Obstetrics: History & Exam

DATING • LEOPOLD'S • FETAL LIE • STATION **KMU - FINAL YEAR MBBS**

1. DATING THE PREGNANCY (THE BASICS)

Naegele's Rule:
• Formula: **LMP + 9 Months + 7 Days**.
• *Requirement:* Only valid if cycles are regular (28 days).

The "Gold Standard" Dating:
• **Dating Scan (Ultrasound):** Most accurate if done between **10-13+6 weeks**.
• **Measurement: Crown Rump Length (CRL)**.
• *If Scan dates & LMP differ by >7 days → Use SCAN dates.*

2. OBSTETRIC HISTORY CODES

G_ P_ (Gravida / Parity):
• **Gravida:** Total number of pregnancies (including current, miscarriages, ectopic).
• **Parity:** Number of births AFTER 24 weeks (Viability).

Example: A woman has 1 child, 1 miscarriage, and is currently pregnant.
• **G3 P1**.

3. ABDOMINAL EXAM: FUNDAL HEIGHT

Symphysis-Fundal Height (SFH):
• Measured from Symphysis Pubis to top of Fundus (in cm).
• **Normal:** SFH ≈ Gestational Age (± 2cm) after 20 weeks.

Key Landmarks:
• **12 Weeks:** Just palpable at Symphysis Pubis.
• **20-22 Weeks:** At the **Umbilicus**.
• **36 Weeks:** At Xiphisternum (Highest point).
• **40 Weeks:** Drops slightly (due to engagement) - "Lightening".

4. FETAL TERMINOLOGY (CONFUSION BUSTER)

1. LIE (Relationship of Spines):
• **Longitudinal:** Baby's spine parallel to Mom's (Normal).
• **Transverse:** Baby's spine perpendicular (Shoulder presentation).

2. PRESENTATION (Part entering pelvis first):
• **Cephalic:** Head first (Vertex is most common).
• **Breech:** Buttocks first.

3. POSITION (Relationship to Maternal Pelvis):
• **LOA (Left Occipito-Anterior):** Most common/ideal.
• **Occipito-Posterior (OP):** "Sunny side up" → Causes backache labor.

5. LEOPOLD'S MANEUVERS (THE 4 GRIPS)

Step 1: Fundal Grip (Top):
• *Action:* Feel the top of the uterus.
• *Finding:* Hard/Round = Head (Breech). Soft/Irregular = Buttocks (Cephalic).

Step 2: Lateral Grip (Sides):
• *Action:* Hands on sides.
• *Finding:* Smooth curve = **Back** (Best for listening to heart). Knobbly parts = Limbs.

Step 3: Pawlik's Grip (Pelvic 1):
• *Action:* One hand (thumb/fingers) above symphysis.
• *Finding:* Is the head engaged? (Can you rock it?).

Step 4: Deep Pelvic Grip (Pelvic 2):
• *Action:* Face patient's feet, both hands dig into pelvis.
• *Finding:* Confirm presentation and engagement (Flexion vs Extension).

6. AUSCULTATION (FHS)

Listen to Fetal Heart Sound (FHS):
• **Tool:** Pinard Stethoscope or Doppler. (24 & 12 weeks Onwards respctvly)
• **Location:** Over the **Anterior Shoulder** of the fetus.
• **Cephalic:** Below umbilicus.
• **Breech:** Above umbilicus.

7. VAGINAL EXAM (STATION & DILATION)

🚨 **THE STATION RULE**
Station is the level of the head relative to the Ischial Spines.
Station 0: Head is AT the spines (Engaged).
Station -1, -2: Above spines (Floating).
Station +1, +2: Below spines (Descending).
Internal Rotation happens at Station 0.

8. AMNIOTIC FLUID VOLUME

Measured by Ultrasound (AFI - Amniotic Fluid Index):
• **Normal:** 5 - 25 cm.
• **Oligohydramnios:** < 5 cm (Causes: Renal agenesis, PPROM, IUGR).
• **Polyhydramnios:** > 25 cm (Causes: Diabetes, Esophageal atresia, Twins).
• **Deepest Vertical Pool (DVP):** < 2cm (Oligo), > 8cm (Poly).

Antenatal Care (ANC)

INVESTIGATIONS • ANTI-D PROTOCOL • FETAL SCREENING **KMU - FINAL YEAR MBBS**

1. THE BOOKING VISIT (8-12 WEEKS)

Goals: Confirm pregnancy, Risk stratify, Baseline labs.
BMI Calculation: Weight (kg) / Height (m^2).
• **Obesity (BMI > 30):** High risk for GDM, Pre-eclampsia. Needs 5mg Folic Acid.

🚨 **FOLIC ACID RULES (MCQ GOLD)**
Standard Dose: 400 mcg (0.4 mg) daily.
High Dose (5 mg) Indications:
1. BMI > 30
2. Diabetes (Pre-existing)
3. Anti-Epileptic Drugs
4. Previous Neural Tube Defect
5. Thalassemia Trait

2. ROUTINE INVESTIGATIONS (THE "MUST-DOS")

1. Full Blood Count (FBC):
• **Anemia:** Hb < 11.0 g/dL (1st/3rd Tri) or < 10.5 g/dL (2nd Tri).
• **Thalassemia Screen:** MCV < 80 fl (Requires Hb Electrophoresis).

2. Blood Group & Antibodies:
• **ABO & Rhesus Status:** Essential for Anti-D.
• **Red Cell Antibodies:** Check Indirect Coombs Test (ICT).

3. Infection Screen (The Big 3):
• **HIV, Hepatitis B (HBsAg), Syphilis (VDRL).**
• **Rubella:** Immunity is checked, but NO vaccine in pregnancy (Live).

4. Urine Analysis:
• Midstream Urine (MSU) for **Asymptomatic Bacteriuria**.
• **Why treat?** 30% progress to Pyelonephritis if untreated.

3. RHESUS NEGATIVE PROTOCOL (ANTI-D)

If Mother is **Rh Negative** and **Antibody Screen Negative**:

Regimen A (Single Dose):
• 1500 IU (300 mcg) at **28 Weeks**.

Regimen B (Two Doses):
• 500-625 IU at **28 Weeks** AND **34 Weeks**.

Always give additional Anti-D after sensitizing events (bleeding/trauma).

4. BREASTFEEDING EDUCATION

• **Exclusive Breastfeeding:** Recommended for first **6 months**.
• **Colostrum:** "Liquid Gold" (Rich in IgA antibodies) - Encourage early initiation within 1 hour.
• **Technique:** Educate on proper **Attachment** (mouth covers areola) and **Positioning** (belly-to-belly).
• **Contraindications:** HIV (in some guidelines), Active TB (untreated), Galactosemia.

5. FETAL ABNORMALITY SCREENING

1st Trimester (11 - 13+6 Weeks):
• **Combined Test (Gold Standard):**
1. **NT Scan:** Nuchal Translucency > 3.0mm is abnormal.
2. **Serum:** PAPP-A + Beta-hCG.

2nd Trimester (15 - 20 Weeks):
• **Quadruple Test:** (AFP, uE3, Inhibin A, Beta-hCG).
• High hCG + High Inhibin A = **Downs Syndrome**.
• High AFP = **Neural Tube Defect**.

The Anomaly Scan (18 - 20+6 Weeks):
• Detailed structural Ultrasound (Heart, Kidneys, Spine).

6. SCREENING VS DIAGNOSTIC (LAB MATRIX)

Condition	Best Screening Test	Confirmatory (Diagnostic)
Syphilis	VDRL / RPR	TPHA / FTA-ABS
HIV	ELISA	Western Blot / PCR
Hepatitis B	HBsAg	HBV DNA PCR
Thalassemia	FBC (MCV < 80)	Hb Electrophoresis
GDM	75g OGTT (24-28w)	75g OGTT (Diagnostic)
Downs	Combined Test	Amniocentesis / CVS

7. ANTIMICROBIALS IN PREGNANCY

Asymptomatic Bacteriuria:
• **Treat:** Nitrofurantoin or Cephalexin.
• **Goal:** Prevent Pyelonephritis & Preterm Labour.

Group B Strep (GBS):
• **Treat:** IV Penicillin during **Labour**.

8. WHO ANTENATAL MODEL (2016)

Minimum Contacts: 8 Contacts.
Schedule: 12, 20, 26, 30, 34, 36, 38, 40 weeks.
(More visits reduces perinatal mortality).

9. VACCINATIONS

✅ **SAFE: Tetanus Toxoid (TT), Influenza, Pertussis.**
❌ **UNSAFE (Live): MMR, Varicella, BCG.**

Physiological Changes

HEMODYNAMICS • CARDIO • RESPIRATORY • RENAL **KMU - FINAL YEAR MBBS**

1. HEMATOLOGY (THE DILUTION EFFECT)

Physiological Anemia:
- **Plasma Volume:** Increases by **45%**.
- **RBC Mass:** Increases by only **20-30%**.
- **Result:** Hemodilution (Hb drops).
- *Normal Hb in Pregnancy:* >11.0 g/dL (1st Tri), >10.5 g/dL (2nd Tri).

Hypercoagulable State (Preparation for PPH):
- **INCREASED:** Factors VII, VIII, IX, X, Fibrinogen (Factor I).
- **DECREASED:** Protein S, Factor XI, XIII.
- **Result:** Protect against PPH, Risk of DVT/PE increases x10.

2. CARDIOVASCULAR CHANGES

Cardiac Output (CO): Increases by 30-50%.
- Max increase by **20-24 weeks**.
- Stroke Volume Increases (Early). Heart Rate Increases (Late).

Blood Pressure (BP):
- Falls in 2nd Trimester (Lowest at 20-24w).
- Returns to baseline by term.
- *Mechanism:* Progesterone reduces Systemic Vascular Resistance (SVR).

🚨 **SUPINE HYPOTENSION SYNDROME**
Cause: Gravid uterus compresses IVC when lying flat.
Effect: Decreased Venous Return → Drop in CO → Dizziness.
Solution: Left Lateral Decubitus position (Never lie a pregnant woman flat!).

3. HEART SOUNDS & MURMURS

Normal Findings in Pregnancy:
- **S3 Gallop:** Normal (Due to rapid filling/high volume).
- **Split S1:** Normal (Early mitral closure).
- **Systolic Flow Murmur:** Common (90%).

ABNORMAL: Diastolic Murmurs (Always pathologic) or S4.

4. RESPIRATORY SYSTEM

The "Air Hunger": Progesterone stimulates the respiratory center.
- **Tidal Volume:** INCREASES (+40%).
- **Respiratory Rate:** UNCHANGED.
- **FRC (Residual Capacity):** DECREASES (Uterus pushes diaphragm up).

Acid-Base Balance:
- State: **Compensated Respiratory Alkalosis**.
- Why? Blow off CO_2 to create gradient for fetus.
- Kidney dumps Bicarbonate (HCO_3) to compensate.

5. RENAL SYSTEM (HYPER-FILTRATION)

Anatomical:
- Kidneys & Ureters dilate (Hydronephrosis).
- **Right > Left** (Right ureter compressed by Uterus & crossed by vessels).

Physiological:
- **GFR:** Increases by 50%.
- **Creatinine/Urea:** LEVELS DROP.
- *KMU Trap:* A creatinine of 0.9 mg/dL (normal in non-pregnant) represents **Renal Impairment** in pregnancy! (Should be < 0.6).
- **Glycosuria:** Common (Renal threshold for glucose drops).

6. GASTROINTESTINAL (THE "SLOW DOWN")

Progesterone Effect (Relaxation):
- **LES Relaxed:** GERD / Heartburn.
- **Gallbladder Relaxed:** Stasis → Gallstones.
- **Gut Motility Reduced:** Constipation.

Anatomical: Appendix is displaced UPWARD and LATERALLY (Change in pain location).

7. ENDOCRINE CHANGES

Gland	Change
Thyroid	TBG Increases → Total T3/T4 High. Free T3/T4 remains Normal. hCG stimulates TSH receptor (Transient Hyperthyroidism).
Pituitary	Enlarges (Prolactin cells). FSH/LH suppressed.
Pancreas	**Diabetogenic State:** hPL causes Insulin Resistance to save glucose for baby.
Adrenal	Cortisol Increases (but bound to CBG).

8. SKIN & GENITAL TRACT

Skin:
- **Chloasma:** "Mask of pregnancy" (Face).
- **Linea Nigra:** Dark line on abdomen.
- **Striae Gravidarum:** Stretch marks.

Genital Tract:
- **Chadwick's Sign:** Bluish discoloration of vagina/cervix (Congestion).
- **Osiander's Sign:** Pulsation in lateral fornix.
- **Vaginal pH:** Acidic (Prevents bacteria, favors Candida).

9. BREAST CHANGES

- **Early:** Tenderness/Tingling.
- **8 Weeks:** Montgomery's tubercles (Sebaceous glands).
- **16 Weeks:** Colostrum can be expressed.
- **Areola:** Darkens (Secondary areola forms).

Ultrasound & Dopplers

DATING • ANOMALY • UMBILICAL/UTERINE DOPPLER **KMU - FINAL YEAR MBBS**

1. FIRST TRIMESTER (DATING & VIABILITY)

The Golden Rules of Dating:
- **< 14 Weeks: Crown Rump Length (CRL)** is the most accurate method (+/- 3-5 days).
- **> 14 Weeks:** CRL becomes inaccurate (baby curls up). Use **Head Circumference (HC)** or BPD.
- **Earliest cardiac activity:** Visible by 6 weeks (TVUS).

2. SECOND TRIMESTER (ANOMALY SCAN)

Timing: 18 - 20+6 weeks.
Purpose: Structural defects (Spina bifida, Cardiac, Renal).
Soft Markers (Suggest Chromosomal issues):
- Nuchal Fold Thickening (>6mm).
- Echogenic Bowel.
- Choroid Plexus Cysts.
- Short Femur.

3. THIRD TRIMESTER (GROWTH)

Best parameter for Fetal Weight?
👉 **Abdominal Circumference (AC)**.
(The liver shrinks first in starvation/IUGR).

Best parameter for Gestational Age (Late)?
👉 **Femur Length (FL)** (Least affected by IUGR).

4. DOPPLER ULTRASOUND (THE FLOW)

1. Uterine Artery Doppler (Maternal Side):
- **Timing:** 20-24 weeks.
- **Normal:** Low resistance flow.
- **Abnormal:** High resistance "Notching".
- **Significance:** Predicts **Pre-Eclampsia** & IUGR.

2. Umbilical Artery Doppler (Fetal Side):
- **Use:** Monitoring IUGR / High Risk.
- **Normal:** High diastolic flow (Baby eating well).
- **Abnormal (Danger Steps):**
  a. Reduced End-Diastolic Flow.
  b. **Absent** End-Diastolic Flow (AEDF) → Delivery imminent.
  c. **Reversed** End-Diastolic Flow (REDF) → Fetal Death likely.

3. Middle Cerebral Artery (MCA):
- **Brain Sparing Effect:** In hypoxia, baby dilates MCA to save brain.
- **Peak Systolic Velocity (PSV):** Best test for Fetal **Anemia**.

5. CEREBRO-PLACENTAL RATIO (CPR)

CPR = MCA Pulsatility / Umbilical Pulsatility
Low CPR (< 1.0) = "Brain Sparing" is happening.
The baby is redistributing blood to the brain because the placenta is failing.
Action: Urgent delivery considerations.

Fetal Wellbeing Assessment

CTG • BIOPHYSICAL PROFILE • AMNIOTIC FLUID **KMU - FINAL YEAR MBBS**

1. BIOPHYSICAL PROFILE (BPP) [HIGH YIELD]

Mnemonic: "**B**at**M**an **O**wns **A** **N**est"
1. **B**reathing Movements (≥ 30 in 30 min).
2. **M**ovements (Gross body movements ≥ 3).
3. **O** (Tone) (Extension/Flexion ≥ 1).
4. **A**mniotic Fluid (> 1 pool).
5. **N**on-Stress Test (CTG - Reactive).

Scoring (Max 10):
- **8-10:** Normal.
- **6:** Equivocal (Repeat).
- **4 or less:** Fetal Hypoxia (Deliver).

Note: Amniotic Fluid is a chronic marker. The others are acute.

2. AMNIOTIC FLUID INDEX (AFI)

- **AFI:** Sum of 4 quadrants. Normal: **5 - 25 cm**.
- **Deepest Vertical Pool (DVP):** Preferred for twins.
  - **< 2 cm:** Oligohydramnios (Renal agenesis, PPROM).
  - **> 8 cm:** Polyhydramnios (DM, GI atresia).

3. CTG: THE BASICS (DR. C BRAVADO)

Baseline Rate: 110 - 160 bpm.
Variability: 5 - 25 bpm (The single best indicator of health).
- *Reduced (<5):* Sleep, Hypoxia, Drugs (Opioids).

Accelerations: Rise of 15bpm for 15s (Reassuring).

4. CTG DECELERATIONS (VEAL CHOP)

Variable Decel → **C**ord Compression.
Early Decel → **H**ead Compression (Vagal - Safe).
Acceleration → **O**K (Oxygenation Good).
Late Decel → **P**lacental Insufficiency (Hypoxia).

🚨 **CTG CLASSIFICATION (NICE Guidelines)**
NORMAL: All 4 features are reassuring.
SUSPICIOUS: 1 Non-reassuring feature.
PATHOLOGICAL: 2+ Non-reassuring OR 1 Abnormal.

Abnormal Features:
- **Rate < 100 or > 180**
- **Variability < 5 for > 90 mins**
- **Repetitive Late Decelerations**
- **Sinusoidal Pattern (Severe Anemia)**

5. NON-STRESS TEST (NST)

Indications: Reduced fetal movements, GDM, IUGR.
Reactive (Normal):
- 2 Accelerations in 20 minutes.
- Normal Baseline & Variability.

Non-Reactive: No accelerations.
- *Action:* Stimulate baby (Acoustic) or do BPP.

Prenatal Screening

ANEUPLOIDY MATRIX • SINGLE GENE DISORDERS **KMU - FINAL YEAR MBBS**

1. ANEUPLOIDY COMPARISON (THE GOLD MATRIX)

How to memorize:
• **Downs (21):** Everything is **UP** (hCG, Inhibin, NT) except AFP/PAPP-A.
• **Edwards (18):** Everything is **LOW** (E for Empty).
• **Patau (13):** Similar to Edwards, but has midline defects.

Feature	Trisomy 21 (Down)	Trisomy 18 (Edward)	Trisomy 13 (Patau)
NT Scan	**Increased (>3mm)**	Increased	Increased
Beta-hCG	**HIGH**	**LOW**	LOW
PAPP-A	LOW	LOW	LOW
AFP	LOW	LOW	Variable
Inhibin A	**HIGH**	N/A	N/A
USG Signs	Absent Nasal Bone Sandal Gap Duodenal Atresia	**Rocker-bottom feet** Clenched fists Choroid Cyst	**Holoprosencephaly** Cleft Lip/Palate Polydactyly

2. NON-INVASIVE PRENATAL TESTING (NIPT)

What is it? Analysis of Cell-Free Fetal DNA in maternal blood.
Timing: From **10 Weeks**.
Accuracy: 99% Sensitivity for Downs.
Indication: High risk on Combined test (>1:150).
Limitation: It is still a **SCREENING** test (Diagnostic confirmation needed).

3. SINGLE GENE DISORDERS

1. Thalassemia (Alpha/Beta):
• **Inheritance:** Autosomal Recessive.
• **Action:** Screen parents (MCV < 80). If both carriers -> CVS/Amnio for fetal DNA analysis.

2. Sickle Cell Disease:
• **Inheritance:** Autosomal Recessive.
• **Screening:** Sickle Solubility Test / Electrophoresis.

3. Cystic Fibrosis:
• **Inheritance:** Autosomal Recessive.
• **Mutation: Delta F508** (CFTR Gene).
• **USG Sign: Echogenic Bowel** (Meconium ileus).

4. Fragile X Syndrome:
• **Inheritance:** X-Linked Dominant.
• **Defect: CGG Trinucleotide Repeat** (FMR1 gene).
• **Features:** Mental retardation, Large ears, Macro-orchidism (Large testes).
• **Diagnosis:** PCR (Southern Blot).

4. NEURAL TUBE DEFECTS (NTDS)

Types: Anencephaly (Fatal), Spina Bifida.
Screening Marker: High AFP (Alpha-fetoprotein).
Ultrasound Signs (Spina Bifida):
• **Lemon Sign:** Scalloping of frontal bones.
• **Banana Sign:** Curved cerebellum (Arnold-Chiari II).
Prevention: 400mcg Folic Acid (5mg if high risk).

Invasive Diagnostic Tests

CVS • AMNIOCENTESIS • CORDOCENTESIS **KMU - FINAL YEAR MBBS**

1. CHORIONIC VILLUS SAMPLING (CVS)

Timing: 11 - 13 Weeks (First Trimester).
Sample: Placental Tissue (Trophoblast).
Route: Transabdominal or Transcervical.
Indications:
• High risk Screening result (>1:150).
• Previous child with genetic disorder.
• DNA analysis (Thalassemia/CF).
Risk of Miscarriage: 1% (Higher than Amnio).

CVS COMPLICATIONS
1. Limb Reduction Defects: If done < 10 weeks.
2. Confined Placental Mosaicism: Placenta has defect, baby is normal (False Positive).
3. Rh Sensitization: Give Anti-D if Rh Negative.

2. AMNIOCENTESIS

Timing: > 15 Weeks (Second Trimester).
Sample: Amniotic Fluid (Fetal skin fibroblasts).
Indications:
• Karyotyping (Downs confirmation).
• Infection Screen (CMV, Toxo PCR).
• Lung Maturity (L/S Ratio - rarely done now).
Risk of Miscarriage: 0.5%.

AMNIO COMPLICATIONS
1. Talipes (Clubfoot): If done < 15 weeks (due to reduced fluid).
2. Respiratory Distress: If done too early.
3. Chorioamnionitis: Infection risk.

3. CORDOCENTESIS (FBS)

Also called: Fetal Blood Sampling (FBS) / PUBS.
Timing: > 20 Weeks.
Target: Umbilical Vein (near placental insertion).
Indications (Therapeutic & Diagnostic):
• **Fetal Anemia:** (Parvovirus B19 / Isoimmunization). *Gold Std Dx & Rx (Transfusion).*
• **Rapid Karyotype:** If Amnio culture fails or urgent result needed (blood grows faster).
• **Fetal Platelet count:** In NAIT (Alloimmune Thrombocytopenia).
Risk of Loss: 1-2% (Highest risk).
Complication: Bradycardia, Cord Hematoma, Bleeding.

4. COMPARISON SUMMARY

Feature	CVS	Amniocentesis	Cordocentesis
Timing	11 - 13 Weeks	> 15 Weeks	> 20 Weeks
Sample	Placenta	Fluid	Fetal Blood
Loss Rate	1%	0.5% (Safest)	1-2% (Riskiest)
Key Risk	Limb Defect	Talipes	Bradycardia

5. STRUCTURAL ANOMALIES (USG)

Anencephaly: "Mickey Mouse" sign absent (No skull vault). Incompatible with life.
Duodenal Atresia: "Double Bubble" sign (Stomach + Duodenum). Linked to **Downs**.
Gastroschisis: Bowel floating freely (Right of cord). No sac.
Omphalocele: Bowel in sac (Midline). Linked to **Chromosomal defects**.
Renal Agenesis: Absent bladder + Severe Oligohydramnios.