SUBJECT: PEDIATRICS (Pulmonology)

THEME 3: FEVER AND COUGH (ACUTE INFECTIONS)

1. VIRAL CROUP (Laryngotracheobronchitis)

KMU LOs: Clinical Presentation, Diagnostic Workup, Management.

A. Classical Vignette

A 2-year-old child presents with a 2-day history of low-grade fever and a **"barking" cough** (seal-like). The mother reports the child has **noisy breathing (stridor)** which worsens at night or when crying.

- **Past Paper Pearl:** "A child with barking cough & respiratory difficulty for 2 days. Most likely diagnosis? **Croup**".
- **Etiology: Parainfluenza Virus** (Type 1 or 3) is the most common cause.

B. Signs & Investigation

- **Sign: Inspiratory Stridor** (Upper airway obstruction).
- **X-Ray Neck (Lateral): "Steeple Sign"** (Subglottic narrowing) – *Note: Diagnosis is usually clinical; X-ray is rarely needed.*

C. Management

1. **Mild (No Stridor at rest):** Single dose **Oral Dexamethasone** (0.15 - 0.6 mg/kg) or Prednisolone. Home management.
2. **Moderate/Severe (Stridor at rest + Retractions):**
    - **Nebulized Epinephrine (Adrenaline):** Reduces edema rapidly (temporarily).
    - **Steroids:** IV/IM Dexamethasone.
    - **Observation:** Monitor for "Rebound phenomenon" after epinephrine wears off.

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2. ACUTE BRONCHIOLITIS

KMU LOs: Etiology, Diagnosis, Management.

A. Classical Vignette

A **5-month-old infant** presents with runny nose (coryza) and cough for 3 days, now developing **difficulty in breathing**. On examination, the child has **tachypnea (RR >60)**, subcostal recessions, and **bilateral widespread wheeze** and crackles.

- **Past Paper Pearl:** "5 month old… subcostal recessions… Bilateral wheeze… Chest X-ray shows hyperinflation… Most common etiologic factor? **Respiratory Syncytial Virus (RSV)**".

B. Investigation

- **CXR: Hyperinflation** (flattened diaphragm), peribronchial thickening, or patchy atelectasis.
- **Diagnosis:** Clinical. Viral panel (PCR) if hospital admission needed.

C. Management

- **Mainstay: Supportive Care** (Oxygen + Hydration/Feeding).
    - *Note:* Nasogastric (NG) feeding if RR >60 (aspiration risk).
- **Contraindications:** Do **NOT** use Steroids or Antibiotics (it is viral). Bronchodilators (Salbutamol) usually do *not* work in first episode bronchiolitis.

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3. PNEUMONIA (Pediatric)

KMU LOs: IMNCI Classification, Organisms, Management.

A. Classical Vignette

A 4-year-old child presents with high-grade fever and cough. The mother says the child is breathing fast.

- **Signs: Chest Indrawing** (Lower chest wall moves *in* when child breathes *out*), Tachypnea, Bronchial breathing.
- **Past Paper Pearl:** "2 year old immunized patient presented with lobar pneumonia likely causative organism? **Streptococcus pneumoniae**".

B. IMNCI Classification (High Yield for MCQs)

- **Past Paper Pearl:** "A child has fever, cough with chest indrawing, but nontoxic looking, classify according to IMNCI? **Pneumonia**".

Signs	IMNCI Classification	Treatment
Danger Signs (Convulsions, lethargy, unable to drink) OR **Stridor in calm child**	**Severe Pneumonia**	**Admit**. IV Antibiotics (Ampicillin + Gentamicin). Oxygen.
Chest Indrawing OR **Fast Breathing** (see rates below)	**Pneumonia**	**Home Care**. Oral Amoxicillin for 5 days.
No signs of pneumonia (just cough/cold)	**No Pneumonia**	Home care. Soothe throat. Watch for danger signs.

- **Fast Breathing Definitions:**
    - 2-12 months: **> 50/min**
    - 1-5 years: **> 40/min**

C. Etiology by Age

- **< 3 weeks:** GBS, E. coli.
- **3 weeks - 3 months:** *Chlamydia trachomatis* (staccato cough, afebrile).
- **3 months - 5 years:** *Strep. pneumoniae* (Most common bacterial), Respiratory Viruses (Most common overall).
- **> 5 years:** *Mycoplasma pneumoniae* (Atypical).

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4. EPIGLOTTITIS (Medical Emergency)

KMU LOs: Recognition (Red Flags).

A. Classical Vignette

A 3-year-old (usually unvaccinated) presents with **high fever**, **toxic appearance**, **drooling of saliva** (can't swallow), and muffled "hot potato" voice. The child prefers to sit in a **tripod position** (leaning forward).

- **Past Paper Pearl:** "Constant noisy breathing, and he is drooling saliva... temp 39C... Diagnosis? **Epiglottitis**".
- **Cause:** *Haemophilus influenzae* type b (Hib).

B. Investigation & Management

- **Sign: "Thumb Sign"** on lateral neck X-ray (Swollen epiglottis).
- **Critical Rule: DO NOT EXAMINE THE THROAT** with a tongue depressor (can precipitate complete airway obstruction).
- **Treatment:**
    1. **Secure Airway:** Intubation in OT (Anesthetist present).
    2. **Antibiotics:** IV Ceftriaxone (3rd Gen Cephalosporin).

THEME 2: SHORTNESS OF BREATH (CHRONIC)

1. CYSTIC FIBROSIS (CF)

KMU LOs: Etiology, Presentation, Diagnosis, Management.

A. Classical Vignette

A child presents with **failure to thrive** (poor weight gain despite good appetite) and **recurrent chest infections** (productive cough). History of **greasy, foul-smelling, bulky stools** (Steatorrhea/Malabsorption).

- **Neonate:** May present with **Meconium Ileus** (bowel obstruction).

B. Pathophysiology

- **Genetic:** Autosomal Recessive defect in **CFTR gene** (Chr 7).
- **Mechanism:** Defective Chloride transport $\rightarrow$ Thick, sticky mucus in lungs and pancreas.

C. Investigation

- **Screening:** Newborn Heel Prick (Immunoreactive Trypsinogen).
- **Gold Standard: Sweat Chloride Test** (Cl > 60 mmol/L).
- **Sputum Culture:** often colonized by ***Pseudomonas aeruginosa*** or *Staph aureus*.

D. Management

- **Respiratory:** Chest Physiotherapy (Vest/Percussion), Nebulized DNase (mucolytic), Prophylactic Antibiotics (Azithromycin).
- **Gastrointestinal: Pancreatic Enzyme Replacement** (Creon) with meals + Fat-soluble vitamins (A, D, E, K).

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2. FOREIGN BODY ASPIRATION

KMU LOs: Differentiate from asthma/infection.

A. Classical Vignette

A toddler (1-3 years) presents with **sudden onset coughing** and choking while playing/eating peanuts. Now has persistent cough or wheeze.

- **Examination: Unilateral Wheeze** or **Decreased Breath Sounds** on *one* side (usually Right side, as right bronchus is wider/steeper).

B. Investigation

- **CXR:** May show **Hyperinflation** of the affected side (ball-valve effect) or atelectasis. *Note:* Most foreign bodies (nuts/food) are radiolucent (invisible on X-ray).

C. Treatment

- **Gold Standard: Rigid Bronchoscopy** (Removal).

PEDIATRIC RESPIRATORY SUMMARY TABLE

Condition	Key Feature (Vignette)	X-Ray Finding	Organism
Croup	Barking cough, Stridor	Steeple Sign	Parainfluenza
Epiglottitis	Drooling, Tripod, Toxic	Thumb Sign	Hib
Bronchiolitis	Wheeze + Crackles in Infant	Hyperinflation	RSV

Condition	Key Feature (Vignette)	X-Ray Finding	Organism
Pneumonia	Fever + Chest Indrawing	Consolidation	Strep. pneumo
Cystic Fibrosis	FTT + Greasy Stool + Infections	Bronchiectasis	Genetic (CFTR)

SUBJECT: SURGERY (THORACIC/TRAUMA)

THEME 1 & 2: CHEST TRAUMA & ACUTE RESPIRATORY DISTRESS

1. TENSION PNEUMOTHORAX

KMU LOs: Clinical Diagnosis (No X-ray), Immediate Decompression.

A. Classical Vignette

A patient presents after a Road Traffic Accident (RTA) or Central Line insertion with **severe respiratory distress** and shock (Hypotension).

- **Key Signs:** Trachea deviated **AWAY** from the affected side, **Hyper-resonant percussion**, **Absent breath sounds**, Distended Neck Veins (JVP).
- **Past Paper Pearl:** "2.5 year old... distress... trachea shifted to left... hyper resonant note on right... Diagnosis: Tension pneumothorax".
- **MCQ Trap:** "The presence of tension pneumothorax... Will always be associated with tracheal deviation" (True/False). **Answer:** It is a late sign, but classically tested.

B. Management

1. **Immediate Action: Needle Decompression** (Thoracostomy).
    - *Site:* **2nd Intercostal Space, Mid-Clavicular Line** (Adults/Kids) OR **5th ICS Anterior Axillary Line** (ATLS 10th Ed update).
    - *Rule:* **Never wait for a Chest X-ray** if clinical signs are present.
2. **Definitive Treatment: Tube Thoracostomy (Chest Drain)** in the "Triangle of Safety".

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2. MASSIVE HEMOTHORAX

KMU LOs: Diagnosis, Indications for Thoracotomy.

A. Classical Vignette

A victim of a **gunshot or stab wound** presents with shock (tachycardia, hypotension).

- **Key Signs: Dull percussion note** (fluid), **Decreased breath sounds**. Trachea may be deviated away.
- **Past Paper Pearl:** "Gunshot injury... restless, breathless... BP 80/40... Dull note, absent breath sound on right side... Diagnosis: Massive Hemothorax".

B. Management

1. **First Line: IV Fluids** (Resuscitation) + **Chest Drain**.
2. **Indication for Emergency Thoracotomy (Surgery):**
    - Immediate drainage of **>1500 ml** blood.
    - Continued bleeding **>200 ml/hr** for 2-4 hours.
    - Hemodynamic instability despite resuscitation.

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3. CARDIAC TAMPONADE

KMU LOs: Beck's Triad, Pericardiocentesis.

A. Classical Vignette

A patient with blunt or penetrating chest trauma presents with "Obstructive Shock".

- **Beck's Triad:**
    1. **Hypotension** (Low BP).
    2. **Distended Neck Veins** (Raised JVP).
    3. **Muffled Heart Sounds**.
- **Pulsus Paradoxus:** Drop in SBP >10 mmHg on inspiration.
- **Past Paper Pearl:** "71 year old... motor vehicle accident... BP 190/100... massive amount of blood in pericardial sac... Diagnosis: Rupture of myocardial wall/Tamponade (or Dissection leading to it)".

B. Investigation & Management

- **First Line Inv: FAST Scan** (Ultrasound).
- **Immediate Rx: Needle Pericardiocentesis** (sub-xiphoid approach).
- **Definitive Rx:** Thoracotomy/Sternotomy (Pericardial Window).

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4. FLAIL CHEST

KMU LOs: Paradoxical Breathing, Analgesia.

A. Classical Vignette

Patient with multiple rib fractures (2 or more ribs fractured in 2 or more places).

- **Key Sign: Paradoxical Breathing** (Chest wall moves *in* on inspiration and *out* on expiration).

B. Management

- **Priority: Analgesia** (Epidural or Nerve Block) to prevent hypoventilation/pneumonia.
- **Severe:** Positive Pressure Ventilation (Intubation).

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5. CHEST DRAIN (TUBE THORACOSTOMY)

KMU LOs: Insertion site, "Triangle of Safety", Management of the tube.

A. Procedure

- **Site: Triangle of Safety**.
    - *Anterior:* Lateral border of Pectoralis Major.
    - *Posterior:* Anterior border of Latissimus Dorsi.
    - *Inferior:* 5th Intercostal Space (Nipple line).
- **Position:** Tube goes **over the top** of the rib (to avoid neurovascular bundle located below the rib).

B. Troubleshooting (Past Paper Gold)

- **Swinging:** The fluid in the tube moves up/down with breathing. *This is normal and good* (shows the tube is patent).

- **Bubbling:** Indicates air leak (Pneumothorax is draining).
- **Clamping: NEVER clamp a chest drain** for a pneumothorax (Risk of Tension Pneumothorax).
    - *Exception:* Only clamp briefly when changing the bottle or checking for leak resolution *under supervision*.
- **Past Paper Pearl:** "What should the emergency department NOT do? **Clamp the chest drain**".

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6. AORTIC DISSECTION (Surgical Perspective)

KMU LOs: Classification and Management.

A. Classical Vignette

Hypertensive patient with tearing interscapular pain. CXR shows **widened mediastinum**.

- **Past Paper Pearl:** "Widened mediastinum... massive amount of blood in pericardial sac... Ascending Aortic Dissection".

B. Management

- **Type A (Ascending): Urgent Surgery** (Bentall Procedure). *High mortality if untreated*.
- **Type B (Descending): Medical Management** (BP control) unless complications (ischemia/rupture).

SUMMARY: TRAUMA TRIAGE (ATLS)

Condition	**Breath Sounds**	**Percussion**	**Trachea**	**Primary Rx**
Tension Pneumothorax	Absent	**Hyper-resonant**	Deviated **Away**	Needle Decompression
Massive Hemothorax	Decreased	**Dull**	Deviated Away	Chest Drain + Fluids

Condition	Breath Sounds	Percussion	Trachea	Primary Rx
Simple Pneumothorax	Decreased	Hyper-resonant	Central	Aspiration or Drain
Cardiac Tamponade	Normal	Normal	Central	Pericardiocentesis

FINAL EXAM STRATEGY (BLOCK O)

1. **Cardiology (45 MCQs):** Focus on **MI management (MONA)**, **ECG localization** (Inferior vs Anterior), and **Heart Failure drugs** (The 4 pillars).
2. **Pulmonology (Total ~40-50 MCQs):**
    - **Adult: Asthma vs COPD** (Reversibility), **TB drugs** (Side effects), **Pleural Effusion** (Stony dull).
    - **Peads: Croup** (Barking cough), **Bronchiolitis** (Wheeze in infant), **Pneumonia** (Chest indrawing).
3. **Surgery: Tension Pneumothorax** (No CXR, Needle first), **Chest Drain safety** (Don't clamp).