Title: ‘Failed intubation or anaphylaxis?’

Target Audience: Post Primary Anaesthetic Trainees, experienced ODPs

Learning objectives:

1. Anaphylaxis drill
2. Confidence that tracheal tube positioned correctly when seen to enter glottis
3. Decision making, teamwork, communication skills

Storyboard:
Anaesthetist takes over ENT list from consultant colleague. Told to place LMA due to surgical preference. LMA placement fails, however many times attempted. Saturations fall into 80s and stay there despite attempts at bag-mask ventilation (even with adjuncts). Anaesthetist should give muscle relaxant and intubate. Intubation will be easy, but there will be anaphylaxis to the muscle relaxant, with hypotension, tachycardia, bronchospasm and falling saturations. ODP will try to persuade anaesthetist that tube is malpositioned. Condition will improve on administration of intravenous adrenaline.

Resources:

Equipment

• SimMan (alert and cooperative) with ECG, NIBP, SaO2 attached. ETCO2 monitoring set up. All DAS guidelines Plan A, B, C and D equipment available outside theatre (difficult intubation trolley, fibreoptic bronchoscope with screen). IVI running. Suxamethonium drawn up on top of anaesthetic machine. Resuscitation trolley in corner of theatre.

• Anaesthetic chart

Students

• Anaesthetists: 2
• No. of ODPs: 1

Faculty

• Facilitator
• Computer operator
• Consultant
• Surgeon (scrubbed)
• Theatre nurse (runner)
Progression of scenario:

During LMA insertions, saturations fall to 80s and remain there. Intubation should be easy, but on ventilation there is no visible chest movement. The SaO2 falls further and there is only a flicker of ETCO2, which then disappears. The NIBP fails to read a blood pressure. Pulses are very faint. Chest auscultation reveals wheeze and poor air entry. The diagnosis is anaphylaxis to muscle relaxant. The ODP comments that the tube is probably in the oesophagus. Eventually, the patient goes into cardiac arrest and requires CPR. When adrenaline is given, the patient regains a cardiac output and ETCO2. With fluid resuscitation and 100% O2 via the ETT, the patient improves.

Possible outcomes:

- Anaesthetist takes tube out and tries to bag mask ventilate: condition continues to worsen
- Anaesthetist suspects blocked circuit: changes to Ambu bag or checks circuit, condition continues to worsen
- Anaesthetist asks about or examines for rash: is told there is a widespread rash, patient still goes into cardiac arrest

<table>
<thead>
<tr>
<th>Stage</th>
<th>Airway</th>
<th>Breathing</th>
<th>ETCO2 (if used)</th>
<th>Sats</th>
<th>HR</th>
<th>BP</th>
<th>CNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Patent, talking</td>
<td>Bilat AE RR16</td>
<td>Not present</td>
<td>98</td>
<td>80</td>
<td>120/70</td>
<td>Alert</td>
</tr>
<tr>
<td>Induction</td>
<td>Partial obstruction</td>
<td>Poor AE bilaterally</td>
<td>Obstructed trace</td>
<td>98 falling slowly</td>
<td>80</td>
<td>100/50</td>
<td>Anaes</td>
</tr>
<tr>
<td>LMA attempts</td>
<td>Obstructed</td>
<td>Minimal AE</td>
<td>Minimal, obstructed</td>
<td>Fall to 86</td>
<td>120</td>
<td>130/70</td>
<td>Anaes</td>
</tr>
<tr>
<td>Administration of muscle relaxant</td>
<td>Can intubate, can’t ventilate</td>
<td>Severe bronchospasm No AE</td>
<td>Nil</td>
<td>Fall to 80 lowest</td>
<td>160</td>
<td>60/20</td>
<td>Anaes</td>
</tr>
<tr>
<td>Tracheal tube removed, reinserted or delay in giving adrenaline</td>
<td>As above</td>
<td>Severe bronchospasm No AE</td>
<td>Nil</td>
<td>No trace</td>
<td>160</td>
<td>Nil (PEA arrest)</td>
<td>Anaes</td>
</tr>
<tr>
<td>Adrenaline (slower resolution if IM)</td>
<td>Can ventilate (if ETT)</td>
<td>Improving bronchospasm Mod AE</td>
<td>Resolving obstructive trace 50mmHg</td>
<td>Improving to 96</td>
<td>120</td>
<td>100/60</td>
<td>Anaes</td>
</tr>
</tbody>
</table>

Scenario Briefing:

Information for the students
You are taking over an ENT list from a consultant colleague. Next on the list is a 50 year old man with a BMI of 45 for endoscopic sinus surgery. His airway was assessed as follows: modified Mallampati score 2, thick neck, mouth opening 4cm, thyromental distance 8cm. Your colleague will hand over to you.

Information for Faculty

- The consultant should press the anaesthetist to use an LMA (this is the surgeon’s preference due to decreased coughing at the end). Can use a Proseal
• The ODP should voice that they think the tube is in the oesophagus
• The ODP should alert the anaesthetist to the rash if they do not ask and the patient is deteriorating towards an unsalvageable state

Escape routes
• Anaesthetist goes to intubate without muscle relaxant: ODP offers suxamethonium (drawn up as emergency drug on top of anaesthetic machine)
• Patient deteriorating and diagnosis not being made: ODP will advise about widespread rash
• Anaesthetist refuses to use LMA: allow intubation, anaphylaxis to muscle relaxant of choice, ODP asserts that tube probably in oesophagus
• Anaesthetist goes to attempt front of neck procedure as saturations falling. ODP suggests trying to intubate

Debriefing:
Goals: (What was going on? What was the diagnosis?)
1. Difficult LMA positioning
2. Anaphylaxis to muscle relaxant
3. ODP misdiagnosing oesophageal intubation

Realism: (Was the scenario realistic? If not, did this impact on decision making?)

Outcome/Options: (What went well? What could be done differently? What were the management options? What human factors issues were highlighted?)
1. Other possible diagnoses: isolated bronchospasm, obstructed circuit, obstructed tube
2. Other options to treat anaphylaxis (adrenaline, fluids and oxygen most important): steroids, antihistamines (H1 and H2 blockers), nebulised beta-agonists, ALS protocol
3. Reinforce value of giving adrenaline intravenously rather than IM
4. Importance of visualising tube entering glottis, use of bougie to make sure (easier to see it go in, clicks, hold-up) and being confident that tube correctly positioned.
5. Situational awareness and decision making

Ways Forward (What were the main learning points? What will you take home from the scenario?)
1. Anaphylaxis drill
2. Sticking to your guns