Basics of Reproduction, Placenta and Fetal Membranes

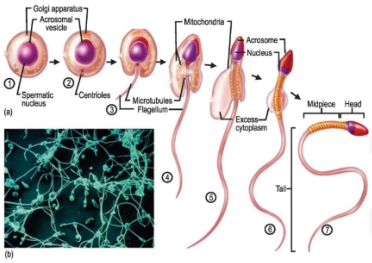
Active Space

GAMETOGENESIS 01:25

Spermatogenesis

- Spermatogenesis starts at puberty

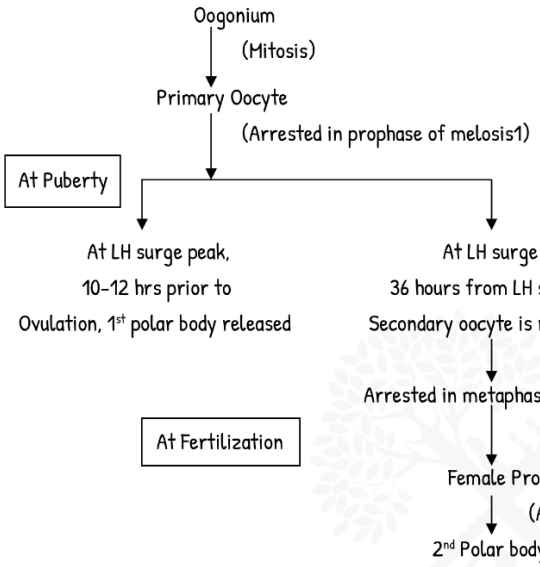
Spermatogonium
↓(Mitosis)
Primary Spermatocyte
↓(Meiosis)
Spermatocyte
↓Meiosis 2
Spermatid
↓
Sperm



- Number of chromosomes become half in Primary Spermatocyte to Secondary Spermatocyte
- Spermatid transforming to form sperm - Spermiogenesis
- Spermiogenesis
  - Nucleus of spermatid will become head of Sperm
  - Golgi apparatus of spermatid will become Acrosome of Sperm
  - Centrioles of spermatid will become Tail of Sperm
  - Mitochondria will become middle piece of Sperm
- 1 Spermatogonium gives rise to 16 primary spermatocytes
- Each Spermatocyte gives rise to 4 sperms
- Maturation of spermatid takes place in servinefevous tubules
- Maturation of sperm takes place in Epididymis
- Sperm life span - 12 hours
- Size of Sperm - 55 microns
- Capacitation : In sperm hyperactivation there is extreme increase in movement and the ability to release acrosomal contents, which allow penetration to the ovum's zona pellucida
  - Time taken to occur : 5-8 hours
  - It begins in Female Genital tract in Fallopian tube, 90% of the time
- Acrosomal Reaction
  - Sperms acrosome release Hyaluronidase enzyme for dissolution of zona pellucida

OOGENESIS

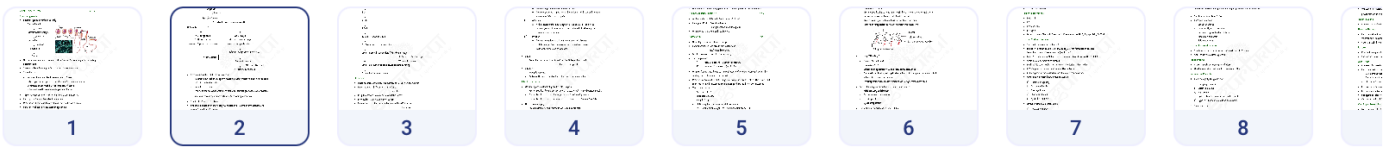
Active Space



- Acrosomal reaction and Cortical reaction
  - In acrosomal reaction, all sperm releasing Hyaluronidase to dissolute the zona pellucida and enter inside
  - In cortical reaction,
    After one sperm nuclei enter zona pellucida, cortical granules will be released and cause hardening of zona pellucida to prevent polyspermy
- Starts at 8-9 weeks of intrauterine life
- Maximum number of primary oocyte are seen at 5th month of intrauterine life around 5-6 million 1° oocytes
- At birth, among the 1 million oocyte, will be left only with 3-5 lacs of primary oocyte
- Among 3-5 lacs, only 400 follicles will mature throughout life

FERTILISATION *09:04*

- It is the fusion of male and female pronuclei
- Takes place in Ampulla of fallopian tube
- In fertilisation,



Active Space

Zygote
↓
2 Cell
↓
4 Cell
↓
8 Cell
↓
16 Cell – Morula on Day 3
↓
Day 3-4 – Morula enters uterine cavity
↓
Day 5 – Morula becomes fluid filled → Blastocyst
→ Outer trophoblast layes
→ Inner Cell mass
↓
Day 5 – Dissolution of zona pellucida/zona hatching
↓
Day 6 – Implantation begins

Blastocyst

- Outer trophoblast will become membrane → Chorion and Amnion
- Inner cell mass differentiates into Epiblast
  Hypoblast
- In Epiblast there is a cavity → Amniotic Cavity
- In Hypoblast, there is primary Yolk Sac
- Epiblast and Hypoblast are further divided into Ectoderm,
  Mesoderm
  Endoderm

Steps of Implantation

- Day 6, Implantation begins
- Type of implantation – Interstitial implantation
- Most common site of implantation – Posterior wall upper 2/3rd body of uterus
- Three steps of implantation –
  I) Apposition
  II) Adhesion
  III) Invasion

I) Apposition
- The blastocyst will attach to endometrium
- The embryo seeks its position on the endometrial tissue and remains immobile with help of pinopods

II) Adhesion
- With adhesion molecules Integrins β1, β3 and β4, L – selectins, proteoglycans, fibronectins etc the blastocyst will slowly go into endometrial endothelium

III) Invasion
- The entire blastocyst will go into endometrial stroma
- With help of proteolytic enzyme such as serinoproteases, metalloproteases and collagenases

Active Space

- Day 8
  - Trophoblast differentiates into Outer Syctiotrophoblast, and Inner Cytotrophoblast
- Day 10-11
  - Implantation ends
  - And when it ends, little bleeding called implantation bleeding

After Implantation

- Uterine layers, anatomically divided into 3 layers
  - Part of Decidua which is present below the blastocyst is called Decidua Basalis
  - Part of Decidua covering blastocyst is called Decidua Capsularis
  - Part of Decidua covering entire uterine cavity is called Decidua Parietalis
- On Ultrasonography, Decidua capsularis and Parietalis look like a double sign
- Once gestational sac increase i.e when baby increases in size, Decidua capsularis and Decidua parietalis will fuse each other and that will be called → Decidua Vera
- Decidua vera is usually formed between 14-16 weeks of gestation
- Upto 14-16 weeks, there can be some amount of bleeding per vaginum coinciding with LMP because endometrial cavity is still open → PLACENTAL SIGN or HALTMANN SIGN
- The fetus is covered by two layers
  - Inner layer is Amnion
  - Outer layer is Chorion

Active Space

- Chorion forming finger like protection into the Decidua – Chorion Frondosium
- Chorion which is not taking part in formation of placenta – Chorion Levae

INTRAUTERUS PERIODS *17:48*

- Ovular or Germinal Period : Fertilisation → 2 weeks
- Embryonic Period : 3 weeks – 8 weeks
  In organogenesis will take place
- Fetal Period : > 8 weeks and till delivery

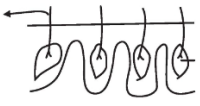
PLACENTA *18:28*

- Normally, placenta is discoid in shape
- Hemochoroidal i.e Half blood from mother and
  Half blood from baby
- Decidua because it shed off after delivery
- Two components :
  I) Fetal Component – Chorion Frondosum
  II) Maternal Component – Decidua Basalis
- Fetal surface is smooth and glistening because of Amnion covering it and at the centre, the umbilical cord is attached
- Maternal surface will be pink, rough and shaggy and divided into multiple lobes and each lobe is called cotyledons and on average, there will be 15–20 cotyledons
- The placenta at term :
  - Diameter : 15–20 cm
  - Thickness : 2.5 cm
  - Weight : 5.0g.
  - Birth weight – to – placenta weight ratio = 6:1
  - At 27 weeks, birth weight – to – placenta weight ratio = 1:1
  - At term, four fifths of the placenta is of fetal origin

Developing of Placenta

- Primary villi formed on Day 12 and it's a solid villi
- In cytotrophoblast, there are finger like protections
- In synctiotrophoblast, lacunae is formed

Spiral arteries



Decidua basalis
In synctiotrophoblast launae is formed

- Secondary villi
  - Formed on Day 16-17
  - There is Decidua Basalis and inner to it, there is synctiotrophoblast where lacunae is present with maternal blood filling into it
  - Then there is cytotrophoblast with finger like protection
  - Inner to cytorophoblast is the extra embryonic mesoderm

- Teritory Villi – Day 18
  - Same as Secondary villi
  - Formed on Day 17
  - Differentiating feeliary villi and Fetal spiral capillaries
  - Space between fetal spiral capillaries and interviflous space containing spiral arteries is placental membrane
  - Cytotrophoblast also makes a shell called → Cytotrophoblast shell
- Layers forming placental barrier (Inner – outermost)
  - Fetal capillary endothelium
  - Extra embryonic membrane
  - Cytotrophoblast
  - Synctiotrophoblast
- The villi carry fetal blood volume = 350mL
- Intervillous space which has maternal blood volume is = 150mL
- Uteroplacental blood flow at term is 450-650mL/min
- The fetal blood flow through the placenta is about 400mL/min and uterine blood flow is 800-900mL/min

Functions of Placenta

I) Transfer of gases, nutrients and waste products – Respiratory nutritive and excretory function
II) Immunological function
III) Endocrine function / hormonal function

Active Space

IV) Enzymatic functions
V) Barrier function

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Placental Hormones

- Beta hCG
- HPL
- Progesterone
- Estrogen
- Others : Human Chorionic Chyroropin, Pregnancy specific P, Glycoprotein, PAPP-A

Human Chrionic Gonadotropin

- Secreted from synctiotrophoblast
- It is seen in serum or urine as early as day & after fertilization because trophoblasts are differentiated on Day 8 itself
- Beta hCG double every 48 hours so maximum at 10 weeks where it is 1,00,000 IU
- After 10 weeks, remains at plateau
- Best test to detect Beta – hCG is FIA > DIA > ELISA + RRA > IMRA
- hCG disappears from urine 48 hours after delivery
- hCG disappears from maternal sera 1-2 weeks after delivery
- Abnormally increased hCG levels are seen in
  a) Maternal pregnancy
  b) Rh incompatibility
  c) Down syndrome
  d) Chorio carcinoma
  e) Hydatidiform mole
- Levels of Beta hCG decreased in :
  a) Ectopic pregnancy
  b) Spontaneous abortion
- Functions of Beta hCG
  - Maintain corpus luteum
  - Growth and development of umbilical cord
  - Primary stimulus for release of testosterone from male fetus
  - Immunosuppression

Type of Estrogen

E1 = Estrone, mainly seen in menopause
E2 = Estradiol, seen in reproductive age group

E3 = Estrio, specific to pregnancy and helps in uterus contraction
E4 = Estetral, specific to pregnancy and help in growth of uterus and breast

- Synthesized from fetal DHEA
- Estrogen functions
  - Growth of uterus
  - Melasma, Hyperpigmentation
  - Increased thyroid binding globulin
  - Retain salt and water
  - Gall bladder stasis

Human Placental Lactogen

- Starts secreting from 24 weeks and maximum at 3rd trimester
- Anti-insulin and causes lypolysis

Progesterone

- Causes smooth decidualisation of uterus
- Uterine velaration and smooth muscle relaxation

Variation of Placenta

1. Placentomgealy (Big placenta) :
   a) Multiple pregnancies
   b) Diabetes mellitus
   c) Macrosomy
   d) Hydrops fetalis (Immune and non immune)
   e) Syphilis (Due to inflammation and edema)
2. Small Placenta
   a) Postdatism
   b) IUGR
   c) Placental Infarcts

Circumvallate Placenta

- There is central depression in double fold of Amnion and Chorion
- On Sonogrpahy, double fold appears as thick linear bond or echo on shelf like structure
- There is risk of Ante partum Hemorrhage and preterm labour

Circumarginate Placenta

- It has a single margin and a single fold of Amnion and Chorion

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Active Space

Succenturiate Lobes

- One lobe of cotyledon is separate from the entire placenta but connected and can prevent with PPM, missing lobe, subinovultion, sepsis, vasa provia

Placenta Spuria

- When one cotyledon is separate from entire placenta and not interconnected

Placenta Bilobate

- Placenta divided into two equal halves and connected with vessels and membranes Velamentous Placenta
- Cord is attached to membrane and not center of placenta

Furcate

- Cord is dividing just before attaching to placenta
- So blood vessels divide before reaching the placenta

Vasa Previa

- Whenever the vessels with membranes overlie the internal, then Vasa Previa
- Placentas that can cause Vasa Previa
  - Valementous Placenta
  - Succenturiate Placenta
  - Biolobato Placenta
- It causes fetal hemorrhage
- Can be diagnosed with IVS with doppler
- Management : Elective LSCS
- Gualitaltus test to differentiate maternal and fetal hemorrhage – APT/Singers test

Morbidly Adherent Placenta

- Due to absence of Nitabucchs fibrinoid layer or Decidua basalis
- Types are :
  - Accreta : Adherent to myometrium
  - Increta : Invades myometrium
  - Percreta : Penetrates myometrium to reach perimetrium
- Causes :
  Previous LSCS
  Past history
  Repeated DNC
  Previous myomectomy hyperotomy scars

- Complications : Relained placenta, PPH
- Diagnostic : 1st line – USG → Loss of Retro placenta translucent gone, Increased Retro placental blood flow 10C – MRI
- Treatment :
  - Elective LSCS
  - Primigravida with accreted – Then after cesarean section loosely adherent placenta removed
  - Multigravid post c-section – cesarean lysterectomy

Active Space

Amniotic Fluid and Its Disorders

Active Space

AMNIOTIC FLUID 00:29

- pH : 7.2 - 7.4 (alkaline)
- Osmolarity of 260 mosmoL/L (Hyposmolal)
- Volume of amniotic fluid at term is 800mL
  - 12 weeks - 50 mL
  - 20 weeks - 400 mL
  - 32 - 34 Weeks - 1 - 1.5L
  - 40 weeks - 800mL
  - 42 weeks - 480mL

HOW AMNIOTIC FLUID IS FORMED 01:33

- In early pregnancy, it is an ultrafiltrate of maternal plasma
- By beginning of 2nd trimester, it consists of extracellular third which diffuses through fetal skin
- After 20 weeks, major contribute is fetal urine
  - Cornification of skin prevents this diffusion
  - So, major contributor is fetal urine and fetal lungs
- Absorption of amniotic fluid is by swallowing

AMNIOTIC FLUID COLOUR 02:22

- Preterm - Colorless
- Term - Straw colored
- Post - Term - Amber/saffron colored
- In Intrauterine death - Tobacco juice
- Abruption - Blood stained
- Rh isoimmunization - Golden yellow colored
- Fetal distress - Green colored

FUNCTIONS 03:27

- Gives space for growth
- Shock absorbent
- No nutritive value
- It helps in GI tract and Respiratory tract growth
- Regulates temperature around fetus

CALCULATION 04:14

- Divide entire abdomen into four quadrants
- Measure maximum vertical depth of amniotic fluid in each quadrant
- Sum them all up
- Normal Range : 5-25 cm
- Among four quadrant, one is deepest and its single deepest vertical pocket must be between 2-8 cms

AMNIOTIC FLUID DISORDERS 05:32

POLYHYDRAMNIOS 05:34

Fetal Conditions

- It is a condition where liquor amnii is in excessive amount > 2 litres
- AFI > 20 cm
- SDP > 8 cm
- Most common cause is idiopathic
- Most common cause if severe polyhydramnios is congenital malformation
- Anencephally
  - Baby cannot swallow
  - No swallowing reflex
- Duodenal atresia
- Esophageal atresia
- Congenital Diaphragmatic Hernia
- Cleft Palate
- Tracheal Obstruction
- High cardiac output causing ↑ urine output
- Tetralogy of fallot
- Fetal anemia
- Ebstein's anomaly

Maternal Conditions

- Increased amniotic fluid – Diabetes mellitus
  Multiple pregnancy
- Placental causes of polyhydramnios – Cyromogalovirus
  Syphilis,
  Parvovirus

Active Space

On Examination

- Uterus will be more period of amenorrhea
- Fetal parts not easily palpable
- Fetal heart sounds are heard with difficulty

Complications of Polyhydramnios

- Uterus overdistended – Compressing the lungs so respiratory distress
- Malpresentation
- Sudden uterine
- Pain in abdomen
- Preterm labour
- Decompression – Abruption
- PPH
- Sub involution

Treatment

- < 37 weeks : Amniocentesis approx 1000 to 1500mL of fluid is slowly withdrawn during approx 30 minutes
- > 37 weeks : Deliver

OLIGOHYDRAMNIOS *11:14*

- Decrease of fluid < 200mL
- On USG : Maximum vertical pool < 2 cm
- AFI is less than 5 cm
- Borderline oligohydramnios is when 5–8 cms
- Causes – Baby should not pass urine or should swallow more

Fetal

- Bilateral renal agenesis
- AR polycystic kidney diseases
- Multiple dysplastic kidney
- Posterior urethral valve

Mother

- Postdatism
- PROM
- Drug – Diuretics, Indomethacin

Active Space

- Anything that causes IuGR
  ↓
  Fetoplacental Insufficiency
  ↓
  Renal Vasoconstruction
  ↓
  ⇩gFR
  ↓
  ⇩Urine output
- Autoimmune disorder
- Pre eclampsia
- Smoking
- Malnutrition

Placental Cause

- Amnion nodosum

  Most common cause is idiopathic

  Most common cause of severe oligohydramnios is congenital information

Clinical Examination

- Uterus will be less than period of amenorrhea
- Fetal heart sounds easily heard

Early onset oligohydramnios

- Congenital malformations
- Do targeted sonography

Complications

- Limb retraction / Limb amputation
- Fetal pulmonary hypoplasia
- Congenital taliper equinovavus

Treatment

- Amnioinfusion

Late onset oligohydramnios

- Usually due to iUGR : Do umbilical Doppler
- Treatment : Treat underlying medical condition

Active Space

- Placenta that can cause Vas a Pervia
  - Valementous placenta
  - Succenturiate Placenta
  - Biolobato Placenta
- It causes fetal hemorrhage
- Can be diagnosed with IVS with Doppler
- Management : Elective LSCS
- Qualitative test to differentiate matural and fetal hemorrhage - APT / Singers test

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- Due to absence of Nitabuchs fibrinoid layer or Decidua basalis
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  - Primigravida with accrete - then after cesarean section loosely adherent placenta removed
  - Mutligravida post c-section - cesarean hysterectomy

Active Space

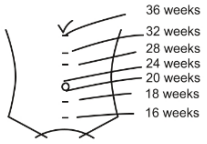
Physiological Changes in Pregnancy

Active Space

There are some External changes,
Internal changes and
Systemic changes

EXTERNAL CHANGES 00:47

- Face : Discoloration of nose and molar eminence → Pregnancy mask
  Due to increased ACTH production due to estrogen
- Black line extending from Xiphisternum to Pubic symphysis → Linea nigra
- Purplish striae on either side of flanks → Stria gravidarum
- Uterus position



- Weight gain
  - Net weight gain - 11kg
  - 1st trimester - 1kg
  - 2nd and 3rd trimester - 5kgs
- Recommended weight gain if Normal BMI → 11.5 - 14 kgs
  Underweight → 14 - 18 kgs
  Overweight → 7 - 11 kgs
  Obese → < 9kgs

INTERNAL CHANGES 03:06

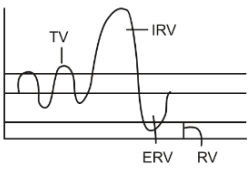
- Bluish discoloration of vagina - Chadwick Sign / Jacqueimer sign
- Increased pulsation in lateral fornices - Osainder's sign
- Softening of Cervix - Goodell's sign
- Regular rhythmic contraction of uterus - Palmer's sign
- Asymmetrical enlargement of uterus due lo lateral implantation - Piskakek sign
- On Bimanual examination, abdominal and vaginal fingers will oppose - Hegar's sign

STEMIC CHANGES 05:01

- Hematological Changes
  - Total Blood volume increases by 50%
  - Platelets also decrease

- Plasma Volume will increase by 60%
- Mildly
- RBCs will increase by 30%
- WBC count Increases
- Total Hemoglobin also increases
- Coagulation factors increase except 11 and 13
- Hb gm/dL will decrease
- ESR increases because Fibrinogen also increases
- Physiological hemodilution so Hematorit will drop
- Anti thrombin structures will decrease

- Pregnancy is a stable of immunosuppression so humoral immunity increases and cell mediated immunity decreases
- Unchanged during pregnancy – β lymphocytes
  Bleeding time
  Clotting time
  Anti thrombin time
- Cardiovascular Changes
  - Loud S1, S2, S3
  - Election systolic murmur up to grade 2
  - Mammary shouffle thats continous hissing murmur in diastolic areas due to increased blood flow in the intermammary vessels
  - Apex beat shifts to 4th inter costal space 1.25cm lateral to midclavicular line
  - ECG shows left axis deviation
  - BP – mid trimester fall in diastolic blood pressure
  - PCWP and CVP unchanged
  - Cardiac output starts to increase from 6 weeks
    Maximum in week 32
    ↑ Further by 50% during 2nd stage of labour
    ↑ Further by 70% in post partum 1hr
- Respiratory Changes



Active Space

- Tidal volume + Inspiratory Reserve Volume → Inspiratory Capacity
- Tidal Volume + Expiratory Reserve Volume → Functional Residual Capacity
- Tidal Volume + IRV + ERV → Vital Capacity
- Vital Capacity + Residual Volume → Total lung capacity
- Gravid Uterus compresses lung by 4 cms → ERV and RV decrease

  ⇩ TV, ERV, IRV, TCC as well
  ⇧ TV, Minute oxygen update, 1 minute ventilation and inspiratory capacity will increase
- Unchanged → IRV, Respiratory rate, Vital capacity

- Renal Changes
  - Right sided, hydroureter > Left sided hydrourter and it is due to progesterone
  - Increased Renal blood flow because of increased GFR
  - Serum creatinine, Serum Burn, Serum uric acid, Serum Na1K1L decrease
  - Amino acid uria
  - Glucosuria
- GI tract and liver
  - Increased HCl
  - GERD
  - Constipation
  - Placental Alkaline phosphates is increased because placental secretes it
  - Gall stone formation can increase
- Endocrinal
  - Prolactin increase
  - FSH and LH increase
  - Blood flow to pituitary gland increases by 135%
  - Growth hormone, Cortisol, ACTH increase
- Thyroid and Gland
  - Increase iodine demand
  - Total T3 and T4 increases
  - Free T3 and T4 unchanged
  - TBg increases
  - TSH mild decrease

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- Pregnancy is state of euthyroid
- TSH < 2.5 in 1st trimester
  < 3.0 in 2nd and 3rd trimester

- Protein
  - Albumin decreases
  - A : G decreases
  - Globulin increases to normal
  - Total protein increase

Active Space

Pregnancy, Antenatal Care

Active Space

PREGNANCY 00:07

- Entire pregnancy is around 280 Days
  - 10 lunar months
  - 9 calendar months + 7 Days
  - 40 weeks
  - From LMP - 9 months + 7 Days → Expected date of delivery
- Gestational age - 280 Days
- Ovulatory age - 280 - 14 = 266 Days
- Calculation of EDD
  - Naegele's formula : LMP + 9 months + 7 days
  - Modified Naegele's formula : LMP-3 months + 7days
- For irregular cycles
  - First trimester
    - CRL will help measure EDD ± 7 days
    - CRL + 42 = gestational age in days
  - Second trimester
    - TCD
    - BPD will give expected date of delivery ± 2 weeks difference
  - Third trimester
    - Femoral length ± 3 weeks
    - Not ideal because too high
    - Third trimester scan mainly for estimating fetal weight by measuring abdominal circumference
  - In IVF,
    From day of oocyte retrieval + 266 days → Expected Date of Delivery
  - Day 3 → Embryo transfer + 263 days → EDD
  - Day5 Embryo transfer + 261 → EDD

- Obstetic Score
  - Gravida : Total no of pregnancy including current number of pregnancy
  - Para : Total no of pregnancies that crossed period of viability beyond 24 weeks of gestation and does not include present pregnancy
- Pregnancy Trimester – 4 in total
  - 1st trimester – Upto 14 weeks
  - 2nd trimester – Upto 28 weeks
  - 3rd trimester – 29 to 42 weeks
  - 4th trimester – Post delivery up to 12 weeks
- Symptoms of 1st trimester
  - Amenorrhea
  - Vomiting
  - Morning Sickness
  - Increased frequently of micturition
  - Easy fatiguability
- Symptoms of 2nd trimester
  - Quickening
- Symptoms of 3rd trimester
  - Pain in abdomen
  - Pedal edema
  - Breath lessness
  - Increased frequently of micturition
  - Lightening
- Calorie intake during pregnancy
  - Pregnancy → + 350 kcal/day
  - Lactation 1st 6 months → + 550kcal/day
    2nd 6 months → + 550kcal/day – 600kcal/day

ANTENATAL CARE 09:42

- WHO : minimum 4 ANC visits or minimum 8 ANC contacts
- As per Indian Scenario
  - 4 ANC visits
  - 1st visit : within 12 weeks
  - 2nd visit : between 14 and 26 weeks
  - 3rd visit : between 28 and 34 weeks
  - 4th visit : between 36 weeks and term

Active Space

- Medications
  - Folic acid : Prophylactic dose – (India) 500µ, (WHO) 400µgm/day
    Therapeutic dose – (India) 5mg/day, (WHO) 4mg/day
    Therapeutic indications – Family history or past history of
    Neural tube defects
    Diabetes mellitus
    Sickle cell anemia
    Antiepileptic
- Iron
  - Total amount of iron required during pregnancy is 1000mg
    - Fetus and placenta require 300mg
    - Growing RBC of mother require – 500mg
    - Lost through sweat, urine and feces – 200mg
    - Lost at time of delivery – 200mg
    - Amount of iron saved due to amenorrhea – 300mg
    - So approx (1200-300) = 900-1000mg required during pregnancy

    In Anemia Mukth Bharath

    - 60mg elemental iron for 180 days in pregnancy and 180 days of post partum
- Calcium and Iodine
  - RDA of calcium during pregnancy – 1000mg
  - RDA of Ioding during pregnancy – 230mg
- Vaccination
  - 2 doses of Td 4 weeks apart
    - 1st dose as soon as pregnant
    - 2nd dose after 4 weeks
  - 2 dose of fdap
  - Can be given in pregnancy
    - All killed vaccines
    - Meningococcal
    - Hepatitis B
    - .Influenza
    - Tdap
    - Rabies

Active Space

- Contraindicated vaccines are :
  - All live vaccines
  - Raricella
  - Small pox
  - bcg
  - MMR
  - Oral polio
  - Exception - Yellow fever and Japanese encephalitis if travelling to endemic areas
- Booking Visit
  - 1st visit is called booking visit in which we look for :
    - Blood group : If Rh-ve, then check husbands blood group too
    - Hb : It should be done in every trimester
    - HbsAg
    - HIV
    - VDRL
    - Urine microscopy routine test
    - Glucose challenge test
    - Pap smear for cervical cancer
    - Serum TSH
    - At 37 weeks, Rectovaginal swab for group B streptococcal

Active Space

Aneuploidy Screening

Active Space

- There are mainly three Aneuploidy
  - Trimosy 13 → Patau
  - Trimsomy 18 → Edward
  - Trisomy 21 → Down's Syndrome
- Down's Syndrome
  - Due to non disjunction

    15% could be due to Robertsonian translocation

SCREENING METHODS

- 1st Trimester
  - Double marker - β hCG +PAPP-A
  - Combined Screening method - Double marker + NT scan

    └→ Has more detection - 84%
  - Nuchal scan
    - 11-14 weeks of gestation when crown length is between 45-84 mm
    - Done in mid sagittal section, Head and thorax should be visible
    - The translucent thickness between nape of neck and skin
    - NT should be < 3mm - Normal
    - NT > 3 mm is Abnormal
    - Most common - Down's Syndrome
- 2nd trimester
  - Quadruple marker - β hCG + inhibin A + Alpha fetoprotein + μE3
    - It has a detection rate of 80-82%
  - Pentamarker → β-hCG + Inhibin A + Alpha fetoprotein + μE3 + Glycosylated hCG
  - Non invasive prenatal testing/cell free fetal DNA → Can be used for Rh typing, blood grouping, Single gene defect
- Recommended for :
  - Age > 35 years
  - Positive First and Second trimester abnormal analyte
  - Sonogram with abnormal aneuploidy

- Prior pregnancy with autosomal trisomy or when known carriers of Robertsonian translocation

- Contraindicated in Twins
- Concept : Certain DNAs enter into maternal circulation and these DNAs are then picked up to do karyotyping

Confirmatory Test

- Indications :
  - Previous abnormal fetus
  - 3 or more spontaneous abortions
  - When patient or their husband is a known carrier of chromosomal anomaly
  - Family h/o of chromosomal abnormalities
  - Major structural defects on USG
  - NTD risk
  - Positive 1st and 2nd trimester screening
- Methods

i) Chronic villous sampling

- Done between 10-13 weeks of gestation
- Trophoblast is targeted here
- Preliminary results will come within 48 hours
- Culture results in 1 week
- Most common complication - Abortion
  Limb reduction effects

ii) Amniocentesis

- Done between 15-20 weeks
- Transabdominal amniocentesis - Ultrasound guided
  Amniocytes picked up - Fetal skin
  Epithelial cells
- Complications - Abortion
- Preliminary results within 48 hours
- Culture results take 1 week

Active Space

iii) Cordocentesis

- Blood is picked up from umbilical cord
- Done between 18-20 weeks
- Fetal blood - WBC
- Complication - Abortion

Active Space

Miscarriage

Active Space

DEFINITION 00:35

- Expulsion or extraction of an embryo or fetus weighing 500gms or less when it is not capable of independent survival

CAUSES 02:05

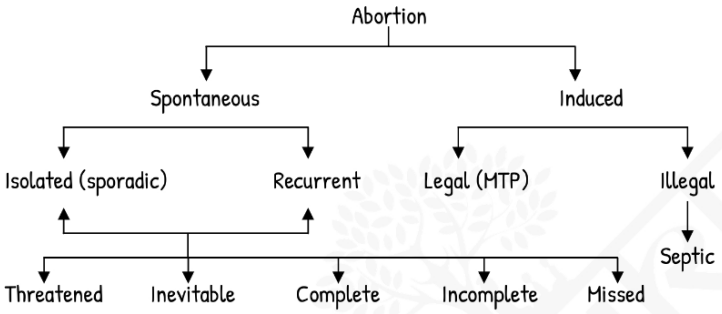
- First trimester :
  1. Genetic factors 50% - Monopsony X is single most frequent chromosomal abnormality
  2. Infections - TORCH infections, syphilis, chmlamydia, spirochaethes
  3. Medical disorders - Unrepaired cyanotic heart disease, hypertension, chronic renal disease
  4. Endocrine: Thyroid disorders, diabetes mellitus, PCOD, hyperprolactinemia, luteal phase defect
  5. Immunological causes : Anti phospholipid antibody syndrome. Inherited thrombophilias
  6. Uterine factors : Cervical incompetence, mullerian anomalies, large and multiple submucous leiomyomas, asherman syndrome, DES exposure in uterus
  7. Enviornmental factors : Alcohol, caffeine, radiation exposure, trauma, subchorionic trauma
- Second trimester abortion causes
  1. Fetal anomalies : Chromosomal, structural
  2. Uterine defects : Congenital, leiomyomas, incompetent crevices
  3. Placental causes : Abruption, previa, defective spiral artery transformation
  4. Maternal disorders : Autoimmune, infections, metabolic

Chromosomal Studies	Incidence Range (%)
Embryonic Euploid 46,XY and 46,XX	~50 45 to 55
Aneuploid Autosomal trisomy Monosomy X (45,X) Tripoidy Tetraploidy Structural anomaly	 22 to 32 5 to 20 6 to 8 2 to 4 2
Anembrynoic (blighted ovum)	~50

RECURRENT PREGNANCY LOSS 11:09

- More than or equal to 3. Consecutive spontaneous pregnancy loss before 24 weeks of gestation
- Start investigating after 2 consecutive pregnancy loss

TYPES OF ABORTION 13:06



MISSED MISCARRIAGE 17:01

Sonographic findings

1. CRL more than or equal to 7 mm and no heartbeat
2. MSD more than or equal to 25 mm and no embryo
3. An initial US scan shows gestational sac with yolk sac and seen after more than or equal to 11 days no embryo with a heartbeat is seen
4. An initial US scan shows a gestational sac without yolk sac and after more than or equal to 2 weeks no embryo with a heartbeat

SEPTIC ABORTION 19:24

- Any abortion associated with clinical evidences of infection of uterus and its contents is called septic abortion
- Most common organism : Group A streptococcus
- Clinical evidences
    1. History of pregnancy or abortion
    2. Fever 38 C or more for at least 24 hours
    3. Offensive or purulent vaginal discharge
    4. Lower abdominal pain, tenderness or mass
    5. Tachycardia of more than 100 per min

Active Space

- Clinical grading of septic abortion
  1. Grade 1 - Infection is localized to uterus
  2. Grade 2 - Infection spreads beyond uterus to the parametric, tubes and ovaries
  3. Grade 3 - Generalized peritonitis and or endotoxin shock or acutely renal failure

TREATMENT *20:47*

- Medical - Antibiotic
- Surgical - Dilation and curretage, posterior colpotomy, laparotomy, hysterectomy

MEDICAL TERMINATION OF PREGNANCY *21:27*

- MTP act was passed in August 1971 and came into effect from April 1972 and revised in 1975, in India
- Revised bill 2020
- MTP amendment act 2021 came into effect from march 2021

Indications

- To save the mother
- Eugenic causes
- Rape case
- Contraception failure
- When continuation of pregnancy is dangerous to life of mother

The abnormalities will be diagnosed by a medical board which consists of gynecologist, radiologist, pediatrician, any other members of state government

Failure of contraception termination up to 20 weeks

- The bill amends this provision to replace married woman or her husband with woman or her partner

Protection of privacy of a woman

- The bill states that no registered medical practictioner will be allowed to reveal name and other particulars of a woman whose pregnancy has been terminated except to a person authorized by any law

Active Space

Active Space

Recommendations

Only qualified persons

- Who has degree or diploma in obs and gynecology
- Who has done 6 months house job in gynaecology & obs
- Who has assisted in 25 or more MTPs

Only in hospitals established by government

Consent of wife is enough

In minor guardian consent

Abortion to be reported

SURGICAL MANAGEMENT *26:39*

- Menstrual regulation syringe
- Suction and evacuation

First Trimester (upto 12 weeks)	Second Trimester (13-20 weeks)
Medical • Mifepristone	• Prostaglandins PGE1 (Misoprostol), 15 methyl PGF2a (Carboprost), PGE2 (Dinprostone) and their analogues (used-intravaginally, intramuscularly or intraamniotically)
• Mifepristone and Misoprostol (PGE1)	• Dilation and evacuation (13-14 weeks)
• Methotrexate and Misoprostol	• Intrauterine instillation of hyperosomotic solutions
• Tamoxifen and Misoprostol	a) Intra-amniotic hypertonic urea (40%), saline (20%) b) Extra - amniotic - Ethacrydine lactate, Progstglandsins (PGE2, PGF2a)
Surgical • Menstrual regulation	• Oxytocin infusion high dose along with either of the above two methods
• Vacuum Aspiration (MVA/EVA)	• Hysterectomy (abdominal)
• Suction evacuation and/or curettage	
• Dilation and evacuation i. Rapid method ii. Slow method	

Cervical Incompetence

Active Space

- It is the inability of cervix to hold products of conception

Causes

- Congenital : Developmental weakness of cervix
  Uterine anomalies like septate nucleus
  Following in utero exposure to diethyl stil bestrol
- Acquired : Due to previous cervical trauma
  Forcible dilatation during MTP and DEC
  Conization of Cervix
  Cauterization of Cervix
  Amputation of Cervix on Fothergill's operation

Clinical Features

- Painless cervical dilatation in second trimester with prolapse and ballooning of membranes into Vagina
- Preterm premature rupture of membranes (PPROM) followed by expulsion of an immature fetus around 5th month of pregnancy

Diagnosis

- Non Pregnancy State
  - On Hysterocervicography → Funneling of internal os
  - Os allows easy passage of 8 negars dilators or passage of foleys catheter filled with 1ml fluid
- Pregnancy state
  - TVS should Cervical length less than 25cm and diameter of internal os < 8mm between 16 to 24 weeks
  - Pattern of opening of cervix - Tyru pattern

Treatment : Cervical Stitch

- Indications
  - History indicated : Should be offered to women with > 3 second trimesters abortions/Preterm births
  - Ultrasound indicated: Women with history of 1 or more second, trimester abortion or preterm birth and now USG shows cervical length 25mm before 24 weeks

- Rescue/Emergency cerlage : When cervical dilatation has started and fetal membranes seen

Cerclage (OS lightening)

- Operation performed to surgically in force weak cervix by some type of purse-string suturing
- Cerclage procedure : Mc Donald and Shirodhar
- Benson and Dufee : Abdominal cerclage
- Rescue cerclage : Worms cerclage

Contraindications of Stitch

- Intrauterine infections
- Placenta previa
- Cervix > 4cm
- Dead fetus
- Bleeding
- Uterine contraction
- Ruptured membrane

Complications

- Rupture of membrane
- Bleeding
- Abortion
- Chorioamnionitis
- Cervical dystocia

Active Space

Ectopic Pregnancy

Active Space

Presence of functional endometrium outside the uterus

Sites

- Tubal (95%) - Ampulla (70%) - Isthmic, Interstitial
- Cervical (< 1y)
- Cesarean Scar (1%)
- Isthmic is earliest to rupture by 6 weeks
- Interstitial is last to rupture because surrounded by uterine musculature

Risk Factors

- Previous ectopic pregnancy
- Sulpingitis
- Post Tubal surgery
- Contraceptives failure : Tubal Sterilisation failures

Ruptured Ectopic Pregnancy

- 50% of patients, classical triad of
  - Amenorrhoea
  - Pain in abdomen
  - Bleeding per vagina
- Signs : In ruptured ectopic, patient in shock
- On PA examination - Tenderness, tenseness, rigidity, guarding
- Cullen sign
- Grey Turner Sign
- On PIV examination :
  - Cervical movements tender
  - Posterior vaginal fornix bulging due to blood collection in pouch of Douglas
  - Tender boggy mass felt on one side of uterus
- Management

  Simultaneous resuscitation and exploratory laparatomy, salpingeclomy

Unruptured Echopic

- CP : Pain due to stretching of fallopian tube

  Amenorrhoea,

  Mild bleeding

- PA : Tenderness in lower abdomen
- PV : Uterus normal size, tender mass may be felt in fornix

Diagnosis

- Transvaginal ultrasound – DOC for tidal ectopic pregnancy
- Grade of recommendation – B
- Bagel's Sign
- Serum progesterone level is not useful in predicting ectopic pregnancy

Management

Expectant Management	Medical Management	Surgical Management
Not doing anything Resolve by itself		
Follow up	Methotrexate	
Clinical stable & pain free Size of GS < 3.5 cm with no FHR Sr. β-hCG < 1000IU/L Able to come for follow-up	No significant pain Unruptured ectopic GS < 3.5cm with no FHR β-hCG < 1500 IU/L Able to return for follow	Significant Pain GS > 3.5mm with FHR β-hCG > 5000IU/L
	Methotrexate 50mg/m2 (single dose is preferred) Check for β-hCG – Day 2, 4 & 7	Salpingectomy (complete removal) Salpingotomy (Incision → remove → suture) Salpingostomy (Incise → remove → kept open)
	Drop in 15% of β-hCG from previous value → she is responding less than 15% drop → Repeat Max. 3 ddoses → Surgery	

If β-hCG 1500-5000 IU/L → Either medical or surgical management

Active Space

Drugs used in Medical management (Most PG males are very knowledgeable)

- Methotrexate
- PGF2 - α
- Mifepristone
- Actinomycin
- Vasopressin
- KCL

Heterotopic Pregnancy

- When one pregnancy inside uterus and one intallopian tube

Abdomen Pregnancy

- Criteria for diagnosis : Shiddiford's Criteria
- M/C symptom : Lower abdominal pain and bleeding
- Braxton Hick contractions absent
- Management : Surgery
- Shiddiford's Criteria :
    i. Presence of normal tubes and ovaries with no evidence of recent or past pregnancy
    ii. No evidence of uteroperitoneal fistula
    iii. Presence of pregnancy should be exclusive to abdomen of peritoneal surface and remove possibility of secondary implantation
- Spielberg's Criteria for Diagnosis of primary ovarian pregnancy
    i. Fallopian tube on affected side intact
    ii. Fetal sac must occupy position of ovary
    iii. Ovary must be connected to uterus by ovarian ligament
    iv. Ovarian tensile located in sac wall
- Ultrasound Criteria for cervical pregnancy (Paalman's)
    i. Echo free uterine cavity or presence of a false gestational sac only
    ii. Hour glass uterine shape
    iii. Ballooned cervical shape
    iv. Gestational sac in endocervix
    v. Placental tissue in cervical canal
    vi. Closed internal os

Active Space

Pregnancy of unknown location

- Minimum amount of β hCG to visusalise gestational sac - 1500IU on TVS
- UP ++ Is positive, No gestational sac on TVS
- Measure serum β hCG < 1500 IU
- Do serial β hCG monitoring every 48 hours
  - If rise - by68% → Intrauterine pregnancy
  - Rise in β hCG by > 30% but less than 63% → Ectopic pregnancy
  - Fall in β hCG → Biochemical pregnancy

Active Space

Molar Pregnancy

Active Space

Aka Gestational trophoblastic disease and it encompasses a group of tumours where there is abnormal trophoblastic proliferation

MODIFIED WHO CLASSIFICATION 00:41

- Molar pregnancies
  - Hydatidform mole (Benign) - Complete mole and Partial mole
  - Invasive mole (malignant)
- Trophoblastic Tumours
  - Choriocarcinoma
  - Placental site trophoblastic tumour
  - Epitheloid trophoblastic tumour

RISK FACTORS 01:10

- Age and prior hydalidform mole
- Women of extreme age > 40 years and < 18 years
- Vitamin A deficiency causes molar pregnancy

PATHOGENESIS 01:33

- Di spermic fertilisation
- Complete mole : Maternal chrosomal inactivation
  Because of which, empty ovum fertilises with one sperm
  The sperm duplicates
- Two ways : Either ovum with no chromosomes fertilises with one sperm and duplicate again or ovum with no chromosomes will fertilise with two sperm → Zygote
- Partial mole
  - Ovum has one set of chromosomes and it fertilises with 2 sperms or Ovum with one set of chromosomes fertilises with 1 chromosome → Triploid
  - Could be 69 xxy and 69xxy, or 69xxx

SYMPTOMS 03:09

- Amenorrhea
- Bleeding per vaginum
- Complete mole
- Pain in abdomen

ON EXAMINATION 03:28

- Complete mole
  - Uterine size > Gestational age
  - Uterus soft, doughy
  - No foetus palpable
  - No FHR heard
- Partial mole
  - Uterine size > Gestational age
  - Foetal parts palpable
  - FHR present
  - External and internal ballotment +ve

COMPLICATIONS 04:02

- Hyperemesis gravidasum
- Theca lutein cysts
- Thyrotoxicosis
- Severe pre-eclampsia
- Pulmonary embolism

INVESTIGATIONS 05:03

- Serum βhCG elevated
  4 complete mole : > 1 lakh IU/L
  10 parital mole : < 1 lakh IU/L
- USG - snow storm appearance
- Histopathological examination - Gold standard

Character	Complete mole	Partial mole
Karyotyping	46xx-90% or 46xx-10y i.e it is Diploid	69xxx or 69xxy i.e it is triploid
Embryo/Foetus	Absent	Present
Trophoblastic hyperplasia	Diffuse overall affection	Focal affection
Foetal RBC in villi	Absent	Present
Scalloping of chronic villi	Absent	Present
P57 Kip 2	Absent	Present

Active Space

MANAGEMENT 06:15

- Surgery of choice : Suction and evacuation
- Pre operative hygroscopic dilators for cervical dilation if cervical dilation is minimum
- If age > 40 years : Total abdominal hysterectomy
  To prevent pulmonary embolism

INTRAOPERATIVE 06:33

- Inset 2 wide bore IV cannula
- Under GA or Regional anesthesia
- 10-14 mm diameter of karmann cannula used for suction and evacuation
- After suction, start oxytocin
- Intraoperative sonography to ensure complete evacuation

POSTOPERATIVE 06:54

- If patient Rh-ve, fetal tissues with partial mole include D antigen RBC → Give anti - D
- No prophylactic chemotherapy as long term prognosis not improved

FOLLOW UP 07:04

- 1st serum β-hCG within 48 hours of evacuation
- Repeat β hCG every 1 week till nil followed by 8 consecutive weeks, then monthly for 6 months

1. Median time of resolution for
   Partial mole : 6 weeks
   Complete mole : 9 weeks
2. Contraceptive of choice : Most recommended - Combined OCPS x 6 months / Barrier
3. Contraception contraindicated : IUCD

Active Space

Postpartum Hemorrhage

Active Space

Definition

When MCT decreases by 10% or the need for blood transfusion after delivery and when blood loss of more than 500ml from genital tract following child birth and > 1000 m after caesarean

Types

- Primary PPH : Bleeding within 24 hours after delivery
  - Causes : Tone, Trauma , Tissue, Thrombin
- Secondary PPH : Bleeding after 24 hours upto 12 weeks
  - Causes : Retained placenta

Causes

- Atonicity : Big uterus, Polyhydramnios, Multiple pregnancy, Macosomia, Diabetes mellitus, Fibroids, Urine anomalies drugs, Prolonged labour, Ante partum Hemorrhage, Anemia, Malnutrition
- Trauma
- Tissue : Retained placenta, MAP, Succentriate
- Thrombin : Bleeding or Coagulation disorders

Management

- Uterine lone → Flabby : Atonic PPH → Uterine massage
  → Well contracted : Not Alonic PPH
  Traumatic → Suture
  Tissue → Dilatation and Evacuation
  Thrombin deficiency → Cryoprecipitate or FFP, Factor VII A
- According to WHO, Any type of PPH within 3 hours of onset of PPH
  IV/IM tranexmic acid 1gm

ATONIC PPM

- Management
  - Primary PPH –
    Step1 : Resusciative, investigative and immediate management of cause
    Step 2 : Medical methods

Step 3 : Mechanical methods
Step 4 : Surgical methods

- Secondary PPH – Dilatation and curetage

- Primary PPH management

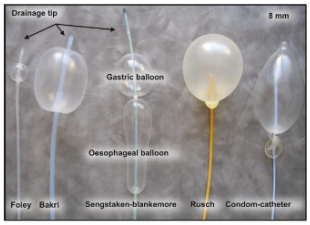
  Step 1 : Resuscitation

  - Call for help, uterine massage
  - Insert 2 wide bore IV cannula and simultaneously draw blood for cross matching and investigation
  - Arrange blood
  - Start on IV crystalloids
  - Catheterise

- Medical Management
  - Oxytocin → 10 iu – 40 iu → IM
    Cold storage IV in drip
    Never IV bolus, causes arrhythmias and hypertension
    - Side effect : Water retention
  - Methergine : 0-2mg, max 5 dose, IM, IV
    - Side effect : Hypertension
    - CI : After delivery of first twin
      Pre eclampsia
      Iso immunization
      Cardiac disease
  - Carboprost : 250µgm, max 8 doses, 2mg, IM/Intramyometrial
    - Side effects : Diarrhoea, Bronchoconstruction
    - CI : Asthmatics
  - Misprostol : 800µg, 1000µg, Pervaginal/SC/Buccal/Oval
    - Side effects : Headache, Fever with chills
  - Caubetocin : Synthols oxytocin, 100µgm (M/IV
  - Syntometins : Oxytocin + Methergin

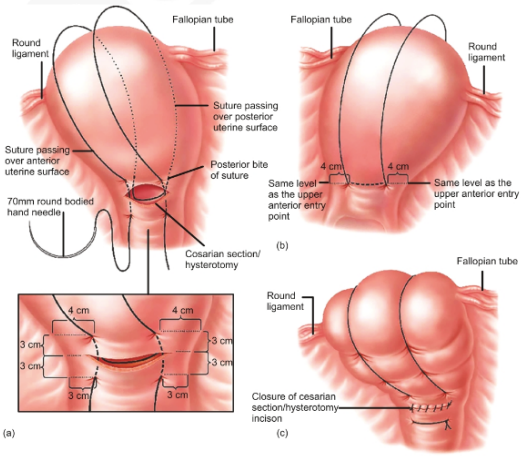
Active Space

- Tamponade method
  - If medical management does not work
    i. Bimanual compression
    ii. Bakri Balloon
    iii. Shirkar Pack/ Condom tamponade
    iv. Non pneumatic anti shock gaement



- Surgical Methods
  i. Blynch suture
  ii. Multiple square suture
  iii. Block suture
  iv. Uterine artery embolization
  v. Uterine and ovarian artery ligation

↳ Ligate uterine artery
↓
If bleeding does not stop
↓
Ligate utero ovarian anastomosis at the cornu
↓
If bleeding still does not stop
↓
Kgate anterior division of internal iliac artery. Around 3cm below the bifurcation of common iliac
If bleeding still does not stop : peripastum hystectomy



Active Space

Antepartum Hemorrhage

Active Space

DEFINITION 00:34

- Bleeding from or into genital tract after foetal viability and up to delivery

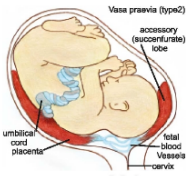
CAUSES 01:08

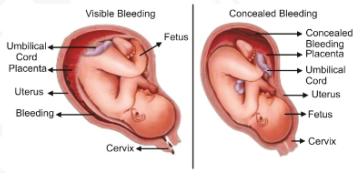
- Placenta previa
- Abruptio
- Vasa previa
- Circumvallate placenta
- Local causes like polyp, carcinoma cervix, varicose veins, trauma
- Unclassified or indeterminate

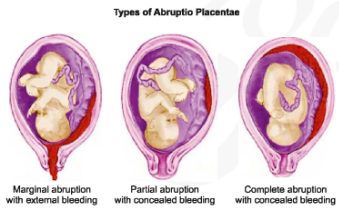
ABRUPTIO 02:07

- Premature separation of a normally situated placenta
- Risk factors :

1. Increased maternal age and parity
2. Hypertension
3. Prom
4. Abuses
5. Sudden uterine decompression
6. External trauma
7. Folic acid deficiency







CLINICAL PICTURE 05:06

- Painful dark altered bleeding
- Decreased to absent fetal movements

On examination

- Patient in shock
- Uterus hypertonic and tender
- Fetal distress to fetal death

PERVAGINAL EXAMINTAION 05:58

- ARM - Blood stained liquor is both diagnosed therapeutically
- IOC - USG

GRADING 06:33

- Grade 0 : Retroplacental clot
- Grade 1 : Uterus hypertonic and tender but no fetal distress
- Grade 2 : Fetal distress to fetal death
- Grade 3 : Maternal DIC, shock and death

MANAGEMENT 07:43

- Pritchards rule → Hcf >30%
- Uo > 30mL/hour
- Immediate delivery

FETAL STATUS 08:15

- Alive - Fetal distress : Emergency C section
  No fetal distress : Augment the labor → Vaginal delivery
- Dead - Maternal status is checked
- If mother's DIC is absent - Induction of labor → Vaginal delivery
- If mother's DIC present - Correct the DIC → Induction of labor → Vaginal delivery

PLACENTA PREVIA 10:33

- Placenta over or near the internal Os
- Type 1 : Placenta within 2 cm from internal OS
- Type 2 : Marginal
- Type 2a : Anterior
- Type 2b : Posterior, Dangerous placenta previa
- Type 3 : Covering the internal OS partially
- Type 4 : Total placenta previa

1. Risk factors of placenta previa
   - Increasing age and increasing parity
   - Past history
   - Previous LSCS
   - Multiple pregnancy
   - Prematurity
   - Smoking
   - Placenta Accreta in current pregnancy

Active Space

2. Clinical presentation
    - Painless vaginal bleeding
    - Recurrent episodes, each episode of bleeding called warning hemorrhage
3. On examination
    - Patient is stable
    - PA - uterus is relaxed and malpresentation is frequent
    - Stall worthy's sign on pushing the presenting part into pelvis which decreases fetal heart rate
4. Diagnosis
    - IOC - USG
    - Gold standard double set up examination - Gentle per vaginal examination in OT
5. Management
    - Macafee and Thomson's regimen
    - Prerequisites : Gestational age < 37 weeks, mother hemodynamically stable, no fetal distress
    - Admit - Bed rest, tocolysis of uterine contractions, steroids for lung maturity
    - Steroids :
        - Dexamethasone 6mg 4 doses 12 hrs apart
        - Betamethasone 12mg 2 doses 24 hours apart
    - Protect the baby from IVH, NEC, RDS

Active Space

Hypertensive Disorder in Pregnancy

Active Space

DEFINITION 00:45

- Defined as blood pressure of greater than or equal to 140 mmHg (systolic) or 90 mmHg (diastolic) on at least two measurements, ideally separated by a period of rest
- Proteinuria is defined as total protein of more than 300 mg/day in the 24 hours collection

GESTATIONAL HYPERTENSION 01:16

- BP > -140/90 mmHg for first time during pregnancy after 20 weeks
- No proetinuria
- BP returns to normal within 12 weeks postpartum

PREECLAMPSIA 01:20

1. BP more than or equal to 140/90 mmHg after 20 weeks of gestation
2. Proteinuria

CHRONIC HYPERTENSION 03:29

1. BP > 140/9- mmHg before pregnancy or diagnosed before 20 qw2ls of gestation
2. Hypertension first diagnosed after 20 weeks of gestation and persistent after 12 weeks postpartum

SUPERIMPOSED PREECLAMPSIA 03:51

- New onset Proteinuria of more than 300 mg per 24 h in hypertensive women but no Proteinuria before 20 weeks of gestation

  Or
- A sudden increase in, Proteinuria or blood pressure of platelet count in women women hypertension

DELTA HYPERTENSION 04:28

- Normptensive and non Proteinuric patient presenting with convulsions or end organ failure it is due to rise in mean arterial pressure in pregnancy

Eclampsia - Convulsion in a hypertensive patient

CAUSES 05:07

- Failure of secondary trophoblastic invasions
- Immunological intolerance
- Maternal maladaptation to CVS of inflammatory changes in pregnancy
- Dietary deficiency : zinc, calcium, magnesium
- Genetic influences : HLA DR4, polymorphism, interlukin 1b

PATHOLOGY 06:06

- Normally, extravillous trophoblastic invasion takes place on the spiral arteries making the high flow low resistance
- Primary wave takes place at 12-14 weeks
- Secondary wave takes at 16 weeks

RISK FACTORS FOR PREECLAMPSIA 09:51

- Patient younger than 20 years or older than 35 years of age
- Young primigragida
- Vesicular mole, multiple pregnancy
- Past history or family history
- Autoimmune disease
- Fetal hydrops
- Smoking

CLINICAL FEATURES 10:33

- Headache
- Vomiting
- Reversible blurring of vision or blindness
- Occipital ischemia
- Retinal vessels vasospasm
- Epigastric pain
- Pulmonary edema
- Oligouria

PREVENTION OF HYPERTENSION IN PREGNANCY 11:47

- Low dose aspirin
- Calcium in women who are deficient- 1.5 mg/day

Active Space

INVESTIGATIONS 12:08

- Maternal evaluation : Hematocrit, peripheral smear for schistiocytes, platelet count decreased, total bilirubin > 1.2 mg/dL, LIVER enzymes AST/ ALT, serum, Creatinine > 0.9 mg/dl, Proteinuria, Fundoscopy, Coagulation profile
- Fetal evaluation : NST, USG with BPP, Doppler

MANAGEMENT 14:00

- Non specific treatment
- Antihypertensives
- Seizure prophylaxis
- DOC : Labetalol 100 mg BD or TDS
- Other drugs : nifedipine, alpha methydopa, hydralazine, nitroglycerin, nitroprusside
- DOC for AC. HTM, IV labetalol
- Drugs contraindicated : ACE inhibitors, ARB, Diuretics
- Mild preeclampsia : Deliver by 37 weeks
- Severe preeclampsia : Deliver by 34 weeks

INDICATIONS FOR TERMINATION IRRESPECTIVE OF GESTATIONAL AGE 15:40

- Impending eclampsia
- Eclampsia
- HELLP Syndrome
- Abruption
- Reversal of end diastolic flow
- Fetal compromise
- Uncontrollable blood pressure or rising creatinine levels

HELLP SYNDROME 16:10

- Criteria for diagnosis of HELLP Syndrome
- Hemolysis schistocytes in blood smear
- Bilirubin > 1.2 mg/dL
- Absent plasma hepatoglobin
- Elevated liver enzymes SGOT 72 IU/L LDH > 600 IU
- Low Platelet count, Platelets < 100 x 103/ mm3

Active Space

Diabetes Mellitus in Pregnancy

Active Space

CARBOHYDRATE METABOLISM IN PREGNANCY 00:40

- State of diabetogenic
  1. Insulin resistance
     - Production of HPL
     - Increased production of cortisol, estrogen, and progesterone
     - Increased destruction of insulin by kidneys and placenta
  2. Increased lipolysis
  3. Altered gluconeogensis
  4. Increased insulin production

TYPES 02:19

1. GDM : Glucose intolerance for the first time in pregnancy
2. OVERT DM : Glucose intolerance before pregnancy

MANAGEMENT 03:29

Preconceptional care

- HbA1C ; < 6.5
- Folic acid 5 mg 3 months prior

CONGENITAL MALFORMATION IN DIABETICS FEMALES 03:50

- Estimation of HbA1C levels
- HbA1C levels
- < 6.5% - No greater risk of malformation than non diabetic mothers
- 6.5-8.5% : Risk of anomalies is 5%
- > 10% : Risk of anomalies is 22%

ANTENATAL MANAGEMENT 05:00

1st trimester

- Aneuploidy screening
- Insulin is DOC
- Insulin mixture

2nd trimester care

- Maternal serum AFP 16-20 weeks gestation
- Targeted USG/TIFFA at 18-22 weeks gestation
- Fetal echo at 18-20 weeks

3rd trimester

- Fetal monitoring from 32-34 weeks - DFMC, NST weekly
- OVERT DM - Well controlled on medications

GESTATIONAL DIABETES *07:21*

- Universal screening - Screen at first visit and repeat screening until 27-28 weeks gestation
- India, Seshiah spot test → RBS > 200 mg/dL

MANAGEMENT *10:11*

- Medical nutrition therapy : Diet + Isometric exercises
- 3 Major meals + 3 Minor meals

MODE OF DELIVERY *12:26*

- According to ACOG : Birth weight more than 4.5 kg - EL.LSCS
- India, birth weight > 4 kg - EL.LSCS
- < 4 kg - Vaginal delivery

INSULIN MANAGEMENT *12:48*

- Evening dose insulin
- With hold morning dose
- Infuse iv normal saline at 100-125 ml/hr
- Regular insulin 1-1.25 IU/hr
- Measure glucose hourly

PUERPERIUM *13:39*

- Post delivery 1st 24 hours - No insulin required
- Shift from saline to OHA
- IUCD - Contraceptive

COMPLICATIONS *14:41*

- Maternal : Polyhydramnios, PPROM, Hypertension in pregnancy, PPH
- Fetus : Hyperglycemia, Hyperinsulinemia, Macrosomia, Polyuria, Shoulder Dystocia, Abortions, Still birth
- Neonatal : Hypoglycemia, Hypokalcemia, Hypocalcemia, Hyoesthesia, Hyperbilirubinemia, Hypomagnesia

Active Space

Shoulder Dystocia

Active Space

Shoulder Dystocia is when head, shoulder stuck inside

Risk Factors

- Diabetes
- Obesity
- Post datism
- Excess weight gain during pregnancy
- Pre Labour :
  - Previous shoulder dystocia
  - Macrosomia
  - Diabetes mellitus
  - Maternal Body Mass index 30
  - Induction of labour
- Intra partum:
  - Prolonged first stage of labour
  - Secondary arrest
  - Prolonged second stage of labour
  - Oxytocin augmentation
  - Assisted vaginal delivery
- 47% of undelivered babies die in 3 minutes

Management

- If routine traction fails to deliver shoulders then diagnose shoulder dystocia
- Call for : Further midwifery assistance,
  Obstetrician
  Pediatric Resuscitation team
  Anesthesist
- Remove bottom of bed placing the back flat and lift the knees to chest in "Mc Roberts" position
- Evaluate for an Episiotomy
- Don't pull hard or you might cause fetal injury
- Pull up for 30 seconds
- Apply suprapubic pressure to the back of front shoulder
- Attempt delivery at same time
- Sustained or Rocking, try up for 30 seconds

- Place two fingers onto back of front shoulder and push to rotate and dislodge shoulder
- Suprapubic pressure at same time
- If not working, then place your other hand in front of back shoulder and push to rotate
- If there is movement, deliver the baby reverse your hand position to try to dislodge shoulders in other direction for 30 seconds
- Remove posterior arm by grasping the baby's wrist
- Pull the hand and sweep in front of baby
- If all fails, roll onto all fours and repeat manoeuvres

3 Possible Extreme Manoeuvres

i. Replace baby and perform caesarean section
ii. Deliberately break the fetal clavicle
iii. Perform a symphisiotomy

Manoeuvres involved

- Mc Roberts – Meralgia Paresthesia
- Suprapubic pressure
- Woods carkscrew
- Posterior arm extraction
- Zanarelli
- Fetal cleidolomy
- Maternal symphysotomy

If non of above manoeuvres weak

- All fours / Gaskins position

Complication

- Most common : Brachial plexus injury → Policeman tip hand
  CSCO injury – Erp's Palsy

Active Space

Multiple Gestation

Active Space

Two types of Twins

- Uniovular : 25%
  - Identical twins
  - Genetically identical
  - Constant - IM 250
  - When a single sperm fetilizes a single ovum and that zygote splits into 100 → Monozygotic or Uniovular or Identical twins
- Binovular Twins : 75%
  - Fraternal twins
  - Genetically distinct
  - Varies with race and ethnicity
  - Those where two sperms fertilise two ovums → Two zygotes
  - Are Dichorionic, Diamniotic
- Finger pount of all twins will be different

Risk Factors

- ART-IVF → For monozygotic twins
- Advancing age and parity
- Family history
- Negroes - Highest risk of twinning
- Mongols - Least risk of twinning
- Ovulation induction with Clomiphene citrate, Gonadotropins
- ART

- Chorionic and Amnionicity of Monozygotic Twins
  - If Morula state within 72 hous → Dichorionic/Diamniotic
  - If Blastocyst Stage in day 4- 8 → Monochorionic/Diamniotic
  - If in Implanted blastocyst stage in days 8-13 → Monochorionic/Monoamniotic
  - If after embryonic disc formation in days 13-15 → Conjoined twins/Siamese twins

- Most common variety of twins→ Dizygotic
- Most common variety of chorionicity → DCDA
- Most common variety of chorionicity → MCDA and amnionicity among monozygotic twins > Dizygotis
- Bad prognosis : Monozygotics > Dizygotic
  Monochorionic > Dichorionic

Zygosities

- Karyotyping
- Different sex

On USG, DC Indicators :

- 2 Separate placenta
- Opposite sex twins always associate with DC
- Twin peale sign or Lambds sign at 11-14 weeks
- > 2 layers in intertwin membrane (4 layers)
- Thickness of intertwin membrane > 2mm
- In early viability scan - 2 separate G sac : yolk sac and tidal intervening membrane > 2mm : DCDA

MC Indicator

- Single G sac with thin intertwin membrane
- Intertwin membrane < 2mm
- Junction - T sign at 11-14 weeks USG

Super fecundation

- Fertilisation of 2 ova released at same time, by sperms released at intercourse at 2 different occasions

Super fetation

- Not possible in human beings
- An interval as long as or longer than a menstrual cycle intervenes between fertilisation → Theoretical

Clinical Diagnosis

- History : Hypermesis gravidasum
  Increased respiratory distress
  Pain abdomen

Active Space

- D/E : D/A – uterus > P.D.A
  Palpate 2 foetal heads, 3 foetal plates
- On auscultation – 2 fetal heart sounds, 10cm apart 10 beats difference heard simultaneously by 2 different examiners

Complications

- Maternal
  i. Anemia
  ii. Hyperemesis
  iii. Pre eclampsia
  iv. Polyhydramnios
  v. Preterm labour
  vi. Gestational diabetes melitis
  vii. APH
  viii. Malpresentation
  ix. Dysfunctional labour
  x. Cord prolapsed
  xi. PPH
  xii. Operative delivery

- Foetal Complications
  i. Congenital malformation
  ii. TTTS
  iii. Acardia twinning
  iv. Preterm Labour
  v. IUGR
  vi. Still birth
  vii. Vanishing twin and abortion
  viii. Monochorionic > Dichorionic

Twin to Twin Transfusion Syndrome

- Mainly in MCDA twins
- Due to deep A-V malformations
- Donor twin → Recipient twin

Active Space

Anemia ↓	Polycythemia ↓
Autoregulation	Polyhydramnios
	Multiple thrombus formation
	Cardiac failure due to volume overlaod → Worst prognosis

Diagnostic Criteria

- MCDA placenta
- Twin oligohydramnios > Polyhydramnios sequence

Guintero Staging

- Stage 1 : Oli/Poly sequence, urine visible in donor bladder
- Stage 2 : Oli/Poly sequence, with no urine in donor bladder
- Stage 3 : Abnormal umbilical artery Doppler findings in one or both twins
- Stage 4 : Hydrops in one or both twins
- Stage 5 : Death in one or both twins

Management

- Monochorionic presentation from 18 weeks every 2 weeks USG
- Increased NT
- Foetal echo
- < 28 weeks : Feto scopic laser ablation of AV malformation
- > 28 weeks : Septostomy, Amnioreduction in polyhydramnios twin
- Mode of delivery : LSCS

Twin Reversed Arterial Perfusion/Acardia Twin

- Monochorionic twin
- Deep A-A anastomosis

Disordant Twin

- Weight difference between both twins > 28% with larger twin as index

Selective IUGR

- Seen in 2nd – 3rd trimester
- Abdomen circumference measurement between two twins > 20mm
- If foetal weight discordance > 20%

Antenatal Management

- Beyond 22 weeks every 2 weeks antenatal visits
- Double dose iron – 2 tablets

Active Space

- ↑ calorie → 40-45 kcal/kg/day
- Aneuploidy screening in 1st trimester
- Cell free foetal DNA in monochorionic twin
- 2nd trimester - Anomaly scan
- Monochorionic twin - Foetal echo at 18-22 weeks
- Dichorionic twin - Weekly NST from 26 weeks
  Monochorionic twins - Weekly NST from 32 weeks
- Aspirin (TS-150mg/day) from 12-16 weeks till delivery

Timing of Delivery

- RCDG
  - DCDA → 37-38 gestation weeks
  - MCDA → 36-37 weeks of gestation
  - MCMA → 32-34 weeks of gestation
  - Triplets → 35 weeks of gestation by elective LSCS after steroids course

Mode of Delivery : Mainly decided by 1st twin

- 1st twin vertex → Vaginal delivery
  2nd twin vertex → Vaginal delivery
- 1st twin vertex → Vaginal delivery
  2nd twin breech → Assisted vaginal breech delivery
- 1st twin vertex → Vaginal delivery
  2nd twin transverse → Shift to OT

Indications for LSCS in Twins

- First twin non vertex
- TTTS
- Conjoint twins
- MCMA twins
- Triplets

Indications for LSCS in 2nd Twin

- Foetal distress in 2nd twin
- Failed IPV
- Prompt closure of cervix after delivery of 1st twin
- Cord prolapse in 2nd twin

Active Space

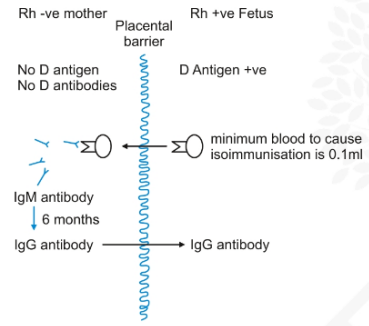
RH Isoimmunization

Active Space

DEFINE 00:52

- Allo immunisation is defined as a product of immune antibodies in an individual in response to foreign red cell antigen derived from another individual of same species provided first one lacks the antigen
- Rhesus antigen present on chromosome- 1
- CcDEe antigen
- D alone has immunogenic potential

METHOD 01:13



Destruction of Foetal RBC

- Hepatosplenomegaly → placentomegaly → Severe Anaemia → Heart failure → Anasarca (hydrops fetalis)
- Milder form → Congenital aneaemia of new born
- ↑ Bilirubin → Icterus gravidarum neonatrum

Prior administration of anti D → D antigen is destroyed immediately → Mother Immune system

CONDITIONS PREDISPOSING TO FETOMATERNAL HEMORRHAGE/ INDICATIONS OF GIVING ANTI-D 03:40

- Abortion, ectopic pregnancy, molar pregnancy
- Cordocentesis for karyotyping
- Amniocentesis
- Chorionic villous sampling
- Attempted version
- Manual removal of placenta
- Blood transfusion
- Trauma
- Antepartum Haemorrhage
- Vaginal delivery
- Caesarean section
- Forceps delivery

Anti-D

- For all Rh negative women who are not isoimmunised
- Anti D at 28 weeks of gestation :

  Routine Antenatal Anti-D
- Post delivery :

  Baby blood group : -ve
  Direct coombs test : +ve
  } No anti - D veg aired
- For any event of Feto maternal hemorrhage
  - < 12 weeks - 50µg, of Anti D
  - > 12 weeks - 300µgm of Anti D

QUANTITIVE TEST TO MEASURE FETOMATERNAL HEMORRHAGE 05:03

i. Kleihguer Retke test - also called acid dilution test
- 300µgm Anti D can neutralize 30ml of fetal whole blood

GUALTITATIVE TEST TO MEASURE FETOMATERNAL HEMORRHAGE 05:31

- Apt test/Singers alkaline denaluration test
- USG : Early detection of hydrops when one or more of following
  - BUDDA sign
  - Pleural effusion

Active Space

- Pericardial effusion
- Skin edema
- Increase placental size

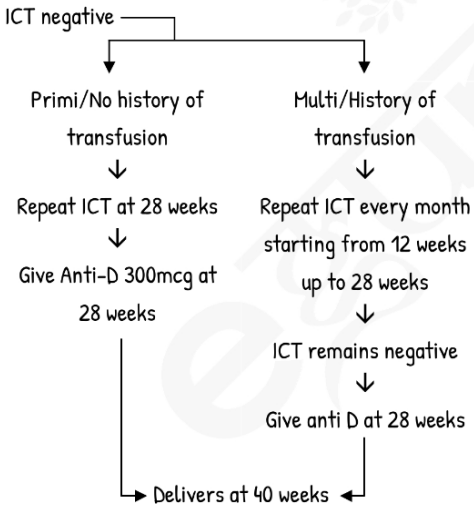
ANTI D PREPARATION 06:17

- From sera of sensitized Rh negative male
- IM inj

MANAGEMENT 06:33

Rh – negative mother
↓
Father blood group

If Rh +ve mother
↓
Indirect coombs test



ICT +ve (sensitized mother)
↓
Serial ICT Titre every 4 weeks
↓
Critical litre 1 in 16 or
Antibody > 60 Iu/L
↓

Active Space

↓

Fetal MCA Doppler every 1-2 weeks

Fetal USG with BPD every 1-2 weeks

From 20 weeks

MCA Doppler	MCA Doppler
Peak systolic velocity	Peak systolic velocity
> 1.5 mom	< 1.5 mom
↓	↓
Severe anemia	Repeat MCA PSV
↓	every 1-2 weeks
Cordocenteris	↓
↓	Deliver by 37-38
HCTY < 30%	weeks
Intrauterine Blood Transfusion	
Deliver by 34 weeks	

CORDOCENTESIS

Hematocrit < 30%	Hematocrit < 30%
↓	↓
Repeated cordocentesis after	Intrauterine blood
2 weeks	transfusion to foetus
↓	↓
Delivery by 37-38 weeks	Delivery by 35 weeks

ROLE OF AMNIOCENTESIS *10:24*

- Spectrometris analysis of Bilirubin ; Plotted on Liley Chart

Zone 1	Zone 2	Zone 3
Mild Anemia	Moderate Anemia	Severe Anemia
↓	↓	↓
Repeat amnio at	Repeat amnio at	Cordocentesis
4 weeks	1-2 weeks	↓
Deliver at term		Intvaturine blood
		transfusion,
		Deliver by 34 weeks

Active Space

HYDROPS FETALIS

11:18

Active Space

Immune

- Rh isoimmunisation

Non Immune

- CVS anomaly
- TORCH infections
- Parvovirus

Anemia

Active Space

ANEMIA IN PREGNANCY 00:56

	ICMR	WHO
Mild	10-11gm/dL	9-11gm/dL
Moderate	7-10	7-9
Severe	4-7	<7
Very severe	< 4 decompensated	

CAUSES 02:34

- Most common cause - Nutritional deficiency
- Most common nutritional deficiency causing anemia - Folic acid + Iron deficiency

PREVENTION 04:06

- Iron supplementation
- Dewarming - Abendazole 400mg stat in 2nd trimester

INVESTIGATIONS 05:32

- CBC
- Peripheral smear
- Stool for ora ; Cyst and Parasite
- Urine Routine
- PS for Malarial Parasite
- LET
- KFT
- Thalassemia screening

MANAGEMENT 07:19

- Oral : Ferrous sulfate, ferrous lumavate, Ferrous succinate, Carbonyl Iron, Ferrous ascorbate
- Parenteral : In non compliant patients with severe anemia, Iron dexivan, Iron sorbital , Ferric carboxy maltose
- Blood transfusion

Total Iron Requirement Calculation

a. 4.4 x body wt (kg) α Hb deficit (gldL) - Includes iron needed for stores replenishment
b. 0.3 x wt (lb) x Hb deficit = Iron req. in mg
c. 250 mg of elemental iron for each gm% of Hb deficit
d. 2.21 x body wt (kg) x Hb deficit (g/dL) + 1000mg

Blood Transfusion Indication 10/46

- Patient with moderate to severe anemia beyond 36 weeks
- Active blood loss
- Refractory anemia
- Severe anemia at gestational age

Active Space

Cardiac Disease in Pregnancy

Active Space

Most common : in India, Rheumatic heart disease

In developed countries - Arterial septal defect

DISORDERS *00:42*

1. Pulmonary hypertension
2. Marfan syndrome
3. Coarctation of aorta
4. Severe left ventricular dysfunction

SYMPTOMS *01:30*

- Syncope
- Chest pain
- Palpitation

SIGNS AND SYNPTOMS *02:08*

- Symptoms : Dysponea, Chest pain, Syncope, Palpitation. Orthopenea, PND, Hemoptysis
- Signs : Cyanosis, clubbing, raised JVP, hepatomegaly, anasarca, diastolic murmur, may systolic murmur above grade 2

MANAGEMENT *03:09*

- Antenatal
  1. Cardiologist opinion
  2. Restrict na intake
  3. Avoid exertion
  4. Test and heart anemia
  5. Frequent ANC
  6. To control heart rate, cardio selective beta blocker - Metaprolol
  7. Anticoagulants
- HD - 2nd fetal anomaly
- Mitral stenosis - Percutaneous balloon valculoplasty
- Ideal time -14 to 18 weeks

PERIPARTUM CARDIOMYOPATHY *07:36*

- Dilated cardiomyopathy
- Auto immune prolactin

- Cardiac failure occurring in last month of pregnancy
- Absence of identifiable cause for the cardiac failure
- Absence of heart disease prior to last month of pregnancy
- Left ventricular systolic dysfunction

Active Space

Jaundice in Pregnancy

Active Space

SUMMARY OF PHYSIOLOGICAL CHANGES IN LIVER DURING PREGNANCY 00:27

- Alkaline phosphates levels ride threefold or fourfold due to placental production
- Decreased : Gall bladder contractile, Albumin and anti thrombin 3 concentrations
- No change : Liver aminotransferase levels, Bilirubin level, Prothrombin time

CAUSES 01:26

Unrelated to Pregnancy	Pregnancy Specific

Hepatic Causes
• Acute viral hepatitis
• Drug induced hepatitis
• Chronic hepatitis
  - Viral (HBV, HCV)
  - Autoimmune hepatitis
• Wilson's disease
• Cirrhosis of liver
• Budd – chiari syndrome
Pre – Hepatic Causes
• Hemolytic anemia
Post – Hepatic Causes
• Common bileduct stone/strictures
• Biliary parsitosis
	• Hyperemesis gravidarum
	• Intrahepatic cholestasis of pregnancy
	• Pre-eclampsia/eclampsia
	• HELLP Syndrome
	• Acute fatty liver of pregnancy

OBSTETRIC CHOLESTASIS 01:28

- 1.5-2%
- Late pregnancy
- Cause unknown

INVESTIGATION 02:28

- Abnormal LFT
- Serum bile acids raised
- Mild OC : > 10-39 micro mol/L
- Severe OC : > 40 micro mol/L
- Post delivery returns to Normal

RISKS 03:09

- Iatrogenic prematurity
- RDS
- Meconium aspiration
- Intrapartum fetal distress
- Still birth
- Fetal cardiac arrest

MANAGEMENT 03:19

- Topical emollients and antihistaminics
- Monitor weekly LFT till delivery
- Ursodeoxycholic acid 10 mg/kg/day till 6 weeks postpartum
- If prolonged patient vitamin. K, q0 mg daily From 34 weeks

PATHOGENEIS 04:48

- Heterozygous women with homozygous fetus ·
- Deficiency of enzyme long chain. Beta hydroxy acyl coA dehydrogenase
- Accumulation of long chain fatty acids in liver
- Fetal fatty acids return to mother → AFLP

CLINICAL PRESENTATION 06:31

- Acute onset
- Progressive
- Nausea, vomiting, abdominal pain. Anorexia. Jaundice, Hypoglycemia

INVESTIGATIONS 06:53

- AST and ALT < 1000 IU/mL
- Bilirubin > 14 micromol/L
- Prolonged PT
- Hypoglycemia
- Liver biopsy : Micro vesicular fatty infiltration
- FFT deranged
- Increases ammonia
- Swansea criteria

SUBSEQUENT PREGNANCIES 07:45

- Genetic counseling
- CVS or amino for identifying ICHAD

Active Space

Normal Labour

Active Space

DEFINITION 00:10

- Normal labor is defined as series of events that take place in genital tract in. Order to expel viable products of conception from the uterus to the outside world through the vagina

THE EDD 00:54

- Expected date of delivery is calculated by Naegele's formula
- The formula is d+7 / m+9 for the LMP
- 45 of females deliver on the EDD
- 50% of females deliver within one week of the EDD
- The EDD calculated by the first trimester ultra sound scan is most accurate

FACTORS INFLUENCING THE LABOR 03:18

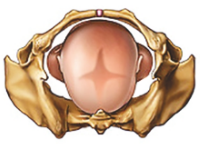
- Power
- Passage
- Passenger

ISCHIAL SPINES 08:21

- Station 0
- Pudendal block is given
- Legatos ani inserted
- Curve of Cyrus forward part
- Ring press any in prolapse at this level
- Internal rotation occurs at this level
- Most cases of deep transverse arrest occur here
- External os lies at this level

THE PELVIC OUTLET 09:48

- Lower border of symphysis pubis
- Pubic arch
- Ischial tuberosities
- Sacroyuberous and sacrospinous ligaments
- Tip of coccyx



Active Space

GYNECOID (50% OF WOMEN)	ANDROID (23% OF WOMEN)	ANTHROPOID (24% OF WOMEN)	FLATYPELLOID (3% WOMEN)
Slighlty ovoid or trasnsversely rounded	Heart shaped, angulated	Oval, wider anterposteriorly	Flattened anteroposteriorly, wide transversely
◯ Round	♡ Heart	⬯ Oval	⬭ Flat
Moderate Straight Blunt, somewhat widely seperated	Deep Convergent Prominent, narrow interspinous diameter	Deep Straight Prominent, often with narrow interspinous diameter	Shallow Straight Blunted, widley seperated
Deep curved	Slightly curved, terminal portion often beaked	Slighlty curved	Slightly cureved
Wide Vaginal Spontaneous Occipitoanterior position	Narrow Cesarean Vaginal Difficult with forceps	Narrow Vaginal Forceps Spontaneous Occipitoposterior position	Wide Vaginal Spontaenous

CONTRACTED PELVIS *12:33*

- Pelvis is contracted if any of its major diameters are shortened by 0.5 cms or more
- In contracted pelvis : mode of delivery is always cesarean
- It is a recurring indication for cesarean section
- Types of contracted pelvis
  1. Rachitic pelvis : seen in rickets
  2. Triradiate pelvis
  3. Osteomalacia pelvis
  4. Naegele's pelvis : if one ala of sacral bone is absent
  5. Robert's pelvis : if both ala of sacral bone are absent

TRIAL OF LABOUR 13:38

- Labour is a mild degree of contracted pelvis when contraction is only at the level of inlet. This is done in hospital setting with the expectation of vaginal delivery.
- But if this fails, caesarean section should be done immediately
- Contraindications of trial of labour
  1. Severe degree of contracted pelvis
  2. Pelvic contraction at mid pelvis or outlet
  3. Previous cesarean section
  4. Elderly primigravida, bad obstetric history
  5. Malpresentation
  6. Previous failed trial of labour
  7. Severe PIH, diabetes, cardiac diseases

FETAL LIE 14:51

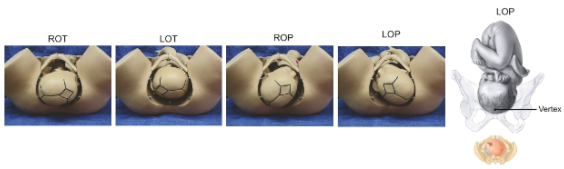
- Relationship of long axis of fetus to long axis of centralized uterus or maternal spine

PRESENTATION 15:44

- The part of fetus which lies in lower uterine segment, Mc Cephalic
- The presenting part is that portion of fetal body that overlies the internal os

DENOMINATOR 17:05

- Arbitrary bony fixed point on the presenting part to determine position of fetus in pelvis
- Vertex - Occiput
- Bore - Sinciput
- Face - Mentum
- Breech - Sacrum
- Shoulder - Acromion



FETAL POSITIONS 19:00

- Position refers to the relationship of an arbitrarily chosen portion of the fetal presenting part to the right or left side of the birth canal

Active Space

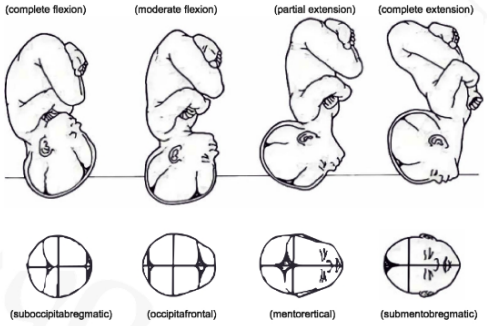
FUNDAL GRIP *21:00*

- If you feel soft, broad and curve irregular surface - Buttock
- Hard, lobular and curved - Head
- 2nd fundal grip : Umbilical or Lateral grip
- 3rd fundal grip : Palwik's grip -
  If mobile then not engaged and if not mobile then engaged

THE MECHANISM OF LABOUR *23:13*

- Defined as series of movements on the foetal head in order to dart to the maternal pelvis
- They are as follows

1. Engagement
2. Descent
3. Flexion
4. Internal rotation
5. Crowning
6. Extension
7. Restitution
8. External rotation



Active Space

Stages of Labour

Active Space

1ST STAGE 00:19

- Onset of true labour pains to full dilatation of cervix (10cm)
- True labour pains: regular, rapid increase in frequency, and intensity associated with cervical changes, codilation. Show mucus plug and blood begins Lower abdomen and radiates to back and thigh

Not relived on medication

- False labour pains : Non progressive, irregular, confined to lower abdomen, relieved on medication
- Latent phase of first stage (0-6 cm)
- Primigravida
    1. Average 10-12 hours
    2. Prolonged : More than 20 hours
- Multigravida
    1. Average : 6-8 hours
    2. Prolonged : > 14 hours
    3. Cause : unripe fervor, excess sedation, early epidural ; analgesia
    4. Treatment: rest and sedation
- Active phase of first stage (6-10cm)
- Rate of cervical dilatation
    1. Primigravida : average - 1.2 cm/hr ; prolonged- < 1.2 cm/hr
    2. Multigravida : average - 1.5 cm/hr ; prolonged < 1.5 cm/hr
- Rate of fetal head descent
    1. Primigravida : average - 1cm/hr ; prolonged more
    2. Multigravida : average - 2 cm/hr ; prolonged more
- Monitoring done by partogram

2ND STAGE 07:12

- Full dilatation to delivery of baby
- Bearing down efforts is important

EPISIOTOMY *10:07*

- It is a planned liberal incision of perineum in order to make the pernireum out layer more spacious for the baby to deliver
- It can be - Median, Mediolateral, Lateral, J shaped
- Most common - Mediolateral episiotomy
- Muscles cut are : Bulbospongiosis, Superficial deep transverse perinie
- Episiotomy is done after local anesthetic injection of 2% lignocaine injection

PERINEAL TEARS *12:40*

- 1st degree : skin is cut
- 2nd degree : skin and muscle
- 3rd degree :
    1. 3a- < 5cm external sphincter cut
    2. 3b - > 50% external sphincter cut
    3. 3c - Internal Anal sphincter cut

3RD STAGE *14:00*

- Placental separation
- 2 types of placental separation ; Marginal and central
- Signs of placental separation :
    1. Suprapubic Bulge
    2. Lengthening of cord
    3. Globular uterus
    4. Increase in uterine height
- Phase of separation - Decidua Spongylosis

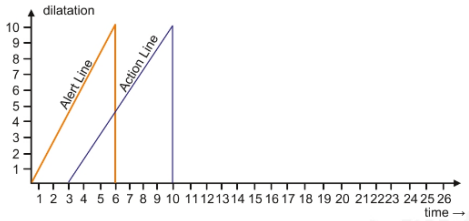
Active Space

Partogram

Active Space

Graphical representation of all events of labour in a single sheet of paper

- Freidman - Sigmoid shaped
- Philopp and Castle - Introduced alert line and Action line



- WHO partogram - Had latent phase
- Modified WHO partogram - Removed latent phase

1. Name of patient
   - Gravida scoring
   - Para scoring
   - Date of admission
2. Time of onset of labour pain
   - Membrane ruptures timing
3. FHR monitoring (ideal FHR monitoring)

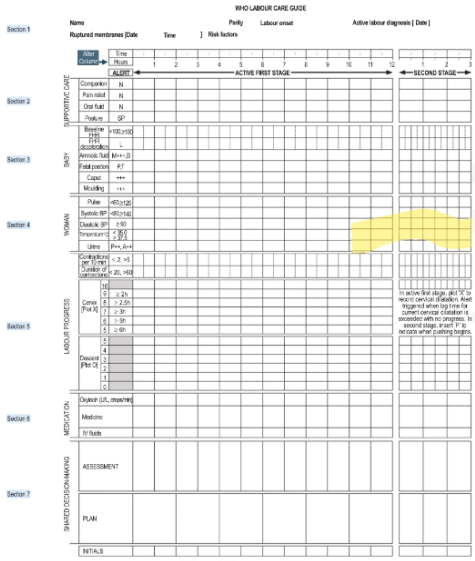
	1st stage	2nd stage
Low Risk	30 mins	15 mins
High Risk	15 mins	5 mins

4. Liquor - Membrane
   - Intact - I
   - Ruptured - colour
5. Moulding - Approximation of skull bones

   Grade 1 : Touching of parietal bones
   Grade 2 : Reducible overlapping of parietal bones
   Grade 3 : Irreducible overlapping of parietal bones
6. Cervicograph - Discuss rate of dilatation and rate of descent of fetal head

Modified WHO Partogram

- No latent phase
- Starts from active phase - 4cm, duration - 1cm/hr/6cm-6hrs)
- IV fluids and drugs
- Temperature every 4 hours should be checked
- PR every 30 mins
- BP every 2 hours
- Urine : Ketone, Sugar, Proteins



WHO LABOUR CARE GUIDE *07:10*

- Begins at 6cm of dilation
- Section 1 and 2, Supportive care Lo l guidelines
- In section 3, t d second stage
  - Anything matching the alert column should be circled
  - Fetal HR checked every 30 minutes
- Section 4, Women's Column
  - Pulse rate > 120 - alert
  - Frequency of measurement - Every 4 hours
  - Abnormal guidelines → Local guidelines
- Labour column, check in both first and second stage

Active Space

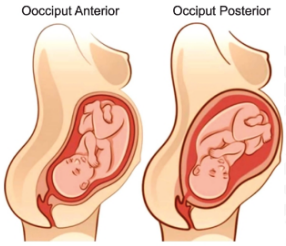
Malpresentation and Malposition

Active Space

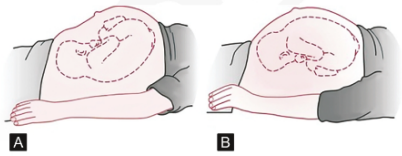
MALPOSITION 00:30

Most common position - LOT, LOA

- Causes of Malposition
  - I) Android Pelvic Brim (most common)
  - II) Anthropoid pelvic brim - Favours direct OPIOA
  - III) Placenta in anterior wall
  - IV) Pendulous abdomen - In multiparae
  - V) Flat sacrum - Transverse position

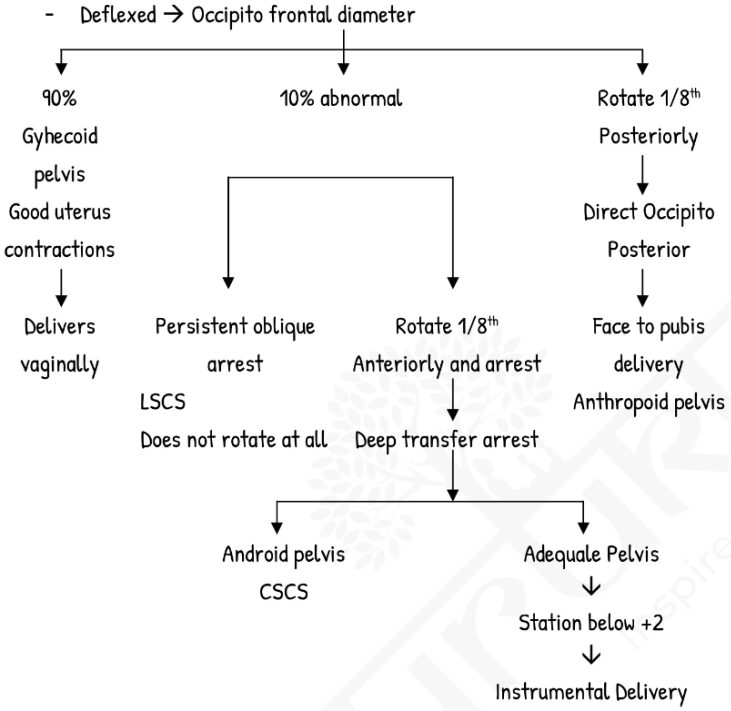


- Diagnose
  - Course of labour usually normal, except four prolonged second stage (1 > 2 hours)
- Per Abdominal examination
  - Sub-umbilical flattening
  - Fetal limbs easily palpable
  - Fetal heart rate heard in flanks



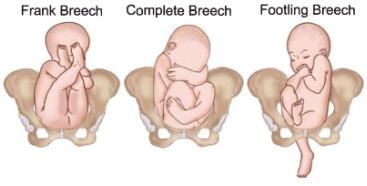
- Per Vaginal Examination
  - Anterior fontanelle is easily felt
  - Posterior frontanelle towards Sacral - Iliac joint
  - Anterior frontanelle easily felt, it has deflexed

- Management
  - Deflexed → Occipito frontal diameter



MALPRESENTATION 06:19

- Types of Breech
  - Most common : Frank breech aka extended breech
  - Frank breech : Least chance of cord prolapse, best for vaginal delivery
  - Complete Breech : High chance of Reversion
  - Footing Breech : Highest chance of cord prolapse – LSCS



Active Space

- Causes of Breech :
  - i) Maternal : Oligohydramnios, contracted pelvis and cephalon pelvis disprpartion, uterine malformation, pelvic tumours, uterine fibroid, multi parous, polyhydramnios
  - ii) Fetal : Hydrocephalus, Anencephaly, Neural tube defects, Congenital myotonic dystrophy, Prematurity
  - iii) Placental : Placenta previa, Short cord, Cornu fundal attachment of placenta
- External Cephalic Version (ECG)
  - Success rate 50%
  - Done under continuous fetal monitoring
  - Subcutaneous terbutaline before procedure relaxes uterus
  - Rh-ve mother – Anti – D given prior to ECV
  - Prerequisites for ECV –
    - Intact membrane
    - Adequate liquor
    - Between gestational age 36 weeks to term
    - Single ton fetus
    - Adequate pelvis
    - No obstetric indication for c-section
  - Done in
    - Primi – 36 weeks
    - Multi – 37 weeks
  - Absolute contraindications
    - Contraindicated if vagina delivery is not an option, like placenta previa
    - Multifetal gestation
    - Relative contraindications are :
      - a) Early labor
      - b) Oligohydramnios
      - c) Membrane rupture
      - d) Known nunchal cord
      - e) Structural uterine abnormalities
      - f) Fetal growth restriction
      - g) Prior abruption or its risks
      - h) Prior caesarean delivery a contraindication

Active Space

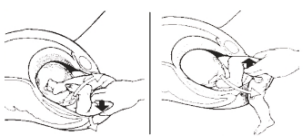
- Complications of ECV
  - Cord enlargement
  - Preterm labor
  - Cord compression
  - PROM
  - Fetal distress
  - Fetal death
  - Abruption

- Indications of LSCS in Breech
  - Lack of operator experience
  - Patient not willing for vaginal delivery
  - Baby weight > 3.8kg – 4kg
  - Baby weight < 1.5kg, preterm IUGK
  - Footing Breech & Kneeling Breech
  - Stargazing Breech
  - Fetal anomalies incompatible with vaginal delivery
  - Prior neonatal birth trauma or prior intrauterine death
  - Contracted pelvis
  - Placenta previa
  - Previous LSCS
  - Primi with Breech – Relative indication

- Assisted Breech Delivery
  - Principle : Masterly inactive
  - Following points are important for safe conduct of a breech delivery
    - Do not be in hurry
    - Nerves pull from below and let mother expel the fetus by her own effort with uterine contractions
    - Always keep fetus with back anterior

- Mechanism of Labour in Breech
  - Buttocks
  - Shoulders
  - Head

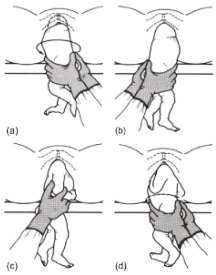
- PINNARD'S Method
  - For arrested lower limb
  - Finger in popliteal fossa



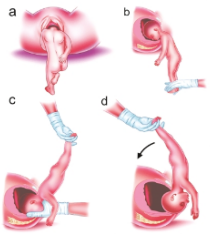
Active Space

Active Space

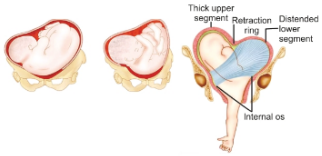
- Lovset's Maneuver
  - For extended arm or nuchal displacement of arm



- Modified Mauriceau – Smellie – Veit Maneuver
  - After coming head of Breech
  - Suprapubic pressure + ar flexion + Shoulder
- Wigard Martin Method
  - No shoulder traction
  - Only suprapubic pressure + Malar flexion
- Burn Marchall
  - Allowing breech to 'hang' by its weight until nape of neck visible



- Race Presentation
  - Presenting diameter - Submento bregmatic - 9.5cm
  - Mento anterior - Vaginal delivery
  - Mento posterior - LSCS
- BROW
  - Mentovertical - 14cm, LSCS
- Transverse lie
  - Dorso anterior position is most common
    - → ECV
    - ↓
    - Fails → LSCS → Followed by extraction of fetus through breech



Preterm Labour, PROM, Postdatism

Active Space

PRETERM LABOUR 00:29

- When delivery occurs before 37 weeks of gestation
- Early preterm : 34 weeks
- Late Preterm : 34-37 weeks and have better prognosis due to lung maturity
- Etiology :
  - i) Uterine Distension : Polyhydramnios, Multiple pregnancy, GDM , Macrosomia, Hydrops fetalis, Uterine anomalies, Fibroids
  - ii) Maternal Fetal Stress : Initiates foetal hypothalamic pituitary axis - Anemia, Smoking, Malnutrition, Drug abuse
  - iii) Cervical Dysfunction : Cervical incompetence
  - iv) Infection : Bacterial vaginosis, Asymptomatic bacteriuria, periodontal infection
- Established Preterm Labour
  - 4 contractions in 20 minutes/8 contractions in 60 minutes + Cervical changes (cervix > 1cm dilation, cervical length < 2cm)
- Threatened Preterm labour
  - Only contractions, no cervical changes
- Predictors of Preterm Labour
  - Fetal fibronectin : Is fibrin glue which adheres amnion to chorion
  - Cervical length measurement → TVS between 16-24 weeks of gestation
  - Cervical length < 2.5 cm → High risk of developing preterm labour
- Fetal Fibronectin
  - In cervical/vaginal secretions at 24-34 weeks is a predictor of preterm labour
  - < 50ng/ml suggests patient can go into preterm labour
- Prevention
  - Progesterone : indicated in all patients with previous preterm labour
    - 17 α hydroxy decaproate - IM
    - Micronised progesterone - PO/PV
  - Cervical encerclage - Mc Donald cerclage
  - Stop smoking

- Management
  - If < 34 weeks : Can consider steroids upto 37 weeks
    Deliver
    Tocolysis is contraindicated
  - If < 34 weeks : Tocolysis
    Steroids
    mgSO4 for neuroprotection
  - Steroids : Dexamethasone 6mg, 4 doses 12 hrs apart, IM OR
    Betamethasone 12mg, 2 doses 24 hrs apart, IM
    It prevents Intraventricular hemorrhage, Respiratory Distress Syndrome, Necrotizing enterocolitis
  - Tocolysis : Prolongs pregnancy minimum by 48 hours and max it prolongs upto 1 week It is for steroids to act
  - Drugs
    - Nifedipine (DOC) : Loading dose20 mg
      Side effects-Headache, Postural hypertension, Knuckle edema
      Contraindications - Heart disease with decreased ejection fraction
    - Atosiban : Doc in patients with heart disease
      Side effects - Neonatal morbidity
    - B-adrenergic Like Terbutalin, Ritodrine, Isoxsuprine, Salbutamol
      Side effects - Tachycardia, Hypotension, Hyperglycemia, Hypokalemia, Pulmonary edema
      Contraindications - Diabetes, Hyperthyroidism
    - Magnesium sulfate
      Side effects : Loss of deep tendon reflexes
      Contraindicated : Renal failure
      Cardiac disease
    - Indomethacin : Loading dose : 50-100my
      Side effects - Gastritis, GERD, Platelet dysfunction, < 32 weeks - premative clossue of PDA
      Contraindicated - Kidney and liver disease
      Ulcerative diseases

Active Space

- Magnesium Sulfate
  - For neuroprotection
  - BEAM trial - < 34 weeks
    Loading dose : 4gm of mgSO4 IV
    Maintenance dose : 1gm/hr
  - For all patients with preterm labour - Vaginal Swab/Rectovaginal Swab for group B streptococcus
    - It positive, give Inj. Benzyl penicillin before onset labour to prevent neonatal meningitis
- Contraindications of Tocolysis
  I) Chorioamnionitis
  II) Severe preeclampsia/eclampsia
  III) Advanced labour
  IV) Fetal distress
  V) Abruption
  VI) IUFD
  VII) Congenital anomalies not compatible with life
  VIII) Pregnancy > 34 weeks

PROM/ PRELABOR RUPTURE OF MEMBRANES *08:21*

- Defined as rupture of membranes at least 1 hour prior to onset of labour
- If it occurs before 37 weeks, it is known as preterm prelabour rupture of membranes
- Etiology :
  - Polyhydramnios
  - Past history
  - Multiple pregnancy
  - Smoking
  - Infections
  - Trauma
- Diagnosis : Sudden gush of fluid or trickling causing a woman to be constantly wet may suggest diagnosis

Active Space

- Different Diagnosis :
  - Increased frequency of micturition
  - Increased vaginal discharge
- Identification
  - Amniotic fluid → odourless
  - Urine → typical odour
  - Amniotic fluke → alkaline
  - Vaginal secretions are acidic
  - Orange nitrazine paper turns blue
  - Litmus paper turn blue

  } Amniotic fluid
  - On microscopy :
    Amniotic fluid – Thin fernig pattern
    Vaginal mucous secretions – Thick fernig pattern under estrogen
  - Alpha – fetoprotein levels in fluid increased
  - FFN in vaginal fluid will indicate fluid is liqor
  - 0.9% Nile blue sulphate test → Fetal skin epithelial cells
  - On USG : Oligohydramnios
- Biochemical Markers
  - Amnisure → contains placental alpha macroglobulin 1
  - Actim test → test for placental protein 12 or insulin like growth factor binding protein
- Complications
  i) Preterm labour
  ii) Chorioamnionitis
  iii) Abruption, Cord prolapse
  iv) Fetal pulmonary hypoplasia, especially in PROM
- Management
  - > 37 weeks of gestation
    - Delivery
    - Treat any intraamniotic infection
    - High vaginal swab for group B streptococcus

Active Space

- 34-36 weeks 17 Days
  - Expectant management and delivery
  - Neonatal consultation
  - Consider steroids if no prior corticosteroid given
- < 34 weeks
  - Expectant management
  - Single course of corticosteroids
  - Tocolysis
  - Magnesium sulphate
  - Antibiotic recommended to prolong latency
    - Erythromycin
    - Amoxicillin – Clavunate should be avoided as it causes Necrotizing enterocollitis in fetus

- Mode of Delivery
  - Vaginal delivery
  - Induction of labour – 25µgm misoprostol per vaginum
- Chorioamnionitis
  - Infection of amniotic fluid
- Diagnostic Criteria
  - Definitive indicator : maternal fever
    - > 39°C on one occasion OR
    - > 38°C on two occasions
  - Associated findings (any one finding)
    - Fetal tachycardia
    - Maternal tachycardia
    - Purulent discharge per vaginum
    - Uterine distress
- Definitive Diagnosis
  - Amniotic fluid culture +ve
  - Gram stain +ve
  - Decreased glucose in amniotic fluid
  - Histopathological – Inflammation and infection of amniotic sac

Active Space

- Management
  - Immediate delivery
  - Mode of delivery - Vagina
  - Antibiotics - Ampicillin + Gentamicin

POST-TERM PREGNANCY *12:43*

- Pregnancy beyond 42 weeks of gestational age
- Postdalism : Pregnancy beyond 40 weeks of gestation age
- Causes :
  - Idiopathic
  - Past history
  - Family history
  - Anencephaly
  - Fetal adrenal hypoplasia
  - X linked placental insufficiency
- Complications
  - Fetal
    - Oligohydramnios
    - Cord compress → Fetal distress
    - Macrosomia
    - Fetal hypoxia
    - Shoulder dystocia
    - Intra cranial hemorrhage
- Maternal
  - Increased operates delivery
  - Perineal tears
  - Post partum hemorrhage
- Diagnosis
  - L/S → 3:9
  - Nile blue sulphate → 40-60% orange coloured cells (not recommended)
  - Post maturity syndrome → Old look face wrinkled
    Peeling of skin
    Loss of brown fat

Active Space

- Management
  - Wait upto 41 weeks
  - If uncomplicated, wait upto 42 weeks
  - Labour induction
  - Any complications if present → Labour induction before itself
  - Fetal surveillance with NST twice weekly must be done along with membrane sweeping
  - If Bishop score, more than 7 → Labour induction → with misoprostol
  - If Bishop score, less than 7 → Unfavorable
    → Do cervical ripening with Dinoprostone →
    Augmentation with oxygen

Active Space

Antepartum Fetal Surveillance

Active Space

Used to check for fetal well being

ANTE PARTUM MONITORING 00:05

- Fetal kick counts
- Fetal doppler
- Biophysical profile
- Non-stress test
- Modified biophysical profile
- Vibro acoustic stimulation test
- Contraction Stress test (outdated)

INTRA PARTUM MONITORING 00:45

- CTG
- Fetal scalp electrode monitoring
- Fetal scalp pH monitoring
- Fetal pulse oximetry

POST PARTUM FETAL MONITORING 00: 50

- APGAR Score
- Cord blood gases

FETAL KICK COUNT 00:59

- Two types
  - Daily fetal movement count
  - Daily fetal kick count - post meal
- Daily fetal movement count = 10 movements in 12 hours is normal
- Daily fetal kick count - Post meal = Mother to perceive 3-4 movements
  ↳ Mother should check fetal kick count one hour post breakfast, Lunch, dinner
- 1 hour
  - Post breakfast
  - Post Lunch
  - Post dinner

  } In that 1 hour Mother should perceive 3-4 movements/hour
- Absolutely no movements for 6 hours-alarming
- Decreased fetal movements → Non - stress test
  If normal then all good
  If abnormal, then do Biophysical profile

- Recurrent decreased fetal movements – Ultrasonography

BIOPHYSICAL PROFILE *02:08*

- Scoring – Manning score
- Mnemonic – BAN MOTO
  - Breathing – 1 cycle of inspiration and expiration
    Resting – 30 secs → 2
  - Amniotic fluid volume – SVDP > 2cm → 2
  - Non stress test – Reactive → 2
  - Movements – 3 discrete movements → 2
  - Tone – 1 episode of flexion – extension – flexion → 2
  - USG done for 30 minutes
  - Score 8, 10 = normal
  - Score 6 = Chronic hypoxia
    → 36 weeks → delivery
  - Score 4 = Acute hypoxia
    - Repeat test for 120 minutes
    - If persistently less, immediate delivery
  - Modified biophysical profile
    - NST + Amniotic fluid index
  - NST : 28 weeks first to disappear (first to show up)
  - Fetal breathing : 20-21 weeks
  - Fetal movements : 9 weeks
  - Fetal tone : 7.5 – 8.5 weeks (last to disappear in hypoxia)

NON STRESS TEST *04:32*

- It mainly measures the autonomic nervous system activity and starts to develop by 28 weeks
- Well developed by 32 weeks
- NST and CTG are the same but when doing it in labour, then called labour
- Whenever there is fetal movements there will be increase in fetal heart rate
- Baseline FHR – maximum black line : 110–160bpm
  - < 110 – Bradycardia
  - > 160 – Tachycardia
- There should be acceleration

Active Space

- There should not be decleration
- NST usually done for 20 minutes and if it does not come out normal, then continue for 20 minutes
- Reactive NST :
  - Baseline : 110-160 bpm
  - Beat to beat : 5-25bpm
  - > 2 accelerations of > 15bpm lasting for > 15 sec
  - No deceleration

CTG *08:39*

- Baseline
- Beat to beat
- Acceleration
- Deceleration types :
  - Early deceleration
    - Uniform
    - Repetitive
    - Decrease in fetal heart rate will coincide with onset of contraction
    - When contraction is peak high, the decrease in heart rate will also be peak low
    - When the contraction recovers, the decrease in fetal heart rate will also recovered
    - Mainly seen in 2nd stage of labour with head compression
  - Later deceleration
    - Uniform
    - Repetitive
    - Decrease in fetal heart rate will be after peak of contraction
    - When onset and recovery of deceleration is after the peak recovery of contraction – Late deceleration
    - Seen in fetal distress
  - Variable deceleration
    - When decrease in fetal heart rate varies with successive contraction
    - Mainly seen in cord compression

Active Space

SINUSOIDAL PATTERN

11:18

Active Space

- Seen in fetal anemia and Hypoxia
- The baby's heart beat will be wave like