- Total
- Subtotal
- Abdominal
- vaginal
- 1 or 2 out BIL Salpingo Oophorectomy
- 1 or 2 out UIL Salpingo Oophorectomy
- Emergency
- Planned
- Obstetric indication
- Gynecological indications
- Laparoscopic
- open
- robotic

## INDICATIONS

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

## PRE REQUISITES

- Consent
- rule out pregnancy
- Pap smear examinatio<sup>n</sup>
- arrange blood
- Precautious measures for Venous thrombo embolism
- INDUCTIVE Antibiotics [1 in 1 hr]

## COMPLICATIONS

INTRA OP INJURIES to Bowel, Bladder & vessels

### URETER INJURY

- In a hysterectomy, mc site of injury → at the site of crossing the uterine artery
- Overall, mc site of injury → at the Pelvic Brim

## POST OP COMPLICATIONS

### HEMORRHAGE

- Immediate → visualized  
if retroperitoneal [Look for signs - ↑PR, shock]
- Reactionary → in 1st 24hrs dlt slippage of ligature
- Secondary → > 24hrs uptill 2-3 weeks dlt infections

WOUND INFECTIONS [4-6% cases]

CUFF CELLULITIS [vaginal cuff]

URINARY RETENTION - dit bladder hypotonia

URITERIC INJURY

- Post op flank pain
- do USG/CT for Dx
- do cystoscopy to localize the block

BLADDER INJURY

- vesico vaginal fistula
- Uretero vaginal fistula

PROLAPSE OF FALLOPIAN TUBE through the vault



CUFF DEHISCENCE

- advice not to have intercourse for 6 weeks

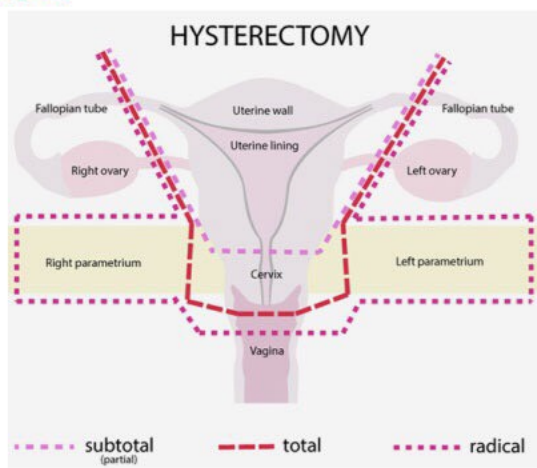
### LAPAROSCOPIC HYSTERECTOMY

① LAVH [Laparoscopic Assisted vaginal Hysterectomy]

- Diagnostic laparoscopy + vaginal Hysterectomy
- Adhesiolysis + vaginal Hysterectomy
- Resection of Adnexae
- Uterines Resected after bladder mobilization

② Total Laparoscopic Hysterectomy

### METHODS



### OVARIES

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

### PROPHYLACTIC OOPHORECTOMY

- BRCA I & BRCA II
- 1° female relatives having CA Breast, CA Ovary → 10-50% Risk

## GENITAL TRACT INFECTIONS

### → OVERZEALOUS CURETTAGE for

- AUB (Abnormal uterine bleeding)  
MTP  
2° PPH [dlt retained bits of placenta]
- Scarring of endometrium [no gland development further]
- leads to 2° amenorrhea → ASHERMAN SYNDROME

### → ENDOMETRIAL TB

- also causes ASHERMAN SYNDROME

CURETTAGE DONE FOR 2° PPH IS MORE LIKELY TO CAUSE ASHERMAN SYNDROME

### - Rx of ASHERMAN SYNDROME

- Hysteroscopic Adhesiolysis
- Follow  $\bar{c}$  High Dose Estrogens & Progestogens

## TUBERCULAR PID

- 20-25% of women in India
- Endometritis → Menorrhagia [initially]



Endometrial destruct<sup>n</sup>



ASHERMAN SYNDROME → Oligomenorrhea  
Hypomenorrhea  
Amenorrhea [mc]

### → Fallopian Tube

- calcific, beaded, rigid tube
- Hydrosalpinx → TOBACCO POUCH HYDROSALPINX
- RETORT SHAPED HYDROSALPINX

## Rx

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



## PELVIC INFLAMMATORY DISEASE

### CAUSES

- Chlamydia → most prevalent ; Indolent
- Gonorrhea → most common in OPD
- Mycoplasma
- TB
- Ureaplasma
- Bacteroides
- Pepto streptococcus
- Bacterial vaginosis
- Streptococcus

### CLINICAL FEATURES

#### SYMPTOMS

- Pain abdomen
- Congestive dysmenorrhea
- Dysparunia
- Fever

#### SIGNS

- Febrile
    - Admit IF
      - Temp →  $> 38^{\circ}\text{C} / 100.4^{\circ}\text{F}$
      - Severe symptoms
      - Suspicious abscess
      - Unreliable
      - Uncertain diagnosis
  - ↑ CRP
  - Leucocytosis
  - On P/V
    - cervical mot<sup>n</sup> tenderness
    - Uterine tenderness
    - Adnexal tenderness
- } CLINICAL TRIAD  
helps in diagnosis

CERVICAL MOTION TENDERNESS ALSO BE SEEN IN RUPTURED ECTOPIC PREGNANCY

### DIAGNOSIS

- Culture
  - vaginal swab
  - cervical swab
  - Endometrial Bx
- Laparoscopy "IF DONE" is the best way to diagnose PID

→ Discharge when fever is →  $< 99.5^{\circ}\text{F}$

## TREATMENT

→ CENTRE FOR DISEASE CONTROL

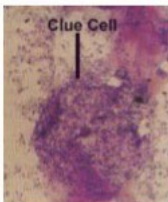
- INPATIENT REGIMES
- OUTPATIENT REGIMES

→ Broad spectrum antibiotics

→ OPD REGIME

- CEFOXITINE 2gm iv or  
CEFOTAXIME 1gm iv } 1 shot for gonorrhea
- DOXYCYCLINE 100gm BD x 14 Days → for chlamydia
- METRONIDAZOLE 500mg BD x 14 Days → for anaerobes  
for Bacterial vaginosis
- AZITHROMYCIN can be given instead of DOXYCYCLINE
- CLINDAMYCIN can be given instead of METRONIDAZOLE

## VAGINITIS

CANDIDIASIS	BACTERIAL VAGINOSIS	TRICHOMONIASIS
<p>→ DIMORPHIC FUNGI</p> <p>Blastospores [Spread] Mycelia [invas<sup>n</sup> &amp; adhere<sup>n</sup>]</p> <p>→ curdy white discharge plaques on vaginal wall on removal → Petechiae</p> <p>→ out of proport<sup>n</sup> PRURITIS</p> <p>→ complicated / uncomplicated</p> <p>uncomplicated</p> <ul style="list-style-type: none"> <li>- seen in (N) women</li> <li>- Good prognosis</li> <li>- always albicans</li> </ul> <p>complicated</p> <ul style="list-style-type: none"> <li>- in immunocompromised [in DM, TB, pregnancy etc]</li> <li>- Recurrent, Severe</li> <li>- always non-albicans</li> </ul> <p>→ TREATMENT</p> <ul style="list-style-type: none"> <li>- AZOLES</li> <li>- Oral FLUCONAZOLE</li> <li>- Rx both ♂ &amp; ♀</li> </ul>	<p>→ Hemophilus vaginalis aka Gardenella vaginalis</p> <p>→ creamy discharge</p> <p>→ WHIFF TEST → +ve</p> <ul style="list-style-type: none"> <li>- Secret<sup>n</sup> + 10% KOH → amines</li> </ul> <p>→ Fishy odour</p> <p>→ CLUE CELLS - vaginal epithelium embedded bacteria</p> <p>→ NO PRURITIS</p>  <p>→ TREATMENT</p> <ul style="list-style-type: none"> <li>- METRONIDAZOLE</li> </ul>	<p>→ by Trichomonas vaginalis flagellate protozoan motile organism causes severe irritat<sup>n</sup> causes Severe pruritis</p> <p>→ COLPITIS MACULARIS [STRAWBERRY VAGINA]</p> <p>→ Greenish yellow, frothy discharge</p> <p>→ TREATMENT</p> <ul style="list-style-type: none"> <li>- METRONIDAZOLE</li> <li>- Rx both man &amp; woman</li> </ul>

### AMSEL'S CRITERIA

- useful in Dx of Bacterial vaginosis
- $\geq 3$  out of 4 are required
  - 1 creamy discharge
  - 2 WHIFF TEST  $\oplus$
  - 3 Fishy odour
  - 4 CLUE CELLS

PH of vagina	→ 4.5	[candidiasis can occur in acidic pH]
Bacterial vaginosis	}	can occur in Alkaline PH [ $>7$ ] Alkalinity shift also predispose [5.5 or 6...]
Trichomoniasis		

### → MC VAGINITIS → BACTERIAL VAGINOSIS

BACTERIAL VAGINOSIS can cause

- PID
- Relapse of PID
- chorioamnionitis [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

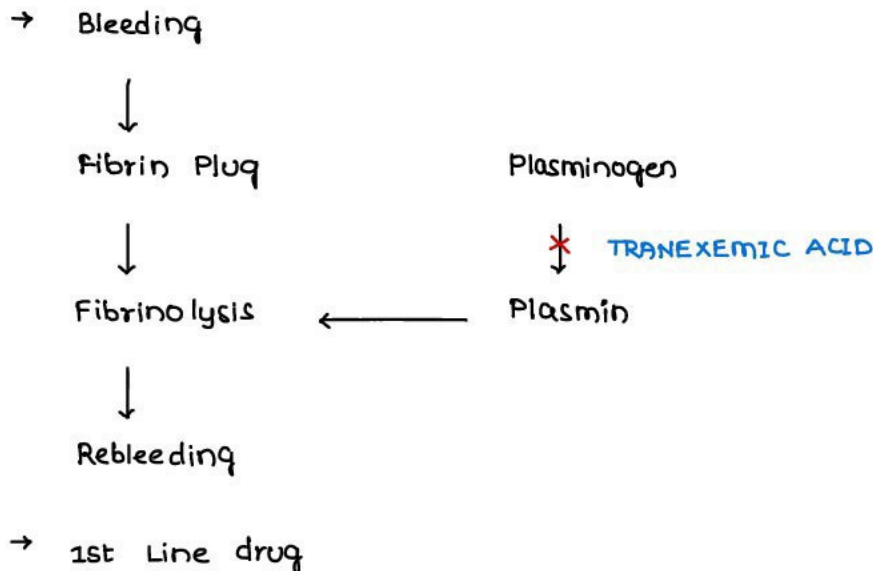
## ABNORMAL UTERINE BLEEDING

### MANAGEMENT

#### 1 NSAIDS

- inhibits vasodilator prostaglandins
- ↓ Pain
- ↓ bleeding in uterine blood vessels
- 1st Line drug

#### 2 TRANEXEMIC ACID



#### 3 HORMONAL MANAGEMENT

- PROGESTERONE                      → stabilizes the endometrium
- ESTROGEN                              → forms new endometrial glands

ESTROGEN WITHDRAWAL > PROGESTERONE WITHDRAWAL

- COMBINED ORAL CONTRACEPTIVE PILLS
- DANAZOL / ANDROGENS              → leads to Endometrial atrophy
- GnRH ANALOGUES                      → down regulat<sup>n</sup> of Pituitary
- IUCD LEVONORGESTROL [MIRENA]

#### 4 SURGICAL MANAGEMENT

- THERAPEUTIC CURETTAGE /  
HEMOSTATIC CURETTAGE /  
DILATATION & CURETTAGE [DNC]
- B/L UTERINE ARTERY EMBOLIZATION by PVA [poly vinyl Alcohol] Particles
- TRANS CERVICAL RESECTION OF ENDOMETRIUM [TCRE]
- MICROWAVE METHOD
- THERMAL METHOD                      → 87°C x 8 min
- HYSTERECTOMY



## CAUSES

- 1 Tumors
- 2 Infections
- 3 Pregnancy related causes
  - 28th July → Last menstrual Period
  - ↓
  - 11th August → Ovulated
  - ↓
  - Embryo implanted on fallopian tube on 17th August
  - ↓
  - 28th August missed her period
  - ↓
  - 30th August bleeding occurs
    - mc fct of ectopic pregnancy → vascular inefficiency
    - embryo degenerat<sup>n</sup>
    - ↓ Progesterone
    - SHEDDING OF DECIDUA
  - other outcomes of ectopic pregnancy → Tubal abort<sup>n</sup>  
Rupture
- 4 Systemic Disorder
  - Hypothyroidism
  - Liver disorder
- 5 Coagulat<sup>n</sup> defects → von Willebrand disease, ITP
- 6 Drugs → Heparin, Warfarin, COCP, IUCD
- 7 Dysfunctional uterine bleeding → Diagnosis of exclusion

## DUB [DYSFUNCTIONAL UTERINE BLEEDING]

### CONDITIONS

#### ANOVULATORY DUB

- 1 Pubertal girls
- 2 Perimenopausal women
- 3 Metropathia Haemorrhagica

→ ANOVULATORY DUB → mc  
in 65% of anovulatory DUB, the Endometrium is Hyperplastic

## OVULATORY DUB

### 1 Corpus luteal ↓ed function



Irregular ripening



Premenstrual Spotting / Bleeding

### 2 Corpus Luteum ↑ed function



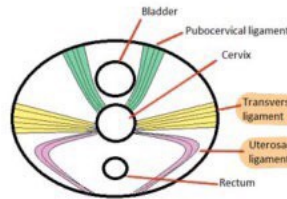
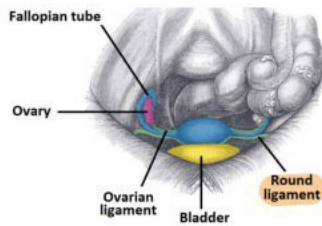
irregular shedding



Post menstrual spotting / Bleeding

## SUPPORTS OF UTERUS

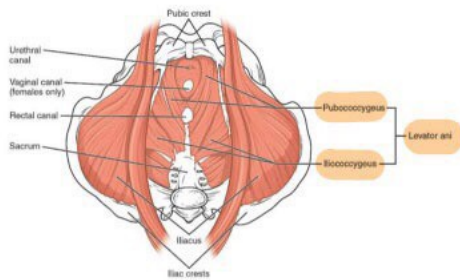
### LIGAMENT SUPPORT



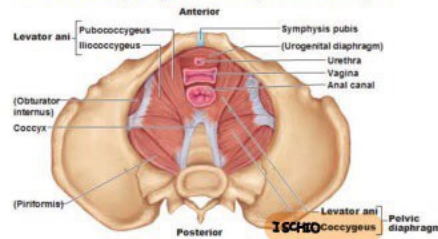
**Mackenrodt's ligament**

← most important among ligaments

### MUSCULAR SUPPORT



The Pelvic Diaphragm = the deepest muscle layer



→ Muscles are the best supports of the uterus

## CAUSES

→ **Abnormal conduct of labour** → most important cause

Early bearing down  
prolong 2nd stage  
faulty instrumental<sup>n</sup>  
early resumpt<sup>n</sup> of work  
multiparity

→ **Connective tissue disorders**

→ **Spina bifida**

→ **↑ abdominal pressure**

ascites

chronic cough

abdominal mass

**EARLY BEARING DOWN** [against the partly dilated [3cm or 5cm] cervix]

→ Leads to cervical stretching/elongation & cervical descent

→ In PAROUS PROLAPSE, usually cervical elongat<sup>n</sup> is present

### PROLONGED 2nd STAGE OF LABOUR

→ in Primis → ≈ 1hr ; Upper limit is 2hr

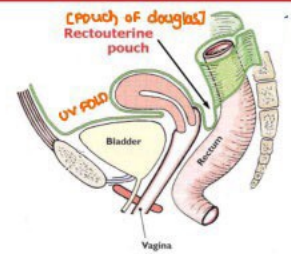
in multi → ≈ 1/2 hr ; Upper limit is 1 hr

→ Ischemic damage of nerves causing Neuronal injury

- Single most important injury predisposing to prolapse

## FAULTY INSTRUMENTATION

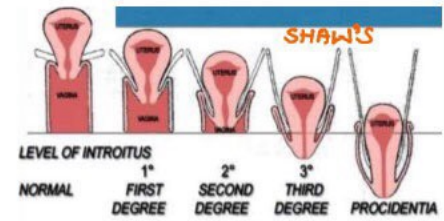
- Good instrumentat<sup>n</sup> prevents prolapse
- Faulty instrumentat<sup>n</sup> causes prolapse



EARLY RESUMPTION OF WORK → < 6 wks of puerperium

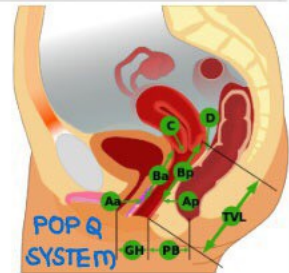
## SHAW'S CLASSIFICATION

- STAGE I → cervix is just below the N level
- STAGE II → cervix is at introitus
- STAGE III → cervix is outside
- STAGE IV → PROCIDENTIA  
[full uterus has prolapsed]



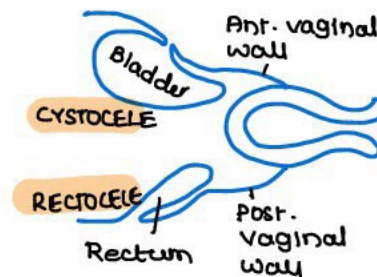
## POP Q SYSTEM

- Pelvic Organ Prolapse Quantification System
- Reproducibility is good & good for comparison



## PARTS OF PROLAPSE WHEN YOU GO FROM ANTERIOR TO POSTERIOR

- Anterior vaginal wall
- Urethrocele
- Cystocele
- Uterus
- Rectocele
- Posterior vaginal wall



## CYSTOCELE - COMPLICATIONS

- Difficult in initiat<sup>n</sup> of micturition
- Retention of urine
- Infection
- Stone format<sup>n</sup>

## RECTOCELE - COMPLICATIONS

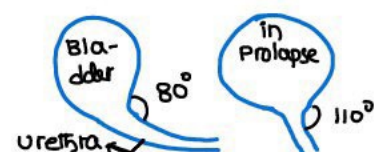
- difficult initiat<sup>n</sup>
- fecolith format<sup>n</sup>



REPOSIT<sup>n</sup> by PESSARY

## OTHER COMPLICATIONS

- Venous congest<sup>n</sup> dlt vaginal band → DEOXYGENATED UTERUS
- DECUBITOUS / DEPENDENT ULCER [dlt venous congest<sup>n</sup>]  
- R<sub>1</sub> → Repositioning & Pessary
- STRESS URINARY INCONTINENCE
- Dragging sensat<sup>n</sup>  
something coming out of vagina } mc presentat<sup>n</sup>  
sense of insecurity in the vagina / Perineum





## PREVENTION OF PROLAPSE

- Physiotherapy
  - antenatal
  - post natal

## TREATMENT

- Rx for elderly women [mc age group]

### 1 VAGINAL HYSTERECTOMY & PELVIC FLOOR REPAIR

- aka WARD & MAYO'S OPERATION
- Hysterectomy done
- Repositioned bladder & rectum
- vault closure done
- Anterior colporrhaphy done
- Posterior Colpo perineorrhaphy done } PELVIC FLOOR REPAIR

#### → VAULT PROLAPSE

- present in 3-4 months of surgery of WARD & MAYO'S OPERAT<sup>n</sup>
- dlt pressure by enterocele through peritoneal defects
- mc cause → neglected enterocele
- Prevented by High ligat<sup>n</sup> or closure of peritoneal defect
- Rx by SACROSPINOPEXY / SACROPEXY
  - Reposit<sup>n</sup> the vault physically
  - tie the vault to ischial spines or uterosacral ligament

#### → STRESS URINARY INCONTINENCE

- present by 2-3 weeks of Sx [hysterectomy]
- dlt improper anterior wall repair

- Rx for younger women

### FOTHERGIL REPAIR / MANCHESTER REPAIR

- Reposit the uterus
- DNC [Dilatation & curettage] to be done
- DO cervical amputat<sup>n</sup> for the lax / elongated cervix
- & Fothergil Stich, Support the uterus & Mackenrodt's ligament
- Pelvic floor repair done along & Fothergil Stich
- Reposit the bladder & rectum
- Pioneered by DONALD in Manchester city Hospital

→ R<sub>1</sub> for NULLIPAROUS PROLAPSE of very young women

### SLING SURGERIES

- Tie a sling to the posterior part of Cervix & pull in & tie inside
- SHIRODKAR SLING → tie to Anterior longitudinal ligament
- KHANNA'S SLING → tie to Anterior Superior iliac spine
- PURANDARE'S SLING → rectus sheath

### STRESS URINARY INCONTINENCE

- d/t improper anterior colporrhaphy
- can be a complication in 2-3 wks after hysterectomy

#### → Surgical Management

- 1 PEYRERA'S } - Needle suspension procedure
- 2 STAMEY'S } - uplifting of urethra

- 3 MMK'S COLPOSUSPENSION } uplifting of ant. vaginal wall
- 4 BURCH COLPOSUSPENSION }

5 TRANS VAGINAL TAPE

6 KELLY'S STITCH



- Plicate the Paravesicle tissues under the bladder neck

→ BEST LONG LASTING RESULTS GIVEN BY COLPOSUSPENSION [upto 95%]

## URINARY FISTULA IN OBSTETRICS

### OBSTRUCTED LABOUR

- No progress of labour inspite of GOOD UTERINE CONTRACTIONS
- R<sub>y</sub> by Cesarean Section
- In the case of ischemic injury to vagina & bladder
  - 5-7 days later, Vesico vaginal Fistula presents
  - Prevented by urinary catheterizat<sup>n</sup> from 14-21 days

### URINARY FISTULAS IN OBSTETRICS

#### CAUSES OF VESICO VAGINAL FISTULA

##### ① OBSTETRIC CAUSES

- Obstructed labour
- Faulty instrumentat<sup>n</sup>
- Destructive operations

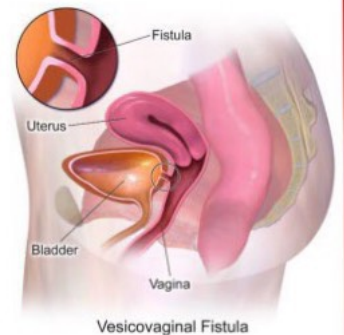
##### ② GYNECOLOGICAL CAUSES

- Hysterectomy
- WERTHEIM → ureteric dissections

##### ③ RADIATION INJURIES → painful fistula

### PRESENTATION

- constant dribbling of urine
- Vulva & thighs are excoriated
- Splash dysuria
- UTI



### TREATMENT

- 1 DIVERT THE STREAM → I catheter
- 2 ZINC CREAM ON THIGH → works as Emollient
- 3 ANTIBIOTICS
- 4 REPAIR
  - Do not repair immediately
  - wait for scarring to happen
  - wait for 2 1/2 - 3 months

### DIAGNOSIS

##### ① 3 SWAB TEST

- Methylene blue is injected into the bladder



3 SWAB TEST

##### ② Mid vaginal fistula

- mc in our country
- d/t obstructed labour



## ⑥ HIGH VAGINAL FISTULA

- d/t forceps vaginal hysterectomy

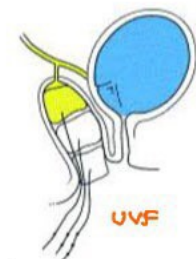
## ⑦ LOW VAGINAL FISTULA

- d/t urethro vaginal fistula or Low vaginal fistula d/t radiat<sup>n</sup> injury

→ Destructive operations can cause any type of fistula

**CASE** → Top most cotton ball is not blue in color but it is colourless but WET

- urinary source is not bladder
- source is ureter → **URETERO VAGINAL FISTULA**
  - Leaking + Continence +nt



## ⑧ DOUBLE DYE TEST

- Cotton balls in vagina
- Methylene blue in the bladder
- Pyridium tablets given orally → impart RED colour to urine
- Helps to Dx Ureterovaginal fistula

- ③ Best diagnostic test for Vesico vaginal fistula → **CYSTOSCOPY**
- Best diagnostic test for uretero vaginal fistula → **INTRA VENOUS UROGRAPHY**

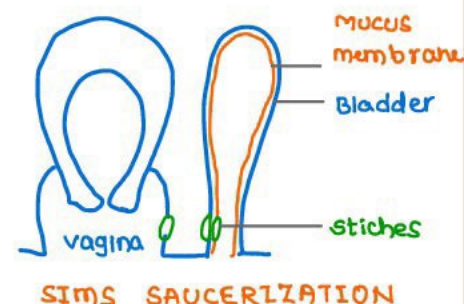
## YUSSUF'S SYNDROME

- Vesico uterine fistula
- presents w menouria

## REPAIR

### ① SIMS SAUCERIZATION FOR VVF

- done under general anesthesia
- 3 circular stitches on
  - mucus membrane of bladder
  - Bladder
  - Vagina
- Done in **KNEE CHEST POSITION**



### ② LOW RECTO VAGINAL FISTULA REPAIR

- make it a Complete Perineal Tear & repair

### ③ HIGH RECTO VAGINAL FISTULA REPAIR

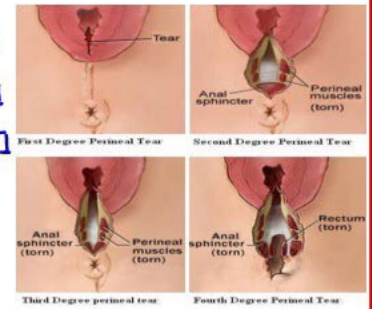
- Divert the bowel → **Colostomy**
- Repair in layers



## PERINEAL TEARS

- mucosal layer tear of vagina
- mucosa + muscle tear
- mucosa + muscle + Anal tear
  - <50% External anal Sphincter tear
  - >50% External anal Sphincter tear
  - Internal anal Sphincter tear

- TYPE I
- TYPE II
- TYPE III
  - IIIa
  - IIIb
  - IIIc



- mucosa + muscle + Anus + Rectal tear → TYPE IV

## COMPLETE PERINEAL TEAR

- TYPE III } COMPLETE PERINEAL TEAR → Repair immediately
- TYPE IV }
- After 24 hrs in a Complete tear, there is colonizat<sup>n</sup> of cut ends
- Will breakdown if repair
- wait for 2 1/2 - 3 months [atleast 6 wks]

## MULLERIAN ABNORMALITIES

### EMBRYOLOGICAL DEVELOPMENT & IT'S ABNORMALITIES

- Female internal genitalia derived from MULLERIAN / PARA MESONEPHRIC DUCT
- male internal genitalia derived from WOLFIAN / MESONEPHRIC / GARTNER DUCT

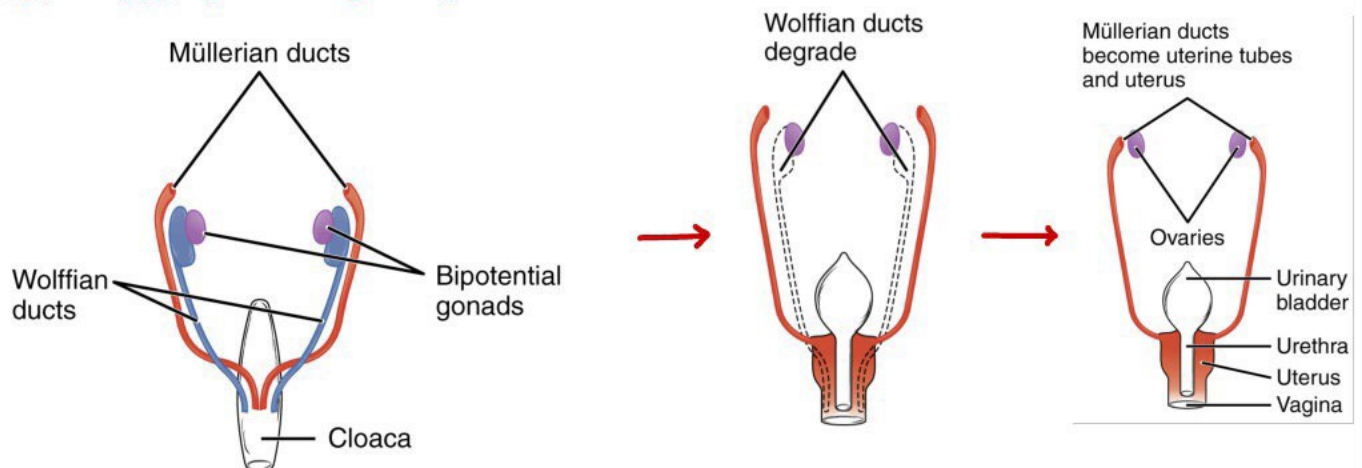
### MULLERIAN DUCT DERIVATIVES

- Uterus
- cervix
- fallopian tubes
- 4/5th OF vagina
  - Lower 1/5th derived from UROGENITAL SINUS
  - ovaries are derived from GENITAL RIDGE

### WOLFIAN DUCT DERIVATIVES

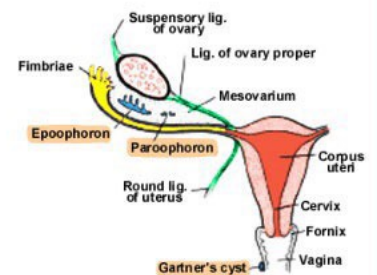
- Epididymus
- vas deferens
- Seminiferous tubules
- Prostatic urethra

### FEMALE GENITAL TRACT DEVELOPMENT



### FATE OF WOLFIAN DUCT IN FEMALES

- Remnants of wolfian duct
  - Epoophoron → above the ovary
  - Paraoophoron → beside the ovary
- obliterated male duct at upper lateral vaginal wall → may lead to GARTNER CYST
  - mostly asymptomatic
  - R by SIMPLE EXCISION



### BARTHOLIN ABCESS

- gland present at anterior 2/3rd & posterior 1/3rd of vulva
- R by MARSUPIALIZATION [Exteriorizat<sup>n</sup> of cavity]



## MULLERIAN DUCT ANOMALIES

### VERTICAL FUSION DEFECTS



TRANSVERSE VAGINAL  
SEPTUM



VAGINAL ATRESIA



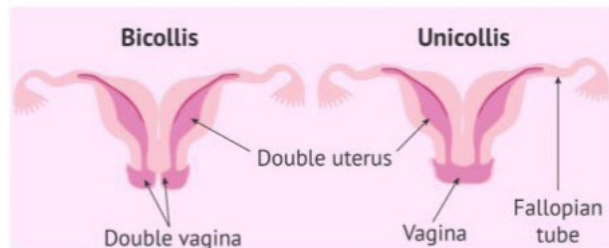
CERVICAL VAGINAL  
ATRESIA



COMPLETE MULLERIAN  
AGENESIS

### LATERAL FUSION DEFECTS

#### 1. DIDELPHYS



#### 2. UNICORNUATE



#### 3. SEPTATE



#### 4. BICORNUATE



### SEPTATE VS BICORNUATE UTERUS

→ On Hysterosalpingography, both septate & bicornuate uterus look similar

- Angle between 2 cavities

-  $< 90^\circ$  [Acute]

→ Septate uterus

-  $> 90^\circ$  [obtuse]

→ Bicornuate uterus

- Distance b/w 2 cavities

-  $< 4\text{cm}$

→ Septate uterus

-  $> 4\text{cm}$

→ Bicornuate uterus

- Fundus

- Broad

→ Septate uterus

- indented/dimpling

→ Bicornuate uterus

SEPTATE UTERUS IS THE SINGLE MOST COMMON MULLERIAN DEFECT



- Best way to distinguish b/w Septate & bicornuate uterus
  - DIAGNOSTIC LAPAROSCOPY + HYSTEROSCOPY
  - MRI [ Best imaging method ]
- **TREATMENT**
  - Septate uterus → removal of septum through hysteroscopy
  - Bicornuate uterus → unification surgery [ STRASSMAN'S or JONE'S ]
- Only indicat<sup>n</sup> of unifying the uterus in bicornuate uterus → Recurrent Abortions

### CRYPTOMENORRHEA

- Menstruat<sup>n</sup> present [ Hematometra - blood in uterus ; Hematocolpos - blood in vagina ] but menstrual blood not coming out
  - Transverse vaginal septum
  - vaginal atresia
  - cervical vaginal atresia
  - Imperforate hymen

### IMPERFORATE HYMEN

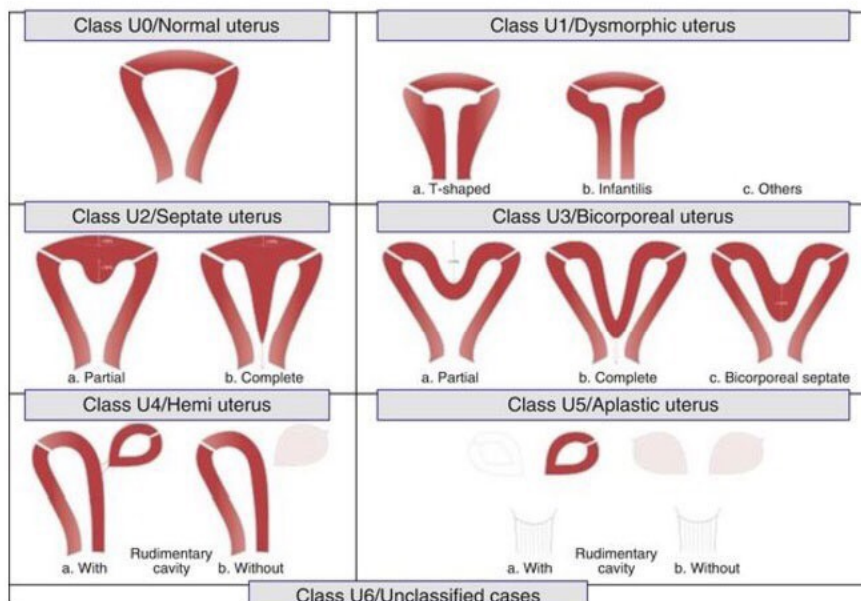
- Not a mullerian anomaly
- It is a canulat<sup>n</sup> defect
- Rx → 1 cruciate incis<sup>n</sup> given  
2 cut along the incision



IMPERFORATE HYMEN

### ESHRE CLASSIFICATION

- European Society for Human Reproduction & Embryology





# INTERSEX

## STRUCTURES

uterus  
cervix  
fallopian tubes  
upper 4/5th of vagina

### OVARIES

lower 1/5th of vagina



## DERIVED FROM

Mullerian / Paramesonephric ducts

Genital ridge

urogenital sinus

## FORMATION OF EXTERNAL GENITALIA

→ After 6 wks of intrauterine life, Sexual differentiat<sup>n</sup> begins

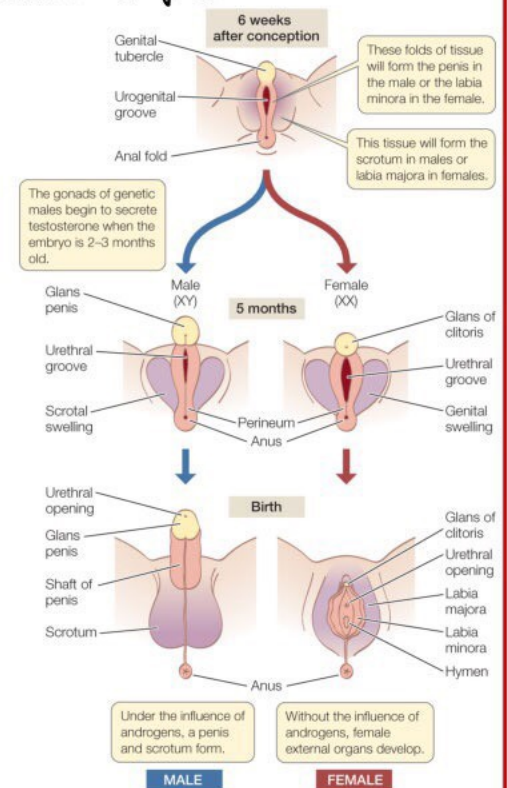
→ Sexual differentiat<sup>n</sup> is based on

Genetic sex [46 xx or 46 xy]  
Gonadal Sex [Ovary or testes]  
Phenotype [vulva or Phallus]

→ Y chromosome has

- Sex determining Region Y [SRY]
- Testes Determining Factor [TDF]

→ Ext. genital format<sup>n</sup> is under the influence of ANDROGENS



> 6 WKS



MALE

TESTES



ANDROGENS



Descent of testes  
format<sup>n</sup> of scrotum  
format<sup>n</sup> of penis

> 6 WKS



FEMALE

OVARIES



NO ANDROGENS



Labia majora  
labia minora  
clitoris  
Lower 1/5th of vagina by urogenital sinus

DEFAULT / BASIC HUMAN SEXUALITY → FEMALE

	MULLERIAN AGENESIS	TESTICULAR FEMINIZATION SYNDROME/ ANDROGEN INSENSITIVITY SYNDROME
KARYOTYPE	→ 46 XX	→ 46 XY
GONAD	→ Ovary	→ Testes
UTERUS, TUBES	→ Absent	→ Absent
VAGINA	→ shallow blind	→ shallow blind
VULVA	→ Normal	→ Normal
BREAST	→ Feminine	→ Large feminine
PERIODS	→ Absent	→ Absent
ANDROGENS	→ 20-80 ng/dl	→ 200-800 ng/dL
PUBIC / AXILLARY HAIR	→ Present	→ Absent

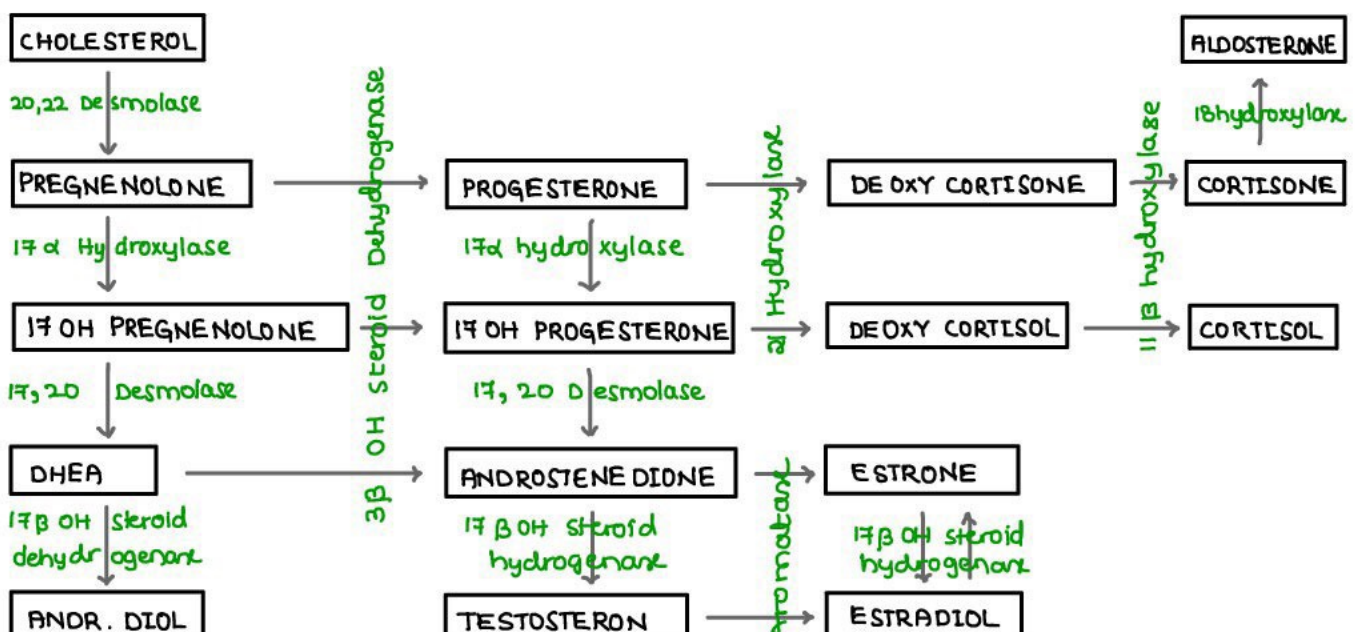
→ In Testicular feminizat<sup>n</sup> syndrome,

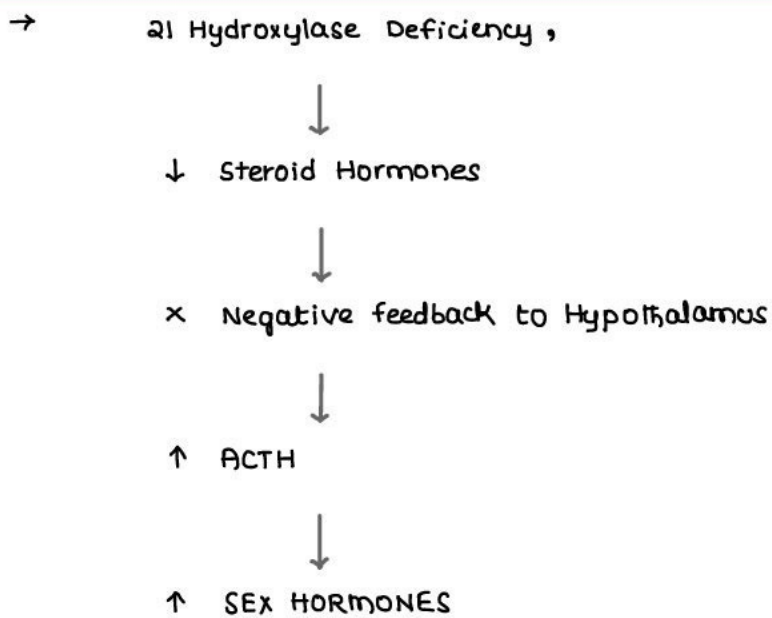
- In periphery, ANDROGENS  $\xrightarrow{\text{Aromatase}}$  ESTROGENS
- ESTROGENS → Large feminine breasts  
Pubic & axillary hair absent

→ 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 removed in TFS at the time of puberty





### CONGENITAL ADRENAL HYPERPLASIA

→ d/t deficiency of 21 Hydroxylase enzyme

#### ① classical variety

→ Boy → Precocious puberty

→ In Girl

- penis & scrotum + nt } AMBIGUOUS  
- NO testes } GENITALIA

#### ② on salt losing variety

- ↓  $\text{Na}^+$

↓  $\text{H}_2\text{O}$

↑  $\text{K}^+$

- fatal to the baby [boy or girl]

#### ③ Late onset / Adult onset Adrenal Hyperplasia

→ Rx by Long term Steroids

→ mc cause of CAH → 21  $\beta$  hydroxylase deficiency

2nd mc cause of CAH → 11  $\beta$  hydroxylase deficiency

#### → PREVENTION

- start the steroids at the time of Dx of next pregnancy

- GENETIC MALE & PHENOTYPIC FEMALE → MALE PSEUDO HERMAPHRODITE
- GENETIC FEMALE & PHENOTYPIC MALE → FEMALE PSEUDO HERMAPHRODITE

#### EXAMPLES OF

- MALE PSEUDO HERMAPHRODITE → TFS
- FEMALE PSEUDO HERMAPHRODITE → CAH

#### → TRUE HERMAPHRODITE

- MALE + FEMALE KARYOTYPE &
- MALE + FEMALE GONADS → OVOTESTIS &
- MALE + FEMALE EXTERNAL GENITALIA

### GONADAL DYSGENESIS

#### SWYER SYNDROME

- 46 XY Female

#### TURNER SYNDROME

Streak gonads  
 ↓ Estrogens  
 Small uterus  
 Primary amenorrhea

#### MIXED GONADAL DYSGENESIS

- Male + Female Karyotype
- Male + Female Gonads
  - U/L undescended testes → not working
  - Contralateral streak ovary → not working
- External genitalia → Female
- 1/3 rd of mixed gonadal dysgenesis have Turner phenotype

IN GONADAL DYSGENESIS, THE EXTERNAL GENITALIA IS ALWAYS OF FEMALE

- MC cause of 1° Amenorrhea → Gonadal Dysgenesis
- MC type of gonadal dysgenesis → Turner Syndrome

- ③ Short stature
  - 1° amenorrhea
  - Streak gonad
  - on USG → hypoplastic uterus
- } TURNER SYNDROME



- 46 XX → 1 Barr body [Normal female]  
→ 46 XO → No Barr body → TURNER SYNDROME  
Short stature  
Shield chest  
Low set hair line  
Lymphedema  
Normal Intelligence

- 46 XY → No Barr Body [Normal male]  
→ 47 XXY → KLINEFELTER SYNDROME  
Tall stature  
Gynecomastia  
Obesity  
azoospermia  
infertility  
Mental Retardation

Q Which one has the best clinical prognosis?

- A CAH  
B TFS  
C MIXED GONADAL DYSGENESIS  
D TRUE HERMAPHRODITES

## INFERTILITY

- 15 - 20% couples are infertile
- **INFERTILE** → AFTER 1YR OF UNPROTECTED INTERCOURSE
- CHANCE OF CONCEPTION  $\propto$  UNPROTECTED INTERCOURSE
  - 90% couple → 1 yr
  - 80% couple → 1st 6 months
  - 10% couple → next 6 months
- 1 Act of intercourse at 14th day, chance of concept<sup>n</sup> → 4-8%.
- chance of concept<sup>n</sup>  $\propto$  many acts in one month → 25%.

## CAUSES

- % of Distribution of causes responsible for infertility
  - MALE → 30 - 40%.
  - FEMALE → 40 - 50%.
  - MALE + FEMALE → 10%.
  - UNEXPLAINED → 10%.

## MALE CAUSES

- oligospermia
- Azospermia

## FEMALE CAUSES

- Anovulatory factors > Tubal factors

## WHO CLASSIFICATION OF ANOVULATION

- |          |                                 |                           |
|----------|---------------------------------|---------------------------|
| TYPE I   | → Hypogonadotropic Hypogonadism |                           |
| TYPE II  | Normogonadotropic Hypogonadism  | → PCOS                    |
| TYPE III | Hypergonadotropic Hypogonadism  | → Premature Ovarian fail. |
| TYPE IV  | Hyperprolactinemia              |                           |

## HISTORY TAKING

### MALE SPECIFIC HISTORY

- Act of intercourse
- Infections → mumps, TB, Filariasis, STDs
- Previous Sx → Orchidopexy / undescended testes
- → Hernia Sx, Varicocele Sx, Hydrocele Sx
- Alcoholic, smoker

### FEMALE SPECIFIC HISTORY

- Infections → Recurrent PID, Endometriosis, TB pelvis
- MTP / Abortions
- Alcohol, smoking

## INVESTIGATIONS

### 1 SEMEN ANALYSIS

→ 1st investigation to be done

→ 2010 WHO SEMEN ANALYSIS

PH	→	> 7.2
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 $\odot$ [KRUGER'S STRICT CRITERIA]
vitality	→	> 50% should be normal
Leucocyte count	→	< $1 \times 10^6$ /ml

### 2 WOMEN

P/V Examination

TVS

Ovulation Tests

- Basal Body Temperature [  $> 0.5^\circ\text{F}$  ]
- USG - Follicular Monitoring
- LH →  $> 15$  IU
- Sr. Progesterone →  $> 3\text{ng/ml}$  on day 21
- Endometrial Biopsy

Hystero Salpingo graphy

- Tells about uterine cavity
- Tells about Tubal patency

HYSTERO SALPINGOGRAPHY



Laparo Hystero Scopy

- Better investigat<sup>n</sup> to know anatomy
- Diagnostic
- Therapeutic

## TREATMENT

### 1 OVULATION INDUCTION

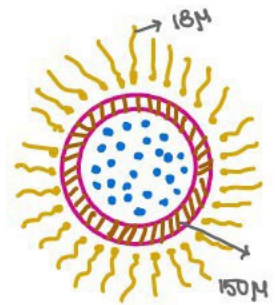
- Indicated for anovulation
- clomiphene citrate
- Letrozole
- HMG
- FSH

### 2 INTRA UTERINE INSEMINATION by Washed Sperms

- Indicated for Low Count sperms, Endometriosis, Cervical factor infertility
- successful in 15-20% of cases

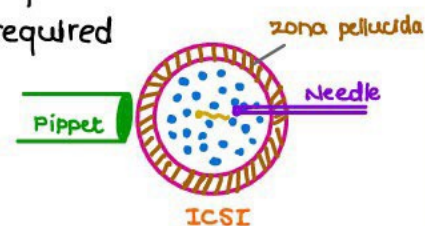
### 3 IN VITRO FERTILIZATION

- Indicated for tubal blockage, Low count sperms, Endometriosis, Cervical factor infertility
- 2 or 3 Day 3 [8 cell] embryos are transferred or 1 or 2 Day 5 [Blastocysts] embryos are transferred
- Success rate → 40 - 45% [pregnancy]  
Takehome baby rate → 25-30%.
- IN VIVO,  
1/5th of Semen will reach the site of fertilization  
1 Lakh sperms collide 1 Ovary & release ACROSIN  
Acrosin softens the ZONA PELLUCIDA → ACROSOME REACTION  
Fertilization occurs & followed by ZONA REACTION, which hardens Zona again
- IVF requires 1 Lakh Sperms to fertilize a oocyte  
So, for IVF at least 3-5 million Sperms required  
for IUI at least 5-10 million Sperms required



### 4 INTRA CYTOPLASMIC SPERM INJECTION

- Indicated for very very Low Sperm Count



### AZOOSPERMIA [Obstructive Azospermia]

- Normal FSH & Azospermia → Obstructive Azospermia
- SPERM EXTRACTION TECHNIQUES

PESA [Percutaneous Epididymal Sperm Aspiration]

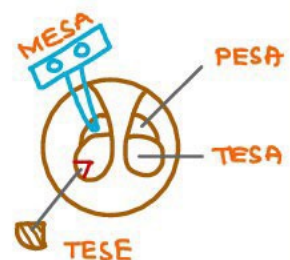
TESA [Testicular Sperm Aspiration]

- Both can be done under Local anesthesia
- Both are simple techniques [Needle Aspiration]

MESA [Microsurgical Epididymal Sperm Aspiration]

TESE [Testicular Sperm Extraction]

- Both are done under GA
- Both are complicated techniques



Q Best technique to get quality sperms ?

- A PESA
- B TESA
- C MESA
- D TESE



- Q controlled ovarian Hyperstimulat<sup>n</sup> was given for IVF  
Pre trigger [HCG], Estradiol levels  $\rightarrow$  800 pg  
What is the next step in management
- A cancel the cycle
  - B continue Stimulat<sup>n</sup> for 1 to 2 days & check estradiol

$\rightarrow$  IDEAL TEMPERATURE FOR SPERMATOGENESIS  $\rightarrow$  35 - 35.5°C