

Airway & Breathing Study guide





Introduction

This study guide is based on the Resuscitation Council's approach to an A-E assessment (Resuscitation Council UK, 2015). Using a structured approach is important to ensure nothing is missed out and to improve the reliability of the assessment in any situation.

Airway and breathing assessments should form part of a systematic A-E assessment for all critical care patients, which are part of standard practice.

Airway

The airway includes the nose, mouth, larynx, pharynx, trachea, bronchi and bronchioles. Its main function is to carry air into the body. The aim of an airway assessment is to ensure this anatomical function is achieved and any obstruction (full or partial) of the airway is identified (Table 1). An indication of a patent airway is the patient's ability to speak with a usual voice in full sentences.



Many patients in critical care will have an artificial airway (endotracheal tubes or tracheostomies) until they are able to protect their own airway, or their respiratory functions improves.





Endotracheal tube (ETT)

Tracheostomy tube

Airway obstruction

An obstructed airway prevents the passage of oxygen to the lungs leading rapidly to hypoxia and potentially cardiac arrest.

Functional airway obstruction may be partial or complete and occur at any point from the level of the mouth/nose down to the end of the trachea (at the level of the carina). Airway obstruction commonly occurs in patients with a reduced conscious level. Less common causes include foreign bodies, secretions (e.g. vomit), and swelling (e.g. anaphylaxis, angio-oedema). While a patient with a partial airway obstruction may be panicked and agitated, beware the still patient whose chest is silent due to a completely obstructed airway.

Recognition

- LOOK
 - Chest movements
 - Use of accessory muscles
 - Tracheal tug
 - Foreign body obstruction
 - Misting of the oxygen mask
- **LISTEN** for abnormal sounds
- **FEEL** airflow on inspiration and expiration through the mouth and nose

Management

Airway obstruction are emergencies. Call for help immediately and instigate basic life support maneuvers to clear the airway and restore oxygenation.

Call for help

Oxygen – 15 L/min via a reservoir mask

Basic manoeuvres: Head tilt with chin lift or jaw thrust

Remove obvious foreign bodies or suction secretions

Use airway adjuncts if tolerated: oropharyngeal airway, nasopharyngeal airway, laryngeal mask

If the patient is not breathing- ventilate using a bag and mask e.g. an AMBU bag until expert help arrives



- Choking
- Gurgling
- Hoarseness
- Snoring
- Stridor











Breathing

Breathing is the process by which air moves in and out of the lungs, allowing gas exchange. In the stable and awake patient, breathing should be:

- Effortless
- Equal, with bilateral chest expansion
- At a rate between 12 20 breaths per minute
- Noise free, i.e., without any abnormal respiratory sounds, like wheezing, stridor or rattling

The breathing assessment should follow the standard BLS principles of look, listen and feel.

- Looking for any respiratory distress signs (Box 1)
- Assessing the depth and pattern of the respiratory cycle for 15 seconds and counting the respiratory rate for a full minute is recommended.
- The acceptable oxygen saturation:
 - >96% for patients without hypercapnic respiratory failure or chronic obstructive pulmonary disease (COPD)
 - 88-92% for patients with those conditions or at risk of worsening hypercapnia (Williams, 2019; National Guideline Centre, 2010; National Institute for Health and Care Excellence, 2018; O'Driscoll et al, 2008).
 - The patient's ability to talk in full sentences is a good indicator of their breathing status.
- Breathing sounds: Listening to the breathing sounds can give an idea of the cause of any breathing difficulty.
 - Rattling noises can indicate secretion
 - Wheezing can infer asthma
 - Stridor can suggest partial airway obstruction

(A more accurate assessment is auscultation with stethoscope, but this requires advanced skills)

Respiratory Failure

Respiratory failure is essentially failure to oxygenate, to eliminate carbon dioxide or a combination of both due to inadequate pulmonary gas exchange. It can be acute or chronic.

Clinical signs of respiratory failure

- Dyspnoea (breathlessness)
- Tachypnoea (respiratory rate > 20 breaths/min)
- Bradypnoea (respiratory rate < 8 breaths/min)
- Using accessory muscles of ventilation
- Inability to talk
- Cyanosis (blue discoloration of skin and mucous membranes due to the tissues having a low oxygen concentration)
- Tachycardia (heart rate > 100 beats/min)
- Confusion, agitation, sweating
- Reduced consciousness



Management – Oxygen therapy

The underlying principle for acutely ill patients is that **hypoxia is** dangerous and needs to be treated immediately. **A reservoir bag mask with 15 L/min O**₂ running is the treatment of choice until expert help arrives.

- Sit the patient up
- Attach monitoring: Pulse oximeter (O2 saturations monitor), Electrocardiogram (ECG), Blood pressure (BP) cuff).

In an improving patient with previously normal, healthy lungs, O_2 therapy should be titrated to target saturations of 94-98% via pulse oximetry using a variety of O_2 delivery devices. Further monitoring with arterial blood gas analysis might be indicated to check oxygen and CO_2 levels to help diagnose the type of respiratory failure and guide further management.

Oxygen delivery methods

Non-invasive ventilation (NIV)	Only for hypercapnic respiratory failure CRITICAL CARE SETTING ONLY	conscious level / agitation
СРАР	 Tight face mask or HOOD (seal needed to keep pressure) Flow 60-100 L/min O₂ up to 100% PEEP valve 5-20 cmH₂O 	 A nasogastric tube to decompress stomach (from swallowing air) might be appropriate REPORT: ↑ RR (25-30), worsened Work of breathing, changes in
High flow oxygen therapy (HFOT)	 Flow 50 L/min O₂ up to 100% Nasal prongs Warm humidification If unwell, increase FiO₂ first followed by flow Wean flow first, then FiO₂ Escalate to CPAP if FiO₂ > 60% 	 OBS: hourly until stable SIT OUT of bed (aim twice/day minimum) EAT & drink normally: use energy supplements Regular breaks – use HFON Consider laxatives
Reservoir face mask	 Flow 15 L/min O₂ delivery 85% 	Use in emergencies / acutely unwell.
Face mask	 Flow ranges 1-15 L/min O₂ delivery 30-60% Humidified systems 	AIM SpO ₂ >94%, Observe and monitor Escalation to CPAP if hypoxic Escalation to NIV if CO ₂ high
Nasal cannula	 Flow of 1-4 L/min Delivers 24-30% of O₂ 	Stable patients Non-humidified