Acute Care Day – Respiratory

SCENARIO – The Patient with Acute Asthma

Notes for the instructor – not volunteered to students

30 minutes have been allocated to the running of the scenario with an additional 10 minutes for discussion of relevant points at the end. Timings are very tight so please try not to over-run.

Please do not tell the students the diagnosis until the scenario is over (unless they are struggling significantly)

This scenario is intended to demonstrate the problems associated with acute breathlessness and its treatment, specifically asthma. The students will be in groups of 5-6. Pick a lead student who will be the doctor and a helper who will be an A&E nurse. As the scenario is running, try to leave them to assess and treat the patient as much as possible. You will require to tell them the results of any observations they ask for e.g. pulse, BP, RR, sats, but only if they actually measure it.

Aim to ensure that students who have not previously been the “doctor” or “nurse” at an acute care day, take a turn on this occasion. Involve all the students in the group in doing something. The ones not actively involved in assessment and treatment could make suggestions regarding management if the lead student is struggling. They should be asked to pay attention to the running of the scenario and make suggestions afterwards about what went well and what could have been better. They can also be involved in discussing blood gas, CXR, ECG results and should take a main part in the post-scenario discussion.

The aim of this scenario is to emphasise the ABCDE form of assessment. In order to achieve this, the scenario should be repeated by a second set of students (one doctor, one nurse) to allow them to get some hands on experience at doing the ABCDE assessment. This second run through should be quicker and allow time for further discussion at the end.

The students should go through the ABCDE algorithm when assessing the patient. This will have been taught to them during the morning lectures so will not be new. They may require some prompting to do this in the correct order. Try not to allow them to move on from A to B and from B to C until they have completed the full assessment. Aim for this to occur in ‘real time’. If they ask for a blood pressure reading, they should go through the motions of taking it before you tell them the results. They may get bogged down in taking a history rather than performing ‘hands on’ interventions. Try to make sure that they understand that a history is important but can be done at the same time as ABC.

Several different blood gas results are supplied which the students should be shown if they ask for them. The first (A – on oxygen) or (B – on air) are the admission gases and ABG’s (C) and (D) are gases from the improving or deteriorating patient respectively, dependant on how the scenario is going. There is also a CXR available, again only if they ask for it. If no CXR is done, the film should only be discussed in
the final 5 mins following the scenario. Blood results and an ECG are also included should they ask for these.

Please do not allow the actor to hyperventilate!

Please ensure that the students are courteous to the actors.

The students should roughly follow the following sequence

A – Airway
The patient is able to talk but is very wheezy. They should talk to the patient and then apply an oxygen mask (trauma mask) and turn the oxygen up to 15 litres.

Learning points
- Speak to the patient first.
- Patient is talking so airway likely to be patent.
- Wheeze is a lower airway obstruction, not upper airway. Do not allow any use of airway adjuncts.
- High flow oxygen asap.

B – Breathing
The students should check respiratory rate, note accessory muscle use and respiratory distress, palpate the trachea, auscultate and percuss the chest and ask for a saturation monitor.
If they actually examine the patient, the observations are as follows:

PEFR 200 (patients normal 500)
RR 30/min
Sats 93% on air but 95% if oxygen already been applied
Trachea central
Poor air entry bilaterally with widespread wheeze and crackles at the right base
Chest resonant to percussion bilaterally with a small area of dullness at the right base

Hopefully the students will now realise that things are wrong and they need to institute some kind of treatment before moving on. If they do not, ask them if they are happy with their assessment of breathing and if there is anything they would like to do to make the situation better. The student should ask for some nebulisers to be given and may suggest taking blood gases or ordering a CXR. Allow them to do this but let them proceed to assess C – circulation before showing them the results.

Learning points at this point
- Recognise the raised respiratory rate as pathological.
- Need to examine chest for any causal factor for the exacerbation in a previously well-controlled asthmatic – infection, rule out tension pneumothorax.
- Recognise the need for high flow oxygen if not already and the fact that sats of 95% on oxygen in a young person are worrying.
• Recognise that the patient is tiring and requires immediate treatment and/or senior help.

C –Circulation
The students should conduct a full examination including pulse, blood pressure, capillary refill, assessment of any oedema or calf swelling and auscultation of the heart.

Again, if they carry out the above, the observations they will obtain are as follows:-

**Pulse 120 bpm**
**Blood pressure 120/75 mmHg**
**Heart sounds difficult to hear but normal with nil added**
**Capillary refill <3 secs, patient hot and sweaty**
**No oedema or calf swelling**

They should at this point indicate that they would like to obtain IV access and take some bloods. They should be directed to the equipment table and asked to choose an appropriate sized cannula. If they do not also suggest starting IV fluids at this point, they can be asked what they think of the cardiovascular parameters measured and what they think the patient’s fluid balance may be. Appropriate blood tests would include FBC, UE, CRP, Blood cultures, blood glucose +/- LFT’s (and ABGs if not already done). Some may also suggest sputum cultures / sputum for viral titres.

*Learning points at this point*

• The tachycardia may be due to a variety of causes. They must understand that asthmatics are breathing rapidly and working hard so are likely to be dehydrated and require IV fluids.
• Patients with an intercurrent infection, such as this patient, will be pyrexial and even more dehydrated.
• IV access is essential in all ill patients.
• The medication some asthmatics are on can results in biochemical derangement (K especially) so it is important to send urgent bloods.

***At this point ask the students how sick they think the patient is. It may be appropriate to show them the flow chart of moderate, severe and life-threatening asthma and ask them which category they think the patient is in.***

**Further Treatment**

After what hopefully is a relatively rapid initial assessment of ABC the students should concentrate on how exactly they are going to treat the asthma. Depending on how they get on, you must decide whether the patient is going to improve or deteriorate further (this may also be decided for you by time constraints). All test results, if the students ask for them, are detailed on the final page.

You should aim to facilitate the initiation of the following:-

• **Nebulisers** – salbutamol 5mg and ipratropium bromide 500mcg through oxygen as saturations are low, repeated as required.
- **Steroids** – hydrocortisone IV 100-200mg or oral prednisolone 50mg
- **Oxygen** – ensure they give high flow, even if they have seen ABG (D) of the deteriorating patient with raised CO2. This may require clarification.
- **Antibiotics** – if intercurrent infection felt to be exacerbating factor. Remember to suggest they take blood and sputum cultures first as long as this does not delay treatment.
- **IV fluids** – for rehydration.

All students should really get this far. They may not know doses and proper names of drugs, but with prompting should manage up to this point. It may be appropriate to leave the discussion of other possible treatments in unresponsive cases to the 5 minutes at the end but if a student is doing particularly well you can ask them if they know of any other treatments for asthma.

Alternative treatments could include:-

- Magnesium
- IV salbutamol
- Volatile anaesthetic agents (i.e. ICU referral)

***At all times please emphasise that continuous review of the patient’s progress is imperative. Deterioration can be very fast. Any normally well-controlled asthmatic who feels unwell enough to phone an ambulance is in danger. Ensure they know to get help sooner rather than later.***

Should you decide to allow the patient to deteriorate, ensure you convey this to the actor. The patient will look exhausted, become less talkative, drowsy, their wheeze will be quieter and saturations will drop as will blood pressure. If the students realise this and repeat the blood gases, show them sample (D) with a raised CO2 level and hypoxia. Ask them at this point if they need any further assistance. Hopefully they will suggest calling intensive care for intubation – if they’ve not already done it previously!

If the students have been particularly speedy in initiating treatment, allow the patient to improve and show the blood gas sample (C) if they want to repeat the tests.

**Learning points at this point**

- Immediate treatment for asthma is imperative.
- A normal or raised CO2 level on blood gas analysis is worrying and should prompt an immediate call for assistance in case the patient requires ventilation.
- Look for and treat any exacerbating factors.
- A reduction in wheeze intensity does not always mean the patient is improving. They may simply be exhausted and unable to shift any significant volume of air.
- Continuous reassessment of any intervention should occur.
- ABC allows treatment and assessment in an organised fashion.
Points for Discussion

Try and summarise what happened during the scenario. The most important thing is to emphasise the use of ABCDE algorithm. Most students have heard of this but are maybe not so confident about putting it into practice.

Critical points to emphasise include:-

- Understand the importance of high flow oxygen.
- Understand that asthmatics can deteriorate rapidly and that it remains a fatal illness.
- Early call for help.
- A normal or raised CO2 level is a VERY worrying sign.
- Rapid institution of simple treatment saves lives.

If you have time you may also want to discuss:-

- CXR – emphasise hyperexpansion, looking for signs of infection, looking for pneumothorax (a complication, especially in those patients who require ventilation).
- Blood gases – respiratory acidosis, CO2 levels especially.
- Bloods – emphasise looking for dehydration, hypokalaemia.

Ask all the students what they felt went well with the scenario. Remember to emphasise the good points.

Subtly suggest areas for improvement in future and allow them to ask questions.
# SUMMARY OF SEVERITY OF ASTHMA

<table>
<thead>
<tr>
<th></th>
<th>MILD</th>
<th>MODERATE</th>
<th>SEVERE (Life-threatening)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEFR</strong></td>
<td>&gt;75% best</td>
<td>33-75% best</td>
<td>&lt;33% best</td>
</tr>
<tr>
<td><strong>Resp Rate</strong></td>
<td>&lt;25/min</td>
<td>&gt;25/min</td>
<td>Poor resp effort</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Silent chest Cyanosis</td>
</tr>
<tr>
<td><strong>Saturations</strong></td>
<td>Normal</td>
<td>&gt;92%</td>
<td>&lt;92%</td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td>&lt;110bpm</td>
<td>&gt;110bpm</td>
<td>Bradycardia Arrythmia</td>
</tr>
<tr>
<td><strong>CNS</strong></td>
<td>Able to converse</td>
<td>Unable to finish sentence in one breath</td>
<td>Exhausted Confused Coma</td>
</tr>
</tbody>
</table>
**SUMMARY OF BLOOD RESULTS**

**FBC -**
- Hb – 14.5 g/dl *(10.5 – 15.0)*
- WCC – 13.0 (1000 cells/mm³) *(4.0 – 10.0)*
- Plt – 151 (1000/mm³) *(110 – 200)*

**U and E’s -**
- Na - 145 mmol/l *(135-147)*
- K - 3.0 mmol/l *(3.3 – 5.0)*
- Cl - 99 mmol/l *(96 – 103)*
- HCO₃ - 27 mmol/l *(24-28)*
- Urea - 9.4 mmol/l *(4.0 – 7.0)*
- Creat - 135 mmol/l *(95 – 130)*

Blood glucose - 5.6 mmol/l *(3.4 – 8.0)*
SUMMARY OF BLOOD GAS RESULTS

Sample A – admission (on 15L oxygen)
- H: 42 (35-45)
- PCO2: 3.1 (4.4 – 6.5)
- PO2: 19.6 (10.0 – 15.0)
- HCO3: 27 (24 – 28)

Sample B – admission (on air)
- H: 42
- PCO2: 3.1
- PO2: 10.0
- HCO3: 27

Sample C – improving post-treatment
- H: 40
- PCO2: 3.8
- PO2: 25.4
- HCO3: 26

Sample D – deteriorating
- H: 54
- PCO2: 6.7
- PO2: 9.6
- HCO3: 28
**Brief to actor – not volunteered to the students**

You are a 35 year old office worker who has known asthma. You have been in hospital a few times before with an exacerbation, usually brought on by a chest infection. Your asthma is normally well controlled and you are otherwise well. You don’t smoke.

You have had a cough and a dirty spit for the last 2-3 days and have been feeling a little more breathless than normal. You normally take a brown inhaler twice a day and a blue inhaler when you need it. Recently you have been taking your blue inhaler more often as you have been more wheezy than normal. Your inhaler ran out last night, you have been unable to sleep due to cough and wheeze and you have now presented to A&E with sudden worsening of breathlessness and wheeze.

At the beginning of the scenario you are alert and anxious / agitated and very breathless and wheezy (be careful not to over-breathe for too long!). You have a chesty cough. You are sitting bolt upright and are only able to speak in broken sentences due to the breathlessness. Now and again you can ask the doctor to help you or say that you can’t get a breath but don’t speak too much, you are trying to conserve your energy. As you become more breathless, you start to use your neck and shoulder muscles to help you breathe – we will show you how.

Listen to what the instructor is saying to the students for cues about what to do next. It is likely that you will become more tired, speak less often and maybe become a little drowsier. This depends on how quickly the students initiate treatment. The instructor will guide you as to what to do. Also, if the students ask you any question you are unsure how to answer, the instructor will provide a prompt. In the worst case scenario, if no treatment is initiated, you will become unconscious. The instructor will not let the students do anything unpleasant to you at this point. If at any time, you are in discomfort, raise your hand and the scenario will be stopped.
Brief to students

This is a 35 year old office worker who has been brought to A&E by ambulance complaining of severe breathlessness. You are the doctor in A&E and are called to assess the patient. Any other information you require will be given to you by the patient. You have a nurse to assist you. The nurse is very competent but will not do anything without being asked. For example, if you want to give oxygen, you must specify how much and via what type of device. You should aim to follow the ABCDE style of assessment.