ILLNESS SIMULATION 6

Simulation focus - Anaphylaxis (Surgical airway - discussion)

Expected outcomes

Team Leader - Perform initial ABCDE assessment, direct team and lead care. Recognises anaphylaxis and instigates appropriate management as per the algorithm. Recognises ongoing deterioration including threatened airway and escalates whilst administering further adrenaline.

Team/More experienced candidate - Recognises loss of airway and refractory anaphylaxis. Is able to discuss various forms of front of neck access including surgical airway.

Assessment

This simulation allows for discussion around surgical airways.

History

Emergency staff:

You have had a pre-alert from a non-paramedic crew bringing in Lou, a three-year-old child, known to be allergic to peanuts. They attended a friend's birthday party and after eating part of a chocolate bar, vomited once and developed a widespread urticarial rash. The ambulance crew are concerned as they appear drowsy with swollen lips.

Ward staff:

You are called to review a three-year-old child, Lou on the paediatric ward. Shortly after receiving their first dose of IV antibiotics for cellulitis the FY1 noted a widespread urticarial rash that they think might be an allergic reaction. The cannula has subsequently tissued and been removed.

Immediately apparent

Please ensure the prompt card with global overview is placed on the manikin for the start of the sim.

As you approach the child you can clearly see evidence of a widespread urticarial rash and lips appear to be full.

*For the **ward case**, cellulitis is noted on the left leg and remains within a previously demarcated area.*

Clinical course *(to be given as the simulation progresses)*

Assess	Features	Action	Key treatment points
A	Mild-moderate facial swelling	Assess, establish airway currently patent but potentially threatened. Oxygen administered	**IM adrenaline (150mcg)** Ask for help
B	**RR 38** with laboured breathing. Equal air entry. Mild generalised wheeze throughout. **SpO_2 92% on room air**.	Assess including auscultation and SpO_2. Recognised increased effort but no LRTI signs. Administer O_2 if not already.	High flow oxygen via non-rebreathe face mask
C	**HR 140, CRT 2, BP 79/38**	Assess and recognise compensated shock.	**IV/IO access** Bloods **10ml/kg fluid bolus**
D	Responds to voice, **GCS 14** (E3V5M6). **BM 6.7** Pupils 4mm, reflexes brisk.	Assess	Check blood glucose

E	Widespread urticarial rash as described, facial swelling. **Temp 37.1ºC**	Assess	

Reassessment

The candidate then begins to hear a strange noise prior to re-assessment.

Assess	Features	Action	Key treatment points
A	Stridor and worsening lip swelling noted	Assess, recognises deteriorating airway	**2nd dose of IM adrenaline (150mcg)** Nebulised adrenaline may be given (5ml 1:1000) **Urgent escalation to anaesthetics**
B	**RR 25** with laboured breathing. Equal air entry. Stridor plus mild generalised wheeze throughout. **SpO_2 91%** on high flow oxygen.	Assess including auscultation and SpO_2. Recognised increased effort but no LRTI signs. Administer O_2 if not already 2 helpers arrive at the end of this section	High flow oxygen via face mask
C	**HR 153, CRT 3-4, BP 71/32**	Assess and recognise decompensated shock. Consider refractory anaphylaxis algorithm /treatments	**10ml/kg fluid bolus** Bloods Consider potential need for adrenaline infusion should patient not respond to 2nd IM dose.
D	Responds to pain, **GCS 12** (E3V4M5). Pupils 4mm, reflexes brisk. **BM 6.7**	Assess and recognise decreased consciousness due to exhaustion (or possible hypercapnia)	
E	Widespread urticarial rash as described, facial swelling. **Temp 37.1ºC**		

Reassessment

As Candidate ends reassessment the child begins to become extremely agitated, saturations drop. There is still cardiac output.

Assess	Features	Action	Key treatment points
A	Quiet stridor, cyanotic. Facial and tongue swelling +++. See-saw abdomen. Airway **not** patent	Assess May trial NPA/OPA/SAD however NPA will make no difference and child will resist insertion of OPA/SAD	Recognises upper airway obstruction necessitating front of neck access Sim ends at this point

NB	This station aims to review the anaphylaxis and refractory anaphylaxis algorithms as well as ensuring the candidate can recognise the airway at threat and obstructed airway. Other suggestions for treatment may be made (i.e., salbutamol/steroids/antihistamines) and it is within your discretion whether they are given and make no difference or are still being located and so are not administered. **If the candidate fails to appreciate the critical airway obstruction on reassessment and need for surgical airway, the insider should suggest it otherwise the patient will deteriorate until it is recognised.** If RSI is suggested, it would be reasonable for faculty helper (or other faculty member) to act out this with the outcome being a “can’t intubate and can’t ventilate” scenario. The candidate could then be questioned on what should be done – front of neck, and the sim ends.

Debrief

Using the learning conversation, discuss the technical and non-technical elements of the simulation

Assessment

This station makes up part of the continuous assessment process, therefore candidates need to know whether they are meeting the standard.

At the end give the opportunity for candidates to ask questions, answer these and then summarise the key points.

Props to print and laminate

Illness 6 - Global overview (to be placed on SIM manikin) - ED

The child has a widespread urticarial rash.

They have very full lips.

Illness 6 - Global overview (to be placed on SIM manikin) - Ward

The child has a widespread urticarial rash.

They have very full lips.

Cellulitis is noted on the left leg and remains within a previously demarcated area.

Illness 6 - Results Information

Venous Blood Gas – taken during first assessment and given if requested

pH	7.19
PO_2	8.1 (FiO_2 0.21)
pCO_2	6.9
HCO_3-	18
BE	-7
Na	138
K	5.3
Ca (ionised)	1.2
Lacate	3.3

BM 6.7

Faculty Helper Information – Illness 6

When candidate requests information regarding observations please give the following in "real-time" (e.g., wait for blood pressure to cycle, saturation trace to be achieved). If key treatment points are not undertaken, consider a "prompt" that would be visible in a child.

Assess	Observation	Example prompt
A	Mild-moderate facial swelling	"Do you think her face usually looks like that?"
B	**RR 38** with laboured breathing. Equal air entry. Mild generalised wheeze throughout. **SpO_2 92% on room air**.	"She's breathing quite hard, isn't she?" "Sounds a bit wheezy"
C	**HR 140, CRT 2, BP 79/38**	If "bloods" prompt and ask which ones
D	Responds to voice, **GCS 14** (E3V5M6). **BM 6.7** Pupils 4mm, reflexes brisk.	
E	Widespread urticarial rash as described, facial swelling. **Temp 37.1ºC**	"I don't like the look of that rash"

First Reassessment – Illness 6

Assess	Observation	Example prompt
A	Stridor and worsening lip swelling noted	"I think her face is getting worse, do you want anything else?" "What's that noise?"
B	**RR 25** with laboured breathing. Equal air entry. Stridor plus mild generalised wheeze throughout. **SpO_2 91%** on high flow oxygen.	"She's breathing quite hard, isn't she?" "Oxygen is still attached"
C	**HR 153** **CRT 3-4** **BP 71/32**	"Do you want more fluids?"
D	Responds to pain, **GCS 12** (E3V4M5). Pupils 4mm, reflexes brisk. **BM 6.7**	"She looks a bit tired, doesn't she?"
E	Widespread urticarial rash as described, facial swelling. **Temp 37.1ºC**	

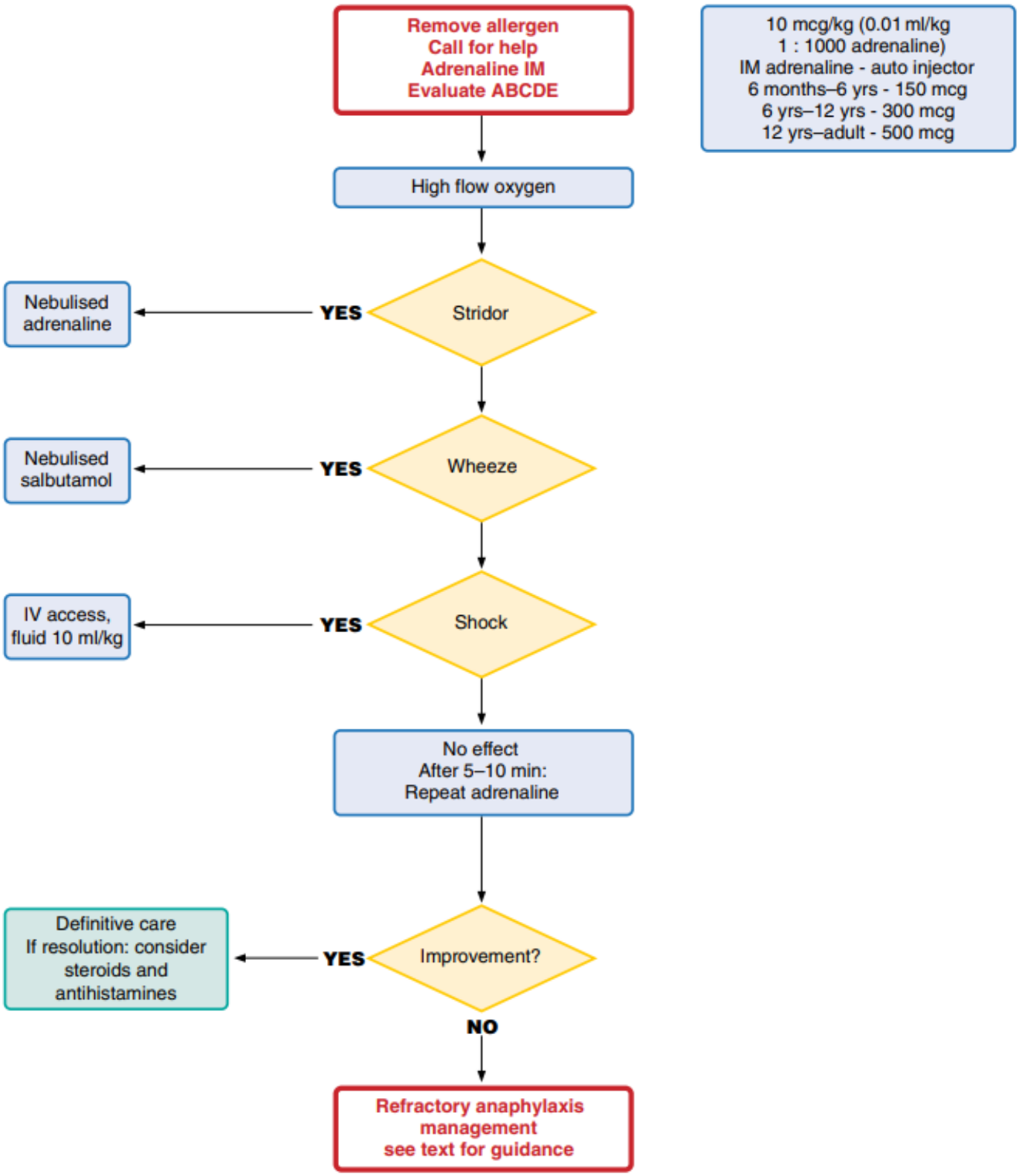
Second Reassessment – Illness 6

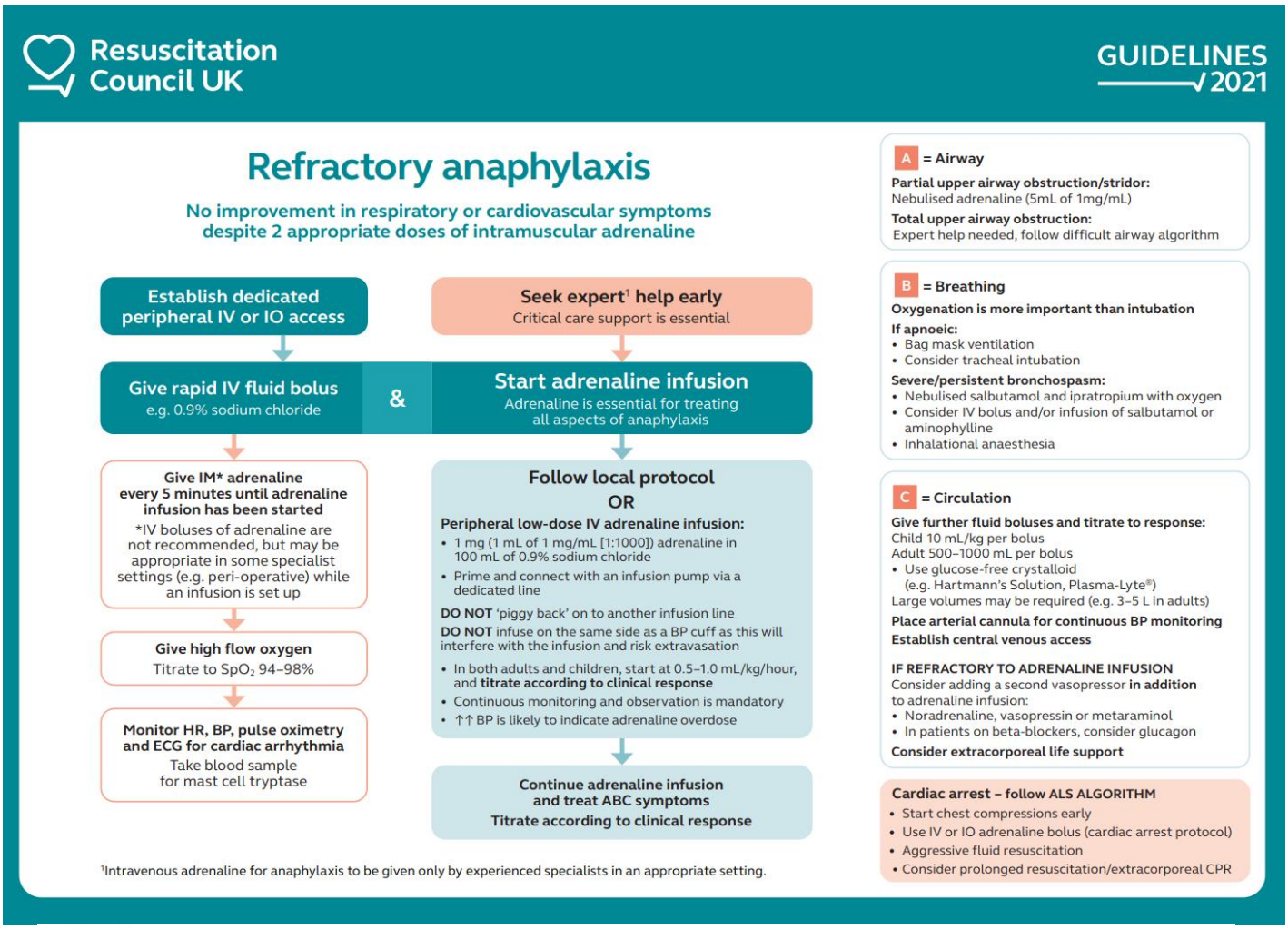
Assess	Observation	Example prompt
A	Quiet stridor, cyanotic. Facial and tongue swelling +++. See-saw abdomen. Airway **not** patent	"Is she still breathing?" "Oxygen is still attached" "What else can we do?" "I think you need more help" **"I think she needs a surgical airway"**
If RSI is suggested, it would be reasonable for faculty helper to act out this with the outcome being a "can't intubate and can't ventilate" scenario. The candidate could then be questioned on what should be done – front of neck, and the sim ends.		

Algorithms:

Anaphylaxis
Refractory Anaphylaxis

APLS: Emergency treatment of anaphylaxis





Further emergency management

For anaphylaxis features that do not respond to initial IM adrenaline, continue with a bolus of balanced crystalloid and/or ventilatory support, and give a second dose of IM adrenaline 5 minutes after the first. If the reaction does not respond to two doses of IM adrenaline, commence **refractory anaphylaxis management**. Give a rapid fluid bolus and commence an IV/IO adrenaline infusion according to local guidelines and titrate to clinical response. While waiting for the infusion to be prepared, continue IM adrenaline every 5 minutes.

The child should be closely monitored with continuous pulse oximetry, blood pressure and ECG. If the shock is refractory to the adrenaline infusion a second vasopressor, such as noradrenaline, vasopressin or metaraminol, could be considered. Guidance from a paediatric intensive care specialist is vital.

Take a blood sample for mast cell tryptase for future analysis as soon as possible, and a second sample 2–4 hours later.

In addition to this treatment, corticosteroids (e.g. hydrocortisone) are still recommended for refractory reactions. The role these drugs have in acute management is limited, as their onset of action is too delayed to be of much benefit in the first hour.

In cardiac arrest, resuscitation should be aggressive – do not give up too soon. Prolonged cardiopulmonary resuscitation, including extracorporeal membrane oxygenation (ECMO), should be considered as the cause of arrest is potentially reversible and the tissue oxygenation prior to arrest is likely to have been normal.