

Acute SOB – Work up

1. Acute Asthma – mild/mod/severe/life-threatening/near-fatal

2. COPD – mild/mod/severe

- Target SpO₂ 88-92% ((If chronic CO₂ retainer/ABG-HCO₃ >30)
- Target SpO₂ 94-98% (If non-CO₂ retainer)

3. Pneumonia

- CURB 65 – antibiotics: refer national antimicrobial guidelines
 - For moderate CAP: IV Co-amoxiclav 1.2g 8H + Clarithromycin 500mg 12H
 - For severe CAP: IV Cefotaxime 1g 8H/Ceftriaxone 1-2g daily + Clarithromycin 500mg 12H
- SMART-COP – management setting

4. Pulmonary embolism

Apply Wells score and revised Geneva score.

5. Pneumothorax

Tension/non-tension	Spontaneous Primary / Secondary	Traumatic Unilateral / Bilateral	Mx: Needle thoracostomy ± IC tube insertion at safe triangle
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6. Pleural effusion

- Unilateral/Bilateral
- mild/mod/massive
- Mx: For symptomatic mod/massive effusion: IC tube insertion/repeated aspiration

7. Chronic parenchymal lung disease

- Bronchiectasis, ILD, etc.

8. ACS Chest Pain Workup

9. Acute pulmonary oedema

- Cardiogenic – LMNOP (Lasix, Morphine, Nitrate if BP- high, Noradrenaline if BP low, O₂, Propped-up-pressure (NIV))
- Nephrogenic – Lasix/ NIV / Dialysis

10. Anaphylaxis

11. DKA – mild/mod/severe • Mx:

- IV fluids
- Insulin infusion (starting with 0.1 unit /kg/h),
- Treat precipitant cause (IV antibiotics if there's clinical suspicion of infection)

12. Sepsis

- Refer Sepsis workup

13. Anemia

- With IHD – Hb target: 10g/dL
- Without IHD – Hb target: 8g/dL
- Slow transfusions under frusemide cover

Table 5 The revised Geneva clinical prediction rule for PE		
Items	Clinical decision rule points	
	Original version	Simplified version
Previous PE or DVT	3	1
Heart rate		
75–94 b.p.m.	3	1
≥95 b.p.m.	5	2
Surgery or fracture within the past month	2	1
Haemoptysis	2	1
Active cancer	2	1
Unilateral lower limb pain	3	1
Pain on lower limb deep venous palpation and unilateral oedema	4	1
Age >65 years	1	1

Clinical probability		
<i>Three-level score</i>		
Low	0–3	0–1
Intermediate	4–10	2–4
High	≥11	≥5
<i>Two-level score</i>		
PE-unlikely	0–5	0–2
PE-likely	≥6	≥3

b.p.m. = beats per min; DVT = deep vein thrombosis; PE = pulmonary embolism.

Breathlessness

Bronchial asthma

Indications for admission

1. Life-threatening attack or near fatal asthma
 - SpO₂ <92%, ABG showing acidosis/ hypoxia/ normal or high CO₂
 - Cyanosis
 - Hypotension
 - Exhaustion, confusion
 - PEFR less than 50% predicted or best
 - Silent chest, poor respiratory effort
2. Tachy-/brady-/arrhythmias
3. Pneumonia/other precipitant of exacerbation meeting admission criteria.
4. Social circumstances preventing reliable observation at home/ difficult access to hospital/living alone

Indications for ICU/HDU admission

1. Severe dyspnoea responding inadequately to initial emergency therapy.
2. Changes in mental status (confusion/lethargy/coma)
3. Persistent or worsening hypoxaemia and/or severe/worsening respiratory distress requiring HFNO/NIV.
4. Need for invasive mechanical ventilation.
5. Haemodynamic instability-need for vasopressors.

Discharge checklist-mild/mod/severe attack

1. Symptoms improved within 4h of observation, not needing regular SABA
2. PEF improving, and > 60-80% of personal best or predicted
3. SpO₂> 94% on room air.
4. Resources at home adequate.

Discharge plan

1. Check inhaler technique
2. Reliever: continue as needed
3. Controller: start or step up
4. Prednisolone: 40-50 mg continue for 5-7 days
5. Followup- within 2-7 days

COPD

Indications for hospital admission

1. Severe symptoms (e.g., high RR, SpO₂ < 88% in a CO₂ retainer or < 92% in a non retainer, confusion, drowsiness or acute respiratory distress).
2. Acute respiratory failure
 - New respiratory acidosis or hypercapnia above baseline on ABG. (Acute or acute on chronic respiratory acidosis)
 - Significant hypoxemia (PaO₂ <60mmHg on room air)/ hypoxaemia below baseline.
3. Onset of new physical signs. (eg: cyanosis/ peripheral oedema)
4. Failure to respond to initial medical management.
5. Presence of serious comorbidities (eg: heart failure, new arrhythmias, etc)
6. Social circumstances preventing reliable observation at home/ difficult access to hospital/living alone

Indications for ICU/HDU admission

1. Severe dyspnoea responding inadequately to initial emergency therapy.
2. Changes in mental status (confusion/lethargy/coma)
3. Persistent or worsening hypoxaemia (PaO₂ <40mmHg) and/or severe/worsening respiratory acidosis (pH<7.25) despite supplemental oxygen and non-invasive ventilation.
4. Need for non-invasive/invasive mechanical ventilation.
5. Haemodynamic instability-need for vasopressors.

Discharge plan

1. Check inhaler technique
2. Reliever: continue as needed
3. Check maintenance therapy and understanding.
4. Check smoking status and advice on cessation.
5. Acute medications if indicated- steroids/ antibiotics
6. Ensure understanding withdrawal of acute medications (steroids and/or antibiotics)
7. Arrange follow-up: early <4w or late <12w as indicated clinically.

Pneumonia

Indications for admission

1. Severity assessment tools

SMART COP

S-Systolic BP <90 mmHg- 2
M-Multilobar involvement-1
A-Albumin <35 g/L- 1
R-Respiratory rate (high) 1
T-Tachycardia ≥ 125 /min 1
C-Confusion 1
O-Oxygenation (low) 2
P-pH <7.35 2

Score

4 → need for invasive respiratory or circulatory support → For ICU
1-3 → apply CURB-65

CURB65 Score

C-Confusion 1
U-BU >7mmol 1
R-RR >30 1
B-DBP <60mmhg or SBP <90mmhg 1
65->65 years 1

0-1 → Discharge
2 or more → Admit

2. Significant comorbidities increasing risk of complications- uncontrolled DM, IHD, chronic lung disease, CKD

3. Social circumstances preventing reliable observation at home/ difficult access to hospital/living alone

Indications for ICU/HDU admission

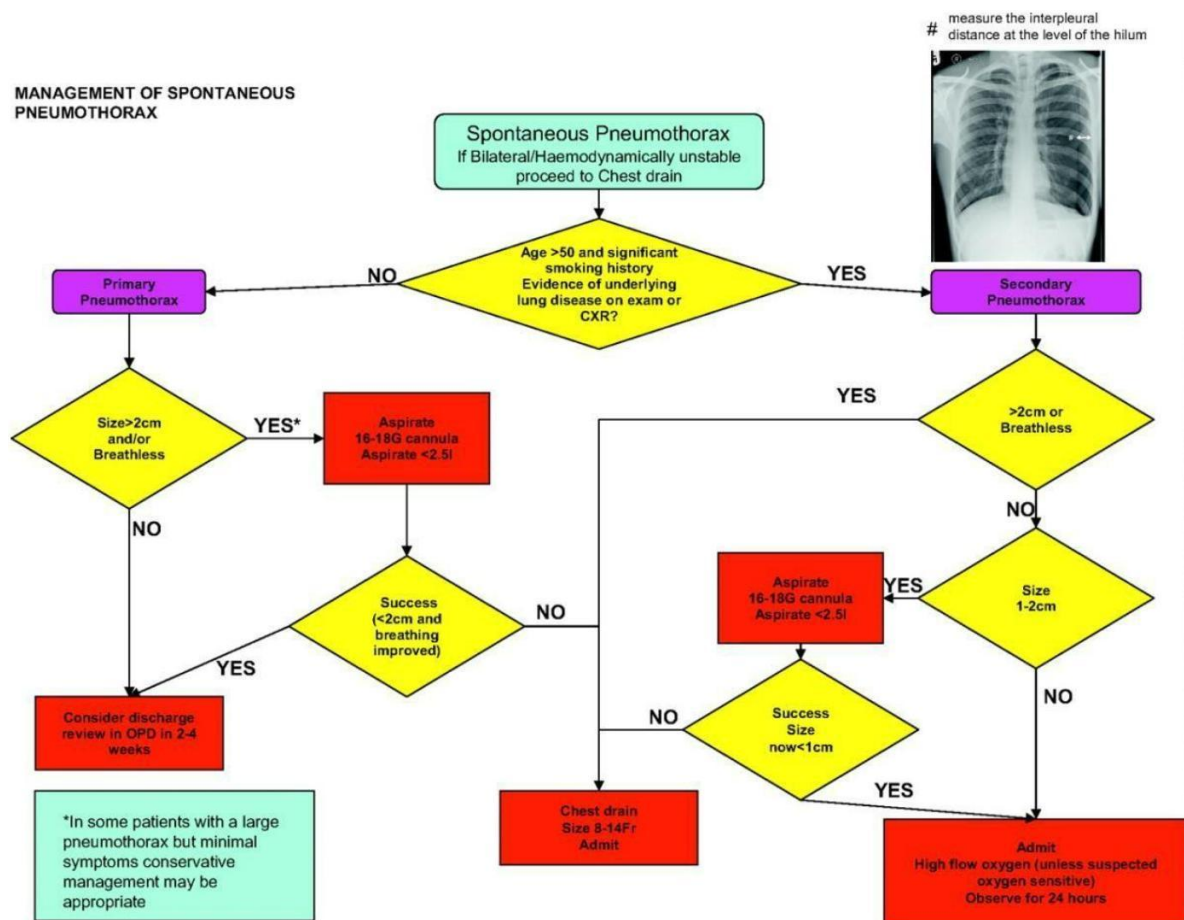
- Altered mental status
- Hypotension requiring inotrope support
- Temperature <36°C (96.8°F)
- Respiratory rate ≥ 30 breaths/minute
- Arterial oxygen tension to fraction of inspired oxygen ($\text{PaO}_2 / \text{FiO}_2$) ratio ≤ 250

- Leukocyte count <4000 cells/microL
- Platelet count <100,000/microL
- Multilobar infiltrates
- CURB 65 score 4-5 or SMART COP score 5 or more

Spontaneous pneumothorax

Indications for admission

1. Patients with satisfactory response (<1cm residual pneumothorax) in a secondary pneumothorax need admission for 24h for observation.
2. Failed outpatient management with aspiration in primary pneumothorax.
3. All patients requiring IC tubes.



Acute pulmonary oedema

Indications for admission-Cardiogenic

1. Severe respiratory distress or failure.
2. Need for invasive or non-invasive ventilation.
3. Need for treatment of underlying cause (e.g., anaemia/ischaemia).

Indications for admission-Non-Cardiogenic

1. Nephrogenic- AEOU-acidosis/electrolyte abnormalities/overload refractory to NIV/uraemia
2. Other critical medical conditions- ARDS, drowning related negative pressure pulmonary oedema

Discharge checklist

1. Resolution of dyspnoea and maintaining normal saturation on room air.
2. Haemodynamically stable.
3. Treatment for underlying cause optimized.
4. Able to reliably increase the diuretic doses as instructed.
5. Check compliance with non-pharmacological management; eg: fluid and salt restriction.

Other causes of breathlessness

DKA-Admit

Anaphylaxis-Admit

Sepsis-Admit

Pleural effusion-Admit

Anaemia-admit if symptomatic dyspnoea/ Hb<7g/dL

How to start and operate BiPAP/CPAP machine

Continue basic **ventilation and oxygenation** support

- **Ventilation**

- i. Propped-up
- ii. Nebulize if suggestive of Asthma/COPD
- iii. If crepts+ & suggestive of heart failure -> IV Frusemide

- **Oxygenation**

- i. Face mask 5-10L/min
- ii. NRBM 10-15L/min

Re assess the patient RR and SpO₂ if
RR>25/min or SpO₂ <94% or
SpO₂ <88% in chronic CO₂ retainers (HCO₃ >30 in ABG/VBG)

Consider escalation to High Flow Nasal Cannula (**HFNC**)/ NIV- CPAP-
BiPAP

Starting BiPAP ventilation

1. Plug the machine
2. Connect the machine to high flow 25L oxygen flow meter(25-70L) starts 25l oxygen flow rate
3. Switch on the machine
4. Unlock the machine & Go to settings and select options as mentioned below
Pathology – Normal Mode –
ST
IPAP-
10
EPAP-
5
Backup Rate - 15

5. Select the appropriate mask
 - if the mask is a vented mask can directly connect to the inspiratory limb.
 - if the mask is a non-vented mask connect additional ventilatory port to the mask before connecting to the inspiratory limb.
6. Run the Machine – Feel the gas flow coming out from the machine explain the patient about the Non Invasive Ventilation.
7. Slightly remove the NRB and fit the NIV mask. Fit the mask tightly to reduce leak <25L/min
8. Keep tidal volume (TV) at 6-8ml/kg \approx 7ml/kg
9. Adjust TV 7ml/kg by increasing ΔP (adjust IPAP by 1cm H₂O increments – Correct ventilation with achieving the target TV
10. After achieving target TV if SPO₂ less than 94%
 - i. Increase FiO₂ by increasing O₂ flow rate above the 25L up to 70l
 - ii. Increase EPAP by 1cmH₂O, Keep the same ΔP (Each 1cmH₂O increment in EPAP should follow 1cmH₂O increment in IPAP to maintain constant ΔP (try to maintain $\Delta P > 5$ cm H₂O)
 - If the patient having obstructive lung disease (BA/COPD) never increase EPAP above 5cm H₂O.
 - iii. Increase I time (I_{min}/I_{MAX})
 - iv. Increase fall time
 - v. Decrease rise time.
11. Re assess the patient clinically after setup and arrange ABG/ VBG one hour after starting NIV

Target RR <25 SPO₂ \geq 94 PCO₂ <45
12. while maintaining SPO₂ \geq 94 If PCO₂ \geq 45
 - Increase TV up to 8ml/kg
 - Decrease EPAP
 - Increase fall time.