CLINICAL GUIDELINE

Recognition and Management of Anaphylaxis

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Important Note:

The Intranet version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Contents

1. Introduction

Anaphylaxis is an extreme form of allergic sensitivity that involves an abnormal antigen-antibody response to a drug or other substance introduced into the body. The incidence of anaphylactic reactions is increasing.1

The World Allergy Organisation Anaphylaxis Committee defines anaphylaxis as: 11 "A serious systemic hypersensitivity reaction that is usually rapid in onset and may cause death. Severe anaphylaxis is characterized by potentially life-threatening compromise in airway, breathing and/or the circulation, and may occur without typical skin features or circulatory shock being present (Emergency treatment of anaphylaxis Guidelines for healthcare providers, 2022)

1.1 **Summary of changes from previous guideline**

This guideline replaces the previous guideline from Resuscitation Council UK (RCUK): Emergency treatment of anaphylactic reactions – Guidelines for healthcare providers (Originally published January 2008, annotated July 2012 with links to NICE guidance).20.

• Greater emphasis on intramuscular adrenaline to treat anaphylaxis, and repeated after 5 minutes Airway/Breathing/Circulation problems persist.

• A specific dose of adrenaline is now included for children below 6 months of age.

• Increased emphasis on the importance of avoiding sudden changes in posture and maintaining a supine position (or semi-recumbent position if that makes breathing easier for the patient) during treatment.

• There are 2 algorithms: Initial treatment of anaphylaxis, with emphasis on repeating the dose of adrenaline after 5 minutes and giving an IV fluid bolus if Airway/Breathing/Circulation problems persist.

& Treatment of refractory anaphylaxis, defined as anaphylaxis where there is no improvement in respiratory or cardiovascular symptoms despite two appropriate doses of IM adrenaline.

• IV fluids are recommended for refractory anaphylaxis, and must be given early if hypotension or shock is present.

• Antihistamines are considered a third-line intervention and should not be used to treat Airway/Breathing/Circulation problems during initial emergency treatment. Non-sedating oral antihistamines, in preference to chlorphenamine, may be given following initial stabilisation especially in patients with persisting skin symptoms (urticaria and/or angioedema).

• Corticosteroids (e.g. hydrocortisone) are no longer advised for the routine emergency treatment of anaphylaxis.

• New guidance is offered relating to the duration of observation following anaphylaxis, and timing of discharge.

This updated guideline has been developed according to the GRADE Evidence to Decision (EtD) frameworks for adoption, adaptation, and de novo development of trustworthy recommendations (GRADE-ADOLOPMENT).2 The evidence tables and conclusions have been peer-reviewed and published.
21

1. Scope

This guidance is applicable to all areas of the NHS GGC Mental Health service. Irrespective of where a situation arises, the need to improve patient outcome by the early administration of intramuscular Adrenaline immediately following diagnosis, drives the associated practice. As nurses are invariably involved in the administration of newly prescribed drugs and they have a statutory duty to provide care, then they are considered the 'first line' of response in the provision of the initial treatment. A prescription is **not** required to administer IM Adrenaline in Anaphylaxis. The treatment Algorithm on page 12 & 13 is guided by the fact that additional interventions are provided
'where equipment and skills' are available but Adrenaline must be available/accessible in all settings, Including Adult, Older People, Learning Disabilities, Addictions, Child and
Adolescent both community and all inpatient/ residential services.

2. Background

Anaphylactic reactions can vary in severity and progress. Extremely rarely the manifestations may be delayed for a few hours. This is an important element for the administration of drugs, particularly parenteral drugs, within a patient's home. Written advice must be provided for the patient and carer describing potential 'delayed' reactions and the necessary actions to take. In inpatient settings, nurses must be aware of the fact that there

may be a delayed reaction and monitor the patient accordingly.

All those who are suspected of having had an anaphylactic reaction should be referred to a specialist in allergy. Intravenous adrenaline must only be used in certain specialist settings and only by those skilled and experienced in its use, this does not include routine Mental Health settings. Individuals who are at high risk of an anaphylactic reaction should carry an adrenaline auto-injector and receive training and support in its use.

Individuals who are involved in resuscitation regularly are more likely to have advanced resuscitation skills than those who are not. This guideline does not expect individuals to obtain intravenous access in an emergency if this is not part of their usual role. Rather, individuals should use skills that they know and use regularly. This will make it more likely that these skills are used effectively on the rare occasions when they are needed to treat an anaphylactic reaction. Any extra skills specifically for the treatment of a patient with an anaphylactic reaction should be reasonably easy to learn, remem ber and implement (e.g., intramuscular (IM) injection of adrenaline).

Treatment of an anaphylactic reaction should be based on general life support principles:

- Use the Airway, Breathing, Circulation, Disability, Exposure (ABCDE*) approach to recognise and treatproblems.
- Call for help early (2222 for main hospital services or 999 for Resource Centres, community settings – including a patients home, LD residential settings and satellite units such as Birdston Nursing Home

Treat the greatest threat to life first.

- Initial treatments should not be delayed by the lack of a complete history or definite diagnosis.

Patients having an anaphylactic reaction in any setting should expect the following as a minimum:

- Recognition that they are seriously unwell.
- An early call forhelp.
- Initial assessment and treatments based on an ABCDE* approach.
- Adrenaline therapy if indicated.
- Investigation and follow-up by an allergyspecialist.

Within community mental health teams/services the availability and use of Adrenaline IM is highly recommended. There is a professional and organisation duty to ensure that rapid access to the definitive treatment for this life threatening emergency should be available. This is particularly relevant if a patient has a history of anaphylaxis (typically patient should have own auto injector which is only used if no service Adrenaline accessible), severe asthma and/or food allergies/allergy history. Adrenaline 1 in 1’000, with needles/syringes should be available within Resource Centres/community facilities to facilitate administration in such circumstances.

*See Appendix 1 for more information about the ABCDE approach.

3. Triggers

Anaphylaxis can be triggered by any of an extensive range of triggers, but those most commonly identified include food, drugs and venom2. The relative importance of these varies considerably with age, with food being particularly important in children and medicinal products being much more common triggers in older people3. Of foods, nuts are the most common cause; muscle relaxants, antibiotics, and NSAIDs are the most commonly implicated drugs (Table 1). It is important to note that, in many cases, no cause can be identified.

	Anaphylaxis (all severities)	Fatal anaphylaxis
Foods	Commonest triggers: • Peanut • Tree nuts • Cow's milk (children) Accounts for 35% of hospital admissions coded as anaphylaxis[5]	Commonest triggers:[5] • Peanut or tree nuts (50%) • Cow's milk (11% of total, 26% in children) 19% of anaphylaxis-related deaths[4]

Medication	Commonest triggers are antibiotics and chemotherapy drugs
	
	Commonest triggers in peri-operative setting:[20]
	• Antibiotics (47%)
	  ○ Co-amoxiclav (23%)
	  ○ Teicoplanin (18%)
	• Neuromuscular blocking agents (NMBAs) (33%)
	• Chlorhexidine (9%)
	
	Accounts for 17% of hospital admissions coded as anaphylaxis[4]
		Commonest triggers:[22]
		• NMBAs (32%)
		• Antibiotics (27%)
		  ○ Penicillins (11%)
		  ○ Cephalosporins (12%)
		• Contrast media (11%)
		• Non-steroidal anti-inflammatory drugs (6%)
		
		39% of anaphylaxis-related deaths[4]

Insect stings	6.5% of hospital admissions coded as anaphylaxis[4]	14% of anaphylaxis-related deaths[4]

(Resuscitation Council UK, 2021)

4.1 Mortality

The overall prognosis of anaphylaxis is good, with a case fatality ratio of less than 1% reported in most population-based studies 4-6. Risk of death is, however, increased in those with pre-existing asthma, particularly if the asthma is poorly controlled 7. There are approximately 20 anaphylaxis deaths reported each year in the UK, although this may be a substantial under-estimate.

4.2 Risk of recurrence

The risk of an individual suffering recurrent anaphylactic reaction appears to be quite substantial, being estimated at approximately 1 in 12 per year8.

4.3 Trends over time

There is very limited data on trends in anaphylaxis internationally, but data indicate a dramatic increase in the rate of hospital admissions for anaphylaxis, increasing from 0.5 to 3.6 admissions per 100,000 between 1990 and 2004: an increase of 700% 9, 10.

When anaphylaxis is fatal, death usually occurs very soon after contact with the trigger. From a case- series, fatal food reactions cause respiratory arrest typically after 30–35 minutes; insect stings cause collapse from shock after 10–15 minutes; and deaths caused by intravenous medication occur most commonly within five minutes

4. Recognising and diagnosing

A diagnosis of anaphylactic reaction is likely if a patient who is exposed to a trigger (allergen) develops a sudden illness (usually within minutes of exposure) with rapidly progressing skin changes and life- threatening airway and/or breathing and/or circulation problems. The reaction is usually unexpected.

The lack of any consistent clinical manifestation and a range of possible presentations cause diagnostic difficulty in practice. Many patients with a genuine anaphylactic reaction are not given the correct treatment12. Patients, particularly children, have been given injections of adrenaline inappropriately for allergic reactions just involving the skin, or for Vasovagal reactions or panic attacks 13.

A single set of criteria will not identify all anaphylactic reactions. There is a range of signs and symptoms, none of which are entirely specific for an anaphylactic reaction; however, certain combinations of signs make the diagnosis of an anaphylactic reaction more likely
14. When recognising and treating any acutely ill patient, a rational ABCDE approach must be followed and life-threatening problems treated as they are recognised (see Appendix 1)

Airway

Severe upper-airway obstruction is uncommon in refractory anaphylaxis. Evidence from autopsy shows significant laryngeal oedema in under 10% of cases.84 this may be due to laryngeal oedema being responsive

to adrenaline treatment.

Tissue oxygenation is more important than tracheal intubation.
If tracheal intubation is indicated, it should be performed by the most experienced clinician available, following a difficult airway protocol (das.uk.com/guidelines).
Nebulised adrenaline can be used to treat upper airway obstruction due to anaphylaxis12 but should not be prioritised over an adrenaline infusion or delay tracheal intubation in cases of critical upper airway obstruction. 6.7.2

Breathing

Severe bronchospasm is common in food-induced anaphylaxis, 85 and in children; in these cases, cardiac arrest is usually secondary to hypoxia. Treat severe respiratory symptoms that are refractory to IM adrenaline with an adrenaline infusion in addition to nebulised and intravenous bronchodilator therapy.

Magnesium sulfate is not recommended as a first-line intravenous bronchodilator in anaphylaxis as it can cause significant vasodilation and worsen hypotension. 6.7.3

Circulation

Reduced venous return is common in anaphylaxis, even in the absence of obvious circulatory compromise (e.g. in those with severe bronchospasm). An adrenaline infusion should be the first-line treatment alongside a fluid bolus.

Give further fluids as necessary. There is a tendency to underuse fluids to treat hypotension during anaphylaxis.20 A large volume (up to 3 – 5 litres in adults) may be needed for severe anaphylactic shock.29 When giving large volumes of fluid, use a non-glucose-containing crystalloid (e.g. Hartmann's or Plasma-Lyte®) rather than 0.9% sodium chloride to reduce the risk of causing hyperchloraemia.

In considering second-line vasopressor treatment, there is insufficient evidence to recommend any particular vasopressor; expert advice and local protocols should be followed. Doses should be titrated to clinical response, and administered only where there is sufficient expertise and monitoring available to minimise the risk of potential side effects (e.g. hypertensive crises and pulmonary oedema).

Cardiac arrest

Circulation problems (often referred to as anaphylactic shock) can be caused by direct myocardial depression, vasodilation and capillary leak, and loss of fluid from the circulation. Bradycardia (a slow pulse) is usually a late feature, often preceding cardiac arrest.

The circulatory effects do not respond, or respond only transiently, to simple measures such as lying the patient down and raising the legs. Patients with anaphylaxis can deteriorate if made to sit up or stand up.

The above Airway, Breathing and Circulation problems can all alter the patient's neurological status (Disability problems) because of decreased brain perfusion. There may be confusion, agitation and loss of consciousness.

Patients can also have gastro-intestinal symptoms (abdominal pain, incontinence, vomiting).

5.1 Skin and or mucosal changes

These should be assessed as part of the Exposure when using the

ABCDE approach.

- They are often the first feature and present in over 80% of anaphylactic reactions.
- They can be subtle or dramatic.
- There may be just skin, just mucosal, or both skin and mucosal changes.
- There may be erythema – a patchy, or generalised, red rash.
- There may be urticaria (also called hives, nettle rash, weals or welts), which can appear anywhere on the body. The weals may be pale, pink or red, and may look like nettle stings. They can be different shapes and sizes, and are often surrounded by a red flare. They are usually itchy.
- Angioedema is similar to urticaria but involves swelling of deeper tissues, most commonly in the eyelids and lips, and sometimes in the mouth and throat.

Skin changes without life-threatening airway, breathing or circulation problems do not signify an anaphylactic reaction. Most patients who have skin changes caused by allergy do not go on to develop an anaphylacticreaction.

5.2 Differential diagnosis

Life-threatening conditions:

- Sometimes an anaphylactic reaction can present with symptoms and signs that are very similar to life-threatening asthma – this is commonest in children.
- A low blood pressure (or normal in children) with a petechial or purpuric rash can be a sign of septic shock.
- Seek help early if there are any doubts about the diagnosis and treatment.
- Following an ABCDE approach will help with treating the differential diagnoses.

Non-life-threatening conditions (these usually respond to simple measures):

- Faint (vasovagalepisode).
- Panic attack.
- Breath-holding episode in child.

Idiopathic (non-allergic) Urticaria or Angioedema.

There can be confusion between an anaphylactic reaction and a panic attack. Victims of previous anaphylaxis may be particularly prone to panic attacks if they think they have been re-exposed to the allergen that caused a previous problem. The sense of impending doom and breathlessness leading to hyperventilation are symptoms that resemble anaphylaxis in some ways. While there is no hypotension, pallor, wheeze, or urticarial rash or swelling, there may sometimes be flushing or blotchy skin associated with anxiety adding to the diagnostic difficulty. Diagnostic difficulty may also occur with vasovagal attacks after immunisation

procedures, but the absence of rash, breathing difficulties, and swelling are useful distinguishing features, as is the slow pulse of a vasovagal attack compared with the rapid pulse of a severe anaphylactic episode. Fainting will usually respond to lying the patient down and raising the legs.

As the diagnosis of anaphylaxis is not always obvious, all those who treat anaphylaxis must have a systematic approach to the sick patient. In general, the clinical signs of critical illness are similar whatever the underlying process because they reflect failing respiratory, cardiovascular, and neurological systems,
I.e. ABCDE problems. Use an ABCDE approach to recognise and treat an anaphylactic reaction. Treat life- threatening problems as you find them. The basic principles of treatment are the same for all age groups.

5. The specific treatment of an anaphylactic reaction depends on:

a. Location.

b. Training and skills of rescuers.

c. Number of responders.

d. Equipment and drugs available.

a) Location

Treating a patient with anaphylaxis in the community will not be the same as in an acute hospital or a psychiatric hospital. Out of hospital (community settings) and for psychiatric hospitals, an ambulance must be called early and the patient transported to an emergency department. Within some psychiatric hospitals adjunctive drugs/ equipment are available e.g. Chlorphenamine, oxygen etc. For community facilities the minimum expected is Adrenaline administration IM and basic life support (CPR) if required.

b) Training of rescuers

All clinical staff should be able to call for help and initiate treatment in a patient with an Anaphylactic reaction. Rescuers must use the skills for which they are trained. Clinical staff who give parenteral medications should have initial training inclusive of ILS (Independent Living Skills) and regular updates in dealing with anaphylactic reactions/ life threatening illness. The Health Protection Agency recommends that staff who give immunisations should have annual updates15.

c) Number of responders

The single responder must always ensure that help is coming. If there are several rescuers, Several actions can be undertaken simultaneously.

d) Equipment and drugs available

Resuscitation equipment and drugs to help with the rapid resuscitation of a patient with an Anaphylactic reaction must be immediately available in all clinical settings. Clinical staff should be familiar with the equipment and drugs they have available and must check them regularly. Within community the minimum expected is IM Adrenaline and a pocket mask for mouth to mask breathing if required.

All patients who have had an anaphylactic reaction should be continuously monitored (e.g., by Ward staff, ambulance crew, in the emergency department etc.). Minimal monitoring within inpatient settings includes pulse oximetry, non-invasive blood pressure and 3-lead ECG.

Monitoring must be supervised by an individual who is skilled at interpreting and responding to any changes.

6.1 Patients having an anaphylactic reaction in any setting

Patients should expect the following as a minimum:

- Recognition that they are seriously unwell.
- An early call for help.
- Initial assessment and treatments based on an ABCDE approach.
- Adrenaline therapy if indicated.
- Investigation and follow-up by an allergy specialist.

6.2 Patient positioning

All patients should be placed in a comfortable position. The following factors should be considered:

- Patients with Airway and Breathing problems may prefer to sit up as this will make breathing easier.
- Lying flat with or without leg elevation is helpful for patients with a low blood pressure (Circulation problem). If the patient feels faint, do not sit or stand them up - this can cause cardiac arrest.
- Patients who are breathing and unconscious should be placed on their side (recovery position).
- Pregnant patients should lie on their left side to prevent caval compression.

6.3 Remove the trigger if possible

Removing the trigger for an anaphylactic reaction is not always possible.

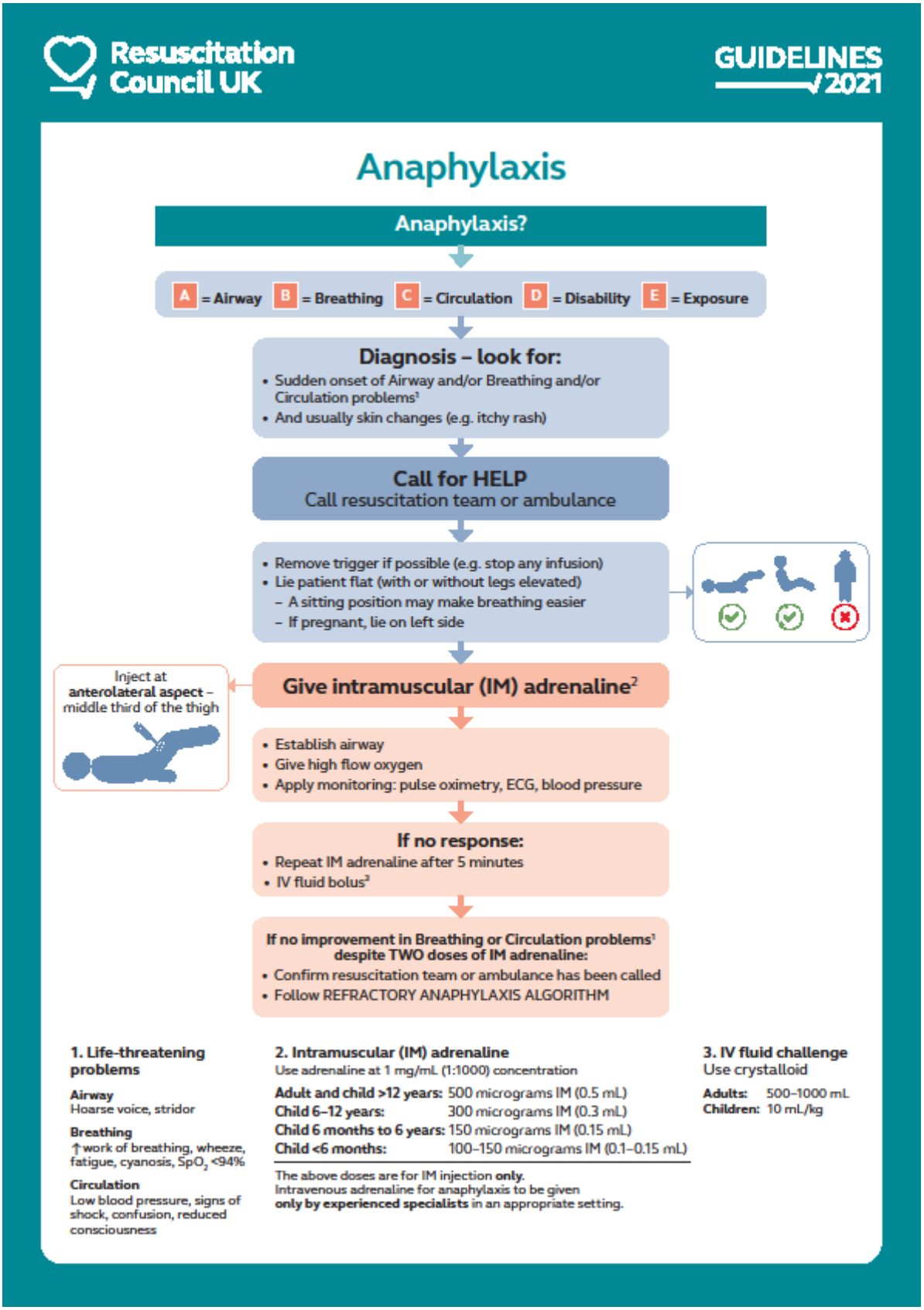
- Stop any drug suspected of causing an anaphylactic reaction (e.g., stop intravenous infusion of a gelatin solution or antibiotic).
- Remove the stinger after a bee sting. Early removal is more important than the method of removal.
- After food-induced anaphylaxis, attempts to make the patient vomit are not recommended.
- Do not delay definitive treatment if removing the trigger is not feasible.

6.4 Cardio-respiratory arrest following an anaphylactic reaction

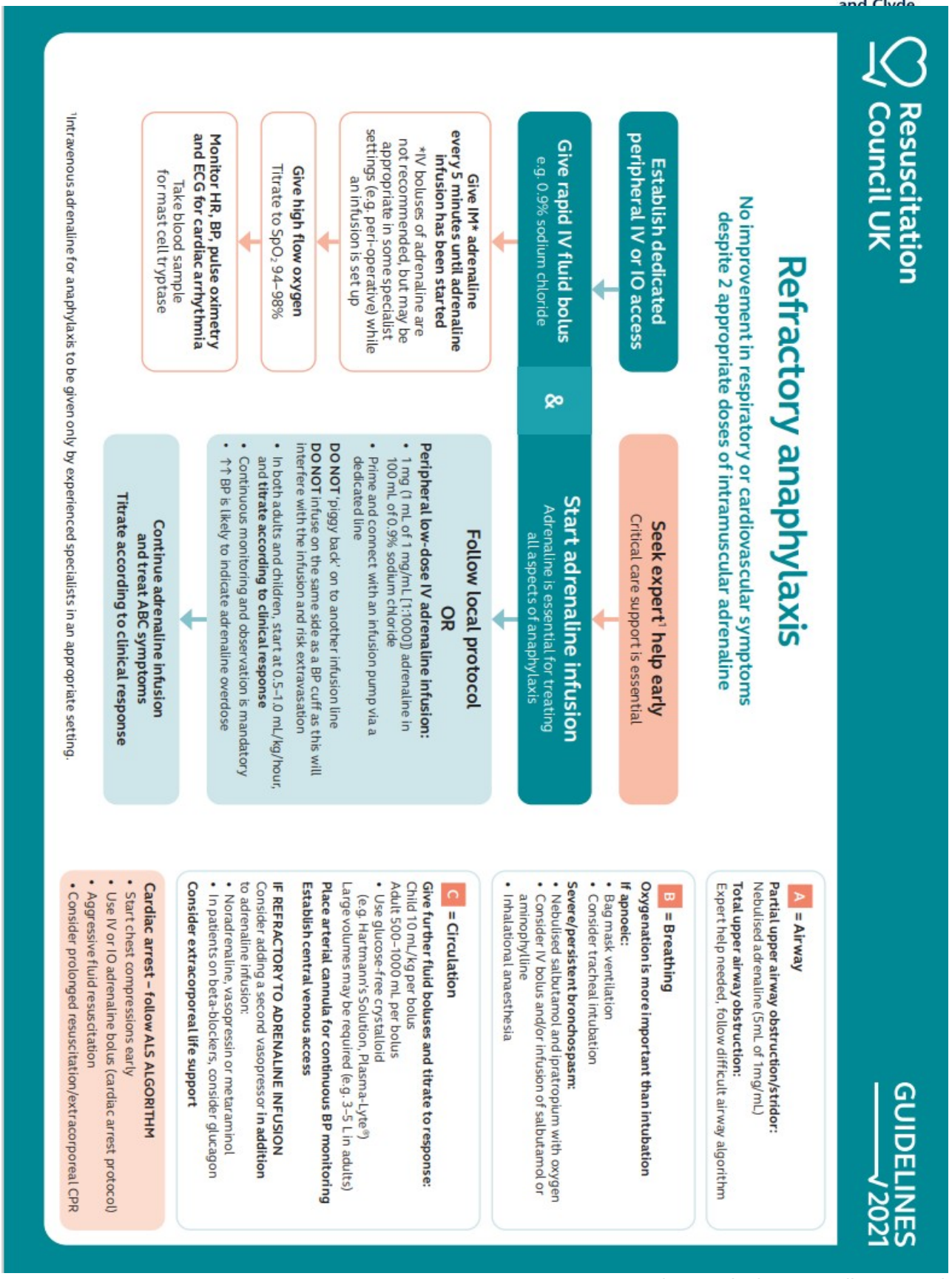
Start cardiopulmonary resuscitation (CPR) immediately and follow current guidelines. Rescuers Should ensure that help is on its way as early advanced life support (ALS) is essential. Use doses

Of adrenaline recommended in the ALS guidelines. The intramuscular route for adrenaline is Not recommended after cardiac arrest has occurred.

6.5 Anaphylaxis algorithm & Refractory Anaphylaxis algorithm



(Resuscitation Council UK, 2021)



(Resuscitation Council UK, 2021)

Download this algorithm:
https://www.resus.org.uk/sites/default/files/202104/Refractory%20anaphylaxis%20algorithm%202021.pdf

Download pages 7-11 (key recommendations, Summary of changes, algorithms):
https://www.resus.org.uk/sites/default/files/2021-04/Anaphylaxis%20Summary%20Document.pdf

7.0 Adrenaline (Epinephrine)

Adrenaline is the most important drug for the treatment of an anaphylactic reaction16. Adverse Effects are extremely rare with correct doses injected intramuscularly (IM).

Difficulties can arise if the clinical picture is evolving when the patient is first assessed. Adrenaline should be given to all patients with life-threatening features of Anaphylaxis. If these features are absent but there are other features of a systemic allergic reaction, the patient needs careful observation and symptomatic treatment using the ABCDE approach. Adrenaline must be readily available in clinical areas where an anaphylactic reaction could occur.

7.1 Intramuscular (IM) Adrenaline

The intramuscular (IM) route is the best for most individuals who have to give adrenaline to treat an Anaphylactic reaction. Monitor the patient as soon as possible (pulse, blood pressure, ECG, pulse Oximetry). This will help monitor the response to adrenaline. The IM route has several benefits:

- There is a greater margin of safety.
- It does not require intravenous access.
- The IM route is easier to learn.

7.2 Choice of needle and technique for intramuscular (IM) injection

The best site for IM injection is the anterolateral aspect of the middle third of the thigh17. The Needle used for injection needs to be sufficiently long to ensure that the adrenaline is injected Into muscle.

The following guidance is based on the recommendations for intramuscular injections for Adrenaline (Emergency treatment of anaphylaxis Guidelines for healthcare providers, 2022). For IM injections," The needle used for injection must be sufficiently long to ensure that the adrenaline is injected into muscle: use a green (21G) or blue (23G) needle (see Appendix 2 for further guidance regarding needle length and IM injection technique)."

Standard UK needle gauges and lengths		
Brown	26G	10 mm
Orange	25G	16 mm or 25 mm
Blue	23G	25 mm
Green	21G	38 mm

Give IM injections with the needle at a 90º angle to the skin. The skin should be stretched, not bunched.

7.3 Adrenaline IM dose

For adults the dose of IM Adrenaline delivered should be:
0.5 mg IM (= 500 micrograms = 0.5 mL of 1:1000) adrenaline

For children the dose of IM Adrenaline should be:
The scientific basis for the recommended doses is weak. The recommended doses are based on What is cons ide red to be safe and practical to draw up and inject in an emergency. (The equivalent volume of 1:1000 adrenaline is shown in brackets)

Adrenaline IM dose	Use 1 mg/mL [1:1000] adrenaline	
Adult and child* > 12 years:	500 micrograms IM	(0.5 mL of 1 mg/ml adrenaline)
6 – 12 years:	300 micrograms IM	(0.3 mL)
6 months – 6 years:	150 micrograms IM	(0.15 mL)
< 6 months:	100 – 150 micrograms IM	(0.1 to 0.15 mL)

*Give 300 micrograms IM (0.3 mL) in a child who is small or prepubertal

(Resuscitation Council UK, 2021)

Repeat the IM adrenaline dose at 5 minute intervals, if there is no improvement in the patient's Condition.

NB: Intravenous Adrenaline would only be used by experienced health care professionals in resuscitation practices during a cardiorespiratory arrest.

7.4 Adrenaline in special populations

Previous Resuscitation Council (UK) guidelines recommended adrenaline dose adjustments in Certain circumstances (e.g., in patients taking tricyclic antidepressants, the previous recommendation was to give half the dose). This is now considered unhelpful for such caveats in the setting of an acute anaphylactic reaction. There is large inter-individual variability in the response to adrenaline. In clinical practice, it is important to monitor the response; start with a safe dose and give further doses if a greater response is needed, i.e. titrate the dose according to effect.

Adrenaline can fail to reverse the clinical manifestation of an anaphylactic reaction, especially when its use is delayed or in patients treated with beta-blockers. The decision to prescribe a beta-blocker to a patient at increased risk of an anaphylactic reaction should be made only after assessment by an allergist and cardiologist.

7.5 Adrenaline auto-injectors

Auto-injectors are often given to patients at risk of anaphylaxis for their own use. Currently, There are only two doses of adrenaline auto-injector commonly available: 0.15 and 0.3 mg. The more appropriate dose for an auto-injector should be prescribed for individual patients by allergy specialists. Healthcare professionals should be familiar with the use of the most commonly available auto-injector devices. The dose recommendations for adrenaline in this guideline are intended for healthcare providers treating an anaphylactic reaction, using a needle and syringe to 'draw up' the dose from an ampoule.

If an adrenaline auto-injector is the only available adrenaline preparation when treating anaphylaxis, healthcare providers should use it.

7.6 Oxygen (give as soon as available)

Initially, give the highest concentration of oxygen possible using a mask with an oxygen reservoir. Ensure high flow oxygen (greater than 10 litres min-1) to prevent collapse of the reservoir during inspiration. If the patient's trachea is intubated, ventilate the lungs with high concentration oxygen using a self- inflating bag.

7.7 IV Fluids (give as soon as available)

The delivery of intravenous fluids would be considered on some mental health inpatient settings where equipment and skills are available. Large volumes of fluid may leak from the patient's circulation during an anaphylactic reaction. There will also be vasodilation, a low blood pressure and signs of shock.

If there is intravenous access, infuse intravenous fluids immediately. Give a rapid IV fluid challenge (500- 1000 mL in an adult) and monitor the response; give further doses as necessary. Consider colloid infusion as a potential cause in a patient receiving a colloid at the time of onset of an anaphylactic reaction and stop the infusion. 0.9% saline is a suitable fluid for initial resuscitation. Do not delay the administration of IM adrenaline whilst attemptingintravenous access.

7.8 Antihistamines (after initial resuscitation)

Antihistamines

- Antihistamines are not recommended as part of the initial emergency treatment for anaphylaxis.21
- Antihistamines have no role in treating respiratory or cardiovascular symptoms of anaphylaxis
- Antihistamines can be used to treat skin symptoms that often occur as part of allergic reactions including anaphylaxis.21
- Their use must not delay treatment of respiratory or cardiovascular symptoms of anaphylaxis (using adrenaline and IV fluids).

The role of antihistamines in anaphylaxis is debated but there is consensus across all guidelines that they are not a first-line treatment.22, 23, and 24 they are of no benefit in treating life-threatening features of anaphylaxis. Most guidelines express concern that their use often delays administration of initial and subsequent doses of adrenaline, thereby increasingmorbidity.21Antihistamines can be helpful in alleviating cutaneous symptoms (whether these are due to anaphylaxis or non-anaphylaxis allergic reactions), but must not be given in preference to adrenaline to treat anaphylaxis. In the presence of ongoing Airway/Breathing/ Circulation problems of anaphylaxis, give further IM adrenaline and seek expert advice. Once a patient has been stabilised, use a non-sedating oral antihistamine (e.g. cetirizine) in preference to chlorphenamine which causes sedation.

11, Recommended doses are shown below. If the oral route is not possible, chlorphenamine can be given by intravenous or intramuscular injection, but note that such H1-receptor antihistamines can cause hypotension when given as a rapid IV bolus.70

Age Dose of oral cetirizine

Age	Dose of oral cetirizine
< 2 years	250 micrograms/kg
2–6 years	2.5–5 mg
6–11 years	5–10 mg
12+ years	10–20 mg
Adults	10–20 mg

(Resuscitation Council UK, 2021)

7.9 Steroids (give after initial resuscitation)

The routine administration of corticosteroids to treat anaphylaxis is not recommended however, there is no evidence for or against their use for refractory anaphylaxis. It is reasonable to consider corticosteroids (such as hydrocortisone) for refractory reactions after initial resuscitation.3 Corticosteroids should not be prioritised over adrenaline infusion and fluid resuscitation.

6. Transfer of Care, Follow up and confirming Diagnosis

It is vital that mental health patients are followed up within acute care settings even if a positive response has been achieved with treatment within a mental health location. This will confirm the diagnosis, inform future risk status and facilitate follow up by an allergy specialist.

Before discharge from hospital (acute) all patients must be:

- Reviewed by a senior clinician (physician).
- Given clear instructions to return to hospital if symptoms return.
- Considered for anti-histamines and oral steroid therapy for up to 3 days. This is helpful for treatment of urticaria and may decrease the chance of further reaction.
- Considered for an adrenaline auto-injector (see below), or given a replacement.
- Have a plan for follow-up, including contact with the patient's RMO and general practitioner.

8.1 Record keeping

To help confirm the diagnosis of anaphylaxis and identify the most likely trigger, it is useful for The medical emergency team, ambulance service and allergy clinic to have:

- A description of the reaction with circumstances and timings to help identify potential triggers.
- A list of administered treatments.
- Copies of relevant patient records, e.g., ambulance charts, emergency department records, observation charts, anesthetic charts.

- Results of any investigations already completed.

8.2 Reporting of reaction

Adverse drug reactions that include an anaphylactic reaction should be reported to the Medicines and Healthcare products Regulatory Agency (MHRA) using the yellow card scheme (www.mhra.gov.uk). The British National Formulary (BNF) includes copies of the Yellow Card at the back of each edition. This mandatory reporting is in addition to the normal organisational requirements such as Datix, incident reporting and briefing note systems.

8.3 Specialist referral

All patients presenting with anaphylaxis should be referred to an allergy clinic to identify the cause, and thereby reduce the risk of future reactions and prepare the patient to manage future episodes themselves. There is a list of specialist clinics on the British Society for Allergy and Clinical Immunology (BSACI) website.

8.4 Patient education

Refer patients at risk of an anaphylactic reaction to an appropriate allergy clinic. Patients need to know the allergen responsible and how to avoid it. If the allergen is a food, they need to know what products are likely to contain it, and all the names that can be used to describe it. They also need information to know how to avoid situations that could expose them to the allergen.

Patients need to be able to recognise the early symptoms of anaphylaxis, so that they can summon help quickly and prepare to use their emergency medication. Patients at risk are should carry their adrenaline auto-injector with them at all times. Patients and those close to them (i.e., close family, friends, and carers) should receive information/ training in using the auto- injector and should practice regularly using a suitable training device, so that they will know what to do in an emergency.

Patients must always seek urgent medical assistance when experiencing anaphylaxis and after using an adrenaline auto-injector. Information about managing severe allergies can be obtained from their allergy specialist, general practitioner, other healthcare professional or the Anaphylaxis Campaign. Although there are no randomised clinical trials, there is evidence that individualised action plans for self- management should decrease the risk of recurrence.

Specific guidance and training is available for schools with children at risk of allergic reactions (www.allergyinschools.org.uk).

All those at high risk of an anaphylactic reaction should consider wearing some device, such as a bracelet (e.g., Medic Alert), that provides information about their history of anaphylactic reaction.

References

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Appendix 1

The ABCDE Approach to Assessing the acutely (physically) Ill Patient

Modified from Advanced Life Support Manual 2021 (Resuscitation Council (UK)) (The ABCDE Approach, 2022)

Underlying principles

The approach to all deteriorating or critically ill patients is the same. The underlying principles are:

1. Use the Airway, Breathing, Circulation, Disability and Exposure
2. (ABCDE) approach to assess and treat the patient.
3. Do a complete initial assessment and re-assess regularly.
4. Treat life-threatening problems before moving to the next part of assessment.
5. Assess the effects of treatment.
6. Recognise when you will need extra help. Call for appropriate help early.
7. Use all members of the team. This enables interventions (e.g. assessment, attaching monitors, intravenous access) to be undertaken simultaneously.
8. Communicate effectively - use the Situation, Background, Assessment, Recommendation, Decision (SBARD) or Reason, Story, Vital signs, Plan (RSVP) approach.
9. The aim of the initial treatment is to keep the patient alive, and achieve some clinical improvement. This will buy time for further treatment and making a diagnosis.
10. Remember – it can take a few minutes for treatments to work, so wait a short while before reassessing the patient after an intervention.

First steps:

1. Ensure personal safety. Wear apron and gloves as appropriate.
2. First, look at the patient in general to see if the patient appears unwell.
3. If the patient is awake, ask, “How are you?” If the patient appears unconscious or has collapsed, shake him and ask, “Are you alright?” If he responds normally, he has a patent airway, is breathing and has brain perfusion. If he speaks only in short sentences, he may have breathing problems. Failure of the patient to respond is a clear marker of critical illness.
4. This first rapid ‘Look, Listen and Feel” of the patient should take about 30 s and will often indicate a patient is critically ill and there is a need for urgent help. Ask a colleague to ensure appropriate help is coming.
5. If the patient is unconscious, unresponsive, and is not breathing normally, (occasional gasps are not normal) start CPR according to the resuscitation guidelines. If you are confident and trained to do so, feel a pulse to determine if the patient has a respiratory arrest. If there are, any doubts about the presence of a pulse start CPR.
6. Monitor the vital signs early. Attach a pulse oximeter, ECG monitor and a non-invasive blood pressure monitor to all critically ill patients, as soon as possible.
7. Insert an intravenous cannula as soon as possible. Take bloods for investigation when inserting the intravenous cannula.

Airway (A)

Airway obstruction is an emergency. Get expert help immediately. Untreated, airway obstruction causes hypoxia and risks damage to the brain, kidneys and heart, cardiac arrest, and death.

1. Look for the signs of airway obstruction

- Airway obstruction causes paradoxical chest and abdominal movements (‘see-saw’ respirations) and the use of the accessory muscles of respiration. Central cyanosis is a late sign of airway obstruction.

In complete airway obstruction, there are no breath sounds at the mouth or nose. In partial obstruction, air entry is diminished and often noisy.

- In the critically ill patient, depressed consciousness often leads to airway obstruction.

2. Treat airway obstruction as a medical emergency

- Obtain expert help immediately. Untreated, airway obstruction causes hypoxaemia (low PaO2) with the risk of hypoxic injury to the brain, kidneys and heart, cardiac arrest, and even death.

- In most cases, only simple methods of airway clearance are required (e.g. airway opening manoeuvres, airways suction, insertion of an oropharyngeal or nasopharyngeal airway). Tracheal intubation may be required when these fail.

3. Give oxygen at high concentration

- Provide high-concentration oxygen using a mask with oxygen reservoir. Ensure that the oxygen flow is sufficient (usually 15 L min^{-1}) to prevent collapse of the reservoir during inspiration. If the patient's trachea is intubated, give high concentration oxygen with a self-inflating bag.

- In acute respiratory failure, aim to maintain an oxygen saturation of 94–98%. In patients at risk of hypercapnic respiratory failure (see below) aim for an oxygen saturation of 88–92%.

Breathing (B)

During the immediate assessment of breathing, it is vital to diagnose and treat immediately life-threatening conditions (e.g. acute severe asthma, pulmonary oedema, tension pneumothorax, and massive haemothorax).

1. Look, listen and feel for the general signs of respiratory distress: sweating, central cyanosis, use of the accessory muscles of respiration, and abdominal breathing.
2. Count the respiratory rate. The normal rate is 12–20 breaths min^{-1}. A high (> 25 min^{-1}) or increasing respiratory rate is a marker of illness and a warning that the patient may deteriorate suddenly.
3. Assess the depth of each breath, the pattern (rhythm) of respiration and whether chest expansion is equal on both sides.
4. Note any chest deformity (this may increase the risk of deterioration in the ability to breathe normally); look for a raised jugular venous pulse (JVP) (e.g. in acute severe asthma or a tension pneumothorax); note the presence and patency of any chest drains; remember that abdominal distension may limit diaphragmatic movement, thereby worsening respiratory distress.
5. Record the inspired oxygen concentration (%) and the SpO2 reading of the pulse oximeter. The pulse oximeter does not detect hypercapnia. If the patient is receiving supplemental oxygen, the SpO2 may be normal in the presence of a very high PaCO2.
6. Listen to the patient's breath sounds a short distance from his face: rattling airway noises indicate the presence of airway secretions, usually caused by the inability of the patient to cough sufficiently or to take a deep breath. Stridor or wheeze suggests partial, but significant, airway obstruction.
7. Percuss the chest: hyper-resonance may suggest a pneumothorax; dullness usually indicates consolidation or pleural fluid.
8. Auscultate the chest: bronchial breathing indicates lung consolidation with patent airways; absent or reduced sounds suggest a pneumothorax or pleural fluid or lung consolidation caused by complete obstruction.
9. Check the position of the trachea in the suprasternal notch: deviation to one side indicates mediastinal shift (e.g. pneumothorax, lung fibrosis or pleural fluid).
10. Feel the chest wall to detect surgical emphysema or crepitus (suggesting a pneumothorax until proven otherwise).
11. The specific treatment of respiratory disorders depends upon the cause. Nevertheless, all critically ill patients should be given oxygen. In a subgroup of patients with COPD, high concentrations of oxygen may depress breathing (i.e. they are at risk of hypercapnic respiratory failure - often referred to as type 2 respiratory failure). Nevertheless, these patients will also sustain end-organ damage or cardiac

arrest if their blood oxygen tensions are allowed to decrease. In this group, aim for a lower than normal PaO2 and oxygen saturation. Give oxygen via a Venturi 28% mask (4 L min^{-1}) or a 24% Venturi mask (4 L min^{-1}) initially and reassess. Aim for target SpO2 range of 88–92% in most COPD patients, but evaluate the target for each patient based on the patient's arterial blood gas measurements during previous exacerbations (if available). Some patients with chronic lung disease carry an oxygen alert card (that documents their target saturation) and their own appropriate Venturi mask.

12. If the patient's depth or rate of breathing is judged to be inadequate, or absent, use bag-mask or pocket mask ventilation to improve oxygenation and ventilation, whilst calling immediately for expert help. In cooperative patients who do not have airway obstruction consider the use of non-invasive ventilation (NIV). In patients with an acute exacerbation of COPD, the use of NIV is often helpful and prevents the need for tracheal intubation and invasive ventilation

Circulation (C)

In almost all medical and surgical emergencies, consider hypovolaemia to be the primary cause of shock, until proven otherwise. Unless there are obvious signs of a cardiac cause, give intravenous fluid to any patient with cool peripheries and a fast heart rate. In surgical patients, rapidly exclude haemorrhage (overt or hidden). Remember that breathing problems, such as a tension pneumothorax, can also compromise a patient's circulatory state. This should have been treated earlier on in the assessment.

1. Look at the colour of the hands and digits: are they blue, pink, pale or mottled?
2. Assess the limb temperature by feeling the patient's hands: are they cool or warm?
3. Measure the capillary refill time (CRT). Apply cutaneous pressure for 5 s on a fingertip held at heart level (or just above) with enough pressure to cause blanching. Time how long it takes for the skin to return to the colour of the surrounding skin after releasing the pressure. The normal value for CRT is usually < 2 s. A prolonged CRT suggests poor peripheral perfusion. Other factors (e.g. cold surroundings, poor lighting, and old age) can prolong CRT.
4. Assess the state of the veins: they may be under filled or collapsed when hypovolaemia is present.
5. Count the patient's pulse rate (or preferably heart rate by listening to the heart with a stethoscope).
6. Palpate peripheral and central pulses, assessing for presence, rate, quality, regularity and equality. Barely palpable central pulses suggest a poor cardiac output, whilst a bounding pulse may indicate sepsis.
7. Measure the patient's blood pressure. Even in shock, the blood pressure may be normal, because compensatory mechanisms increase peripheral resistance in response to reduced cardiac output. A low diastolic blood pressure suggests arterial vasodilation (as in anaphylaxis or sepsis). A narrowed pulse pressure (difference between systolic and diastolic pressures; normally 35–45 mmHg) suggests arterial vasoconstriction (cardiogenic shock or hypovolaemia) and may occur with rapid tachyarrhythmia.
8. Auscultate the heart. Is there a murmur or pericardial rub? Are the heart sounds difficult to hear? Does the audible heart rate correspond to the pulse rate?
9. Look for other signs of a poor cardiac output, such as reduced conscious level and, if the patient has a urinary catheter, oliguria (urine volume < 0.5 mL kg^{-1} h^{-1}).
10. Look thoroughly for external haemorrhage from wounds or drains or evidence of concealed haemorrhage (e.g. thoracic, intra-peritoneal, retroperitoneal or into gut). Intra-thoracic, intra-abdominal or pelvic blood loss may be significant, even if drains are empty.
11. The specific treatment of cardiovascular collapse depends on the cause, but should be directed at fluid replacement, haemorrhage control and restoration of tissue perfusion. Seek the signs of conditions that are immediately life threatening (e.g. cardiac tamponade, massive or continuing haemorrhage, septicaemia shock), and treat them urgently.
12. Insert one or more large (14 or 16 G) intravenous cannulae. Use short, wide-bore cannulae, because they enable the highest flow.
13. Take blood from the cannula for routine haematological, biochemical, coagulation and microbiological investigations, and cross-matching, before infusing intravenous fluid.
14. Give a bolus of 500 mL of warmed crystalloid solution (e.g. Hartmann's solution or 0.9% sodium chloride) over less than 15 min if the patient is hypotensive. Use smaller volumes (e.g. 250 mL) for patients with known cardiac failure or trauma and use closer monitoring (listen to the chest for crackles after each bolus).
15. Reassess the heart rate and BP regularly (every 5 min), aiming for the patient's normal BP or, if this

is unknown, a target > 100 mmHg systolic.

16. If the patient does not improve, repeat the fluid challenge. Seek expert help if there is a lack of response to repeated fluid boluses.
17. If symptoms and signs of cardiac failure (dyspnoea, increased heart rate, raised JVP, a third heart sound and pulmonary crackles on auscultation) occur, decrease the fluid infusion rate or stop the fluids altogether. Seek alternative means of improving tissue perfusion (e.g. inotropes or vasopressors).
18. If the patient has primary chest pain and a suspected ACS, record a 12-lead ECG early.
19. Immediate general treatment for ACS includes:
    - Aspirin 300 mg, orally, crushed or chewed, as soon as possible.
    - Nitroglycerine, as sublingual glyceryl trinitrate (tablet or spray).
    - Oxygen: only give oxygen if the patient's SpO_2 is less than 94% breathing air alone.
    - Morphine (or diamorphine) titrated intravenously to avoid sedation and respiratory depression.

Disability (D)

Common causes of unconsciousness include profound hypoxia, hypercapnia, cerebral hypoperfusion, or the recent administration of sedatives or analgesic drugs.

- Review and treat the ABCs: exclude or treat hypoxia and hypotension.
- Check the patient's drug chart for reversible drug-induced causes of depressed consciousness. Give an antagonist where appropriate (e.g. naloxone for opioid toxicity).
- Examine the pupils (size, equality and reaction to light).
- Make a rapid initial assessment of the patient's conscious level using the ACVPU method: Alert, New confusion, responds to Vocal stimuli, responds to Painful stimuli or Unresponsive to all stimuli. Alternatively, use the Glasgow Coma Scale score. A painful stimuli can be given by applying supra-orbital pressure (at the supraorbital notch).
- Measure the blood glucose to exclude hypoglycaemia using a rapid finger-prick bedside testing method. In a peri-arrest patient, use a venous or arterial blood sample for glucose measurement as finger prick sample glucose measurements can be unreliable in sick patients. Follow local protocols for management of hypoglycaemia. For example, if the blood sugar is less than 4.0 mmol L^{-1} in an unconscious patient, give an initial dose of 50 mL of 10% glucose solution intravenously. If necessary, give further doses of intravenous 10% glucose every minute until the patient has fully regained consciousness, or a total of 250 mL of 10% glucose has been given. Repeat blood glucose measurements to monitor the effects of treatment. If there is no improvement, consider further doses of 10% glucose. Specific national guidance exists for the management of hypoglycaemia in adults with diabetes mellitus.
- Nurse unconscious patients in the lateral position if their airway is not protected.

Exposure (E)

To examine the patient properly, full exposure of the body is necessary. Skin and mucosal Changes after anaphylaxis can be subtle. Minimise heat loss. Respect the patient's dignity.

Additional information

1. Take a full clinical history from the patient, relatives or friends, and other staff.
2. Review the patient's notes and charts
    a. Study both absolute and trended values of vital signs.
    b. Check that important routine medications are prescribed and being given.
3. Review the results of recent laboratory or radiological investigations.
4. Consider what level of care is required by the patient, e.g., transport to nearest A&E facility.

5. Make complete entries in the patient's notes of your findings, assessment and treatment. Record the patient's response to therapy.

6. Consider definitive treatment of the patient's underlying condition.