

THE ADMINISTRATION OF ADRENALINE (IM) IN LIFE THREATENING ANAPHYLAXIS

Protocol and Procedure

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1. Introduction

This clinical protocol covers the procedure, Administration of Adrenaline (IM) in Life Threatening Anaphylaxis. The framework for the development of the protocol is provided by the Human Medicines Regulations 2012, the Resuscitation Council (UK) document, Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers (May 2021) and the Resuscitation Council (UK) Resuscitation Guidelines 2021.

2. Aim and Purpose of the protocol

- 2.1 To provide healthcare providers with clear guidelines that allow them to administer intramuscular (IM) adrenaline in an individual showing the clinical signs of a life threatening anaphylactic reaction.
- 2.2 To ensure that the healthcare provider can administer adrenaline in the community/hospital/practice setting in order to meet the clinical needs of the patient.
- 2.3 The protocol sets out the conditions under which the healthcare provider can administer intramuscular (IM) adrenaline in an individual showing the clinical signs of a life threatening anaphylactic reaction.
- 2.4 The protocol includes requirements for knowledge and skills, as well as guidelines, should further action be required.

3. Key objectives

- 3.1 To outline the appropriate management of an individual showing the clinical signs of a life threatening anaphylactic reaction.
- 3.2 To comply with the Human Medicines Regulation (2012) which states the exemption – that Adrenaline 1:1000 can be administered by anyone without a prescription to save a life - and the Resuscitation Council (UK) Guidelines, Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers (May 2021). See the anaphylaxis algorithms in appendices 1 and 2.
- 3.3 To ensure a consistent approach across NHS Lothian in the treatment of life threatening anaphylaxis by healthcare providers.
- 3.4 To provide clear guidelines in regard to the administration of intramuscular (IM) adrenaline for the treatment of life threatening anaphylaxis.

4. Protocol scope

- 4.1 This protocol and procedure applies to all healthcare providers in all locations where staff are involved in the care, treatment and provision of services to patients.
- 4.2 Administration of adrenaline in anaphylaxis is a shared responsibility between medical and other healthcare providers.

4.3 Knowledge and skills recommended:

1. Healthcare providers should ensure they are up to date with online LearnPro Anaphylaxis module.
2. Healthcare providers should ensure they are up to date with appropriate level of resuscitation training both practical and online.
3. Healthcare providers should ensure any additional training is accessed and up to date as appropriate.

5. Evidence Base

This clinical protocol is based on the following documents

Resuscitation Council (UK) (2021) **Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers.**

Available at https://www.resus.org.uk/sites/default/files/2021-05/Emergency%20Treatment%20of%20Anaphylaxis%20May%202021_0.pdf May 2021.

Resuscitation Council (UK) (2021) **Adult Basic Life Support Guidelines 2021**

Available at <https://www.resus.org.uk/library/2021-resuscitation-guidelines/adult-basic-life-support-guidelines> May 2021.

Resuscitation Council (UK) (2021) **Advanced Life Support Guidelines 2021.** Available at <https://www.resus.org.uk/library/2021-resuscitation-guidelines/adult-advanced-life-support-guidelines> May 2021.

Statutory Instrument 1916. The Human Medicines Regulations (2012) part 12, Chapter 3. regulation 238 exemption (schedule 19). Medicinal products for parenteral administration in an emergency. Available from <http://www.legislation.gov.uk/ukxi/2012/1916/contents/made> October 2012.

6. THE PROTOCOL

The Administration of Adrenaline in Life Threatening Anaphylaxis

6.1. Introduction

Anaphylaxis is a severe, life threatening generalised or systemic hypersensitivity reaction. Anaphylaxis has a broad range of potential triggers but the most common include food, drugs and venom. In many cases however no cause can be identified. This is termed an idiopathic reaction. Death from anaphylaxis is rare but when fatal, usually occurs very soon after contact with the trigger.

6.2 A diagnosis of anaphylaxis is likely if the patient;

- is exposed to a trigger (allergen)
- develops a sudden unexpected illness (within minutes of exposure)
- exhibits rapidly developing skin changes with life threatening airway and/or breathing and/or circulation problems.

6.3 Generalised signs such as urticaria (rash), angioedema (rapid swelling of the skin and mucosal tissue) and rhinitis (irritation and inflammation of the nose) would not be described as a life threatening anaphylactic reaction as these are not life threatening features.

6.4 All patients who have an anaphylactic reaction should expect the following as a minimum,

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

6.5 Adrenaline is the most important drug for the treatment of an anaphylactic reaction. Adrenaline can reverse peripheral vasodilatation and oedema, which helps restore cardiac output and dilates the airway passages to ease breathing. Adrenaline also acts directly on mast cells inhibiting the allergic response.

6.6 The intramuscular (IM) route is the safest and easiest route to give adrenaline to treat an anaphylactic reaction. Adrenaline is absorbed quickly and adverse effects are extremely rare when the correct dose is injected intramuscularly (IM).

6.7 Intravenous (IV) Adrenaline is for use only by clinical specialists such as anaesthetists, intensive care doctors and emergency physicians.

6.8. In an emergency situation where an individual exhibits the clinical signs of life threatening anaphylaxis, the healthcare provider can administer Adrenaline intramuscularly (IM) without either a prescriber being present and/or a medical prescription (SI 1916. Human Medicines Regulations 2012 Part 12 Chapter 3 Regulation 238.Schedule 19)

Action	Rationale
<p>The healthcare provider acts at all times within their professional code of conduct. For nurses - Nursing and Midwifery Council Code of Practice (October 2018) For AHP – Health Professions Council (HPC).</p>	<p>The healthcare provider should practice within the remit of their professional body to ensure safe and effective care in life threatening anaphylaxis.</p>
<p>Where appropriate the healthcare provider has completed training in the recognition, treatment and management of anaphylaxis including the administration of Adrenaline. This is updated appropriately. It is the responsibility of each healthcare provider to ensure their practice is current and valid.</p> <p>Clinical signs and diagnosis of anaphylaxis is based on</p> <ul style="list-style-type: none"> • Known exposure to a trigger (allergen) • Development of a sudden unexpected illness (within minutes of exposure) • Having rapidly developing skin changes with life threatening airway and/or breathing and/or circulation problems. <p>Life threatening problems</p> <p>Airway – hoarse voice, stridor.</p> <p>Breathing – wheeze, fatigue , cyanosis, increased work of breathing, SpO₂ less than 94%.</p> <p>Circulation – low blood pressure, signs of shock, confusion, reduced consciousness.</p>	<p>This ensures the healthcare provider has a sound theoretical knowledge base in regard to anaphylaxis and is able to recognise and treat an anaphylactic reaction safely and effectively.</p> <p>Available anaphylaxis training and annual updates:</p> <ul style="list-style-type: none"> • e-learning module on Anaphylaxis in LearnPro • Anaphylaxis update sessions provided for appropriate staff groups. • Level 2 resuscitation updates and ILS (L3) resuscitation training sessions will include anaphylaxis. • ALS courses (L4) also include anaphylaxis as a topic. <p>For details of training see intranet. Training can be booked using the electronic booking system eESS.</p> <p>For appropriate targeted training contact local Resuscitation Officers to discuss requirements.</p>
<p>The healthcare provider has completed training in resuscitation skills. This is updated appropriately. It is the responsibility of each healthcare provider to ensure their practice is current and valid.</p>	<p>Should the patient collapse in spite of appropriate treatment or if treatment fails, the healthcare provider is able to recognise, seek help and initiate treatment in a cardiac arrest.</p>

7. The Procedure

Action	Rationale
<p>If the patient is conscious</p> <ul style="list-style-type: none"> • Call for help. • Remove trigger if possible. • Lie patient flat (with or without legs elevated). <ul style="list-style-type: none"> - A sitting position may make breathing easier. - If pregnant, lie on left side. • Give intramuscular (IM) Adrenaline (inject at anterolateral aspect – middle third of the thigh). • Establish airway. • Give high flow oxygen if available. • Apply monitoring: pulse oximetry, ECG, blood pressure if available. • If no response repeat IM Adrenaline after 5 minutes. • IV fluid bolus if available. • If no improvement in breathing or circulation problems despite TWO doses of IM Adrenaline <ul style="list-style-type: none"> - Confirm resuscitation team or ambulance has been called. - Follow REFRACTORY ANAPHYLAXIS ALGORITHM. • Record in patient notes (paper and electronic). 	<p>To provide safe and effective immediate treatment for a patient experiencing a life threatening anaphylactic reaction.</p> <p>To ensure expert help is on its way should patient develop complications or fail to respond to treatment.</p>
<p>If the patient is unconscious and not breathing normally:</p> <ul style="list-style-type: none"> • Assess patient as per current resuscitation guidelines. • Call 2222/(9)999 or get help by local policy /operational procedure as appropriate. • Commence cardiopulmonary (CPR) resuscitation until help arrives. Provide appropriate handover. 	<p>To provide appropriate treatment as recommended by current Resuscitation Council (UK) Guidelines 2021.</p>

7.2 Adrenaline Administration

The standard administration from a 1 ml/1mg ampoule of 1:1000 Adrenaline is documented below, the required volume is drawn up using a graduated 1ml syringe and injection is by a 23G blue needle 25mm (1 inch) in length. This needle size is recommended as suitable for all ages.

Patients Age	Dose and Volume of Adrenaline 1 in1000 (1mg/1ml)	
	Volume	Dose
Child <6 months	0.1ml - 0.15ml	100-150 micrograms IM
Child 6 months to 6 years	0.15 ml	150 micrograms IM
Child 6-12 years	0.3 ml	300 micrograms IM
Adult and child over 12 years old	0.5 ml	500 micrograms IM

Adrenaline from an auto injector:

There are various types of auto injector devices available (Emerade, Epipen, Jextpen). The administration technique of auto injector devices can differ. Instructions are provided with every device and should be read and followed.

8. Recommended post emergency care treatment

8.1 The National Institute for Health and Clinical Excellence (NICE) Clinical Guideline 134 (Aug 2020) suggests that after an anaphylactic episode many people do not receive optimum management of their condition.

8.2 NICE CG 134 recommendations include

- Take an initial blood sample for mast cell tryptase as soon after emergency treatment has commenced as possible. Repeat blood sample 1-2 hours (no later than 4 hours) from onset of symptoms. Inform patient a third blood sample may be required at follow up to measure baseline mast cell tryptase.
- Observe the patient for 6 – 12 hours from the onset of symptoms unless they had a prompt and effective response to treatment. It is recommended that children under 16 should be admitted.
- Record the circumstances immediately prior to episode to try and identify the possible trigger. Document clinical features and time of onset.
- Offer an appropriate auto injector and ensure education is provided for the patient as well as parents and potential carers.
- Offer referral to specialist allergy services to investigate, diagnose, monitor and provide ongoing management and education.

9. Monitoring

9.1 Implementation of the protocol and procedure will be monitored through NHS Lothian 2222 audit forms and when appropriate also through any datix alerts to ensure that, the information received has been understood by staff and also to

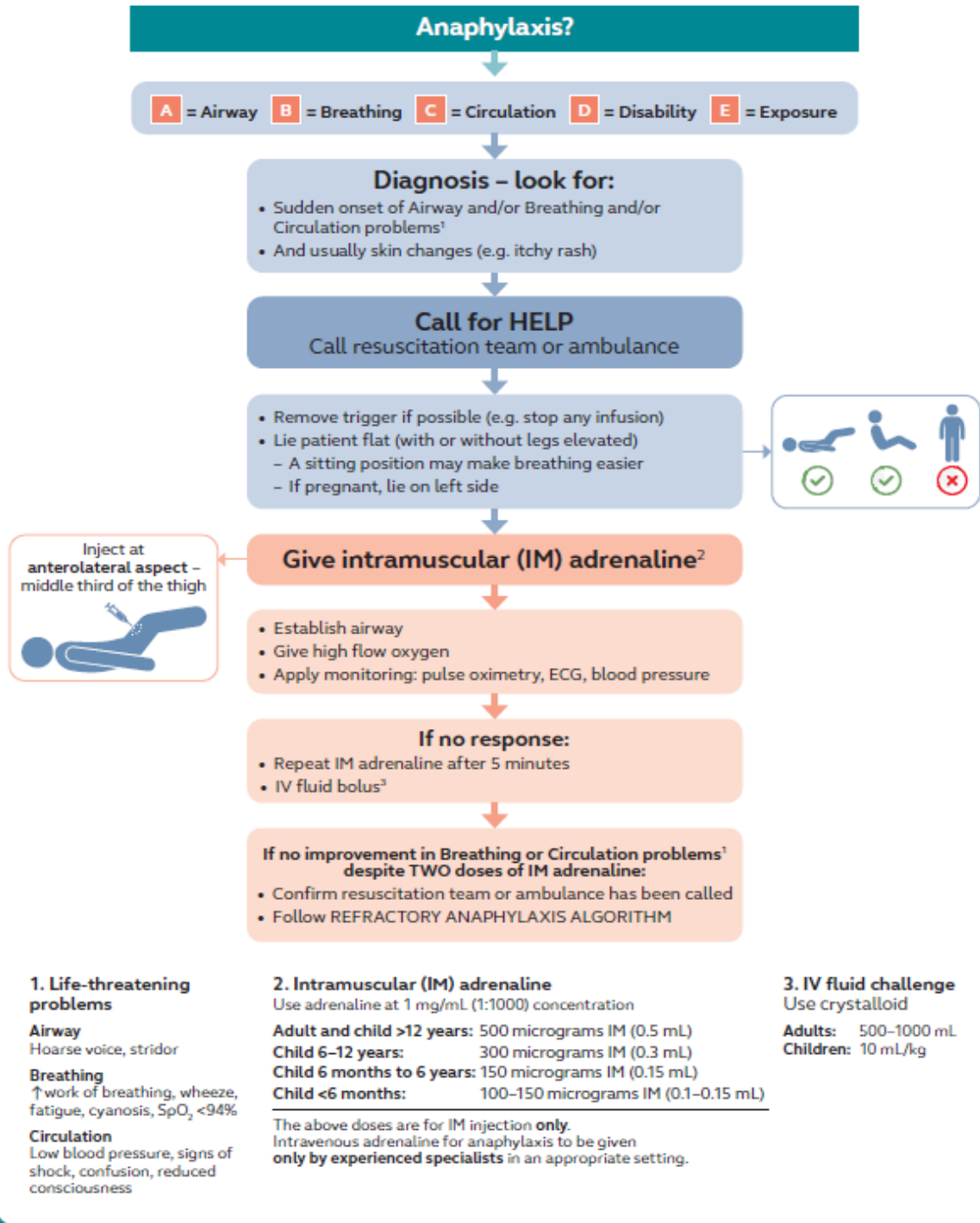
confirm that the protocol and procedure is being used effectively for the benefit of all individuals.

10. References

- 10.1 National Institute for Health and Clinical Excellence (NICE Aug 2020) Clinical Guidelines (CG 134) Initial assessment and referral following emergency treatment of an anaphylactic episode. Available at <http://guidance.nice.org.uk/CG134> Last updated Aug 2020.
- 10.2 Nursing and Midwifery Council (NMC) **Code: standards of conduct, performance and ethics for nurses and midwives** NMC. London. Available at <http://www.nmc-uk.org/The-revised-Code/> Last updated Oct 2018
- 10.3 Resuscitation Council (UK) (2021). **Emergency treatment of anaphylactic reactions: Guidelines for healthcare providers Guideline.** The Resuscitation Council (UK). London. Available at <http://www.resus.org.uk/pages/reaction.pdf> May 2021.
- 10.4 HMS Government Statutory Instrument 1916. The Human Medicines Regulations 2012. Part 12 Chapter 3 Regulation 238 Schedule 19. TSO (The Stationary Office) Annotated July 2012 Available at <http://www.legislation.gov.uk/uksi/2012/1916/contents/made> Oct 2012

11. Appendix 1 – Anaphylaxis Algorithm

Anaphylaxis

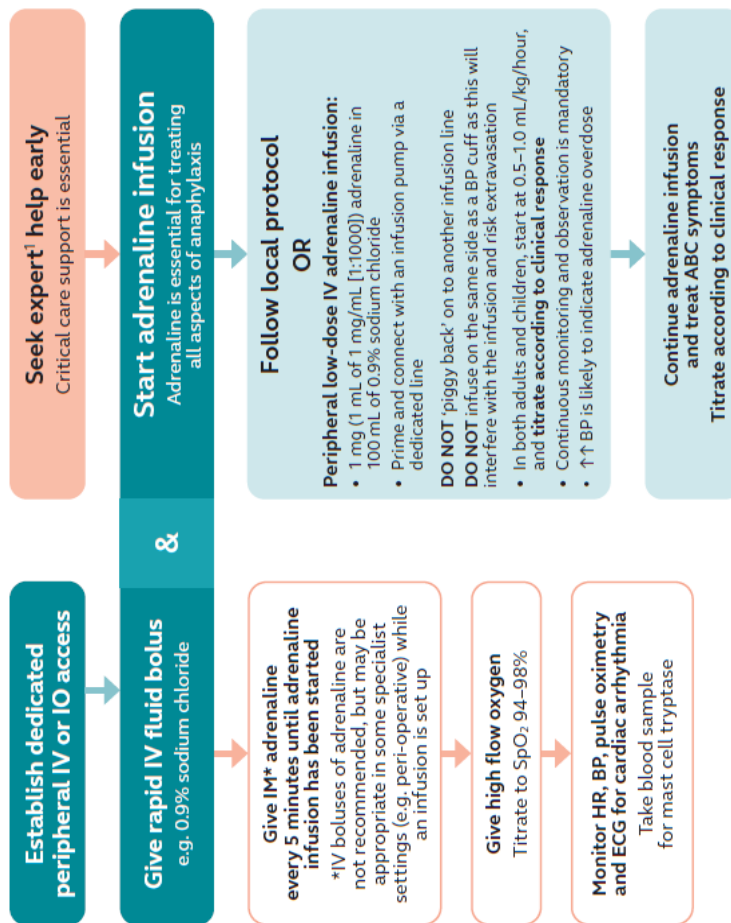


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12. Appendix 2 – Refractory Anaphylaxis Algorithm

Refractory anaphylaxis

No improvement in respiratory or cardiovascular symptoms despite 2 appropriate doses of intramuscular adrenaline



¹Intravenous adrenaline for anaphylaxis to be given only by experienced specialists in an appropriate setting.

A = Airway

Partial upper airway obstruction/stridor:
Nebulised adrenaline (5mL of 1mg/mL)

Total upper airway obstruction:
Expert help needed, follow difficult airway algorithm

B = Breathing

Oxygenation is more important than intubation

If apnoeic:

- Bag mask ventilation
- Consider tracheal intubation

Severe/persistent bronchospasm:

- Nebulised salbutamol and ipratropium with oxygen
- Consider IV bolus and/or infusion of salbutamol or aminophylline
- Inhalational anaesthesia

C = Circulation

Give further fluid boluses and titrate to response:

- Child 10 mL/kg per bolus
- Adult 500–1000 mL per bolus
- Use glucose-free crystalloid (e.g. Hartmann's Solution, Plasma-Lyte®)

Large volumes may be required (e.g. 3–5 L in adults)

Place arterial cannula for continuous BP monitoring

Establish central venous access

IF REFRACTORY TO ADRENALINE INFUSION

Consider adding a second vasopressor in addition to adrenaline infusion:

- Noradrenaline, vasopressin or metaraminol
- In patients on beta-blockers, consider glucagon

Consider extracorporeal life support

Cardiac arrest – follow ALS ALGORITHM

- Start chest compressions early
- Use IV or IO adrenaline bolus (cardiac arrest protocol)
- Aggressive fluid resuscitation
- Consider prolonged resuscitation/extracorporeal CPR