Definition:
The diagnosis of asthma is a clinical one. Asthma is a chronic inflammatory disorder of the airways usually associated with widespread but variable airflow obstruction and an increase in airway response to a variety of stimuli. Obstruction is often reversible, either spontaneously or with treatment.

Key learning outcomes
By the end of this session the candidate will:

- Understand how to assess and treat the patient with asthma
- Recognise the signs and symptoms of severe, life-threatening, and near-fatal asthma
- Understand the potential complications following tracheal intubation and ventilation

Instructor information
Set the mood, establish usefulness and state learning outcomes for the session.

This session can be led as either:

- Case-based discussion using visual aids
- Simulation-based workshop +/- manikin

Case study
A 58-year-old ‘brittle’ asthmatic is brought in to the hospital with shortness of breath.

Clinical signs:
A  Clear
B  RR 30 min⁻¹, peak expiratory flow rate (PEFR) unrecordable, SpO₂ 86% on 6 litres min⁻¹ oxygen via Hudson mask
C  P 140 min⁻¹, BP 100/60 mmHg
D  Unable to speak and starting to tire
E: Pale and clammy

What action will you take?
Instructor information – points for discussion

- Discuss signs/symptoms of severe, life-threatening, and near-fatal asthma
- Discuss common trends in ABGs, including significance of ‘normal’ or rising PaCO₂ in deteriorating patient
- Initial treatment: oxygen, nebulised ß₂ agonists
- The aim of oxygen therapy is to maintain a normal arterial oxygen saturation (94 – 98%)
- Consider IV magnesium sulphate 8 to 10mmol (depending on dose available) over 20 min
- Role of intravenous bronchodilators; role of steroids (IV vs. oral)
- Discuss need for intubation and fluids

Case study continued

Arterial blood gases

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Normal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>FiO₂</td>
<td>0.4 (approx)</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>7.24</td>
<td>7.35 – 7.45</td>
</tr>
<tr>
<td>PaCO₂</td>
<td>50 mmHg</td>
<td>35 – 45 mmHg</td>
</tr>
<tr>
<td>PaO₂</td>
<td>51 mmHg</td>
<td>&gt; 75 mmHg on air</td>
</tr>
<tr>
<td>HCO₃⁻</td>
<td>20 mmol l⁻¹</td>
<td>22-26 mmol l⁻¹</td>
</tr>
<tr>
<td>BE</td>
<td>- 4 mmol l⁻¹</td>
<td>+/- 2 mmol l⁻¹</td>
</tr>
</tbody>
</table>

What will you do now?

Case study continued

The patient is intubated and shortly afterwards there is no palpable pulse.
Instructor information – points for discussion

- Reinforce normal ALS algorithm / guidelines for PEA
- Causes of arrest may not be present immediately prior to arrest but present simultaneously or following – Tension pneumothorax, Hypoxia, Hypokalaemia/electrolyte imbalance
- Consider relevant reversible causes: Hypoxia due to severe bronchospasm, arrhythmias due to Hypoxia or aminophylline or Hypokalaemia (aminophylline, salbutamol); Tension pneumothorax secondary to high airway inflation pressures and air trapping associated with bronchospasm
- Avoid hyperventilation – consider compression of the chest wall and/or a period of apnoea (disconnection of tracheal tube) to relieve gas trapping
- Discuss mechanical and manual ventilation considerations
- The patient has a tension pneumothorax – discuss signs / symptoms and needle decompression and follow up with thoracostomy tube
- Transfer to ICU

Key modifications to ALS approach

- Consider early tracheal intubation
- Ventilation may be difficult and its considerations
- Patients are at higher risk of pneumothorax
- Other key reversible causes include hypoxia and hyper/Hypokalaemia + metabolic disorders
- Treat dehydration
- Bronchodilators after initial resuscitation

Instructor information

Allow candidates to ask questions and reflect on the session content before terminating the session with a succinct review of the major points covered.