STATION 1 – MEDICINE INTERACTIVE

Thyroid Examination and Relevant Systemic Examination

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CANDIDATE INSTRUCTIONS

Task: Perform complete thyroid examination on standardized patient presenting with neck swelling.
Include: Inspection, palpation (anterior & posterior approaches), auscultation, retrosternal extension assessment, and relevant systemic examination.
Time: 8 minutes. Examiner will observe and question.

STEP-BY-STEP EXAMINATION PROTOCOL

1. GENERAL INSPECTION (Standing in front)
• Symmetry of neck swelling
• Scar marks (previous surgery)
• Dilated veins (superior vena cava obstruction)
• Position of trachea
• Eye signs (exophthalmos, lid lag, periorbital edema)
• Skin: pretibial myxoedema, palmar erythema, thyroid acropachy
• Tremor (outstretched hands)
• Pulse (rate, rhythm, character – bounding in hyperthyroidism)
• Temperature (warm, sweaty palms)

2. NECK INSPECTION
• Ask patient to swallow (thyroid moves up with deglutition)
• Ask patient to protrude tongue (thyroglossal cyst moves up, thyroid does not)
• Observe from side for retrosternal extension

3. PALPATION – ANTERIOR APPROACH
• Stand facing patient
• Use thumb and fingers to palpate isthmus (2nd-4th tracheal rings)
• Palpate each lobe: size, shape, surface, consistency, tenderness, nodules
• Assess mobility with swallowing
• Feel for thrill (place fingers lightly over gland)

4. PALPATION – POSTERIOR APPROACH
• Stand behind patient
• Use both hands to palpate lobes between thumbs anteriorly and fingers posteriorly
• More accurate for deep nodules and retrosternal extension

5. PEMBERTON'S SIGN (Retrosternal Extension)
• Raise both arms above head until they touch face
• Look for facial plethora, cyanosis, respiratory distress
• Indicates thoracic inlet obstruction

6. AUSCULTATION
• Listen over thyroid lobes for bruit (systolic, continuous)
• Indicates increased vascularity (hyperthyroidism)

7. LYMPH NODE EXAMINATION
• Pre-auricular, post-auricular, submandibular, submental
• Anterior & posterior cervical chains
• Supraclavicular (Virchow's node – malignancy sign)

8. TRACHEAL POSITION
• Palpate trachea in suprasternal notch
• Deviation suggests large goitre or retrosternal extension

RELEVANT SYSTEMIC EXAMINATION

EYE Signs (Graves' Ophthalmopathy):
• **Exophthalmos** – proptosis >18mm (upper limit normal)
• **Lid lag (von Graefe's sign)** – sclera visible above cornea on downward gaze
• **Lid retraction (Dalrymple's sign)** – staring appearance
• **Impaired convergence (Möbius sign)**
• **Impaired upward gaze (Kocher's sign)**
• **Chemosis, periorbital edema**
• **Opthalmoplegia** – usually inferior rectus involved first

Cardiovascular:
• Bounding pulse, wide pulse pressure
• AF (irregularly irregular)
• Systolic flow murmur
• High-output cardiac failure signs

Neuromuscular:
• Proximal myopathy (difficulty standing from squatting)
• Tremor (fine, resting)
• Hyperreflexia (hyperthyroid) / Hyporeflexia with slow relaxation (hypothyroid)
• Chorea (rare)

Dermatological:
• Pretibial myxoedema (Graves') – non-pitting, indurated, pigmented plaques on shins
• Thyroid acropachy – clubbing with periosteal new bone formation
• Palmar erythema, onycholysis (Plummer's nails)
• Dry, coarse skin, hair loss (hypothyroidism)

INTERPRETATION & DIFFERENTIALS

HYPERTHYROIDISM (Graves' Disease):
• Diffuse, smooth, soft goitre with bruit
• Exophthalmos, lid lag, pretibial myxoedema
• Tremor, tachycardia, AF
• **Investigations:** TSH ↓, FT3/FT4 ↑, TRAb/TSI positive, TSH-R stimulating antibodies
• **Imaging:** Thyroid uptake scan – diffuse increased uptake

HYPOTHYROIDISM (Hashimoto's):
• Firm, rubbery, irregular goitre (may be atrophic in late stage)
• No eye signs (unless concurrent Graves')
• Bradycardia, delayed reflexes, dry skin
• **Investigations:** TSH ↑, FT4 ↓, anti-TPO antibodies positive

SOLITARY THYROID NODULE:
• Single palpable nodule, others non-palpable
• **Red flags for malignancy:** Hard, irregular, fixed, rapid growth, cervical lymphadenopathy, hoarseness, radiation history
• **Investigations:** TSH, USG (hypoechoic, microcalcifications, irregular margins), FNAC (Bethesda system)

RETROSTERNAL GOITRE:
• Pemberton's sign positive
• Dyspnea, stridor, dysphagia
• Deviation/compression of trachea
• **Imaging:** CT neck/chest with contrast (tracheal deviation, calcification)

EXAMINER CHECKLIST (20 MARKS)

Component	Marks
Consent, hand hygiene, exposure	2
General inspection (eyes, skin, tremor)	2
Neck inspection (swallowing, tongue protrusion)	2
Anterior palpation technique	2
Posterior palpation technique	2
Pemberton's sign	2
Auscultation for bruit	1
Lymph node examination	2
Tracheal position	1
Systemic examination (eyes, reflexes, CV)	2
Communication & professionalism	2

CRITICAL ERRORS (FAIL)

Misses Pemberton's sign (airway obstruction risk)
Rough palpation causing pain
No examination of eye signs in suspected Graves'
Misses hard, fixed nodule (malignancy)
No consent or chaperone

VIVA RAPID FIRE

Q1: What is the normal thyroid weight?
A: 15-25g

Q2: What is the blood supply to thyroid?
A: Superior thyroid artery (external carotid), Inferior thyroid artery (thyrocervical trunk), Thyroid ima artery (variable, from aorta/brachiocephalic)

Q3: What is the difference between toxic multinodular goitre and Graves'?
A: TMNG: nodular, no eye signs, patchy uptake on scan; Graves': diffuse, eye signs, diffuse high uptake

Q4: What is Jod-Basedow phenomenon?
A: Hyperthyroidism induced by iodine administration in iodine-deficient patients with nodular goitre

Q5: What are indications for surgery in Graves' disease?
A: Large goitre with compressive symptoms, suspicion of malignancy, failed medical therapy, patient preference, pregnancy (2nd trimester) with poor control

STATION 2 – SURGERY INTERACTIVE

Thyroid Examination with Surgical Perspective & Pre-operative Assessment

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CANDIDATE INSTRUCTIONS

Task: Perform thyroid examination with specific focus on surgical anatomy, pre-operative assessment, and operative planning.
Focus: Isthmus, lobes, pyramidal lobe identification, mobility, retrosternal extension, vocal cord assessment, and lymph nodes.
Time: 8 minutes.

SURGICAL ANATOMY FOCUS

Pyramidal Lobe:
• Remnant of thyroglossal duct
• Present in 40-50% of population
• Extends upward from isthmus toward hyoid
• Must be identified and removed in total thyroidectomy to prevent recurrence

Tubercle of Zuckerkandl:
• Posterior extension of thyroid lobe
• Important landmark for recurrent laryngeal nerve
• Nerve usually passes medial to tubercle

Berry's Ligament:
• Suspensory ligament attaching thyroid to cricoid and trachea
• Contains RLN and parathyroid blood supply
• Careful dissection required here

PRE-OPERATIVE ASSESSMENT

1. AIRWAY ASSESSMENT
• Pemberton's sign (as above)
• Chest X-ray: tracheal deviation, retrosternal extension
• CT neck/chest if retrosternal goitre suspected
• Flow-volume loops if respiratory symptoms

2. VOCAL CORD ASSESSMENT
• **Mandatory before all thyroid surgeries**
• Indirect laryngoscopy (mirror) or flexible nasendoscopy
• Document vocal cord movement
• Pre-existing palsy changes surgical approach

3. HORMONAL STATUS
• TSH, FT3, FT4 (must be euthyroid before surgery)
• Hyperthyroid: treat with carbimazole + propranolol + Lugol's iodine (10 days pre-op)
• Hypothyroid: thyroxine replacement

4. MALIGNANCY WORKUP (if suspected)
• USG neck (characteristics of nodule)
• FNAC (Bethesda classification)
• CT chest/abdomen if invasive disease suspected
• Calcitonin, CEA (medullary carcinoma)
• Serum calcium, PTH (parathyroid involvement)

OPERATIVE PLANNING CONSIDERATIONS

Extent of Surgery:
• Hemithyroidectomy (lobectomy) – unilateral nodule, low risk
• Total thyroidectomy – malignancy, bilateral disease, Graves', MNG with compressive symptoms
• Completion thyroidectomy – completion after incidental malignancy found

Approach:
• Kocher's collar incision (3-4cm above sternal notch)
• Minimally invasive video-assisted (MIVAT) – selected cases
• Robotic – transaxillary, retroauricular

Key Structures to Identify:

- Recurrent laryngeal nerve (RLN) – motor to vocal cords
- Superior laryngeal nerve (external branch) – cricothyroid, voice pitch
- Parathyroid glands (4) – preserve blood supply or autotransplant

HIGH-YIELD SURGICAL SIGNS

Pemberton's Sign: Indicates retrosternal extension → airway risk, may need sternotomy
Mobility with Swallowing: Confirms thyroid origin (vs lymph node)
Fixity to Structures: Suggests malignancy (Riedel's thyroiditis rare)
Cervical Lymphadenopathy: Central (level VI) or lateral (levels II-V) – metastatic spread
Hoarseness: RLN palsy – malignancy or previous surgery

CRITICAL ERRORS (FAIL)

Fails to assess Pemberton's sign (misses airway risk)
No mention of vocal cord check (standard of care)
Misses lymphadenopathy (staging impact)
Does not assess hormonal status (thyroid storm risk)
Rough handling of gland (capsular rupture risk if malignancy)

VIVA RAPID FIRE

Q1: What is the relationship between RLN and inferior thyroid artery?
A: Variable – usually passes posterior to artery on right, anterior on left, but highly variable

Q2: What are the indications for total vs hemithyroidectomy?
A: Total: malignancy, bilateral disease, Graves', completion; Hemi: unilateral benign nodule, low-risk incidental microcarcinoma

Q3: How do you preserve parathyroid glands?
A: Identify all 4, preserve inferior thyroid artery branches, capsular dissection, autotransplant if devascularized

Q4: What is the danger zone in thyroid surgery?
A: Berry's ligament – RLN and parathyroid blood supply at risk

Q5: What are complications of thyroid surgery?
A: Hemorrhage (airway), RLN palsy (hoarseness), SLN palsy (voice fatigue), hypoparathyroidism (hypocalcemia), thyroid storm, wound infection, keloid

STATION 3 – OBS INTERACTIVE

CTG Interpretation – Reassuring vs Non-Reassuring (DR CBRAVADO)

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CANDIDATE INSTRUCTIONS

Task: Interpret two CTG traces using DR CBRAVADO systematic approach.
Trace 1: Normal term pregnancy, spontaneous labour.
Trace 2: Pre-eclampsia, reduced fetal movements, meconium-stained liquor.
Time: 8 minutes. Explain findings and management decisions.

DR CBRAVADO MNEMONIC (SYSTEMATIC INTERPRETATION)

D – Define Risk: Maternal (PIH, DM, IUGR), Fetal (multiple pregnancy, anomaly), Intrapartum (meconium, bleeding, fever)

R – Rate of Contractions: Frequency (every 2-3 min), Duration (40-60 sec), Intensity (palpable/resting tone)

C – Contractions/Baseline Rate: 110-160 bpm (normal), >160 (tachycardia), <110 (bradycardia)

B – Baseline Variability: 5-25 bpm (normal), <5 (reduced), <3 (absent), >25 (increased/saltatory)

R – Recurrent Accelerations: Present = reassuring, Absent = need further assessment

A – Accelerations/Decelerations:
• **Early decelerations:** Head compression, benign, mirror contractions
• **Late decelerations:** Uteroplacental insufficiency, **OMINOUS**, starts after peak, recovers after contraction
• **Variable decelerations:** Cord compression, V-shaped, abrupt
• **Prolonged deceleration:** >2 min but <10 min
• **Bradycardia:** <110 bpm for >10 min

V – Variability Pattern: Sinusoidal (severe anemia/fetal hypoxia), Saltatory (acute hypoxia)

A – Assessment Overall: Reassuring, Non-reassuring, Abnormal

D – Decision: Continue, Escalate monitoring, Urgent delivery

O – Observation Plan: Frequency of review, need for FBS, delivery timing

CTG CLASSIFICATION (NICE GUIDELINES)

REASSURING (Normal):
• Baseline: 110-160 bpm
• Variability: 5-25 bpm
• Accelerations: Present
• Decelerations: None or early
Action: Continue standard care

NON-REASSURING (Suspicious):
• Baseline: 100-109 or 161-180 bpm
• Variability: <5 bpm for 40-90 min
• Accelerations: Absent
• Decelerations: Variable with concerning characteristics
Action: Correct reversible causes (position change, IV fluids, stop oxytocin), continuous monitoring, consider FBS if available

ABNORMAL (Pathological):
• Baseline: <100 or >180 bpm
• Variability: <5 bpm for >90 min or sinusoidal
• Decelerations: Late decelerations, >3 min bradycardia, complicated variable
Action: Urgent senior review, FBS if appropriate, prepare for immediate delivery

MANAGEMENT ALGORITHMS

Immediate Actions for Non-Reassuring CTG:
1. Left lateral position (improves placental perfusion)
2. IV fluids (correct hypovolemia)
3. Stop oxytocin if running
4. Tocolysis (terbutaline) if tachysystole

5. Oxygen (if maternal hypoxia)
6. Correct hypotension (ephedrine/phenylephrine)
7. Vaginal examination (exclude cord prolapse, assess progress)

Fetal Blood Sampling (FBS) Indications:
• Single non-reassuring feature with no accelerations
• Abnormal CTG but delivery not immediately warranted
• pH <7.20 = urgent delivery, 7.20-7.25 = repeat in 30 min, >7.25 = continue

Delivery Timing:
• Category 1 (Immediate threat): <30 minutes
• Category 2 (Urgent): <75 minutes
• Category 3 (Expedited): <24 hours

EXAMPLE TRACE ANALYSIS

TRACE 1 (Reassuring):
• Baseline 140 bpm, variability 15 bpm
• Accelerations present with fetal movement
• Early decelerations with contractions
• **Assessment:** Normal CTG
• **Plan:** Continue intermittent monitoring if low risk

TRACE 2 (Abnormal):
• Baseline 170 bpm (tachycardia)
• Reduced variability 3-5 bpm
• Late decelerations with every contraction
• No accelerations
• **Assessment:** Pathological CTG – uteroplacental insufficiency
• **Plan:** Immediate left lateral, IV fluids, stop oxytocin, urgent delivery (Category 2 CS if no progress, Category 1 if bradycardia)

CRITICAL ERRORS (FAIL)

Misses late decelerations (fetal hypoxia/acidosis)
Does not use systematic approach (misses key features)
No management plan (escalation/delivery decision)
Confuses early vs late decelerations
Ignores maternal factors (fever, drugs, position)

VIVA RAPID FIRE

Q1: What is the significance of reduced variability?
A: Can indicate fetal sleep cycle (20-40 min), drugs (pethidine, $MgSO_4$), prematurity, or fetal hypoxia/acidosis if persistent >90 min

Q2: Differentiate early vs late deceleration?
A: Early: onset with contraction, nadir at peak, recovery by end – head compression. Late: onset after peak, nadir after peak, recovery after contraction ends – uteroplacental insufficiency

Q3: What is sinusoidal pattern?
A: Smooth, wave-like oscillation with frequency 3-5 cycles/min, absent variability. Indicates severe fetal anemia (feto-maternal hemorrhage) or hypoxia. Emergency delivery required

Q4: When is FBS contraindicated?
A: Maternal infection (HIV, Hep B/C, HSV), fetal bleeding disorder, prematurity <34 weeks, thick meconium (risk inhalation)

Q5: What is the effect of maternal position on CTG?
A: Supine position causes aortocaval compression, reduced placental perfusion, late decelerations. Left lateral relieves this

STATION 4 – OBS INTERACTIVE

Pelvic Types, Diameters & Clinical Significance

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CANDIDATE INSTRUCTIONS

Task: Using pelvic model/mannequin, identify the four pelvic types and demonstrate measurement of key diameters.
Include: Anatomical landmarks, normal measurements, clinical significance for labour.
Time: 8 minutes.

PELVIC TYPES (CALDWELL-MOLLOY CLASSIFICATION)

1. GYNECOID (Female Pelvis) – 50%:
• Shape: Round/oval inlet, wide posterior segment
• Ischial spines: Not prominent
• Subpubic arch: Wide (>90°)
• Sacrum: Well-curved
• **Labour:** Favorable, direct occipito-anterior (OA) common

2. ANDROID (Male Pelvis) – 33%:
• Shape: Heart-shaped inlet, prominent ischial spines
• Sacrum: Straight, forward inclination
• Subpubic arch: Narrow
• **Labour:** Deep transverse arrest common, persistent occipito-posterior (OP), high failure to progress, C-section rate increased

3. ANTHROPOID (Ape-like) – 25%:
• Shape: Oval AP diameter > transverse
• Sacrum: Long, narrow
• **Labour:** High incidence of OP position, but labour may proceed normally as AP diameter adequate

4. PLATYPELLOID (Flat) – 3%:
• Shape: Kidney-shaped, wide transverse, short AP
• Sacrum: Straight
• **Labour:** Engagement difficult, high head at term, obstructed labour common, high C-section rate

PELVIC DIAMETERS (CRITICAL MEASUREMENTS)

INLET DIAMETERS:
• **Anteroposterior (AP) – True Conjugate:** 11 cm (sacral promontory to top of symphysis)
• **Obstetric Conjugate:** 10.5 cm (promontory to midpoint of symphysis) – **SMALLEST AP DIAMETER, CRITICAL FOR ENGAGEMENT**
• **Diagonal Conjugate:** 12.5 cm (promontory to lower margin of symphysis) – measurable on exam
• **Transverse:** 13 cm (widest transverse diameter)
• **Oblique:** 12 cm

MID-PELVIC DIAMETERS:
• **Interspinous:** 10.5 cm (between ischial spines) – **NARROWEST PELVIC PLANE**
• **AP:** 11.5 cm (below sacral promontory to back of symphysis)

OUTLET DIAMETERS:
• **Intertuberous:** 11 cm (between ischial tuberosities)
• **AP:** 13.5 cm (tip of coccyx to lower margin of symphysis)
• **Posterior sagittal:** 9 cm (midpoint intertuberous to coccyx)

CLINICAL THRESHOLDS:
• Obstetric conjugate <10 cm = CPD likely
• Interspinous <10 cm = mid-pelvic obstruction
• Intertuberous <8 cm = outlet obstruction

CLINICAL ASSESSMENT TECHNIQUE

Digital Pelvic Examination:
1. **Diagonal conjugate:** Middle finger to sacral promontory, mark level of symphysis on hand, measure with pelvimeter (subtract 1.5-2 cm for obstetric conjugate)
2. **Ischial spines:** Palpate for prominence (android = prominent)
3. **Sacrum:** Assess curvature (curved = favorable, straight = android/platypelloid)
4. **Subpubic arch:** Angle between inferior rami (wide >90° vs narrow <90°)
5. **Intertuberous diameter:** Estimate width between ischial tuberosities

Imaging:
• MRI pelvimetry (gold standard for CPD assessment)
• CT (if cephalo-pelvic disproportion suspected)
• X-ray (rarely used now due to radiation)

FETAL HEAD DIAMETERS (RELEVANT)

Suboccipitobregmatic: 9.5 cm (flexed vertex, optimal)
Occipitofrontal: 11.5 cm (military attitude)
Mentovertical: 13.5 cm (brow presentation – obstructs)
Submentobregmatic: 9.5 cm (face presentation, extended)

CRITICAL ERRORS (FAIL)

Confuses diagonal vs obstetric conjugate
Does not know critical threshold (10.5 cm obstetric conjugate)
Misses android pelvis features (deep transverse arrest risk)
Cannot identify ischial spines
No clinical application (CPD prediction)

VIVA RAPID FIRE

Q1: Which pelvic type is most favorable for vaginal delivery?
A: Gynecoid

Q2: What is the narrowest pelvic plane?
A: Mid-pelvis (interspinous diameter 10.5 cm)

Q3: Which presentation is most common in anthropoid pelvis?
A: Occipito-posterior (OP)

Q4: What is the significance of obstetric conjugate <10 cm?
A: Cephalopelvic disproportion (CPD) likely, engagement unlikely, C-section indicated

Q5: How do you clinically estimate obstetric conjugate?
A: Measure diagonal conjugate (promontory to lower symphysis), subtract 1.5-2 cm

STATION 5 – OBS INTERACTIVE

Preterm Labour Scenario – Diagnosis & Management

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SCENARIO

Patient: Mrs. A, 28 years old, G2P1, 32 weeks gestation.
Presenting Complaint: Painful regular contractions for 4 hours, watery vaginal discharge.
History: Previous preterm delivery at 34 weeks (3 years ago). No antenatal complications.
Examination: Uterine contractions every 4 minutes, lasting 40 seconds. Cervical dilatation 3 cm, 50% effaced, membranes intact.
Task: Take focused history, discuss investigations, and outline immediate management.

DEFINITIONS

Preterm Labour: Regular uterine contractions + cervical change before 37 completed weeks
Threatened PTL: Contractions without cervical change
PPROM: Preterm premature rupture of membranes (before labour starts)
Extreme Preterm: <28 weeks
Very Preterm: 28-32 weeks
Moderate-Late Preterm: 32-37 weeks

RISK FACTORS (HIGH-YIELD)

Obstetric History: Previous PTL/PPROM (recurrence 15-30%), cervical surgery (cone biopsy, LLETZ), uterine anomaly
Current Pregnancy: Multiple pregnancy, polyhydramnios, cervical insufficiency, placental abruption, chorioamnionitis
Infection: UTI, bacterial vaginosis, sexually transmitted infections, periodontal disease
Lifestyle: Smoking, cocaine use, low BMI, high stress, physical exertion
Demographic: Age <18 or >35, low socioeconomic status, African ethnicity

DIAGNOSTIC WORKUP

1. Confirm Preterm Labour:
• Fetal fibronectin (fFN) – negative predictive value high (>95% no delivery in 7-14 days)
• Cervical length USG – <25mm predictive
• Bishop score >6

2. Exclude Contraindications to Tocolysis:
• Severe preeclampsia/eclampsia
• Major antepartum hemorrhage
• Chorioamnionitis (fever, uterine tenderness, foul discharge)
• Fetal distress/death
• Severe IUGR
• PPROM with infection

3. Investigations:
• **FBC:** WCC (infection), Hb
• **CRP/Procalcitonin:** Infection markers
• **Vaginal swab:** GBS status, culture
• **Urine dipstick & culture:** Exclude UTI
• **USG:** Fetal presentation, estimated weight, cervical length, liquor volume
• **Amniocentesis:** If chorioamnionitis suspected (glucose, Gram stain, culture)

STEPWISE MANAGEMENT

IMMEDIATE (First Hour):
• Left lateral position
• IV access, fluids
• CTG monitoring (fetal heart, contractions)
• Steroids for fetal lung maturity (if not given)
• Tocolysis assessment (contraindications?)

CORTICOSTEROIDS (Antenatal):
• **Betamethasone 12 mg IM × 2 doses, 24 hours apart**
• OR **Dexamethasone 6 mg IM × 4 doses, 12 hours apart**

• **Effect:** Reduces RDS by 50%, IVH, NEC, mortality
• **Optimal timing:** 24 hours to 7 days after first dose
• **Repeat courses:** Not recommended (may reduce fetal growth)

TOCOLYSIS (If <34 weeks, no contraindications):
Goal: Delay delivery 48 hours for steroids + transfer to tertiary center

First Line – Nifedipine:
• Loading: 20 mg PO (if contractions persist, repeat in 30 min)
• Maintenance: 20 mg PO every 6-8 hours for 48 hours
• Max 160 mg/day
• Side effects: Flushing, headache, hypotension, tachycardia
• Contraindications: Hypotension, cardiac disease

Alternative – Atosiban (Oxytocin Antagonist):
• IV bolus 6.75 mg, then infusion 300 mcg/min for 3 hours, then 100 mcg/min
• Fewer side effects, expensive
• Preferred in cardiac disease

Alternative – Indomethacin:
• 100 mg PR/PO, then 25-50 mg every 6 hours × 48 hours
• Contraindications: >32 weeks (risk ductus closure), oligohydramnios, IUGR

MAGNESIUM SULFATE (Neuroprotection):
• **Indication:** <32 weeks gestation, imminent delivery within 24 hours
• **Regimen:** Loading 4g IV over 30 min, then 1g/hour infusion until delivery
• **Effect:** Reduces cerebral palsy by 30%
• Monitor: Patellar reflexes, respiratory rate, urine output (toxicity: loss of reflexes, respiratory depression)
• Antidote: Calcium gluconate 1g IV

ANTIBIOTICS:
• **PPROM:** Erythromycin 250 mg PO QID × 10 days (or azithromycin)
• **GBS prophylaxis:** If GBS+ or unknown status: Benzylpenicillin 3g IV, then 1.5g 4-hourly until delivery
• **Chorioamnionitis:** Broad spectrum (ampicillin + gentamicin + metronidazole)

TRANSFER:
• Urgent transfer to tertiary center with NICU if:
- Gestational age <32 weeks
- Estimated fetal weight <1500g
- Significant maternal comorbidity

CONTRAINDICATIONS TO TOCOLYSIS

Maternal: Severe preeclampsia/eclampsia, APH, chorioamnionitis, significant medical disease (severe cardiac, uncontrolled DM)
Fetal: Death, distress requiring delivery, severe IUGR <5th centile, lethal anomaly
Other: Cervical dilatation >6 cm (ineffective)

CRITICAL ERRORS (FAIL)

Performs digital examination in suspected praevia (catastrophic hemorrhage)
Omits corticosteroids (missed opportunity for lung maturity)
No neuroprotection <32 weeks ($MgSO_4$)
Continues tocolysis with chorioamnionitis (maternal sepsis risk)
No GBS prophylaxis (neonatal sepsis)
Inappropriate tocolysis >34 weeks (no benefit, risks)

VIVA RAPID FIRE

Q1: What is the optimal window for antenatal steroids?
A: 24 hours to 7 days after first dose; beneficial up to 34-36 weeks

Q2: Why avoid indomethacin >32 weeks?
A: Risk of premature closure of ductus arteriosus, pulmonary hypertension

Q3: What is the target of tocolysis?
A: Delay delivery 48 hours for steroids + $MgSO_4$ + transfer, not to prevent delivery

Q4: Signs of chorioamnionitis?
A: Maternal fever >38°C, uterine tenderness, foul discharge, maternal/fetal tachycardia, leukocytosis

Q5: What is the recurrence risk of PTL?
A: 15-30% after one PTL, higher if previous early delivery

Crafted with ❤️ Noaman Khan Musakhel

STATION 6 – OBS INTERACTIVE

Magnesium Sulfate – Uses, Doses & Monitoring

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SCENARIO

Task: Demonstrate knowledge of Magnesium Sulfate use in obstetrics.
Station: Identify $MgSO_4$ ampule, state indications, calculate dose, and explain monitoring for toxicity.
Time: 8 minutes.

IDENTIFICATION

Ampule: Magnesium Sulfate 50% w/v (500 mg/mL)
Concentration: 2 mmol/mL (Mg = 24 g/mol)
Presentation: 10 mL ampule (5g), 20 mL ampule (10g)
Appearance: Clear, colorless solution

CLINICAL USES IN OBSTETRICS

1. ECLAMPSIA TREATMENT (First-line anticonvulsant):
• Prevents recurrent seizures
• More effective than phenytoin, diazepam

2. SEVERE PRE-ECLAMPSIA (Seizure prophylaxis):
• Severe features: BP >160/110, proteinuria, end-organ dysfunction
• Continue 24 hours post-delivery or last seizure

3. FETAL NEUROPROTECTION:
• Gestational age <32 weeks
• Imminent preterm birth (within 24 hours)
• Reduces cerebral palsy by 30%

4. Tocolysis (Rare/Second-line):
• Not first-line due to side effects
• Sometimes used for uterine relaxation (e.g., ECV, uterine inversion)

DOSING REGIMENS

ECLAMPSIA REGIMEN (Zuspan or Pritchard):

Zuspan Regimen (IV only):
• Loading: 4-6g IV over 15-20 minutes
• Maintenance: 1-2g/hour continuous IV infusion
• Continue 24 hours post-delivery or last seizure

Pritchard Regimen (IV + IM):
• Loading: 4g IV + 10g IM (5g in each buttock)
• Maintenance: 5g IM every 4 hours in alternate buttocks
• Continue 24 hours post-delivery

NEUROPROTECTION REGIMEN:
• Loading: 4g IV over 30 minutes
• Maintenance: 1g/hour IV until delivery (max 24 hours)
• If delivery delayed >12 hours, may repeat loading dose

RECURRENT SEIZURE (While on $MgSO_4$):
• Additional 2g IV bolus over 5 minutes
• Check serum Mg level
• Consider alternative anticonvulsant if recurrent (phenytoin, lorazepam)

MONITORING & TOXICITY

THERAPEUTIC LEVEL: 2-3.5 mmol/L (4-7 mEq/L)
TOXICITY LEVELS:

• 3.5-5 mmol/L: Loss of patellar reflexes
• 5-7.5 mmol/L: Respiratory depression
• >7.5 mmol/L: Cardiac arrest

CLINICAL MONITORING (Every 15-30 min):
• Patellar reflexes (must be present)
• Respiratory rate (>12/min)
• Urine output (>30 mL/h or >100 mL/4h)

ANTIDOTE: Calcium Gluconate 10% 10 mL (1g) IV over 10 minutes
Mechanism: Competitive antagonist at neuromuscular junction

CONTRAINDICATIONS & CAUTIONS

Absolute Contraindications:
• Myasthenia gravis
• Severe renal failure (Cr >150 µmol/L, adjust dose or avoid)
• Heart block
• Toxicity signs

Relative Contraindications:
• Moderate renal impairment (reduce dose by 50%, monitor levels)
• Hepatic failure
• Concurrent CNS depressants (enhanced sedation)

SIDE EFFECTS

• Flushing, warmth
• Nausea, vomiting
• Headache
• Muscle weakness
• Respiratory depression (toxicity)
• Cardiac arrest (severe toxicity)
• Neonatal: Hypotonia, respiratory depression (reversible with calcium)

CRITICAL ERRORS (FAIL)

Cannot calculate dose (4g = 8 mL of 50% solution)
No monitoring plan (reflexes, respiration, urine)
Does not know antidote (calcium gluconate)
Uses in myasthenia gravis (contraindicated)
No renal function check before dosing

VIVA RAPID FIRE

Q1: Why is $MgSO_4$ preferred over diazepam in eclampsia?
A: Better seizure control, less respiratory depression, reduced NICU admission, better maternal outcomes

Q2: How long do you continue $MgSO_4$ post-delivery?
A: 24 hours after delivery or last seizure, whichever is later

Q3: What is the first sign of $MgSO_4$ toxicity?
A: Loss of patellar reflexes (at levels >3.5 mmol/L)

Q4: Calculate dose: Patient needs 4g loading. You have 50% w/v 10mL ampules.
A: 50% w/v = 500 mg/mL = 0.5 g/mL. 4g ÷ 0.5 g/mL = 8 mL. Give 8 mL IV

Q5: Mechanism of action in neuroprotection?
A: NMDA receptor antagonism, vasodilation, anti-inflammatory, antioxidant, stabilizes neuronal membranes

STATION 7 – OBS INTERACTIVE

Eclampsia Scenario – Emergency Management

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SCENARIO

Patient: Mrs. B, 24 years old, primigravida, 36 weeks gestation.
History: Admitted with BP 170/110, proteinuria +++, headache, visual disturbances for 2 days.
Event: Suddenly develops tonic-clonic seizure on ward.
Task: Immediate management, stabilization, and delivery planning.

DEFINITION

Eclampsia: New-onset tonic-clonic seizures in a pregnant/postpartum woman with preeclampsia, not attributable to other causes.
Incidence: 1-2% of preeclamptic patients.
Timing: 40% antepartum, 20% intrapartum, 40% postpartum (up to 4 weeks).

IMMEDIATE MANAGEMENT (ABCDE APPROACH)

A – AIRWAY:
• Turn patient left lateral position (prevent aspiration, improve placental perfusion)
• Suction oropharynx
• Insert oropharyngeal airway if needed
• Oxygen 10-15 L/min via non-rebreather mask

B – BREATHING:
• Assess respiratory rate, oxygen saturation
• Bag-valve-mask if respiratory depression
• Prepare for intubation if status epilepticus (>5 min) or recurrent seizures

C – CIRCULATION:
• IV access (2 large-bore cannulae)
• Monitor BP, HR, ECG
• Fluid restriction (80-100 mL/hour) – risk of pulmonary edema
• Strict fluid balance chart

D – DISABILITY (Seizure Control):
• **Magnesium Sulfate (First-line):**
Loading: 4g IV over 5-10 minutes
Maintenance: 1g/hour infusion
• If recurrent seizure: Additional 2g IV bolus
• Alternative: Lorazepam 2-4mg IV or Diazepam 5-10mg IV (if $MgSO_4$ unavailable or contraindicated)

E – EXPOSURE/EXAMINATION:
• Check for injuries (tongue bite, fractures)
• Fetal monitoring (CTG) once stabilized
• Assess gestational age, presentation

BLOOD PRESSURE CONTROL

Target: Reduce to <160/110 mmHg (avoid sudden drops – fetal compromise)

First-line – Labetalol:
• 20mg IV over 2 min, then 40mg after 10 min, then 80mg every 10 min (max 220mg)
• Contraindicated in asthma, heart block

Alternative – Hydralazine:
• 5mg IV bolus, then 5-10mg every 20 min
• Risk of tachycardia, headache

Alternative – Nifedipine:
• 10mg PO (short-acting), may repeat after 30 min
• Avoid sublingual (erratic absorption)

DELIVERY PLANNING

TIMING:
• Eclampsia is not indication for immediate crash CS (unless fetal distress)
• Stabilize mother first ($MgSO_4$, BP control)
• Delivery within 12-24 hours once stabilized

MODE:
• Vaginal delivery preferred if feasible
• Induction with prostaglandins/oxytocin
• CS if:
- Failed induction
- Fetal distress
- Severe abruption
- Uncontrollable hypertension
- Other obstetric indications

ANAESTHESIA:
• Epidural preferred (reduces BP, avoids GA risks)
• Avoid GA if possible (airway edema, aspiration risk)
• If GA: Senior anaesthetist, smaller ETT (airway edema)

POST-SEIZURE MONITORING

• Continue $MgSO_4$ 24 hours post-delivery or last seizure
• Monitor reflexes, respiration, urine output
• Strict fluid balance (risk pulmonary edema)
• Monitor for complications: DIC, HELLP, renal failure, pulmonary edema
• Fetal monitoring until delivery

COMPLICATIONS

Maternal:
• Aspiration pneumonia
• Hypoxic brain injury
• Intracranial hemorrhage
• Cardiac arrest
• DIC
• Acute renal failure
• Pulmonary edema
• HELLP syndrome
• Death (1-2% in developed countries, 10-15% in developing)

Fetal:
• Hypoxia/acidosis
• Abruptio placentae
• Prematurity
• Intrauterine death

CRITICAL ERRORS (FAIL)

Does not turn patient left lateral (aspiration risk)
Uses diazepam as first-line ($MgSO_4$ superior)
Aggressive fluid resuscitation (pulmonary edema)
Immediate crash CS without stabilization
No BP control (stroke risk)
Stops $MgSO_4$ too early (recurrence risk)

VIVA RAPID FIRE

Q1: What is the most common cause of death in eclampsia?
A: Intracranial hemorrhage or aspiration pneumonia

Q2: Can eclampsia occur without proteinuria?
A: Yes, 20% of cases. New-onset hypertension + end-organ dysfunction sufficient

Q3: Why left lateral position?
A: Prevents aspiration, relieves aortocaval compression, improves placental perfusion

Q4: What is HELLP syndrome?
A: Hemolysis, Elevated Liver enzymes, Low Platelets – severe form of preeclampsia

Q5: Recurrence risk in next pregnancy?
A: 2-16% preeclampsia, 2% eclampsia

STATION 8 – OBS INTERACTIVE

Antepartum Hemorrhage (APH) – Diagnosis & Management

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SCENARIO

Patient: Mrs. C, 30 years old, G3P2, 34 weeks gestation.
Presenting: Sudden onset painless vaginal bleeding, bright red, soaked 3 pads in 2 hours.
History: Previous CS 2 years ago. No abdominal pain, no trauma.
Examination: BP 100/60, Pulse 110, SFH 34 cm, breech presentation, fetal heart 140 bpm regular.
Task: Diagnosis, immediate management, and delivery planning.

DEFINITION & CLASSIFICATION

APH: Vaginal bleeding from 24 weeks gestation until delivery.
Incidence: 2-5% of pregnancies.

CAUSES:
• **Placental (80%):**
- Placenta praevia (painless bleeding)
- Placental abruption (painful bleeding)
- Vasa praevia (fetal blood, high mortality)
• **Maternal:** Cervical ectropion, polyps, carcinoma, infection
• **Fetal:** Velamentous cord insertion
• **Other:** Trauma, show (cervical changes)

DIFFERENTIAL DIAGNOSIS

Feature	Placenta Praevia	Abruptio Placentae
Bleeding	Painless, bright red	Painful, dark red (concealed/mixed)
Uterus	Soft, relaxed	Tender, rigid, hypertonic
Fetal position	Malpresentation common (high head)	Normal presentation
Fetal heart	Usually normal	Bradycardia/distress common
Risk factors	Previous CS, multiparity, advanced age	Hypertension, trauma, smoking, cocaine
Shock	Proportional to visible blood loss	Out of proportion (concealed hemorrhage)

IMMEDIATE MANAGEMENT (ALL APH)

1. RESUSCITATION:
• Large-bore IV access × 2 (14-16G)
• Cross-match 4 units blood (group & save minimum)
• FBC, coagulation profile, Kleihauer-Betke (if Rh-negative)
• IV fluids/colloids/blood as needed
• Oxygen 10-15 L/min
• Catheterize (monitor urine output >30 mL/h)

2. FETAL ASSESSMENT:
• CTG monitoring immediately
• Fetal viability, heart rate pattern
• Presentation (malpresentation suggests praevia)

3. DO NOT PERFORM DIGITAL EXAMINATION (until placenta praevia excluded)

4. ULTRASOUND:
• Transabdominal: Placental location
• If posterior praevia suspected: Transvaginal (safe if gentle, sterile)
• Fetal biometry, presentation, liquor

SPECIFIC MANAGEMENT

PLACENTA PRAEVIA:

• **Minor (bleeding stopped, fetal stable, <37 weeks):**
- Admit for observation
- Steroids for fetal lung maturity if <34 weeks
- Iron supplements
- Discharge if stable 48 hours, no home >20 km from hospital
- Elective CS at 38-39 weeks (major praevia) or trial of labor if minor praevia (>2 cm from os)

• **Major (active bleeding, hemodynamic compromise, fetal distress):**
- Immediate CS (Category 1 or 2)
- Senior obstetrician, anaesthetist, pediatrician
- Blood products available
- Risk of placenta accreta (especially with previous CS)
- May need hysterectomy, interventional radiology, cell salvage

PLACENTAL ABRUPTION:

• **Mild (maternal stable, fetal stable):**
- Conservative if <34 weeks, steroids, close monitoring
- Delivery if term or deteriorating

• **Severe (maternal compromise, fetal distress, DIC):**
- Immediate delivery (vaginal if possible, CS if fetal distress)
- Correct coagulopathy (FFP, cryoprecipitate, platelets)
- Monitor for DIC, acute renal failure, Sheehan's syndrome
- Vaginal delivery usually faster (unless fetal distress)

COMPLICATIONS

Maternal:
• Hemorrhagic shock
• DIC (especially abruption)
• Acute renal failure
• Sheehan's syndrome (postpartum pituitary necrosis)
• Postpartum hemorrhage
• Infection
• Maternal death

Fetal:
• Hypoxia/asphyxia
• Prematurity
• IUGR
• Anemia (fetomaternal hemorrhage)
• Stillbirth (50% in severe abruption)

RHESUS NEGATIVE MANAGEMENT

Kleihauer-Betke Test: Quantifies fetomaternal hemorrhage
Anti-D Immunoglobulin:
• 500 IU if <20 weeks
• 1500 IU if >20 weeks
• Additional dose if massive fetomaternal hemorrhage (>4 mL)
• Give within 72 hours

CRITICAL ERRORS (FAIL)

Performs digital examination before excluding praevia (catastrophic hemorrhage)
No cross-match/blood availability
Delays CS in major praevia with active bleeding
Misses concealed abruption (shock out of proportion)
No Rh-negative protocol
Vaginal examination in known praevia

VIVA RAPID FIRE

Q1: What are the types of placenta praevia?
A: Major (covering os, partial or complete) – CS only; Minor (edge <2 cm from os but not covering) – may trial labor

Q2: What is the risk of placenta accreta with previous CS?
A: 3% with 1 CS, 11% with 2 CS, 40% with 3 CS, 60%+ with 4+ CS

Q3: What is Couvelaire uterus?
A: Severe abruption with blood infiltrating myometrium causing purple discoloration, uterine atony

Q4: When is vaginal examination safe in APH?
A: Only after ultrasound confirms placenta not covering os, or in OR prepared for immediate CS

Q5: What is vasa praevia?
A: Fetal vessels crossing membranes over cervical os. Painless bleeding with high fetal mortality. Emergency CS if diagnosed

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STATION 9 – OBS INTERACTIVE

Pregnancy Induced Hypertension (PIH) – Drugs & Management

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SCENARIO

Patient: Mrs. D, 28 years old, primigravida, 32 weeks gestation.
BP: 160/110 mmHg on two occasions 4 hours apart.
Urine: Proteinuria ++ on dipstick.
Symptoms: Headache, epigastric pain.
Investigations: Platelets 120,000, ALT 80, Creatinine 110.
Task: Classify severity, drug management, and delivery planning.

DEFINITIONS & CLASSIFICATION

Gestational Hypertension: New-onset BP ≥140/90 after 20 weeks without proteinuria
Preeclampsia: GH + Proteinuria (≥300 mg/24h or ≥+ on dipstick × 2) OR End-organ dysfunction
Severe Preeclampsia: BP ≥160/110 OR any of the following:
• Neurological: Headache, visual disturbances, hyperreflexia, seizures
• Hematological: Platelets <100,000, DIC
• Hepatic: Epigastric/RUQ pain, ALT/AST >2x normal
• Renal: Creatinine >106 µmol/L, oliguria
• Pulmonary: Pulmonary edema
• Fetal: IUGR, oligohydramnios, abnormal Dopplers

Eclampsia: Seizures in preeclamptic patient
Chronic Hypertension: Pre-existing or <20 weeks
Superimposed Preeclampsia: Chronic HTN with new proteinuria or worsening features

ANTIHYPERTENSIVE THERAPY

TARGET BP: 130-150/80-100 mmHg (avoid sudden drops)

FIRST-LINE: LABETALOL
• **Dose:** 200 mg PO TDS, titrate up to 800 mg TDS
• **Acute:** 20 mg IV, then 40 mg after 10 min, then 80 mg every 10 min (max 220 mg)
• **Contraindications:** Asthma, heart block, severe bradycardia
• **Side effects:** Hypotension, dizziness, fetal bradycardia

SECOND-LINE: NIFEDIPINE
• **Dose:** 10-20 mg PO TDS (short-acting)
• **Modified release:** 30-60 mg OD
• **Caution:** Avoid sublingual (erratic absorption, sudden drop)
• **Side effects:** Flushing, headache, peripheral edema

THIRD-LINE: METHYLDOPA
• **Dose:** 250 mg PO TDS, max 2 g/day
• **Safety:** Longest track record in pregnancy
• **Side effects:** Sedation, dry mouth, hemolytic anemia, hepatic dysfunction

HYDRALAZINE (IV for acute severe HTN):
• **Dose:** 5 mg IV bolus, then 5-10 mg every 20 min
• **Infusion:** 1-5 mg/hour
• **Side effects:** Tachycardia, headache, fluid retention

CONTRAINDICATED: ACE inhibitors, ARBs (teratogenic), Diuretics (reduce volume, except pulmonary edema)

SEIZURE PROPHYLAXIS (SEVERE FEATURES)

MAGNESIUM SULFATE:
• **Indications:** Severe preeclampsia, eclampsia
• **Regimen:** 4g IV loading + 1g/hour maintenance
• **Duration:** 24 hours post-delivery or last seizure
• **Monitoring:** Patellar reflexes, respiratory rate, urine output
• **Antidote:** Calcium gluconate 1g IV

DELIVERY PLANNING

TIMING:
- **Gestational Hypertension:** Deliver at 37-38 weeks
- **Preeclampsia without severe features:** Deliver at 37 weeks
- **Severe Preeclampsia:** Deliver after 34 weeks (stabilize first)
- **Severe <34 weeks:** Stabilize, steroids for lung maturity, deliver if deteriorating

MODE:
- Vaginal delivery preferred if favorable cervix
- Induction with prostaglandins/oxytocin
- CS if unfavorable, fetal distress, or obstetric indications
- Epidural analgesia (reduces BP, but avoid hypotension)

INTRAPARTUM MONITORING:
- BP every 15-30 min
- Fluid restriction (80 mL/h) – risk pulmonary edema
- CTG continuous
- Watch for placental abruption
- Active management 3rd stage (risk PPH)

POSTPARTUM MANAGEMENT

- Continue antihypertensives (risk highest first 48 hours)
- Continue $MgSO_4$ if severe (24 hours)
- Monitor BP, urine output, reflexes
- Risk of eclampsia up to 4 weeks postpartum
- Follow-up BP at 6 weeks (chronic HTN vs resolved)
- Thromboprophylaxis if prolonged bed rest

CRITICAL ERRORS (FAIL)

Does not treat severe range BP (>160/110) – stroke risk
Uses ACE inhibitors (contraindicated)
No seizure prophylaxis in severe features
Excessive IV fluids (pulmonary edema)
Delays delivery in severe preeclampsia >34 weeks
Discharges without postpartum BP follow-up

VIVA RAPID FIRE

Q1: Why avoid ACE inhibitors in pregnancy?
A: Teratogenic (renal agenesis, oligohydramnios, IUGR), contraindicated 2nd/3rd trimester

Q2: What is the HELLP syndrome?
A: Hemolysis, Elevated Liver enzymes, Low Platelets – severe preeclampsia variant

Q3: When does preeclampsia typically present?
A: Third trimester (peak 34 weeks), but can present 20 weeks to 4 weeks postpartum

Q4: What is the only cure for preeclampsia?
A: Delivery of placenta

Q5: Long-term cardiovascular risk?
A: 3-4x increased risk of chronic hypertension, ischemic heart disease, stroke later in life

STATION 10 – OBS INTERACTIVE

Fetal Presentation, Lie & Attitude Identification

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CANDIDATE INSTRUCTIONS

Task: Identify fetal presentation, lie, and attitude on pelvic mannequin/model or picture.
Include: Determining presenting part, position, denominator, and clinical significance.
Time: 8 minutes.

DEFINITIONS

LIE: Relation of long axis of fetus to long axis of uterus
• Longitudinal (99% at term) – parallel
• Transverse – perpendicular
• Oblique – angled (unstable, converts to longitudinal or transverse)

PRESENTATION: Part of fetus lowest in birth canal/presenting first
• Cephalic (96%) – vertex (flexed), brow (military), face (extended)
• Breech (3-4%) – frank, complete, footling
• Shoulder (0.5%) – transverse lie
• Compound – two presenting parts

ATTITUDE: Relation of fetal parts to each other (flexion/extension)
• **Flexed:** Vertex (optimal), suboccipital to center
• **Extended:** Face, brow
• **Deflexed:** Military (occipitofrontal diameter presents)

POSITION: Relation of denominator to maternal pelvis
• **Vertex:** Occiput (O) – OA, OP, LOT, ROT, etc.
• **Breech:** Sacrum (S) – SA, SP, LST, RST
• **Face:** Mentum (M) – MA, MP, LMT, RMT

PALPATION TECHNIQUE (LEOPOLD MANEUVERS)

1. FUNDAL PALPATION:
• What occupies fundus?
• Breech (broad, soft, irregular) vs Head (hard, round, ballotable)

2. UMBILICAL PALPATION:
• Locate back (smooth, convex) and limbs (small, irregular)
• Determines position (back left = LOA/LSCA)

3. PAWSIK'S GRIP (Suprapubic):
• Determine presenting part
• Cephalic: Hard, round, ballotable
• Breech: Soft, broad, irregular
• Assess engagement (5th palpable = floating, 0/5 = deeply engaged)

4. PELOPALPATION:
• Face patient feet, assess descent into pelvis
• Determine attitude (flexion vs extension)
• Assess caput/moulding if labouring

DIAMETERS & MECHANISMS

VERTEX (Flexed – Optimal):
• Presenting diameter: Suboccipitobregmatic (9.5 cm)
• Engagement: Biparietal diameter between ischial spines
• Mechanism: Engagement, descent, flexion, internal rotation, extension, restitution, external rotation

BROW (Military – Obstructed):
• Presenting diameter: Occipitomental (13.5 cm)
• Too large for pelvis – obstructed labour
• Management: CS unless flexes to vertex or extends to face

FACE (Extended – Rare):

• Presenting diameter: Submentobregmatic (9.5 cm)
• Mechanism: Engagement, descent, internal rotation of chin, extension
• Delivery: Mentum anterior (delivers by flexion), Mentum posterior (CS)

BREECH:
• Frank (flexed hips, extended knees) – 70%
• Complete (flexed hips and knees)
• Footling (extended hips, one/both feet presenting) – cord prolapse risk
• Presenting diameter: Bitrochanteric (10 cm)

CLINICAL SIGNIFICANCE

OPTIMAL FOR VAGINAL DELIVERY:
• Vertex, flexed, LOA/ROA
• OA rotates to occiput anterior naturally

PROBLEMATIC:
• **OP (Occipito-posterior):** Backache, prolonged labour, assisted delivery/CS
• **Brow:** Obstructed labour, CS mandatory
• **Face MP:** Cannot deliver vaginally
• **Breech:** Cord prolapse, head entrapment, birth trauma
• **Transverse/Oblique:** Cord prolapse, obstructed labour, uterine rupture

MANAGEMENT:
• Breech >36 weeks: ECV (external cephalic version)
• Transverse lie: Admit, exclude placenta praevia, CS if persistent
• Unstable lie: Exclude polyhydramnios, pelvic tumor

CRITICAL ERRORS (FAIL)

Cannot differentiate vertex from breech
Does not know optimal diameters (suboccipitobregmatic 9.5 cm)
Misses brow presentation (obstructed labour risk)
No engagement assessment
Confuses position terminology (OA vs OP)

VIVA RAPID FIRE

Q1: What is the presenting diameter in vertex flexed?
A: Suboccipitobregmatic (9.5 cm)

Q2: What is the most common position at onset of labour?
A: Left Occiput Transverse (LOT) 40%

Q3: Why is mentum posterior face presentation undeliverable?
A: Neck cannot extend further to allow occiput to pass under pubic symphysis

Q4: What is the denominator in breech presentation?
A: Sacrum

Q5: Success rate of ECV?
A: 50-60% overall, higher in multiparous, posterior placenta, normal liquor

STATION 11 – OBS INTERACTIVE

Episiotomy – Instruments, Technique & Complications

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CANDIDATE INSTRUCTIONS

Task: Identify episiotomy instruments, demonstrate incision site, and discuss prerequisites, complications, and repair.
Time: 8 minutes.

INSTRUMENTS IDENTIFICATION

1. EPISIOTOMY SCISSORS (Mayo/Bandage Scissors):
• Blunt-tipped, angled blades
• Protects fetal head during cutting
• Length 14-16 cm

2. NEEDLE HOLDER:
• Mayo-Hegar or Gillies
• For suturing perineal tear/episiotomy

3. TOOTHED FORCEPS:
• For grasping tissue edges
• Allis tissue forceps

4. RETRACTORS:
• Doyen's retractor (right-angled)
• For visualization during repair

5. SUTURE MATERIAL:
• Vicryl 2-0 (absorbable, synthetic)
• Chromic catgut (traditional)
• Continuous subcuticular or interrupted

TYPES OF EPISIOTOMY

Type	Description	Pros/Cons
Mediolateral (45°)	From posterior fourchette, directed laterally away from midline	Preferred – avoids sphincter, but painful, healing issues
Midline (Median)	Directly posterior toward anus	Less blood loss, easier repair, but high risk 3rd/4th degree tear
J-shaped	Starts midline, curves laterally	Rarely used
Lateral	Starts lateral to midline	Rare, more bleeding

Recommendation: Mediolateral preferred (reduces OASI – Obstetric Anal Sphincter Injury)

PREREQUISITES FOR EPISIOTOMY

INDICATIONS:
• Fetal distress (need expedite delivery)
• Shoulder dystocia (creates room for maneuvers)
• Breech delivery (control aftercoming head)
• Forceps/vacuum delivery
• Rigid perineum preventing delivery
• Preterm delivery (protect head)
• Previous 3rd/4th degree tear

TIMING:
• **Correct:** When head is visible 3-4 cm, perineum thinned, between contractions
• **Too early:** Excessive bleeding, infection
• **Too late:** Tear already occurred, ineffective

TECHNIQUE:
1. Adequate analgesia (pudendal block or perineal infiltration with lidocaine)

2. Two fingers protecting fetal head between blades
3. Cut at height of contraction when perineum thinned
4. Single decisive cut (2-4 cm)
5. Control bleeding with pressure

PERINEAL TEAR CLASSIFICATION

1st Degree: Skin and superficial perineal fascia only
2nd Degree: Extends into perineal muscles (bulbospongiosus, superficial transverse perineal) but not sphincter
3rd Degree: Involves external anal sphincter (EAS)
• 3a: <50% EAS thickness
• 3b: >50% EAS thickness
• 3c: Internal anal sphincter (IAS) also involved
4th Degree: Extends into rectal mucosa

REPAIR PRINCIPLES:
• Adequate lighting, analgesia, visualization
• Repair in layers (vaginal mucosa, perineal muscle, skin)
• Sphincter tears: Overlap technique, delayed absorbable suture (PDS)
• Antibiotics (3rd/4th degree)
• Laxatives post-repair
• Physiotherapy follow-up

COMPLICATIONS

Immediate:
• Hemorrhage (cutting vessels)
• Extension into sphincter/rectum
• Inadequate anesthesia

Early:
• Infection
• Hematoma
• Breakdown of wound
• Pain
• Urinary retention

Late:
• Dyspareunia (painful intercourse)
• Perineal pain
• Rectovaginal fistula
• Anal incontinence (flatus/fecal)
• Rectocele
• Psychological trauma
• Painful scar

PRECAUTIONS

• Restricted use (not routine)
• Mediolateral technique
• Proper timing
• Skilled repair with good visualization
• Adequate analgesia
• Postpartum care (hygiene, ice packs, analgesia)
• Follow-up for 3rd/4th degree tears (anal manometry, endoanal ultrasound)
• Future delivery: ELSCS if previous 3rd/4th degree with symptoms

CRITICAL ERRORS (FAIL)

Midline episiotomy (high sphincter injury risk)
No fetal head protection during cutting
Cuts before perineum thinned (excessive bleeding)
Inadequate repair visualization (missed sphincter tear)
Routine episiotomy (not indicated)

VIVA RAPID FIRE

Q1: What angle is recommended for mediolateral episiotomy?
A: 45-60° from midline (60° reduces sphincter injury more than 45°)

Q2: What is OASI?
A: Obstetric Anal Sphincter Injury – 3rd/4th degree tears

Q3: Suture material for perineal repair?
A: Vicryl 2-0 (absorbable, synthetic, less reaction than catgut)

Q4: When is episiotomy mandatory?
A: Never mandatory, but strongly indicated for shoulder dystocia, breech, operative vaginal delivery, fetal distress with rigid perineum

Q5: Follow-up for 3rd degree tear?
A: Review at 6-12 weeks, anal manometry, endoanal ultrasound if symptoms, counsel future mode of delivery

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STATION 12 – OBS INTERACTIVE

Vacuum Delivery – Indications, Technique & Safety

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CANDIDATE INSTRUCTIONS

Task: Identify vacuum extractor, state indications/contraindications, demonstrate application technique, and discuss safety limits.
Time: 8 minutes.

INSTRUMENT IDENTIFICATION

VENTOUSE (VACUUM EXTRACTOR) TYPES:

1. MALMSTRÖM (Metal):
• Rigid metal cup (50-60 mm)
• Chain traction mechanism
• High traction force
• Risk of scalp laceration

2. SILASTIC/SOFT CUP (Kiwi, Omnicup):
• Silicone rubber cup
• Hand-held pump (Kiwi) or separate suction
• Less traction force
• Safer, preferred for occiput posterior

3. POSTERIOR CUP (Bird/ODON):
• Designed for OP positions
• Flexible rim

COMPONENTS:
• Vacuum cup (metal or soft)
• Tubing
• Vacuum pump (manual or electric)
• Traction handle
• Pressure gauge (0-0.8 kg/cm^2 or mmHg)

INDICATIONS

MATERNAL:
• Prolonged second stage (nulliparous >2 hours, multiparous >1 hour with epidural; nulliparous >1 hour, multiparous >30 min without epidural)
• Maternal exhaustion
• Medical conditions preventing pushing (cardiac, neurological)

FETAL:
• Suspicion of fetal compromise (non-reassuring CTG)
• Prophylactic for preterm delivery (protect head)

ADVANTAGES OVER FORCEPS:
• Less anesthesia required (pudendal block vs spinal/GA)
• Less perineal trauma
• Can be used in OP position (with suitable cup)
• Can check application before traction

CONTRAINDICATIONS

ABSOLUTE:
• Gestational age <34 weeks (risk IVH)
• Fetal bleeding disorder (hemophilia, alloimmune thrombocytopenia)
• Suspected fetal bone demineralization (osteogenesis imperfecta)
• Face/brow presentation
• Non-cephalic presentation (breech, shoulder)
• Unengaged head (above ischial spines)
• Cephalopelvic disproportion
• Gestational age >41 weeks (risk shoulder dystocia)

RELATIVE:
• Previous CS (uterine scar – careful assessment)

- Fetal macrosomia (>4000g – risk shoulder dystocia)
- OP position (use posterior cup, experienced operator)
- Scalp hematoma/caput (check for previous attempts)
- Maternal obesity (difficult application)

PREREQUISITES

- Cephalic presentation confirmed
- Head engaged (0/5 or +1 station, at or below ischial spines)
- Cervix fully dilated
- Membranes ruptured
- Bladder empty (catheterize)
- Adequate analgesia (pudendal block or epidural topped up)
- Adequate pelvis (CPD excluded)
- Operator skilled in technique
- Consent obtained
- Neonatal resuscitation available
- Backup plan if fails (forceps/CS)

TECHNIQUE

1. PREPARATION:
- Explain procedure, consent
- Lithotomy position
- Empty bladder
- Adequate analgesia
- Check presentation, position, station

2. APPLICATION:
- Largest cup that fits
- Center over flexion point (3 cm anterior to posterior fontanelle)
- For OA: Center of occiput
- For OP: Flexion point more posterior
- No vaginal tissue/cervix in cup
- Check all around rim

3. CREATING VACUUM:
- Increase pressure gradually:
- 0.2 kg/cm² (150 mmHg) – check application
- 0.4 kg/cm² (300 mmHg) – wait 1 min
- 0.6-0.8 kg/cm² (450-600 mmHg) – maximum traction
- Check application between increments

4. TRACTION:
- Traction perpendicular to cup plane
- Coordinate with contractions and maternal pushing
- Two pulls per contraction maximum
- Apply steady traction, no rocking
- Check progress with each pull

5. RELEASE:
- Release vacuum when head crowns
- Remove cup
- Deliver shoulders and body normally
- Check for injuries

SAFETY LIMITS (CRITICAL)

TIME LIMITS:
- Maximum 3 pulls (contractions) with maximum traction
- Cup should dislodge (pop-off) no more than 2 times
- Total time from application to delivery ideally <15 minutes
- If no progress after 3 pulls → abandon

POP-OFF POLICY:
- If cup pops off twice, reassess
- If malposition, reapply correctly
- If correct position but no progress → abandon

ABANDON CRITERIA:
- No descent with adequate traction
- Cup pops off repeatedly
- Fetal distress worsens
- Maternal trauma

→ **Switch to forceps (if appropriate) or CS**

COMPLICATIONS

FETAL:
• Scalp abrasions/lacerations
• Cephalhematoma (blood under periosteum, doesn't cross sutures)
• Subgaleal hemorrhage (potentially fatal, crosses sutures)
• Intracranial hemorrhage (rare, <34 weeks risk)
• Retinal hemorrhage
• Jaundice (from hemorrhage)
• Neonatal encephalopathy (hypoxia if prolonged)

MATERNAL:
• Perineal tears (less than forceps)
• Cervical lacerations (if cup includes cervix)
• Vaginal wall tears
• Postpartum hemorrhage
• Infection

WHERE PERFORMED

LOCATION: Operating Theatre (OT) or Delivery Room with full facilities
REQUIREMENTS:
• Immediate access to CS if needed
• Anesthesia support
• Neonatal resuscitation team present
• Blood products available
• Adequate lighting
• Full obstetric emergency setup

CRITICAL ERRORS (FAIL)

Application before full dilatation (cervical tear)
Unengaged head (cord prolapse, failed delivery)
Wrong flexion point (extension, larger diameter)
Exceeds 3 pulls (fetal injury)
No backup plan (failed vacuum, no CS/forceps)
Uses in <34 weeks (IVH risk)
No neonatal resuscitation

VIVA RAPID FIRE

Q1: What is the flexion point?
A: 3 cm anterior to posterior fontanelle, center of cup placement

Q2: Difference between cephalhematoma and subgaleal hemorrhage?
A: Cephalhematoma: Subperiosteal, limited by sutures, benign. Subgaleal: Below galea, crosses sutures, can cause hypovolemic shock

Q3: Why avoid vacuum in <34 weeks?
A: Fragile skull, risk intraventricular hemorrhage (IVH)

Q4: What is sequential instrument use?
A: Using forceps after failed vacuum (or vice versa) – increases complication risk, avoid if possible

Q5: Maximum pressure for vacuum?
A: 0.8 kg/cm² or 600 mmHg

STATION 13 – PAEDS INTERACTIVE

Type 1 DM with DKA – Emergency Management

KMU FINAL YEAR MBBS • 8 MINUTES

SCENARIO

Patient: Ahmed, 8-year-old male, 25 kg.
Presenting: 3-day history of polyuria, polydipsia, weight loss, vomiting, abdominal pain.
Examination: Drowsy, dehydrated, Kussmaul breathing, fruity breath.
Vitals: HR 130, BP 90/60, RR 35, Temp 37.2°C.
Investigations: Glucose 28 mmol/L, pH 7.15, HCO_3 12, Ketones +++.
Task: Immediate management, fluid resuscitation, insulin therapy, and monitoring.

DIAGNOSTIC CRITERIA (DKA)

Blood Glucose: >11 mmol/L (usually >16)
Acidosis: pH <7.30 or bicarbonate <15 mmol/L
Ketosis: Blood ketones >3 mmol/L or urine ketones ++/+++

SEVERITY:
• **Mild:** pH 7.25-7.30, HCO_3 15-18
• **Moderate:** pH 7.00-7.24, HCO_3 10-15
• **Severe:** pH <7.00, HCO_3 <10, altered consciousness

IMMEDIATE MANAGEMENT (FIRST HOUR)

1. AIRWAY & BREATHING:
• Airway protection if altered consciousness (GCS <8)
• Oxygen if hypoxic
• Intubation may be needed for coma/apnea (care with acidosis – hyperventilate)

2. CIRCULATION:
• Large-bore IV access × 2
• Initial fluid resuscitation: 0.9% NaCl 10-20 mL/kg over 1-2 hours
• Do NOT exceed 20 mL/kg in first hour (risk cerebral edema)
• If shock: 20 mL/kg bolus, reassess

3. ASSESSMENT:
• Weight (actual or estimated)
• Neurological status (GCS, pupils)
• Severity of dehydration (usually 5-10%)
• Look for precipitant (infection, missed insulin)

4. INVESTIGATIONS:
• Blood gas (venous/capillary)
• Glucose, electrolytes (Na, K), urea, creatinine
• FBC, blood culture (if infection suspected)
• Urinalysis
• ECG (monitor K^+)

FLUID THERAPY

DEFICIT CALCULATION:
• Dehydration: 5-10% body weight
• Maintenance: 1500 mL/m^2/day or Holliday-Segar method
Total fluids over 48 hours (not faster)

FLUID PROTOCOL:
• **0-1 hour:** 0.9% NaCl 10-20 mL/kg (resuscitation)
• **1-12 hours:** 0.9% NaCl + KCl (if urine passed and K^+ <5.5)
• **12-24 hours:** 0.45% NaCl + 5% dextrose (when glucose <14)
• **24-48 hours:** Complete deficit replacement

RATE:
• Calculate deficit + maintenance
• Give over 48 hours (slower than adults – prevent cerebral edema)

- Typical rate: 1.5-2× maintenance initially, then reduce
- **Never exceed 4 L/m²/day**

INSULIN THERAPY

DO NOT GIVE BOLUS INSULIN (risk rapid osmotic shifts, cerebral edema)

CONTINUOUS IV INFUSION:
- **Dose:** 0.05-0.1 units/kg/hour (start 1-2 hours after fluids started)
- **Preparation:** 50 units Regular insulin in 50 mL 0.9% NaCl (1 unit/mL)
- **Rate:** 0.05-0.1 mL/kg/hour

TARGET GLUCOSE:
- Fall 3-4 mmol/L per hour (not faster)
- When glucose <14 mmol/L: Add 5% dextrose to fluids
- Maintain glucose 8-12 mmol/L during treatment
- Continue insulin until ketones cleared and patient eating

TRANSITION TO SUBCUTANEOUS:
- Overlap IV and SC insulin by 1-2 hours
- Give basal insulin (glargine/detemir) before stopping IV
- Continue rapid-acting with meals

POTASSIUM MANAGEMENT

CRITICAL: Despite total body K^+ depletion, serum K^+ may be normal/high due to acidosis

PROTOCOL:
- **K^+ >5.5 mmol/L:** Do NOT give K^+, check ECG, recheck in 1 hour
- **K^+ 3.5-5.5 mmol/L:** Add 40 mmol KCl/L (if urine passed)
- **K^+ <3.5 mmol/L:** Add 60 mmol KCl/L, cardiac monitoring, consider delay insulin

MONITORING:
- Check K^+ 2 hourly initially
- ECG monitoring if abnormal K^+
- Never give K^+ as bolus (cardiac arrest risk)

BICARBONATE THERAPY

RARELY INDICATED
Consider only if:
- pH <6.9 AND
- Hemodynamic instability despite fluid resuscitation

DOSE (if used):
- 1-2 mmol/kg over 2 hours
- Or 100 mL 8.4% bicarbonate diluted in 400 mL 0.9% NaCl
- Given slowly over 2 hours

RISKS:
- Paradoxical CNS acidosis (CO_2 crosses blood-brain barrier, HCO_3^- does not)
- Cerebral edema
- Hypokalemia
- Delayed ketone clearance
- Tissue hypoxia (left shift of oxyhemoglobin curve)

Most guidelines: DO NOT USE BICARBONATE in pediatric DKA

CEREBRAL EDEMA PREVENTION

RISK FACTORS:
- New onset diabetes (first episode DKA)
- Younger age (<5 years)
- Severe acidosis (pH <7.0)
- Low pCO_2
- High BUN
- Overly rapid fluid administration
- Bolus insulin
- Bicarbonate use

EARLY SIGNS:
- Headache

- Bradycardia + hypertension (Cushing's triad)
- Altered mental status
- Pupillary changes
- Seizures
- Incontinence

TREATMENT:
- Reduce fluid rate by 1/3
- Mannitol 0.5-1 g/kg over 15 min (repeat if no response)
- OR 3% hypertonic saline 2.5-5 mL/kg
- Elevate head of bed
- CT head (exclude other causes)
- Consider hyperventilation if intubated
- ICU care

MONITORING

- Hourly: Vitals, neurological status, fluid balance
- 1-2 hourly: Glucose (aim fall 3-4 mmol/L/hour)
- 2 hourly: Electrolytes (Na, K)
- 4 hourly: Blood gas, ketones
- Input/output chart (strict)
- Weight daily
- ECG if K^+ abnormal

COMPLICATIONS

Cerebral Edema: 1-2% incidence, 25% mortality, leading cause of death
Hypokalemia: Cardiac arrhythmias
Hypoglycemia: Brain injury
Aspiration: Gastroparesis
Infection: Sepsis
Thrombosis: Dehydration, hypercoagulability
Mucormycosis: Rare, fungal infection

CRITICAL ERRORS (FAIL)

Bolus insulin (cerebral edema)
Excessive initial fluids (>20 mL/kg in first hour)
No potassium monitoring (arrhythmia)
Bicarbonate routine use (harmful)
Misses cerebral edema signs (bradycardia + hypertension)
Rapid glucose fall (target >4 mmol/L/hour)
No dextrose when glucose drops (hypoglycemia, ketone clearance continues)

VIVA RAPID FIRE

Q1: Why no insulin bolus in pediatric DKA?
A: Risk rapid osmotic shifts, cerebral edema, hypoglycemia without glucose control

Q2: Target glucose fall rate?
A: 3-4 mmol/L per hour (not faster)

Q3: When to add dextrose?
A: When glucose < 14 mmol/L, add 5% dextrose to prevent hypoglycemia while continuing insulin to clear ketones

Q4: Signs of cerebral edema?
A: Headache, bradycardia with hypertension (Cushing's), altered consciousness, seizures, pupillary changes

Q5: Treatment of cerebral edema?
A: Mannitol 0.5-1 g/kg or 3% saline 2.5-5 mL/kg, reduce fluids, elevate head, ICU

STATION 14 – OBS INTERACTIVE

Oxytocin Ampule – Uses, Doses & Safety

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SCENARIO

Task: Identify oxytocin ampule, state doses for different indications, demonstrate dilution calculation, and discuss safety monitoring.
Time: 8 minutes.

IDENTIFICATION

Ampule: Oxytocin (Syntocinon)
Concentration: 5 units/mL or 10 units/mL
Presentation: 1 mL ampule (5 or 10 units)
Appearance: Clear, colorless solution
Storage: Room temperature, protect from light

CLINICAL USES & DOSING

1. INDUCTION OF LABOUR:
• **Low-dose regimen (preferred):**
- Start: 1-2 mU/min (0.001-0.002 units/min)
- Increment: 1-2 mU/min every 30-40 min
- Maximum: 20-30 mU/min
• **High-dose regimen:**
- Start: 4-6 mU/min
- Increment: 4-6 mU/min every 15-20 min
- Maximum: 40 mU/min

DILUTION FOR INFUSION:
• 10 units oxytocin in 1 L 0.9% NaCl or 5% dextrose
• Concentration: 10 mU/mL
• Rate: 6 mL/hour = 1 mU/min
• 60 mL/hour = 10 mU/min

2. AUGMENTATION OF LABOUR:
• Same as induction, but only if contractions inadequate and no CPD
• Ensure 4 contractions/10 min, each >40 sec

3. ACTIVE MANAGEMENT 3RD STAGE:
• **Prevention PPH:** 10 units IM (or slowly IV) after delivery of anterior shoulder or immediately after delivery
• **Treatment PPH:** 10 units IV slowly, then 20-40 units in 1 L crystalloid at 250 mL/hour

4. POSTPARTUM HAEMORRHAGE (PPH):
• 10 units IV slowly
• Followed by infusion: 40 units in 500 mL at 125 mL/hour (40 mU/min)
• If no IV access: 10 units IM

5. INCOMPLETE/INEVITABLE MISCARRIAGE:
• 10 units IM or slowly IV after evacuation
• Promotes uterine contraction, reduces bleeding

6. THERAPEUTIC ABORTION:
• 10-20 units in 500 mL, IV infusion after procedure

CONTRAINDICATIONS

ABSOLUTE:
• Placenta praevia (major)
• Vasa praevia
• Cord presentation/prolapse
• Cephalopelvic disproportion
• Fetal distress (non-reassuring CTG)
• Previous uterine scar with contraindication to labor (classical CS, myomectomy entering cavity)
• Grand multiparity (relative)
• Uterine hyperstimulation

RELATIVE:
• Previous uterine scar (caution, low dose, close monitoring)
• Breech presentation
• Multiple pregnancy
• Polyhydramnios
• Severe preeclampsia/eclampsia

MONITORING & SAFETY

CTG MONITORING: Continuous once oxytocin started
CONTRACTION PATTERN: Aim 4-5 contractions/10 min, duration 40-60 sec
TACHYSYSTOLE: >5 contractions/10 min OR contractions lasting >90 sec OR insufficient relaxation
MANAGEMENT OF TACHYSYSTOLE:
• Reduce or stop oxytocin
• Left lateral position
• IV fluids
• Tocolysis (terbutaline 0.25 mg SC) if fetal distress
• Restart at lower dose when settled

FLUID BALANCE:
• Oxytocin has ADH-like effect
• Risk water intoxication with high doses, prolonged infusion, hypotonic fluids
• Use isotonic fluids (0.9% NaCl)
• Monitor for headache, nausea, hyponatremia

SIDE EFFECTS

• Uterine tachysystole (most common)
• Uterine rupture (rare, risk with scar)
• Fetal distress (due to tachysystole)
• Water intoxication (hyponatremia, confusion, seizures)
• Hypotension (rapid IV bolus)
• Nausea, vomiting
• Antidiuretic effect

CALCULATION EXAMPLE

strong class="high">PRESCRIPTION: Start oxytocin at 2 mU/min, increase by 2 mU/min every 30 min, max 20 mU/min

PREPARATION:
• 10 units oxytocin in 1 L 0.9% NaCl = 10,000 mU in 1000 mL = 10 mU/mL
• 1 mU/min = 6 mL/hour (since 10 mU in 1 mL, need 0.1 mL for 1 mU, ×60 min = 6 mL/hour)
• 2 mU/min = 12 mL/hour
• 20 mU/min = 120 mL/hour

ALTERNATIVE CONCENTRATION:
• 30 units in 500 mL = 60 mU/mL
• Used for PPH (higher concentration)

CRITICAL ERRORS (FAIL)

Uses in major placenta praevia (catastrophic hemorrhage)
No CTG monitoring
Continues despite tachysystole (fetal hypoxia)
Rapid escalation (uterine rupture risk)
Bolus injection (hypotension, tachycardia)
Wrong dilution calculation
No fluid restriction protocol (water intoxication)

VIVA RAPID FIRE

Q1: What is tachysystole?
A: >5 contractions in 10 minutes, or contractions >90 seconds, or insufficient relaxation between

Q2: Why avoid hypotonic fluids with oxytocin?
A: Oxytocin has ADH effect; hypotonic fluids + high dose = water intoxication, hyponatremia, seizures

Q3: Maximum dose for induction?
A: 20 mU/min (low-dose) or 40 mU/min (high-dose regimen), but rarely need >10-15 mU/min

Q4: When to discontinue oxytocin in labor?
A: Active phase established (4-5 cm, good contractions), or tachysystole, or fetal distress, or delivery imminent

Q5: Difference between induction and augmentation?
A: Induction: Labor initiated when not in labor. Augmentation: Labor strengthened when already in labor but progress inadequate

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STATION 15 – MEDICINE STATIC

Acromegaly – Diagnosis & Management

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SCENARIO

Patient: Mr. X, 45-year-old male.
Presenting: Progressive change in facial features over 5 years, enlarged hands and feet, jaw protrusion, headache, visual disturbances.
Examination: Coarse facial features, prognathism, macroglossia, interdental separation, large spade-like hands, thickened heel pad, oily skin, skin tags, hypertension.
Image: [Photo showing characteristic acromegalic facies]
Task: Diagnosis, investigations, and management.

WHAT IS THE DIAGNOSIS?

ACROMEGALY
Chronic progressive disease caused by growth hormone (GH) excess, usually from pituitary somatotroph adenoma, after epiphyseal fusion (before fusion = gigantism).

FACIAL IDENTIFICATION POINTS (HIGH-YIELD)

SKULL & FACE:
• Frontal bossing (prominent brow)
• Enlarged paranasal sinuses
• Prognathism (protruding jaw, underbite)
• Malocclusion, interdental separation
• Macroglossia (enlarged tongue)
• Enlarged nose, lips, ears
• Deep nasolabial folds
• Oily, thick skin

EXTREMITIES:
• Large spade-like hands (increased ring size)
• Enlarged feet (increased shoe size)
• Thickened heel pad (>25 mm on X-ray)
• Carpal tunnel syndrome
• Arthropathy (degenerative joint disease)

OTHER FEATURES:
• Skin tags (acrochordons)
• Acanthosis nigricans
• Hyperhidrosis
• Hypertension
• Headache
• Visual field defects (bitemporal hemianopia)
• Goitre
• Organomegaly (heart, liver, kidney)

WHAT INVESTIGATIONS WILL YOU DO?

1. SCREENING TEST:
• **Oral Glucose Tolerance Test (OGTT) with GH:**
- 75g glucose orally
- GH measured at 0, 30, 60, 90, 120 minutes
- **Normal:** GH suppresses to <1 µg/L (or <0.4 µg/L with sensitive assay)
- **Acromegaly:** GH fails to suppress, paradoxical rise

2. CONFIRMATORY:
• **IGF-1 (Somatomedin C):** Elevated, correlates with disease activity, better for monitoring
• Age and sex-matched reference ranges

3. TUMOR LOCALIZATION:
• **MRI Pituitary (Gold Standard):** Gadolinium-enhanced, identifies adenoma (usually macroadenoma >10 mm)
• CT if MRI contraindicated

4. ASSESS COMPLICATIONS:
• **Visual fields:** Formal perimetry (bitemporal hemianopia)

- **Pituitary function:** Prolactin, TSH, FT4, cortisol, LH, FSH, testosterone/estradiol (hypopituitarism)
- **Cardiac:** ECG, echocardiogram (LVH, cardiomyopathy, arrhythmias)
- **Metabolic:** Fasting glucose, HbA1c (diabetes), lipids
- **Sleep study:** Obstructive sleep apnea
- **Colonoscopy:** Colonic polyps/cancer screening
- **Bone:** X-ray hands/feet (arthropathy), DEXA (osteoporosis risk)
- **Heel pad thickness:** X-ray (>25 mm suggestive)

STEPWISE MANAGEMENT

GOALS:
- Normalize GH (<2 µg/L in OGTT) and IGF-1
- Remove/tumor control
- Preserve normal pituitary function
- Treat complications

1. SURGERY (First-line):
- **Transsphenoidal surgery:** Microscopic or endoscopic
- **Success:** 80-90% if microadenoma (<10 mm), 40-50% if macroadenoma
- **Complications:** CSF leak, diabetes insipidus, hypopituitarism, meningitis
- **Immediate effect:** GH drops within hours

2. MEDICAL THERAPY:

Somatostatin Analogues (First-line medical):
- **Octreotide LAR:** 20 mg IM monthly
- **Lanreotide Autogel:** 60-120 mg SC monthly
- **Pasireotide:** 40-60 mg IM monthly (broader spectrum)
- Effect: Reduces GH and tumor size in 50-70%
- Side effects: Gallstones, GI upset, hyperglycemia

GH Receptor Antagonist:
- **Pegvisomant:** 10-30 mg SC daily
- Blocks GH action, normalizes IGF-1 in 90%
- Does not reduce tumor size
- Monitor liver enzymes

Dopamine Agonists:
- **Cabergoline:** 0.5-2 mg weekly
- Less effective (20% normalize IGF-1)
- Useful if prolactin co-secreted

3. RADIOTHERAPY:
- **Indications:** Failed surgery and medical therapy
- **Types:** Conventional fractionated, Gamma Knife, CyberKnife
- **Onset:** Slow (years to full effect)
- **Complications:** Hypopituitarism (common), optic neuropathy, second tumors

4. FOLLOW-UP:
- GH and IGF-1 every 3-6 months
- MRI annually
- Pituitary function tests
- Cardiac, colonoscopy, sleep apnea monitoring

COMPLICATIONS

METABOLIC: Diabetes mellitus, dyslipidemia
CARDIOVASCULAR: Hypertension, LVH, cardiomyopathy, heart failure, arrhythmias (2-3x mortality)
RESPIRATORY: Obstructive sleep apnea, respiratory insufficiency
MUSCULOSKELETAL: Degenerative arthropathy (severe in 50%), carpal tunnel, osteoporosis
NEOPLASTIC: Colorectal polyps/cancer (2-3x risk), thyroid nodules
NEUROLOGICAL: Headache, visual loss, carpal tunnel, radiculopathy
REPRODUCTIVE: Menstrual irregularities, infertility, erectile dysfunction
MORTALITY: 2-3x normal if untreated (cardiovascular, respiratory, cancer)

VIVA RAPID FIRE

Q1: Screening test for acromegaly?
A: OGTT with GH measurement – failure to suppress to <1 µg/L

Q2: Best marker for disease activity?
A: IGF-1 (integrated measure of GH secretion)

Q3: First-line treatment?
A: Transsphenoidal surgery

Q4: Visual field defect?
A: Bitemporal hemianopia (compression of optic chiasm)

Q5: Why heel pad thickness?
A: Soft tissue thickening >25 mm suggests acromegaly (not specific)

Q6: Medical options if surgery fails?
A: Somatostatin analogues (octreotide, lanreotide), GH receptor antagonist (pegvisomant), dopamine agonists (cabergoline)

STATION 16 – UROLOGY INTERACTIVE

Foley's Catheter – Identification & Clinical Use

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CANDIDATE INSTRUCTIONS

Task: Identify Foley's catheter components, state sizes and indications, demonstrate insertion technique, and discuss complications.
Time: 8 minutes.

INSTRUMENT IDENTIFICATION

COMPONENTS:
• **Shaft:** Latex or silicone tubing, length 40-45 cm
• **Tip:** Rounded with eye (drainage hole), 2-3 cm from balloon
• **Balloon:** Near tip, inflatable (5-30 mL capacity)
• **Drainage channel:** Main lumen for urine flow
• **Inflation channel:** Separate port for balloon inflation
• **Valve:** One-way valve on inflation port (Luer lock)
• **Drainage bag connector:** At external end

MATERIALS:
• **Latex:** Cheaper, but allergy risk, encrustation
• **Silicone:** Allergy-safe, less encrustation, longer use
• **Silver-coated:** Antibacterial, reduces CAUTI
• **Hydrogel-coated:** Reduces friction, urethral trauma

SIZES

FRENCH (Fr) SCALE: Circumference in mm (1 Fr = 0.33 mm diameter)

ADULT MALE: 14-18 Fr (16 Fr standard)
ADULT FEMALE: 12-16 Fr (14 Fr standard)
CHILDREN: 6-12 Fr
HEMaturia/Clots: 20-24 Fr (3-way catheter for irrigation)

BALLOON SIZES:
• **Standard:** 5-10 mL (most common)
• **Post-TURP:** 30-50 mL (traction hemostasis)
• **Suprapubic:** 10 mL

TYPES:
• **2-way:** Drainage + balloon (most common)
• **3-way:** Drainage + balloon + irrigation channel (hematuria, TURP)
• **Coude tip:** Curved tip for BPH/enlarged prostate
• **Tiemann tip:** Angled for difficult catheterization

INDICATIONS

URINARY RETENTION:
• Acute retention (AUR): Painful, emergency
• Chronic retention (CUR): Painless, residual >300 mL
• Causes: BPH, urethral stricture, neurogenic bladder, drugs, post-op

SURGICAL:
• Perioperative monitoring (major surgery, urology)
• Post-operative (orthopedic, pelvic surgery)
• TURP/TURBT irrigation

MONITORING:
• Critically ill patients (hourly urine output)
• Fluid balance assessment
• AKI monitoring

WOUND PROTECTION:
• Sacral/decubitus ulcers (keep skin dry)
• Perineal surgery

THERAPEUTIC:
• Bladder irrigation (clots, infection)
• Intravesical medication (chemotherapy)
• Ureteral stent placement (as conduit)

PALLIATIVE:
• Terminal illness comfort
• Severe incontinence (last resort)

CONTRAINDICATIONS

ABSOLUTE:
• Urethral trauma (blood at meatus, high-riding prostate)
• Suspected urethral rupture (pelvic fracture)
• Acute prostatitis (risk septicemia)

RELATIVE:
• Recent urethral surgery/anastomosis
• Urethral stricture (risk false passage)
• Severe BPH (use Coude tip or filiform followers)
• Bladder tumor (risk seeding – use suprapubic)
• Coagulopathy (bleeding risk)

ALTERNATIVE IF CONTRAINDICATED: Suprapubic catheterization

INSERTION TECHNIQUE (ASEPTIC)

PREPARATION:
• Consent, explain procedure
• Privacy, chaperone
• Supine position, legs abducted (frog-leg)
• Good lighting
• Sterile gloves, drape, cleansing solution (betadine/chlorhexidine)
• Lubricant jelly (2% lignocaine gel if available)

MALE INSERTION:
1. Retract foreskin, clean glans (circular motion, center outward)
2. Hold penis perpendicular to body (straightens penile urethra)
3. Apply lignocaine gel, wait 2-3 min
4. Insert catheter gently to bifurcation (Y-junction)
5. Advance further 5-7 cm until urine flows (enters bladder)
6. Inflate balloon with sterile water (check volume on catheter)
7. Gently pull back until resistance (balloon at bladder neck)
8. Connect to drainage bag
9. Replace foreskin (prevent paraphimosis)

FEMALE INSERTION:
1. Separate labia with non-dominant hand (cleansed fingers)
2. Clean urethral meatus (front to back)
3. Identify meatus (below clitoris, above vagina)
4. Insert catheter 5-7 cm until urine flows
5. Inflate balloon, withdraw slightly, connect bag

CONFIRMATION:
• Urine flow confirms bladder placement
• Never inflate balloon without urine flow (risk urethral rupture)
• If resistance: Do not force, try smaller catheter, seek help

COMPLICATIONS

INSERTION:
• Urethral trauma, false passage (especially BPH/stricture)
• Urethral perforation
• Bleeding (hematuria)
• Pain, patient distress
• Paraphimosis (if foreskin not replaced)

INDWELLING:
• **CAUTI (Catheter-Associated UTI):** Most common, bacteriuria at 3-10% per day
• Encrustation, blockage
• Bladder stones
• Bladder spasms (urge to void)
• Bypassing (leakage around catheter)
• Urethral stricture (long-term)
• Pressure necrosis of urethra (if balloon in urethra)

REMOVAL:
• Urinary retention (failed trial without catheter)
• Infection

CATHETER CARE & REMOVAL

MAINTENANCE:
• Closed drainage system
• Bag below bladder level
• Regular emptying (don't overfill)
• Daily meatal hygiene
• Secure catheter (leg strap)
• Assess daily: Is catheter still needed?

REMOVAL:
• Deflate balloon completely (syringe on inflation port)
• Gentle traction while patient exhales/coughs
• Ensure intact removal (check balloon)
• Trial without catheter (TWOC):
- Measure residual volume (bladder scan)
- If >100-150 mL, may need recatheterization or clean intermittent self-catheterization (CISC)

CRITICAL ERRORS (FAIL)

Inflates balloon before confirming urine flow (urethral rupture)
Forces catheter past resistance (false passage)
No aseptic technique (infection)
Misses blood at meatus (urethral trauma – suprapubic needed)
Does not replace foreskin (paraphimosis)
Wrong size selection (trauma or inadequate drainage)
No consent/chaperone

VIVA RAPID FIRE

Q1: What size for adult male?
A: 14-18 Fr, 16 Fr standard

Q2: Why Coude tip?
A: Curved tip navigates enlarged prostate (BPH) better

Q3: How to confirm catheter in bladder?
A: Urine flow before balloon inflation

Q4: What is CAUTI?
A: Catheter-associated UTI – most common nosocomial infection, 3-10% risk per day

Q5: Alternative if urethral injury suspected?
A: Suprapubic catheterization (do NOT attempt urethral)

Q6: Balloon size for TURP?
A: 30-50 mL for traction hemostasis

STATION 17 – OBS INTERACTIVE

Gestational Diabetes Mellitus (GDM) – Management & Counselling

KMU FINAL YEAR MBBS • 8 MINUTES

SCENARIO

Patient: Mrs. E, 32 years old, G2P1, 28 weeks gestation, BMI 32.
Screening: 75g OGTT – Fasting 5.8 mmol/L, 2-hour 9.2 mmol/L.
History: Previous baby 4.2 kg, family history of diabetes.
Task: Counsel patient, outline management, and discuss delivery planning.

DIAGNOSTIC CRITERIA (WHO/IADPSG)

75g OGTT (24-28 weeks):
• **Fasting:** ≥5.1 mmol/L (92 mg/dL)
• **1-hour:** ≥10.0 mmol/L (180 mg/dL)
• **2-hour:** ≥8.5 mmol/L (153 mg/dL)
Any one value elevated = GDM

RISK FACTORS:
• BMI >30
• Previous GDM
• Previous macrosomia (>4 kg)
• Family history diabetes
• Polycystic ovary syndrome
• South Asian, Black, Hispanic ethnicity
• Age >35

WHAT YOU MUST TELL THE PATIENT

1. EXPLANATION OF GDM:
• "Diabetes that develops during pregnancy due to hormones blocking insulin action"
• Usually resolves after delivery
• Affects 10-20% of pregnancies
• Not your fault, but needs management

2. RISKS IF UNCONTROLLED:
To Baby:
• Large baby (macrosomia) – birth trauma, shoulder dystocia
• Low blood sugar after birth (needs monitoring)
• Jaundice, breathing problems
• Stillbirth risk (rare with good control)
• Childhood obesity and diabetes risk

To Mother:
• High BP/preeclampsia
• Polyhydramnios (too much fluid)
• Difficult delivery, higher chance of C-section
• Future type 2 diabetes (50% risk in 10 years)

3. MANAGEMENT PLAN:

Lifestyle (First-line):
• **Diet:** Regular meals, low glycemic index, controlled carbohydrates, high fiber, avoid sugary drinks
• **Exercise:** 30 min walking daily (if no contraindications)
• **Weight management:** No weight loss, but controlled gain
• **Self-monitoring:** Finger-prick glucose 4× daily (fasting + post-meals)

Targets:
• Fasting: <5.3 mmol/L
• 1-hour post-meal: <7.8 mmol/L
• 2-hour post-meal: <6.4 mmol/L

Medication if diet fails:
• Metformin (crosses placenta but safe)
• Insulin (does not cross placenta, preferred if high glucose or complications)
• Glyburide (less preferred)

4. MONITORING DURING PREGNANCY:
• Growth scans every 4 weeks (check baby size, fluid)

• Doppler studies (placental function)
• Fetal kick counting
• Possible CTG in third trimester

5. DELIVERY PLANNING:
• Aim vaginal delivery at 38-39 weeks (if well-controlled, no complications)
• Induction if poor control, macrosomia, or other complications
• C-section if estimated fetal weight >4.5 kg (shoulder dystocia risk)
• Continuous glucose monitoring in labor (target 4-7 mmol/L)
• Insulin/dextrose infusion if on insulin

6. POSTPARTUM:
• Stop medication immediately after delivery
• Breastfeed (helps glucose control)
• 6-week OGTT to confirm resolution
• Annual diabetes screening (lifelong)
• Future pregnancies: Early screening, preconception counseling

7. RED FLAGS:
• Reduced fetal movements
• Severe headache, visual disturbance (preeclampsia)
• Very high glucose readings (>11 mmol/L)
• Ketones in urine (vomiting, illness)

DIETARY MANAGEMENT DETAILS

CARBOHYDRATE CONTROL:
• 3 main meals + 3 snacks (prevents spikes)
• Complex carbs (whole grains, legumes) not simple sugars
• Glycemic index awareness
• Portion control (plate method: ½ vegetables, ¼ protein, ¼ carbs)

AVOID:
• Sugary drinks, fruit juices
• Sweets, desserts
• White bread, rice (excessive)
• Large portions

ENCOURAGE:
• Lean proteins
• Healthy fats
• Non-starchy vegetables
• Water, diet drinks

INSULIN THERAPY (IF NEEDED)

INDICATIONS:
• Fasting glucose >5.3 mmol/L on diet
• Post-meal glucose >target on diet
• Complications (polyhydramnios, macrosomia)

REGIMEN:
• **Basal:** NPH or detemir at bedtime (controls fasting)
• **Bolus:** Rapid-acting (aspart, lispro) with meals
• **Dose:** Start 0.7-1.0 units/kg/day, split 50% basal, 50% bolus
• Titrate based on glucose monitoring

INTRAPARTUM:
• IV insulin + dextrose sliding scale
• Target glucose 4-7 mmol/L
• Stop subcutaneous insulin during active labor

CRITICAL ERRORS (FAIL)

Does not explain risks to baby
No self-monitoring instructions
Wrong glucose targets
Does not mention postpartum OGTT
No future diabetes screening advice
Oral hypoglycemic agents contraindicated (metformin actually safe, insulin preferred)
No delivery timing discussion

VIVA RAPID FIRE

Q1: When to screen for GDM?
A: 24-28 weeks, or early if risk factors

Q2: Fasting glucose target in GDM?
A: <5.3 mmol/L

Q3: When to deliver?
A: 38-39 weeks if well-controlled; earlier if complications

Q4: Future diabetes risk?
A: 50% develop type 2 diabetes within 10 years

Q5: Metformin safety?
A: Crosses placenta but safe, insulin preferred if high glucose or complications

STATION 18 – PAEDS INTERACTIVE

Testicular Torsion vs Orchitis – Diagnosis & Management

KMU FINAL YEAR MBBS • 8 MINUTES

SCENARIO 1: TORSION

Patient: Ahmed, 14-year-old male.
Presenting: Sudden onset severe left scrotal pain 4 hours ago, waking from sleep.
History: Nausea, vomiting, no fever, no urinary symptoms.
Examination: Left testis high-riding, horizontal lie, exquisitely tender, cremasteric reflex absent. Prehn's sign negative (pain not relieved by elevation).

SCENARIO 2: ORCHITIS

Patient: Bilal, 16-year-old male.
Presenting: Gradual onset right scrotal pain over 2 days, fever, dysuria.
History: Recent mumps (2 weeks ago), urinary frequency.
Examination: Right testis swollen, tender, but normal position, cremasteric reflex present. Prehn's sign positive (pain relieved by elevation).

DIFFERENTIAL DIAGNOSIS

Feature	Testicular Torsion	Orchitis	Torsion of Appendix
Age	Neonatal or puberty (12-18)	Any age, often post-pubertal	Prepubertal (7-12)
Onset	Sudden, severe	Gradual	Sudden but less severe
Nausea/Vomiting	Common (50%)	Rare	Rare
Fever	Absent	Present	Absent/low
Urinary symptoms	Absent	Often present	Absent
Testis position	High-riding, horizontal	Normal position	Normal position
Cremasteric reflex	Absent (key sign)	Present	Present
Prehn's sign	Negative (no relief)	Positive (relief)	Positive
Blue dot sign	Absent	Absent	Present (appendix visible)

INVESTIGATIONS

TESTICULAR TORSION:
• **Doppler Ultrasound (First-line):** Absent or reduced blood flow to testis (sensitivity 90-100%)
• **Color Doppler:** Compare both sides
• **Radioisotope scan:** If ultrasound equivocal (rarely used now)
• **Do NOT delay surgery for imaging if high suspicion**

ORCHITIS:
• **Doppler Ultrasound:** Increased blood flow (hyperemia)
• **Urine analysis:** Pyuria, culture (bacterial)
• **Swabs:** Urethral (STI)
• **Blood tests:** FBC (leukocytosis), CRP, viral titers (mumps)
• **Ultrasound:** Exclude abscess, tumor

MANAGEMENT

TESTICULAR TORSION – EMERGENCY:

Immediate:
• **Time is testis:** Viability 90% at 6 hours, 50% at 12 hours, 10% at 24 hours
• Analgesia (do not delay surgery)
• **Emergency scrotal exploration** (within 6 hours ideal)

Surgical:
• Scrotal incision
• Detorsion (usually medial to lateral – "open book")
• Warm packs, assess viability (color, bleeding)
• If viable: Bilateral orchidopexy (fix both sides – prevent contralateral torsion)
• If non-viable: Orchidectomy + contralateral orchidopexy

Manual Detorsion (Temporary):
• Only if surgical delay >1 hour
• Rotate testis laterally (like opening a book)
• 50% success rate
• Still requires surgery for fixation

ORCHITIS – CONSERVATIVE:

Supportive:
• Bed rest
• Scrotal elevation (Prehn's positive)
• Ice packs
• Analgesia (NSAIDs)
• Supportive underwear

Specific:
• **Bacterial:** Antibiotics (cephalosporins, fluoroquinolones if STI suspected – cover Chlamydia/Gonorrhea)
• **Viral (Mumps):** Supportive only, steroids if severe
• **Complications:** Abscess drainage if needed

Follow-up:
• Ultrasound resolution
• Semen analysis if bilateral (fertility concern)
• Mumps orchitis: 30% testicular atrophy, infertility rare if unilateral

SPECIAL FORMS

NEONATAL TORSION:
• Usually extravaginal (tunica vaginalis)
• Often painless, firm testis
• Usually detected late (not viable)
• Contralateral fixation recommended

TORSION OF TESTICULAR APPENDIX (Appendix Testis):
• Remnant of Müllerian duct
• "Blue dot sign" – visible through skin
• Self-limiting, conservative management
• Surgery only if diagnosis uncertain

COMPLICATIONS

Torsion:
• Testicular infarction, atrophy
• Infertility (if bilateral or prolonged)
• Autoimmune orchitis (rare)
• Psychological impact

Orchitis:
• Testicular atrophy (30% mumps)
• Abscess formation
• Infertility (bilateral)
• Recurrence

CRITICAL ERRORS (FAIL)

Delays imaging in suspected torsion (surgical emergency)
Waits for ultrasound >1 hour with high suspicion
Does not check cremasteric reflex (key differentiator)
Fails to fix contralateral side (recurrence risk)
Confuses with epididymo-orchitis (misses torsion)
No time documentation (viability calculation)

VIVA RAPID FIRE

Q1: Window for testicular salvage?
A: 6 hours (90% viability), 12 hours (50%), 24 hours (10%)

Q2: Key clinical sign to differentiate torsion from orchitis?
A: Absent cremasteric reflex in torsion

Q3: Why bilateral orchidopexy?
A: Bell-clapper deformity often bilateral; prevents contralateral torsion

Q4: Direction of detorsion?
A: Usually medial to lateral (opening book), but can be variable – explore if uncertain

Q5: Mumps orchitis fertility risk?
A: 30% testicular atrophy, but infertility rare if unilateral; bilateral orchitis (rare) has high infertility risk

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STATION 19 – MEDICINE INTERACTIVE

Graves' Disease – Clinical Features, Investigation & Treatment

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SCENARIO

Patient: Miss F, 28-year-old female.
Presenting: 3-month history of weight loss, heat intolerance, tremor, palpitations, anxiety.
Examination: BP 140/70, HR 110 regular, fine tremor, lid lag, diffuse smooth goitre with bruit, warm moist skin.
Task: Confirm diagnosis, investigate, and discuss treatment options.

CLINICAL FINDINGS

GENERAL:
• Weight loss despite increased appetite
• Heat intolerance, sweating
• Anxiety, irritability, emotional lability
• Insomnia
• Fatigue, proximal myopathy

CARDIOVASCULAR:
• Tachycardia, palpitations
• Atrial fibrillation (especially elderly)
• Wide pulse pressure
• Systolic flow murmur
• High-output cardiac failure

NEUROMUSCULAR:
• Fine tremor (hands, tongue)
• Hyperreflexia
• Proximal myopathy (difficulty climbing stairs)
• Periodic paralysis (Asian males, hypokalemia)

DERMATOLOGICAL:
• Warm, moist skin
• Palmar erythema
• Onycholysis (Plummer's nails)
• Pretibial myxoedema (infiltrative dermopathy)
• Thyroid acropachy (clubbing, periosteal reaction)

OPHTHALMOLOGICAL (Graves' Orbitopathy):
• Lid retraction (Dalrymple's sign)
• Lid lag (von Graefe's sign)
• Exophthalmos/proptosis
• Periorbital edema, chemosis
• Ophthalmoplegia (inferior rectus most common)
• Optic neuropathy (rare, sight-threatening)

THYROID:
• Diffuse, smooth, soft goitre
• Thyroid bruit (increased vascularity)
• Thrill
• Tenderness (rare in Graves')

INVESTIGATIONS

1. THYROID FUNCTION TESTS:
• **TSH:** Suppressed (<0.01 mU/L)
• **Free T4:** Elevated
• **Free T3:** Elevated (often disproportionately high)

2. AUTOANTIBODIES:
• **TSH Receptor Antibodies (TRAb/TSI):** Positive in 95% (diagnostic)
• **Thyroid Peroxidase Antibodies (TPO):** Positive in 70%
• **Thyroglobulin Antibodies:** Variable

3. IMAGING:
• **Radioactive Iodine Uptake (RAIU):** Diffusely increased uptake (not in pregnancy/lactation)
• **Thyroid Ultrasound:** Diffuse hypervascularity (color Doppler), no nodules
• **CT/MRI Orbits:** If severe ophthalmopathy (extraocular muscle enlargement, fat expansion)

4. OTHER:
• ECG (AF, rate)
• FBC (anemia)
• LFTs (elevated enzymes)
• Calcium, vitamin D (bone health)
• Lipids (often low)

TREATMENT OPTIONS

1. ANTITHYROID DRUGS (First-line in most):

Drugs:
• **Carbimazole (CMZ):** 20-40 mg OD (UK/Europe)
• **Methimazole (MMI):** 20-40 mg OD (US)
• **Propylthiouracil (PTU):** 100-150 mg TDS (first trimester pregnancy, thyroid storm)

Mechanism: Inhibit thyroid peroxidase (block iodine organification)
PTU additional: Blocks peripheral T4→T3 conversion

Regimen:
• Initial: High dose until euthyroid (4-8 weeks)
• Titration: Reduce dose by 50% when T4 normal
• Maintenance: 5-10 mg CMZ for 12-18 months
• **Block-Replace:** High dose ATD + thyroxine (not superior)

Side Effects:
• **Common:** Rash, pruritus, arthralgia
• **Agranulocytosis:** 0.1-0.5% (fever, sore throat – stop drug, check FBC)
• **Hepatotoxicity:** Cholestatic (CMZ), Hepatocellular (PTU)
• **Vasculitis:** ANCA-positive (PTU)
• **Teratogenic:** CMZ (aplasia cutis), PTU (hepatotoxicity) – both risks

Success: 30-50% remission after 12-18 months

2. RADIOACTIVE IODINE (RAI):
• **Indications:** Relapse after ATD, ATD side effects, large goitre, cardiac disease
• **Contraindications:** Pregnancy (absolute), lactation, active severe ophthalmopathy
• **Dose:** 5-15 mCi I-131
• **Effect:** Destroys thyroid tissue over 6-12 weeks
• **Outcome:** 80% hypothyroidism at 10 years (lifelong thyroxine)
• **Ophthalmopathy:** May worsen – give steroids if active eye disease

3. SURGERY (Total/Subtotal Thyroidectomy):
• **Indications:** Large goitre with compressive symptoms, suspicion of malignancy, pregnancy (2nd trimester), failed medical therapy, patient preference
• **Preparation:** Euthyroid with ATD + Lugol's iodine 10 days pre-op (reduces vascularity)
• **Complications:** Hypoparathyroidism, RLN palsy, bleeding, hypothyroidism
• **Outcome:** Rapid control, 10-20% recurrence if subtotal, hypothyroidism if total

4. ADJUNCTIVE THERAPY:
• **Beta-blockers:** Propranolol 20-40 mg TDS (controls tremor, palpitations, peripheral conversion)
• **Iodides:** Lugol's iodine (pre-op, thyroid storm)
• **Steroids:** Severe ophthalmopathy

OPHTHALMOPATHY MANAGEMENT

MILD: Lubricants, elevate head sleep, selenium supplements
MODERATE-SEVERE: IV methylprednisolone (pulsed), orbital radiotherapy
SIGHT-THREATENING (Dysthyroid Optic Neuropathy): Urgent surgical decompression
REHABILITATIVE: Orbital decompression, strabismus surgery, eyelid surgery

CRITICAL ERRORS (FAIL)

Does not check for pregnancy before RAI
Misses agranulocytosis warning (fever, sore throat)
No ophthalmopathy assessment
Surgery without pre-operative preparation (thyroid storm)
Stops beta-blocker abruptly (rebound)
No follow-up plan (relapse monitoring)

VIVA RAPID FIRE

Q1: Diagnostic antibody in Graves'?
A: TSH Receptor Antibodies (TRAb/TSI)

Q2: First-line treatment in young patient?
A: Antithyroid drugs (carbimazole/methimazole)

Q3: Why Lugol's iodine before surgery?
A: Reduces thyroid vascularity and hormone release (Wolff-Chaikoff effect transient)

Q4: Danger sign with ATD therapy?
A: Fever, sore throat (agranulocytosis) – stop drug immediately, check FBC

Q5: Long-term outcome of RAI?
A: 80% hypothyroidism at 10 years – requires lifelong thyroxine

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STATION 20 – SURGERY INTERACTIVE

Thyroid Surgery – Steps, Types & Complications

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CANDIDATE INSTRUCTIONS

Task: Explain steps of thyroidectomy, discuss types of surgery, and outline complications with prevention strategies.
Time: 8 minutes.

TYPES OF THYROID SURGERY

1. HEMITHYROIDECTOMY (Thyroid Lobectomy + Isthmusectomy):
• Removes one lobe and isthmus
• Indications: Unilateral benign nodule, low-risk differentiated thyroid cancer (<4 cm, no extrathyroidal extension)
• Advantage: Preserves contralateral lobe (may not need thyroxine)

2. TOTAL THYROIDECTOMY:
• Removes both lobes and isthmus
• Indications: Malignancy, bilateral disease, Graves' disease, MNG with compressive symptoms, strong family history thyroid cancer
• Requires lifelong thyroxine

3. SUBTOTAL THYROIDECTOMY:
• Removes both lobes leaving posterior rim (2-4g)
• Rarely done now (risk recurrence, need completion)
• Historical use in Graves'

4. COMPLETION THYROIDECTOMY:
• Removal of remaining lobe after previous hemi/lobectomy
• Indication: Incidental malignancy found, completion staging

5. LYMPH NODE DISSECTION:
• Central (Level VI) compartment
• Lateral (Levels II-V) if clinically involved
• Prophylactic central dissection in medullary carcinoma

SURGICAL STEPS (KOCHER'S INCISION)

1. POSITIONING:
• Supine with neck extended (shoulder roll)
• Head ring, arms tucked
• Reverse Trendelenburg if obese

2. INCISION:
• Kocher's collar incision: 3-5 cm above sternal notch
• Follow skin creases (Langer's lines)
• Extends from one sternomastoid to other

3. SKIN FLAPS:
• Raise subplatysmal flaps superiorly to thyroid cartilage, inferiorly to sternal notch
• Stay in correct plane (avoids bleeding, preserves blood supply)

4. STRAP MUSCLES:
• Separate sternohyoid in midline (linea alba)
• Retract laterally (rarely need to cut)
• Sternothyroid may be divided if large goitre

5. MOBILIZATION:
• Divide middle thyroid vein (first)
• Ligate superior thyroid artery and vein close to gland (preserve external laryngeal nerve)
• Identify and preserve parathyroid glands (superior usually posterior, inferior variable)
• Identify recurrent laryngeal nerve (RLN) at cricothyroid joint or inferior thyroid artery
• Ligate inferior thyroid artery on gland (not main trunk – preserves nerve and parathyroid blood supply)
• Ligate thyroid ima if present

6. EXCISION:
• Dissect thyroid from trachea (divide Berry's ligament)
• Preserve posterior capsule (parathyroids)
• Inspect specimen for parathyroids (autotransplant if devascularized)
• Hemostasis

7. CLOSURE:
• Drains (controversial, often omitted in hemi)
• Strap muscles (if divided)
• Platysma (good cosmetic result)
• Subcuticular skin closure
• Steristrips, dressing

COMPLICATIONS

IMMEDIATE (0-24 hours):
• **Hemorrhage/Hematoma:** 0.3-1% – airway obstruction, emergency opening of wound
• **Respiratory obstruction:** Hematoma, laryngeal edema, bilateral RLN palsy
• **Thyroid storm:** If unprepared hyperthyroid patient

EARLY (1-7 days):
• **Hypocalcemia:** 5-15% transient, 1-3% permanent (hypoparathyroidism)
• **RLN palsy:** 1-2% temporary, 0.5-1% permanent
• **Superior laryngeal nerve injury:** Voice fatigue, pitch changes
• **Seroma:** Fluid collection
• **Infection:** Rare (<1%)
• **Chyle leak:** If lateral neck dissection (thoracic duct injury)

LATE:
• **Hypothyroidism:** 10-50% (depending on extent of surgery)
• **Hypoparathyroidism:** Permanent in 1-3% (total thyroidectomy)
• **Keloid/Hypertrophic scar:** Especially dark skin
• **Recurrent goitre:** If subtotal performed
• **Psychological:** Body image, voice concerns

PREVENTION STRATEGIES

RLN Injury:
• Identify nerve in every case (visual identification gold standard)
• Nerve monitoring (IONM) – controversial benefit
• Ligate inferior thyroid artery on gland, not main trunk
• Be careful at Berry's ligament (nerve enters larynx)

Hypoparathyroidism:
• Identify and preserve all 4 parathyroid glands
• Preserve blood supply (inferior thyroid artery branches)
• Capsular dissection
• Autotransplant devascularized glands to sternomastoid or forearm
• Check PTH, calcium post-op

Hemorrhage:
• Meticulous hemostasis
• Avoid Valsalva at end of case
• Drains if extensive dissection
• Pressure dressing

Thyroid Storm:
• Pre-operative preparation (euthyroid)
• Lugol's iodine 10 days pre-op
• Beta-blockade

POST-OPERATIVE CARE

• **Observation:** Neck swelling, respiratory distress, voice change
• **Calcium check:** At 6 hours and 12 hours (total thyroidectomy)
• **Symptoms of hypocalcemia:** Perioral tingling, Chvostek's sign, Trousseau's sign
• **Treatment:** Calcium carbonate + calcitriol if symptomatic or low calcium
• **Thyroxine:** Start 24 hours post-op if total thyroidectomy (weight-based: 1.6 mcg/kg)
• **Follow-up:** Thyroid function tests, calcium, voice assessment
• **Pathology:** Histology review, staging if malignancy

CRITICAL ERRORS (FAIL)

Does not identify RLN (standard of care)
Sacrifices parathyroid glands
Operates on unprepared hyperthyroid patient (storm)
Misses post-op hematoma (airway)
No voice check post-op

Wrong level incision (keloid, poor cosmesis)
No calcium monitoring (tetany, laryngospasm)

VIVA RAPID FIRE

Q1: What is Berry's ligament?
A: Suspensory ligament attaching thyroid to cricoid/trachea; contains RLN and parathyroid blood supply – danger zone

Q2: Blood supply to parathyroids?
A: Inferior thyroid artery (main), anastomosis with superior thyroid artery

Q3: Signs of hypocalcemia post-op?
A: Perioral tingling, muscle cramps, Chvostek's sign (facial nerve tap), Trousseau's sign (carpal spasm with BP cuff)

Q4: Management of post-op hematoma with airway compromise?
A: Remove sutures immediately at bedside, evacuate clot, secure airway, return to theatre

Q5: Why Lugol's iodine pre-op?
A: Reduces gland vascularity and fragility, reduces hormone release (Wolff-Chaikoff effect)

STATION 21 – PAEDS STATIC

Nephrotic Syndrome – Diagnosis & Management

KMU FINAL YEAR MBBS • 8 MINUTES

SCENARIO

Patient: Ali, 4-year-old male.
Presenting: 2-week history of puffy eyes and swollen legs, decreased urine output.
History: Recent upper respiratory infection.
Examination: Periorbital edema, ascites, scrotal edema, pitting edema legs.
BP: 90/60 mmHg.
Urine dipstick: Protein ++++, Blood negative.
Task: Diagnosis, investigations, and management.

WHAT IS THE DIAGNOSIS?

NEPHROTIC SYNDROME
Characterized by:
• Heavy proteinuria (>50 mg/kg/day or protein/creatinine ratio >200 mg/mmol)
• Hypoalbuminemia (<25 g/L)
• Edema
• Hyperlipidemia

MINIMAL CHANGE DISEASE (MCD): 80% of children, steroid-responsive
AGE: Peak 2-6 years, M>F

INVESTIGATIONS

FIRST-LINE:
• **Urine dipstick:** Heavy protein (+++ to ++++)
• **Urine protein:creatinine ratio:** >200 mg/mmol (or >2 mg/mg)
• **Serum albumin:** <25 g/L
• **Total protein:** Reduced
• **Renal function:** Urea, creatinine (usually normal)

ADDITIONAL:
• **Lipid profile:** Elevated cholesterol, triglycerides
• **FBC:** Hemoconcentration (Hemoglobin may be high)
• **Coagulation:** Risk thrombosis (loss of antithrombin III)
• **Sodium:** May be dilutional hyponatremia
• **Complement (C3, C4):** If atypical presentation (low in MPGN, PSGN)
• **ASO titre, throat swab:** If post-streptococcal suspected
• **Hepatitis B, HIV:** Secondary causes
• **ANA, Anti-dsDNA:** If SLE suspected

RENAL BIOPSY (Indications):
• Steroid-resistant (no remission after 4 weeks prednisolone)
• Atypical features: Hematuria, hypertension, low C3, renal impairment, age <1 or >10 years
• Frequent relapses with steroid toxicity

STEPWISE MANAGEMENT

1. GENERAL MEASURES:
• Bed rest initially (severe edema)
• Normal protein diet (1-2 g/kg/day – do NOT restrict)
• Salt restriction (severe edema)
• Fluid restriction if severe hyponatremia
• Monitor weight, urine output, BP daily

2. DIURETICS (If severe edema):
• **Albumin infusion:** 20% albumin 1 g/kg over 4 hours, followed by IV furosemide 1-2 mg/kg
• **Caution:** Rapid infusion causes pulmonary edema
• **Oral diuretics:** Once edema milder

3. STEROID THERAPY (First Episode):
• **Prednisolone:** 60 mg/m^2/day (max 80 mg) in 2-3 divided doses for 4 weeks
• **Then:** 40 mg/m^2 (max 60 mg) alternate days for 4 weeks

• **Total:** 8 weeks minimum
• **Response:** Urine protein negative within 10-14 days (90%)

4. STEROID RESPONSE DEFINITIONS:
• **Steroid-sensitive:** Remission within 4 weeks
• **Steroid-resistant:** No remission after 4 weeks (biopsy, second-line)
• **Frequent relapses:** ≥2 relapses within 6 months of initial response, or ≥4 in 12 months
• **Steroid-dependent:** Relapse on tapering or within 2 weeks of stopping

5. RELAPSE TREATMENT:
• Prednisolone 60 mg/m²/day until urine protein negative for 3 days
• Then 40 mg/m² alternate days for 4 weeks
• Taper over 2-3 months

6. STEROID-SPARING AGENTS (Frequent relapses/Dependent):
• **Levamisole:** 2.5 mg/kg alternate days (less toxic)
• **Cyclophosphamide:** 2 mg/kg × 8-12 weeks (cumulative toxicity)
• **Cyclosporine:** 3-5 mg/kg/day (nephrotoxic, monitor levels)
• **Mycophenolate mofetil:** 600-800 mg/m² BD
• **Rituximab:** Steroid-resistant, frequent relapses

7. COMPLICATION MANAGEMENT:
• **Infection:** Prompt antibiotics (encapsulated organisms risk), varicella prophylaxis if exposed
• **Thrombosis:** Prophylaxis if severe hypoalbuminemia, treat if occurs
• **Hypovolemia:** IV albumin if signs of shock
• **Hyperlipidemia:** Usually resolves with remission, statins rarely needed

COMPLICATIONS

INFECTIONS:
• Spontaneous bacterial peritonitis (S. pneumoniae, E. coli)
• Cellulitis
• Varicella (can be severe)
• Loss of immunoglobulins in urine

THROMBOSIS:
• Loss of antithrombin III, increased clotting factors
• Renal vein thrombosis (flank pain, hematuria)
• Sagittal sinus thrombosis

HYPVOLEMIA:
• Risk of shock with gastroenteritis
• Acute kidney injury

OTHER:
• Growth retardation (chronic steroids)
• Cushingoid features, obesity
• Cataracts, glaucoma
• Hypertension
• Osteoporosis
• Psychiatric effects

PROGNOSIS

• **Minimal Change:** Excellent, most outgrow by adolescence
• **Focal Segmental Glomerulosclerosis (FSGS):** Poorer, progressive to ESRD
• **Mesangial Proliferative:** Variable
• **Membranous:** Rare in children, associated with hepatitis B

CRITICAL ERRORS (FAIL)

Restricts protein severely (malnutrition)
Does not check for infection (peritonitis)
Shortens steroid course (relapse)
Misses steroid toxicity (growth, BP, cataracts)
No thrombosis prophylaxis in high-risk
Rapid albumin infusion (pulmonary edema)
No varicella plan (exposure can be fatal)

VIVA RAPID FIRE

Q1: Most common histology in children?
A: Minimal Change Disease (80%)

Q2: Steroid dose for first episode?
A: 60 mg/m²/day (max 80 mg) for 4 weeks, then 40 mg/m² alternate days for 4 weeks

Q3: When to do renal biopsy?
A: Steroid-resistant, atypical features (hematuria, hypertension, low C3, renal impairment, age <1 or >10)

Q4: Why infection risk?
A: Loss of immunoglobulins and complement factors in urine, edema (skin breakdown), immunosuppression

Q5: Vaccination advice?
A: Give pneumococcal vaccine (risk peritonitis), varicella if not immune, avoid live vaccines during high-dose steroids

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STATION 22 – MEDICINE INTERACTIVE

Type 1 Diabetes Mellitus Counselling

KMU FINAL YEAR MBBS • 8 MINUTES

CANDIDATE INSTRUCTIONS

Task: Counsel newly diagnosed Type 1 DM patient (18-year-old) in simple terms. Explain disease, self-management, and emergency recognition.
Special Requirement: Demonstrate ability to explain in Pashto/local language concepts without medical jargon.
Time: 8 minutes.

WHAT YOU MUST TELL THE PATIENT

1. EXPLANATION OF DISEASE (Simple Terms):
• "Your body needs sugar (glucose) for energy. Insulin is the key that lets sugar into your cells."
• "In your diabetes, your body stopped making insulin. Without insulin, sugar stays in the blood and makes you sick."
• "This is not from eating sugar. It is an autoimmune condition – your body's defense system attacked the insulin-making cells."
• "It is lifelong, but you can live a normal life with proper management."

2. INSULIN THERAPY (The Lifesaver):
• "You MUST take insulin every day to stay alive. Without it, you will get very sick (DKA)."
• "You will inject insulin under the skin (abdomen, thigh, arm) 4 times daily or use a pump."
• "Types: Long-acting (background) and rapid-acting (with meals)."
• "Never skip insulin, even if sick or not eating."
• "Rotate injection sites to avoid lumps (lipohypertrophy)."

3. BLOOD SUGAR MONITORING:
• "Check your sugar 4 times daily: Before meals and bedtime."
• "Target: 4-7 mmol/L before meals, <10 mmol/L after meals."
• "Keep a logbook. Bring to every doctor visit."
• "Learn pattern recognition – how food, exercise, stress affect your sugar."

4. DIET & LIFESTYLE:
• "Eat regular meals, do not skip."
• "Count carbohydrates to match insulin dose."
• "Healthy diet: Vegetables, whole grains, lean protein, limit sugary drinks."
• "Alcohol: Can cause low sugar – eat with it, monitor closely."
• "Exercise: Good for health, but check sugar before/after, may need extra carbs."

5. HYPOGLYCEMIA (LOW SUGAR – EMERGENCY):
• "Signs: Shaking, sweating, hunger, confusion, irritability, fast heartbeat."
• "If <4 mmol/L: Take 15g fast sugar (3 glucose tablets, 150mL juice, 1 tablespoon sugar)."
• "Recheck in 15 minutes. Repeat if still low."
• "Then eat proper meal/snack."
• "If unconscious: Do NOT give food by mouth. Family must give glucagon injection and call emergency."
• "Always carry glucose tablets."
• "Tell family/friends how to help."

6. HYPERGLYCEMIA & KETONES (HIGH SUGAR – DANGER):
• "If sugar >15 mmol/L, check ketones (urine strip or blood meter)."
• "If ketones present: You need more insulin, drink water, seek medical help."
• "Signs of DKA: Vomiting, abdominal pain, rapid breathing, fruity breath, confusion – EMERGENCY."
• "Never stop insulin when sick. May need more."

7. SICK DAY RULES:
• "Continue insulin even if not eating."
• "Check sugar every 2-4 hours."
• "Check ketones if sugar >15."
• "Drink plenty of fluids (sugar-free if sugar high, sugary if sugar low)."
• "Seek help if vomiting, ketones, or unable to eat for >6 hours."

8. LONG-TERM COMPLICATIONS PREVENTION:
• "Good control prevents eye, kidney, nerve, heart problems."
• "Annual eye checks, urine tests, foot checks."
• "Stop smoking (if applicable)."
• "Blood pressure and cholesterol control."

9. PRACTICAL ASPECTS:
• "Carry diabetes ID card/bracelet."
• "Driving: Notify DVLA, check sugar before driving, stop if <5 mmol/L."
• "Travel: Carry insulin in hand luggage, extra supplies, time zone adjustments."
• "School/Work: Inform key people, private place for injections."

10. FOLLOW-UP:

• "Regular clinic visits: HbA1c every 3 months (target <48 mmol/mol or 6.5%)."
• "Annual complication screening."
• "Diabetes educator, dietitian access."
• "Psychological support if needed."

PASHTO/LOCAL LANGUAGE KEY PHRASES

Essential concepts to convey without jargon:

"Suger khuun kharab de" – Sugar in blood is bad
"Insulin dawa de che suger control kawi" – Insulin is medicine that controls sugar
"Har roz dawa wajawi" – Must take medicine every day
"Khuun check kawal de" – Must check blood
"Low sugar – shaking, sweating – shadani warkawi" – Low sugar gives shaking, sweating – eat sugar
"High sugar – vomiting – doctor ta rashi" – High sugar with vomiting – come to doctor
"Khwaara khwari, exercise, dawa – dray hamahanga de" – Food, exercise, medicine – all three balanced

Cultural sensitivity:
• Involve family in education (collective decision-making)
• Address concerns about injections (fear, stigma)
• Clarify diabetes is not contagious or curse
• Explain insulin is not addictive
• Discuss Ramadan fasting safety if applicable

CRITICAL ERRORS (FAIL)

Uses medical jargon without explanation
Does not emphasize insulin essential nature
Misses hypoglycemia emergency management
No sick day rules
Does not check patient understanding
No follow-up plan
Dismisses cultural concerns

VIVA RAPID FIRE

Q1: HbA1c target in T1DM?
A: <48 mmol/mol (6.5%) if achievable without hypoglycemia, individualized

Q2: Rule of 15 for hypoglycemia?
A: 15g fast carbs, recheck in 15 min, repeat if needed

Q3: Why continue insulin when sick?
A: Illness causes stress hormones that raise sugar; DKA risk if insulin omitted

Q4: What is honeymoon period?
A: Temporary partial remission after diagnosis (weeks-months) where insulin needs drop – do not stop insulin

Q5: Driving regulations?
A: Check sugar before driving, >5 mmol/L required, stop if hypoglycemia symptoms, notify licensing authority

STATION 23 – OBS THEORY

Rh Isoimmunization – Screening & Prevention

KMU FINAL YEAR MBBS • 5 MINUTES

WHAT IS RH ISOIMMUNIZATION?

Definition: Development of antibodies against Rh(D) antigen when Rh-negative mother is exposed to Rh-positive fetal blood, leading to hemolytic disease of fetus/newborn (HDFN) in subsequent pregnancies.

PATHOPHYSIOLOGY

First Pregnancy:
• Rh-negative mother + Rh-positive father = Rh-positive fetus (50% chance)
• Fetomaternal hemorrhage (FMH) during pregnancy/labor exposes mother to D antigen
• Primary immune response: IgM (no placental transfer, takes 4-8 weeks)
• Sensitization occurs

Subsequent Pregnancies:
• Secondary immune response: IgG (crosses placenta)
• Hemolysis of fetal RBCs
• Anemia → hydrops fetalis (edema, ascites, pericardial effusion)
• Hyperbilirubinemia after birth (kernicterus risk)

SCREENING IN PREGNANCY

1. BLOOD GROUP & ANTIBODY SCREEN (Booking):
• All pregnant women
• If Rh-negative: Identify, counsel
• If already sensitized (anti-D present): High-risk pregnancy, refer specialist

2. ANTI-D IMMUNOGLOBULIN (Non-sensitized Rh-negative):

Routine Prophylaxis:
• **28 weeks:** 1500 IU IM (or 500 IU if given earlier protocol)
• **Post-delivery:** 500-1500 IU within 72 hours (if baby Rh-positive)
• **Kleihauer test:** Quantifies FMH, determines additional Anti-D needed

Sensitizing Events (Before 28 weeks):
• Threatened miscarriage, abdominal trauma, ectopic pregnancy
• Invasive procedures (amniocentesis, CVS)
• External cephalic version
• Antepartum hemorrhage
• Stillbirth, intrauterine death
• **Dose:** 250-500 IU within 72 hours

3. FETAL MONITORING (If Sensitized):
• Titers every 4 weeks
• Ultrasound: MCA PSV (middle cerebral artery peak systolic velocity) >1.5 MoM suggests anemia
• Amniocentesis: Bilirubin (OD 450), fetal blood sampling
• Intrauterine transfusions if severe
• Early delivery if mature

KLEIHauer-BETKE TEST

• Acid elution technique
• Fetal RBCs resistant to acid, appear dark
• Quantifies FMH (mL of fetal blood in maternal circulation)
• **Calculation:** If >4 mL fetal RBCs (8 mL whole blood), additional Anti-D required (125 IU per 1 mL fetal cells)
• Determines dose post-delivery

PREVENTION SUCCESS

• Anti-D reduces sensitization from 12-16% to 0.2%
• Routine antenatal Anti-D (28 weeks) further reduces risk

- All Rh-negative non-sensitized women should receive
- Future: Anti-D monoclonal antibodies

STATION 24 – OBS THEORY

Labour Curve (Partograph) – Interpretation

KMU FINAL YEAR MBBS • 5 MINUTES

WHAT IS A PARTOGRAPH?

Graphic recording of progress of labor and condition of mother and fetus. WHO tool for early detection of abnormal labor.

COMPONENTS

1. PATIENT IDENTIFICATION: Name, age, gravida, para, hospital number, date

2. FETAL CONDITION:
• Fetal heart rate (every 30 min in active phase)
• Membranes (intact/ruptured, time, color of liquor)
• Moulding (1-3 scale)

3. LABOR PROGRESS:
• Cervical dilatation (cervicograph – key component)
• Descent of head (5/5 to 0/5)
• Uterine contractions (frequency/10 min, duration)

4. MATERNAL CONDITION:
• Pulse, BP, temperature
• Urine output, protein, ketones
• Oxytocin (if used)
• Drugs given

CERVICOGRAPH (ALERT & ACTION LINES)

ALERT LINE:
• Starts at 4 cm dilatation
• Slope of 1 cm/hour (represents onset of active phase)
• Expected normal progress

ACTION LINE:
• Parallel to alert line, 4 hours to the right
• If cervical plot crosses action line → intervention required
• Decision: Augmentation (if hypotonic) or CS (if CPD)

INTERPRETATION:
• **Left of alert line:** Normal progress
• **Between lines:** Close observation
• **Crosses action line:** Action required
• **Primary arrest:** No progress >4 hours active phase
• **Secondary arrest:** No progress >2 hours in second stage

MANAGEMENT BASED ON PARTOGRAPH

Prolonged Latent Phase (>8 hours): Rest, sedation, oxytocin if needed
Prolonged Active Phase: Assess contractions, CPD, augmentation
Precipitate Labor: <3 hours, risk PPH, lacerations
Secondary Arrest: CPD vs malposition, consider CS

STATION 25 – OBS THEORY

Primary Postpartum Hemorrhage – Definition & Management

KMU FINAL YEAR MBBS • 5 MINUTES

DEFINITION

Primary PPH: Blood loss >500 mL within 24 hours of vaginal delivery, or >1000 mL after CS.
Severe PPH: Blood loss >1000 mL or signs of hypovolemia.
Incidence: 5-10% of deliveries.

CAUSES (4 Ts)

Tone (70%): Uterine atony – most common
Trauma (20%): Lacerations, episiotomy, hematoma, uterine rupture, inversion
Tissue (10%): Retained placenta, clots
Thrombin (1%): Coagulopathy, DIC, anticoagulants

MANAGEMENT (STEPWISE)

CALL FOR HELP: Activate hemorrhage protocol, additional staff, anesthetist, blood bank

A – ASSESS & RESUSCITATE:
• Large-bore IV × 2 (14G)
• Bloods: FBC, coagulation, cross-match 4-6 units
• IV fluids/colloids/blood
• Oxygen
• Keep warm
• Catheterize (monitor urine output)

B – BLEEDING CONTROL:

Medical (Uterine Atony):
1. **Uterine massage** + bimanual compression
2. **Oxytocin:** 10 units IM/IV, then 40 units in 500 mL at 125 mL/hour
3. **Ergometrine:** 0.5 mg IM (contraindicated: hypertension, heart disease)
4. **Carboprost (PGF2α):** 0.25 mg IM every 15 min (max 8 doses) – asthma caution
5. **Misoprostol (PGE1):** 800-1000 mcg PR
6. **Tranexamic acid:** 1g IV over 10 min (within 3 hours)

Surgical/Physical:
• **Examination under anesthesia:** Exclude tears, retained tissue
• **Balloon tamponade:** Bakri balloon
• **Compression sutures:** B-Lynch, Hayman
• **Arterial ligation:** Uterine, utero-ovarian, internal iliac
• **Interventional radiology:** Uterine artery embolization
• **Hysterectomy:** Last resort (life-saving)

C – CAUSE TREATMENT:
• Retained placenta: Manual removal
• Trauma: Repair lacerations
• Inversion: Replace uterus
• Coagulopathy: FFP, cryoprecipitate, platelets

PREVENTION

• Active management 3rd stage (oxytocin 10 units)
• Controlled cord traction
• Uterine massage
• Early recognition of risk factors
• Availability of blood products

STATION 26 – OBS THEORY

Breech Delivery – Technique

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TYPES OF BREECH

Frank (70%): Hips flexed, knees extended (buttocks presenting)
Complete (10%): Hips and knees flexed (buttocks and feet)
Footling (Incomplete) (10%): One or both feet presenting
Kneeling (Rare): Knees presenting

MECHANISM OF LABOR

- Engagement: Breech (bitrochanteric diameter 10 cm) in transverse diameter of inlet
- Descent with increasing flexion
- Internal rotation (anterior hip rotates to symphysis)
- Lateral flexion: Breech distends perineum
- Delivery of buttocks and trunk to umbilicus
- Delivery of shoulders (anterior shoulder under symphysis)
- Delivery of head by flexion (Mauriceau-Smellie-Veit maneuver or forceps)

SPONTANEOUS BREECH DELIVERY

DO NOT TOUCH until buttocks distend perineum
DO NOT PULL on trunk
Allow spontaneous delivery to umbilicus

Assistance after umbilicus:
- Support body in prone position (legs hang down – promotes head flexion)
- Dry, stimulate breathing
- If head not delivering spontaneously → intervene

ASSISTED BREECH DELIVERY (MANEUVERS)

1. PINARD'S MANEUVER (Legs extended):
- If legs extended (frank breech)
- Press on popliteal fossa to flex knee
- Sweep leg down and out

2. LOVSET'S MANEUVER (Arms extended):
- Body rotated so anterior shoulder is under symphysis
- Deliver anterior arm by sweeping across chest
- Rotate 180° and deliver other arm

3. MAURICEAU-SMELLIE-VEIT (MSV) MANEUVER (Head):
- Baby straddles examiner's arm
- Middle finger on maxilla (promotes flexion)
- Fingers on shoulders
- Suprapubic pressure by assistant (flexes head)
- Deliver head in flexion

4. FORCEPS TO AFTERCOMING HEAD:
- Piper forceps (specialized) or standard forceps
- Apply to sides of head (not trunk)
- Suprapubic pressure
- Gentle traction with flexion

CAESAREAN SECTION FOR BREECH

Indications:
- Footling breech (cord prolapse risk)
- Estimated fetal weight >3800g or <1500g
- Hyperextended head
- Previous perinatal loss

- Primigravida (controversial, patient choice)
- Failure to progress
- Fetal distress

Term Breech Trial (2000): Planned CS safer for term singleton breech

COMPLICATIONS

CORD PROLAPSE: Especially footling, immediate CS
HEAD ENTRAPMENT: Undilated cervix, preterm
NUCHAL ARMS: Arms around neck, prevent delivery
EXTENSION OF HEAD: Difficult delivery, trauma
ORGAN DAMAGE: Liver, adrenal, spleen (rough handling)
BIRTH ASPHYXIA: Cord compression, delayed head delivery
FRACTURES: Skull, spine, humerus, clavicle

STATION 27 – OBS THEORY

Antenatal Care – Aims, Visits & Investigations

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AIMS OF ANTENATAL CARE

- Promote health of mother and baby
- Screen for risk factors and complications
- Prevent, detect, and manage complications
- Prepare for labor, delivery, and parenthood
- Provide health education and counseling

VISIT SCHEDULE (LOW-RISK PRIMIGRAVIDA)

WHO RECOMMENDATION (2016): 8 contacts

Timing:

- **First:** <12 weeks (booking)
- **Second:** 20 weeks
- **Third:** 26 weeks
- **Fourth:** 30 weeks
- **Fifth:** 34 weeks
- **Sixth:** 36 weeks
- **Seventh:** 38 weeks
- **Eighth:** 40 weeks

Traditional (UK): 10 visits (more frequent in 3rd trimester)

INVESTIGATIONS BY VISIT

BOOKING (<12 weeks):
- FBC (anemia)
- Blood group & antibody screen
- Hemoglobin electrophoresis (sickle/thalassemia)
- Infection screen: HIV, Hepatitis B, Syphilis (VDRL), Rubella immunity
- Urine culture (asymptomatic bacteriuria)
- Dating ultrasound (8-14 weeks)
- Down syndrome screening (combined test: nuchal translucency + PAPP-A + β-hCG)

18-20 WEEKS:
- Anomaly scan (fetal anatomy)
- Placental location

24-28 WEEKS:
- FBC
- Glucose tolerance test (GDM screening)
- Antibody screen (if Rh-negative)
- Anti-D if indicated

32-34 WEEKS:
- FBC
- Antibody screen
- Anti-D if Rh-negative

36 WEEKS:
- FBC
- Group B Streptococcus screen (some countries)
- Position check (breech management)
- Ultrasound if indicated (growth)

40+ WEEKS:
- Fetal monitoring if overdue
- Induction planning

COMPONENTS OF EACH VISIT

- History: Symptoms, concerns
- Examination: BP, weight, SFH, presentation, fetal heart
- Urine dipstick: Protein, glucose, ketones, infection
- Review investigations
- Health education
- Plan next visit

STATION 28 – OBS THEORY

Fetal Head Anatomy – Sutures, Fontanelles & Diameters

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SUTURES OF FETAL SKULL

FRONTAL (METOPIC): Between frontal bones, closes early (2 years)
SAGITTAL: Between parietal bones, anteroposterior
CORONAL: Between frontal and parietal bones
LAMBDOID: Between parietal and occipital bones

CLINICAL SIGNIFICANCE:
• Allow molding during labor
• Overlap reduces diameter
• Excessive molding + caput = CPD warning

FONTANELLES

ANTERIOR (BREGMA):
• Diamond-shaped
• 4 sutures meet (2 coronal, 1 frontal, 1 sagittal)
• Closes: 18 months
• Clinical: Bulging = ↑ICP, Depressed = dehydration

POSTERIOR:
• Triangular
• 3 sutures meet (sagittal, 2 lambdoid)
• Closes: 6-8 weeks
• Smaller than anterior

PRESENTATIONS

VERTEX: Occiput presenting, head flexed (suboccipital region near center)
BROW: Between vertex and face, head partially extended (military)
FACE: Head fully extended, face presenting (mentum anterior or posterior)

DIAMETERS:
• **Suboccipitobregmatic (Vertex):** 9.5 cm – optimal, smallest
• **Occipitofrontal (Brow):** 11.5 cm – military
• **Mentovertical (Brow):** 13.5 cm – obstructed
• **Submentobregmatic (Face):** 9.5 cm – face, extended
• **Occipitomental (Face):** 12.5 cm – face, partially flexed

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STATION 29 – OBS THEORY

Cesarean Section – Steps

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PRE-OPERATIVE

- Consent (risks: hemorrhage, infection, injury, thrombosis, future pregnancy risks)
- Anesthesia assessment (usually spinal/epidural)
- Fasting, antacid prophylaxis
- Catheterize bladder
- Skin preparation, sterile draping
- Fetal monitoring until incision
- Team briefing, WHO checklist

OPERATIVE STEPS (PFANNENSTIEL)

1. INCISION:
- Pfannenstiel (transverse, 2-3 cm above symphysis, in skin crease)
- Or Midline vertical (emergency, obesity, previous surgeries)

2. ABDOMINAL WALL:
- Incise subcutaneous fat
- Incise fascia (midline or transverse)
- Separate rectus muscles (midline)
- Open peritoneum (transverse incision)

3. UTERINE INCISION:
- Lower segment transverse (Monro Kerr) – preferred
- Lower segment vertical (Kerr) – preterm, malpresentation, placenta praevia
- Classical (upper segment) – rare, transverse lie, very preterm
- Bladder reflection (vesicouterine peritoneum) if low segment

4. DELIVERY:
- Incise uterus, extend bluntly or sharply
- Deliver head (pressure on fundus or forceps)
- Suction oropharynx
- Clamp and cut cord
- Deliver placenta and membranes
- Oxytocin 10 units IV/IM

5. REPAIR:
- Inspect uterine cavity
- Uterine closure: 2 layers (endometrial + myometrial) with continuous sutures (Vicryl/PDS)
- Check hemostasis
- Close peritoneum (optional)
- Close fascia
- Subcuticular skin closure
- Dressing

COMPLICATIONS

Immediate: Hemorrhage, bladder/bowel injury, fetal laceration
Early: Infection, thrombosis, ileus, wound dehiscence
Late: Scar pain, adhesions, placenta accreta in future pregnancy, uterine rupture risk

STATION 30 – PAEDS THEORY

Congenital Hypothyroidism – Diagnosis & Management

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CLINICAL FEATURES

EARLY (Often asymptomatic):
- Prolonged jaundice
- Feeding difficulties
- Lethargy, hypotonia
- Constipation
- Large fontanelles
- Macroglossia
- Umbilical hernia
- Hypothermia

LATE (If untreated):
- Growth failure
- Developmental delay
- Intellectual disability (cretinism)
- Coarse features
- Dry skin, hair loss

NEWBORN SCREENING

- **Guthrie test (heel prick):** TSH or T4 at 48-72 hours
- **Positive:** TSH >20 mU/L (varies by lab)
- **Recall:** Confirmatory serum TSH, T4
- **Timing critical:** Treatment by 2 weeks prevents intellectual disability

INVESTIGATIONS

CONFIRMATORY:
- Serum TSH (elevated)
- Serum T4/T3 (low)
- Thyroid ultrasound (agenesis, ectopic, hypoplasia)
- Thyroid scintigraphy (if diagnosis uncertain)
- X-ray knee (absent distal femoral epiphysis – delayed bone maturation)

DIFFERENTIAL DIAGNOSIS:
- Primary (thyroid): Agenesis, ectopic, dyshormonogenesis
- Secondary (pituitary): TSH deficiency
- TSH receptor blocking antibodies (transient)
- Iodine deficiency/excess

MANAGEMENT

LEVOTHYROXINE:
- **Dose:** 10-15 mcg/kg/day (higher than adult per kg)
- Start immediately, never delay for confirmatory tests if high suspicion
- Crush tablet, mix with small amount of milk/formula
- Give same time daily
- Avoid soy, iron, calcium (interfere absorption)

MONITORING:
- TSH, free T4 every 1-2 months first year
- Target: TSH 0.5-2.5, FT4 upper normal range
- Growth, development assessment
- Bone age X-ray

PROGNOSIS:
- Normal intellectual development if treated by 2 weeks
- Delay >1 month: IQ loss
- Lifelong treatment (usually)

Crafted with ❤️ Noaman Khan Musakhel

STATION 31 – MEDICINE THEORY

Addison's Disease – Diagnosis & Treatment

KMU FINAL YEAR MBBS • 5 MINUTES

CLINICAL FEATURES

SYMPTOMS:
• Fatigue, weakness
• Weight loss, anorexia
• Nausea, vomiting, abdominal pain
• Salt craving
• Postural dizziness
• Hyperpigmentation (skin creases, mucous membranes, pressure areas)
• Vitiligo (autoimmune association)

SIGNS:
• Hypotension (postural drop)
• Hyperpigmentation
• Loss of axillary/pubic hair (women – loss of adrenal androgens)
• Vitiligo
• Adrenal crisis: Shock, dehydration, confusion

INVESTIGATIONS

1. BASAL CORTISOL: Low (<100 nmol/L diagnostic, <550 nmol/L suspicious)

2. SHORT SYNACTHEN TEST (Gold Standard):
• Baseline cortisol, ACTH
• 250 mcg ACTH (tetracosactide) IM/IV
• Cortisol at 30 and 60 min
• **Normal:** Peak >550-600 nmol/L
• **Addison's:** Flat response (no rise)

3. ACTH LEVEL:
• **Elevated:** Primary adrenal failure (Addison's)
• **Low:** Secondary (pituitary) or tertiary (hypothalamic)

4. RENIN & ALDOSTERONE:
• Renin high, aldosterone low (primary)
• Confirms adrenal failure vs pituitary

5. AUTOANTIBODIES:
• 21-hydroxylase antibodies (70-90% autoimmune)
• Associated autoimmune: Thyroid, pernicious anemia, type 1 DM

6. IMAGING:
• CT adrenals: Calcification (TB), hemorrhage, metastases, atrophy
• CXR: TB

7. CAUSES WORKUP:
• TB (endemic areas)
• HIV, fungal
• Metastases
• Hemorrhage (Waterhouse-Friderichsen)

TREATMENT

GLUCOCORTICOID REPLACEMENT:
• **Hydrocortisone:** 15-25 mg/day in 2-3 divided doses
- 10 mg morning, 5 mg noon, 5 mg evening (simulates diurnal rhythm)
• **Prednisolone:** 3-5 mg daily (longer acting, cheaper)
• **Dexamethasone:** Avoid (no mineralocorticoid activity, Cushingoid side effects)

MINERALOCORTICOID REPLACEMENT:
• **Fludrocortisone:** 50-100 mcg daily
• Monitor BP, electrolytes, plasma renin

ANDROGEN REPLACEMENT (Women):
• DHEA 25-50 mg daily (optional, improves libido, energy)

SICK DAY RULES:

• Double hydrocortisone during illness
• IM hydrocortisone if vomiting
• Emergency injection kit for patients
• Medical alert bracelet

ADRENAL CRISIS:
• Hydrocortisone 100 mg IV bolus
• Fluid resuscitation (0.9% NaCl)
• Treat precipitant
• Continue 200 mg/24 hours (50 mg q6h or infusion)

STATION 32 – MEDICINE THEORY

Cushing's Syndrome – Diagnosis & Management

KMU FINAL YEAR MBBS • 5 MINUTES

CLINICAL FEATURES

METABOLIC:
• Central obesity, moon face, buffalo hump
• Purple striae (>1 cm, abdominal)
• Easy bruising
• Poor wound healing
• Proximal myopathy
• Osteoporosis, fractures

CARDIOVASCULAR:
• Hypertension
• Diabetes/dyslipidemia

DERMATOLOGICAL:
• Thin skin
• Acne, hirsutism
• Fungal infections

PSYCHIATRIC:
• Depression, anxiety, psychosis
• Insomnia

REPRODUCTIVE:
• Menstrual irregularities
• Decreased libido, erectile dysfunction
• Infertility

INVESTIGATIONS (2 REQUIRED)

1. SCREENING TESTS (Do 2):

Overnight Dexamethasone Suppression Test:
• 1 mg dexamethasone at 11 PM
• Cortisol at 8 AM next day
• **Normal:** <50 nmol/L (suppresses)
• **Cushing's:** >50 nmol/L (fails to suppress)

24-hour Urinary Free Cortisol (×2-3 collections):
• Elevated in Cushing's
• False positives: Stress, depression, alcoholism, pregnancy

Late-night Salivary Cortisol (×2):
• Loss of diurnal rhythm
• Elevated at midnight

2. CONFIRM LOCALIZATION:

Plasma ACTH:
• **Low/Undetectable:** Adrenal cause
• **High:** Pituitary (Cushing's disease) or ectopic

High-dose Dexamethasone Test:
• 2 mg q6h × 48 hours
• **Suppresses (>50%):** Pituitary Cushing's
• **No suppression:** Ectopic ACTH or adrenal

Imaging:
• MRI pituitary (microadenoma)
• CT adrenals (adenoma, hyperplasia, carcinoma)
• CXR/CT chest (ectopic ACTH – small cell lung cancer, carcinoid)

Inferior Petrosal Sinus Sampling (IPSS): • Gold standard for ACTH-dependent Cushing's
• Differentiates pituitary vs ectopic

MANAGEMENT

PITUITARY (CUSHING'S DISEASE):
- **Transphenoidal surgery:** First-line (70-90% remission microadenoma)
- **Radiotherapy:** If surgery fails
- **Medical:** Ketoconazole, metyrapone, pasireotide (pre-op or if surgery contraindicated)
- **Bilateral adrenalectomy:** Last resort (risk Nelson's syndrome)

ADRENAL:
- **Adenoma:** Laparoscopic adrenalectomy
- **Carcinoma:** Surgery + mitotane + chemotherapy
- **Hyperplasia:** Bilateral adrenalectomy

ECTOPIC ACTH:
- Treat primary tumor (resection if possible)
- Medical blockade (ketoconazole, metyrapone) if source not found
- Bilateral adrenalectomy if severe, source unknown

STATION 33 – SURGERY THEORY

Breast Cancer – Risk Factors & Investigations

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RISK FACTORS

NON-MODIFIABLE:
- Female gender (100x risk vs male)
- Age (>50 years)
- Family history (1st degree relative)
- Genetic mutations (BRCA1, BRCA2, TP53, PTEN)
- Early menarche (<12), late menopause (>55)
- Dense breast tissue
- Previous breast cancer
- Radiation exposure (chest)

MODIFIABLE:
- Nulliparity, late first pregnancy (>30)
- Hormone replacement therapy
- Oral contraceptives (slight)
- Alcohol consumption
- Obesity (postmenopausal)
- Physical inactivity
- Smoking

INVESTIGATIONS

1. TRIPLE ASSESSMENT:

Clinical: History and examination (lump characteristics, nodes)

Imaging:
- **Mammography:** Screening, >40 years, calcifications, spiculated mass
- **Ultrasound:** <35 years, characterizes cyst vs solid, guides biopsy
- **MRI:** High risk, dense breasts, extent of disease, implant evaluation

Pathology:
- **FNA (Fine Needle Aspiration):** Cytology, quick, outpatient
- **Core Biopsy:** Histology, receptor status, gold standard
- **Excisional biopsy:** If core inconclusive

2. STAGING INVESTIGATIONS:
- CT chest/abdomen/pelvis (stage III, symptoms)
- Bone scan (if symptoms, elevated ALP, stage III)
- PET-CT (selected cases)
- Tumor markers (CEA, CA 15-3) – not for diagnosis

3. RECEPTOR STATUS (Core Biopsy):
- ER (Estrogen Receptor)
- PR (Progesterone Receptor)
- HER2 (Human Epidermal Growth Factor Receptor 2)
- Ki-67 (proliferation index)
- Determines treatment (endocrine, targeted therapy)

STATION 34 – RADIOLOGY

X-ray KUB – Interpretation

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INDICATIONS

- **Renal colic (nephrolithiasis)**
- **Urinary tract obstruction**
- **Constipation/bowel obstruction**
- **Foreign body**
- **Pre-ureteroscopy for stone counting**

SYSTEMATIC INTERPRETATION

1. QUALITY:
- **Penetration (vertebral bodies visible behind heart)**
- **Inspiration (9-10 posterior ribs)**
- **Rotation (medial clavicles equidistant from spinous processes)**

2. AIRWAY: Trachea midline

3. BREATHING: Lung fields, costophrenic angles, diaphragm

4. CIRCULATION: Cardiac size, aorta

5. DIAPHRAGM: Right higher than left (liver)

6. EFFICIENCY (Everything else):

Bones:
- **Ribs, vertebrae, pelvis, femoral heads**
- **Look for fractures, lytic lesions, calcifications**

Soft Tissues:
- **Psoas shadows (lost in retroperitoneal pathology)**
- **Renal outlines**
- **Soft tissue masses**

Abdomen:
- **Gas pattern (dilated loops, air-fluid levels)**
- **Calcifications**
- **Foreign bodies**

PATHOLOGICAL FINDINGS

RENAL CALCULI:
- **90% radio-opaque (calcium oxalate/phosphate)**
- **Along line of ureters (from renal hilum to bladder trigone)**
- **Staghorn calculus (fills pelvicalyceal system)**
- **Uric acid stones: Radiolucent (need CT)**

GALLSTONES:
- **10% radio-opaque**
- **Right upper quadrant**
- **Faceted appearance**

PANCREATIC CALCIFICATIONS:
- **Chronic pancreatitis**
- **"Chain of lakes" appearance**

AORTIC ANEURYSM:
- **Curvilinear calcification**
- **>3 cm diameter**

OBSTRUCTION:
- **Dilated bowel loops (>3 cm small bowel, >6 cm large bowel)**
- **Air-fluid levels (erect film)**
- **Loss of haustral markings**

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