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BEFORE BEGINNING

○ If you are using a mobile device or laptop, please ensure that it is fully charged.



○ You should also have a pen and notepad ready.



○ Ensure you are in a quiet area with minimal distractions.



In addition to the above please make yourself familiar with some of the tools available above such as;

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Here you will find useful documents that will be relevant to the course you are undertaking but also you will have access to a CPD reflective learning template which you can download and complete to gain your points.

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Presenter Function

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INTRODUCTION:

Anaphylaxis is an acute life-threatening event caused by a severe allergic reaction to a specific substance/allergen.

This module has been developed to provide the learner with an overview of what defines an anaphylactic event, including causes, symptoms and what immediate actions are required to manage anaphylaxis.

LEARNING OUTCOMES

By the end of the module the learner should:

- Be able to define the term 'anaphylaxis'
- Understand the prevalence of allergic reactions and anaphylactic events within the UK
- Identify the three main characteristics of anaphylaxis
- Identify common causes of anaphylaxis
- Differentiate an allergic reaction from anaphylaxis
- Treat someone who has anaphylaxis

DEFINITION:

Anaphylaxis is a condition caused by a massive overreaction of the body's immune system producing an excessive amount of histamine. Histamine is a chemical that is released by **mast** cells that are responsible for fighting off allergens that trigger symptoms such as skin irritation/rashes, sneezing, periorbital oedema (swelling of the eyes), wheezing etc.

The UK Resuscitation Council describes anaphylaxis as:

'a severe, life-threatening, generalised or systemic hypersensitivity reaction. It is characterised by rapidly developing life-threatening airway and/or breathing and/or circulation problems usually associated with skin and mucosal changes.'

<https://www.resus.org.uk/anaphylaxis/>.

Common allergens can include certain medications, insect bites, stings, latex, seafood, eggs and nuts. During an anaphylactic event huge amounts of a chemical called **histamine** are released by immune cells.

Anaphylaxis has three main characteristics:

- 1) It presents itself as a rapid onset where the casualty usually becomes very unwell very quickly
- 2) Airway, Breathing and/or Circulation compromised
 - Swollen eyes, lips, hands or feet
 - Feeling lightheaded or faint
 - Swelling of the mouth, throat or tongue which can cause breathing and swallowing difficulties
 - Wheezing
 - Abdominal pain, nausea and vomiting
 - Collapse into unconsciousness
- 3) A skin rash (*urticaria*) or hives, flushing and/or swelling (in some casualties)

EPIDEMIOLOGY:

Taking into consideration available records to date it is estimated that:

- The UK has some of the highest prevalence rates of allergic conditions in the world with over 20% of the population affected by one or more allergic disorder (M. L. Levy, 2004).
- A staggering 44% of British adults suffer from at least one allergy and the number of sufferers increased by around 2 million between 2008 and 2009 alone. Almost half (48%) of sufferers have more than one allergy (Intel, 2010).
- Anaphylaxis during general anaesthesia occurs in 1 in 10,000–20,000 uses of anaesthetics. These patients may be denied general anaesthesia in the future unless a safe combination of drugs can be identified (NICE , 2014).
- In the UK it is estimated that 500,000 people have had a venom-induced anaphylactic reaction and 220,000 people up to the age of 44 have had a nut-induced anaphylactic reaction.
- Food is a particularly common trigger in children.
- UK estimates suggest that approximately 1 in 1333 of the population of England has experienced anaphylaxis at some point in their lives (Stewart AG, and Ewan PW, 1996).
- There are approximately 20 deaths from anaphylaxis reported each year in the UK with around half the deaths being iatrogenic, although this may be an underestimate (Pumphrey RS, 2000).

THE IMMUNE SYSTEM:

The immune system is made up of a complex and vital network of cells and organs responsible for producing antibodies to defend the body from infectious foreign bodies/microorganisms/allergens. When the body is exposed to an unknown allergen, mast cells mediate the inflammatory responses such as hypersensitivity and allergic reactions and do so by producing histamine.

Common allergic reactions such as hay fever, certain types of asthma, eczema and hives are linked to an antibody produced by the body called the immunoglobulin E (IgE)- IgE antibody. When a susceptible person is exposed to an allergen the body starts producing a large quantity of similar IgE antibodies. Should the individual be re-exposed to the same allergen it may result in an allergic reaction as the body produces even more histamine. Symptoms of an allergic reaction will vary depending on the type and amount of allergen encountered and how the body's immune system reacts.

Allergy symptoms aren't normally life threatening but a severe allergic reaction can lead to anaphylaxis. Even if you or your child has had only a mild anaphylactic reaction in the past there's an increased risk of more severe anaphylactic episodes should there be any further exposure to the allergy-causing substance.

WHAT IS ANAPHYLAXIS?

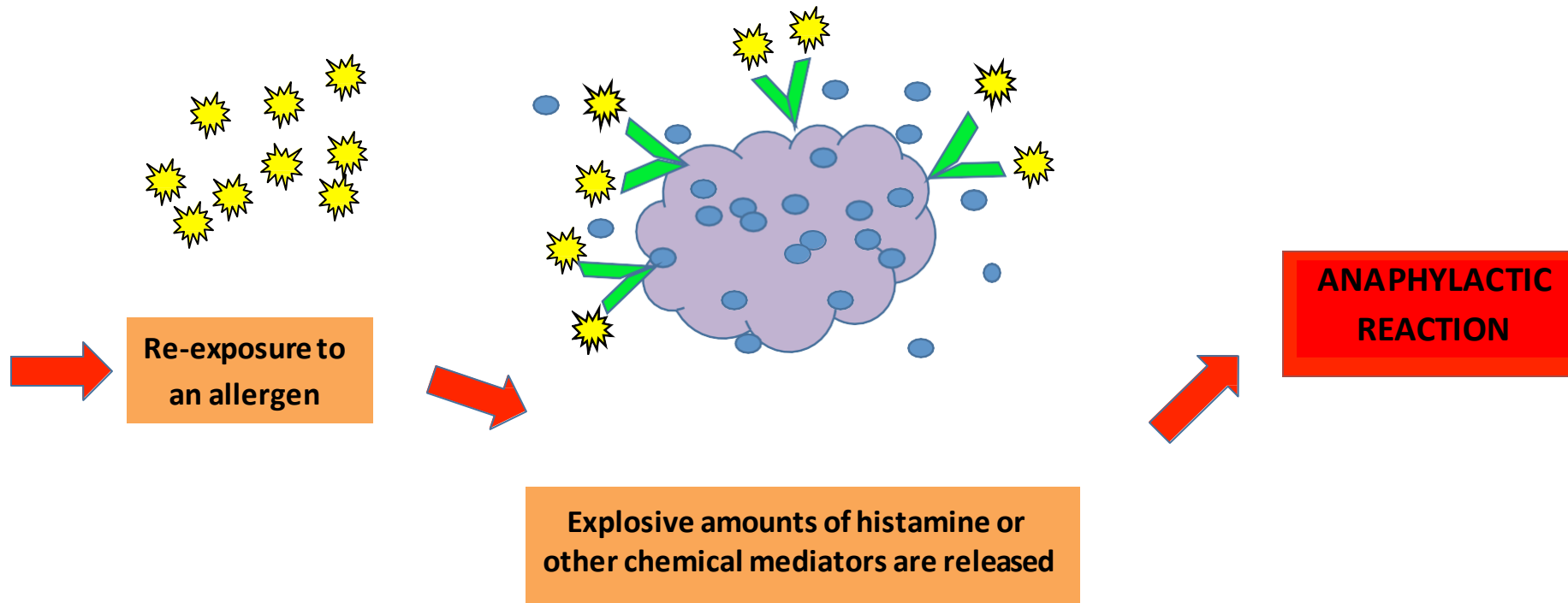
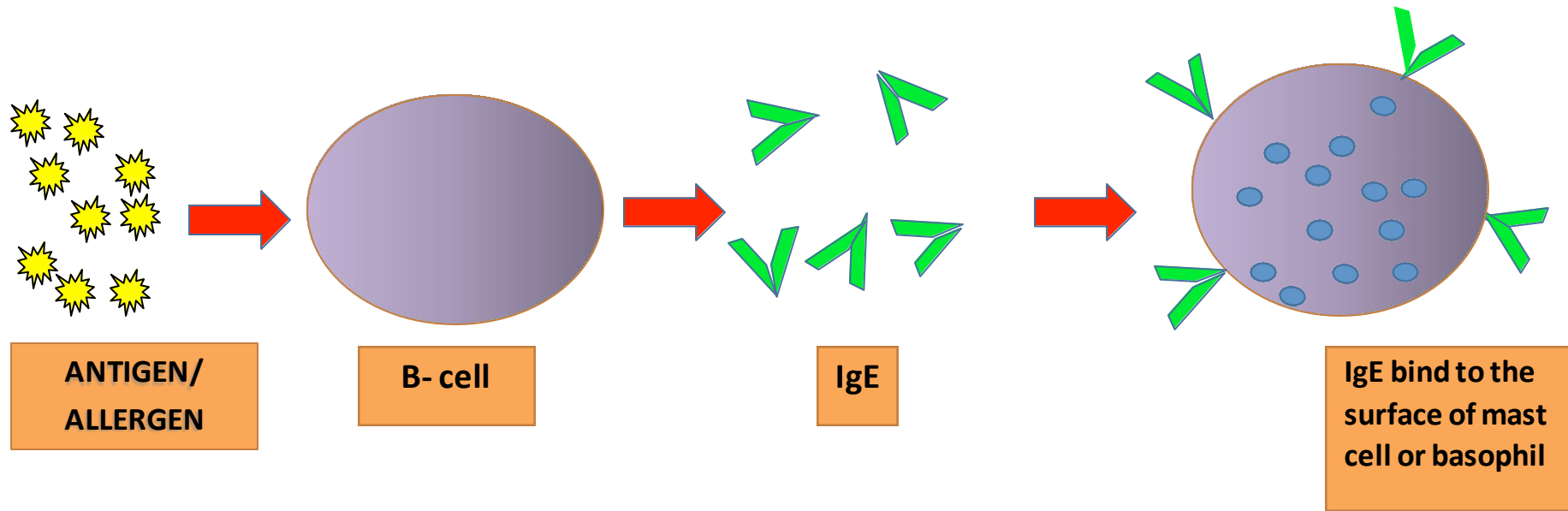
Onset of anaphylaxis is a medical emergency where symptoms develop rapidly (typically within minutes) and where its clinical course is unpredictable, presenting with varying severity and clinical features. The more quickly the symptoms begin the more likely the reaction will be severe.

SIGNS AND SYMPTOMS

- Itching (often the first symptom), redness, hives, swelling, sweating
- Swelling in the nose or throat, hoarseness, wheezing, difficulty speaking, trouble breathing, chest tightness
- Abnormal heart rate or rhythm, shock, heart attack
- Stomach cramps, nausea, vomiting, diarrhoea

Anaphylaxis is most likely when **all** of the following three criteria are met:

1. Sudden onset and rapid progression of symptoms
2. Life-threatening airway and/or breathing and/or circulation problems
3. Skin and/or mucosal changes (flushing, urticaria, angioedema)



COMMON ALLERGENS THAT CAN TRIGGER ANAPHYLAXIS:

ALLERGEN	Examples (please note that this list is not exhaustive)
FOOD	Lactose, egg proteins, shellfish, dairy products, chick peas, fruits, yeast, gelatine
INSECT STINGS	Wasps, bees, hornets
NUTS (including foods that contain nuts)	Peanuts, walnuts, hazel nuts, brazil nuts, almonds
ANTIBIOTICS	Penicillin, vancomycin, gentamycin, neomycin, amoxicillin
OTHER MEDICINAL PRODUCTS	Non-steroidal (Ibuprofen), chemotherapy, vaccines
MISCELLANEOUS	Latex, lupin, etc. In rarer cases aerobic exercise, such as jogging, or even less intense physical activity, such as walking can also trigger anaphylaxis



DIFFERENTIAL DIAGNOSIS AND OTHER 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.

Non-life-threatening conditions (those conditions that normally respond to simple measures):

- Faint (vasovagal episode)- will usually respond to lying the patient down and raising the legs.
- Panic attack- 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.
- Breath-holding episode in children
- Idiopathic (non-allergic) urticaria or angioedema

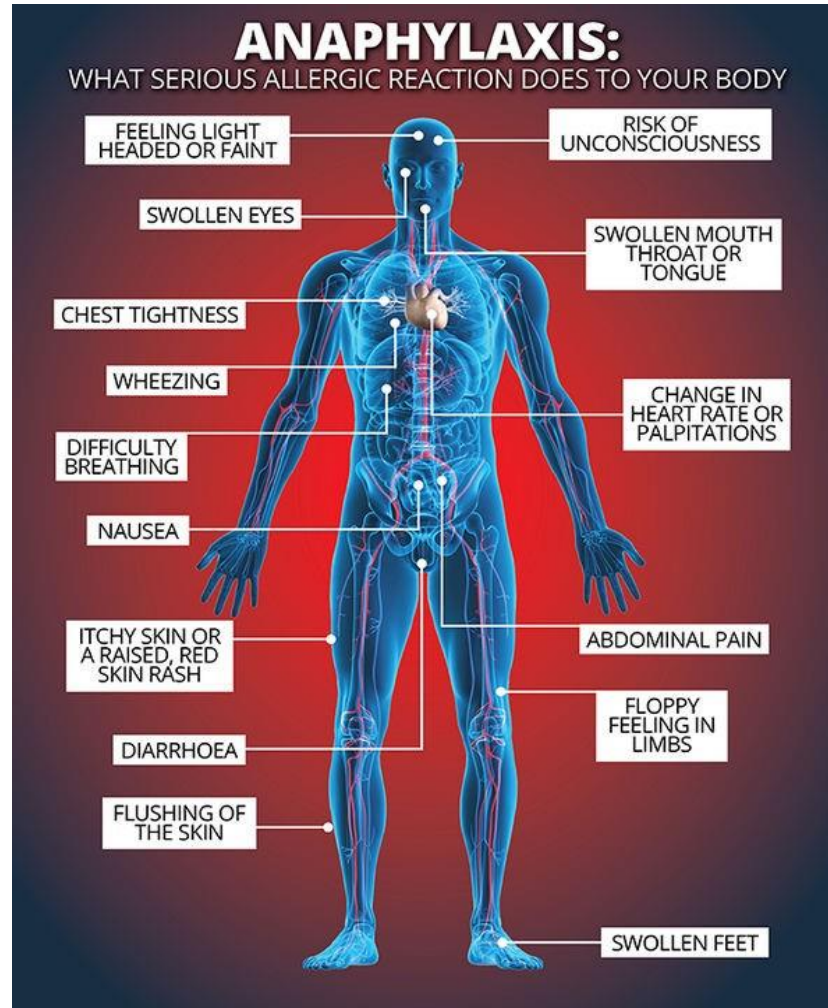
IDENTIFYING ANAPHYLAXIS:

Anaphylactic shock is a sudden and **severe** form of a hypersensitivity reaction where there is an inappropriate reaction or excessive response to some foreign substance.

Characteristic features of anaphylactic shock include:

- Collapse within seconds after exposure to the offending allergens
- Laryngeal oedema which manifests as a lump in the throat, hoarseness, or stridor
- On examination the patient is likely to show symptoms of urticarial rash, which can be localised or widespread. In anaphylaxis, urticaria is part of a life-threatening condition.
- Sudden increase in vascular permeability (angioedema), which can subsequently lead to oedema of the skin, obstruction of the airways and vascular collapse, the results of which may be fatal.





Picture: available from Daily Express <https://www.express.co.uk/life-style/health/674409/anaphylaxis-allergic-reaction-symptoms-bee-stings>

ALLERGIC REACTION OR ANAPHYLAXIS?

SEVERE ALLERGIC REACTION	<u>ANAPHYLAXIS</u>
<p>Allergic reactions, moderate to severe allergic reactions:</p> <ul style="list-style-type: none">• Rashes• Swelling of the face, eyes, or tongue• Hives (especially over the neck and face)• Difficulty swallowing• Itching, wheezing, nasal congestion• Fear or feeling of apprehension or anxiety• Watery, red eyes• Abdominal cramps or abdominal pain• Nausea and vomiting• Weakness, dizziness or light-headedness• Chest discomfort or tightness	<p>Anaphylaxis is a life-threatening condition and a medical emergency. It is an acute systemic (multi-system) and severe Type I Hypersensitivity allergic reaction.</p> <p>Symptoms of a severe reaction occur but onset is within seconds or minutes after exposure. It typically presents with three or more of the following symptoms:</p> <ul style="list-style-type: none">• Itchy rash• Throat or tongue swelling• Difficulty in swallowing, shortness of breath• Nausea, vomiting, or diarrhoea• Abdominal pain• Erratic and weak pulse• Swelling to the skin, face, lips, around eyes• Can be fatal if emergency treatment is not provided

TREATMENT FOR MILD ALLERGIC REACTIONS

If a mild reaction to an allergen is evident, antihistamines in the form of oral tablets or a suspension (Cetirizine, Loratadine, Diphenhydramine etc.) can be effective, however this can take up to 15 minutes before any benefit is seen.

Individuals with a known history of severe allergies or deemed at high risk of suffering an anaphylactic reaction may wear Medical Identity Bracelets. An anaphylaxis bracelet alerts others to the fact that you or your child has an anaphylactic allergy. The bracelet warns of the potential of anaphylaxis. This enables emergency professionals to gain vital information from member's secure emergency personal records, 24/7, 365 days a year, especially where the individual is in an unresponsive or unconscious state and unable to communicate.



PRIORITIES AND MANAGEMENT OF ANAPHYLACTIC SHOCK:

Anaphylactic shock may occur suddenly and unexpectedly and as previously discussed it is a life-threatening condition, especially in circumstances where emergency facilities are not available. Death may ensue if prompt action is not taken. Maintenance of airway, breathing and circulation are paramount to preserve life.

BASIC LIFE SUPPORT

Patients suffering from an anaphylactic reaction should be recognised and treated using the Airway, Breathing, Circulation, Disability, Exposure (**ABCDE**) approach as per Resuscitation Guidance (UK);

<u>A</u> irway problems	<ul style="list-style-type: none">• Airway swelling e.g. throat and tongue swelling• Difficulty in breathing and swallowing• Sensation that throat is 'closing up'
<u>B</u> reathing difficulties	<ul style="list-style-type: none">• Shortness of breath; increased respiratory rate; wheeze• Patient becoming tired or confused• Cyanosis (appears blue) – a late sign• Respiratory arrest
<u>C</u> irculation problems	<ul style="list-style-type: none">• Increased pulse rate (tachycardia)• Low blood pressure (hypotension)• Decreased consciousness level• Myocardial ischaemia/angina• Cardiac arrest
<u>D</u> isability	<ul style="list-style-type: none">• Sense of "impending doom"; anxiety, panic• Decreased consciousness level caused by airway, breathing or circulation complications
<u>E</u> xposure	<ul style="list-style-type: none">• Skin changes are often the first feature and are present in over 80% of anaphylactic reactions (skin, mucosal, or both skin and mucosal changes)• Urticaria (also called hives, nettle rash, weals or welts) anywhere on the body• Angioedema - similar to urticaria but involves swelling of deeper tissues e.g. eyelids and lips, sometimes in the mouth and throat

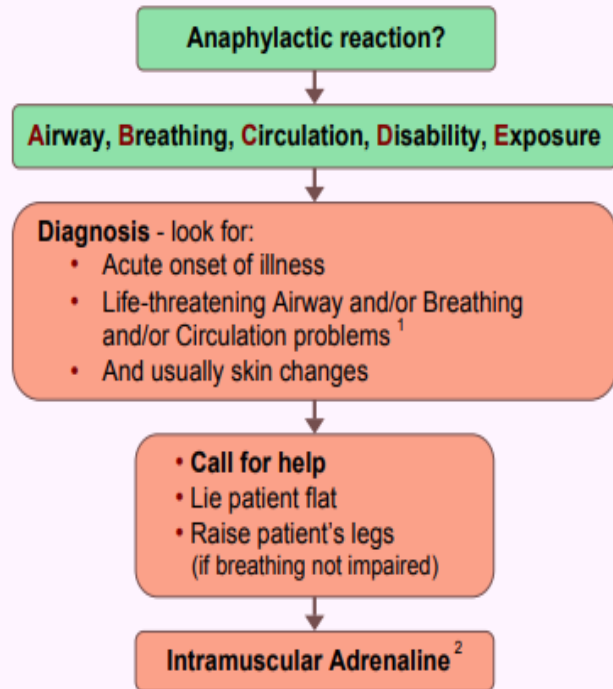
EMERGENCY PROCEDURES ARE AS FOLLOWS:

Call 999 for an ambulance immediately – mention that you think the person has anaphylaxis

1. Remove any trigger if possible – for example, carefully remove any wasp or bee sting stuck in the skin
2. Lie the person down flat in the left lateral position – unless they're unconscious, pregnant or having breathing difficulties (refer to BLS guidelines - <https://www.resus.org.uk/resuscitation-guidelines/adult-basic-life-support-and-automated-external-defibrillation/>)
3. Patients who have previously experienced similar symptoms are likely to carry an auto-injector of adrenalin (**epinephrine**).
4. If appropriately trained, aim the auto-injector on the outer thigh, press to inject contents via intramuscular route (IM) and hold in place for 5-10 seconds. Call 112/999 after first injection and assess response. Even if the casualty has shown evidence of recovery, emergency services MUST always be called.
5. If the symptoms don't improve after 5 minutes (following the first adrenaline administration), and where a second auto-injector is available, repeat step 4.
6. Be prepared to commence CPR (cardiopulmonary resuscitation)



Anaphylactic reactions – Initial treatment



Administration of Adrenaline (Epinephrine)

Adrenaline (epinephrine) intramuscularly (IM) in the anterolateral aspect of the middle third of the thigh (safe, easy, effective):

- Adult IM dose 0.5 mg IM (= 500 micrograms = 0.5 mL of 1:1000) adrenaline (epinephrine).
- Child IM dose (the equivalent volume of 1:1000 adrenaline (epinephrine) is shown in brackets):

✎ >12 years: 500 micrograms IM (0.5 mL),
i.e. the same as the adult dose.

(If the child is small or prepubertal administer 300 micrograms (0.3 mL of 1:1000))

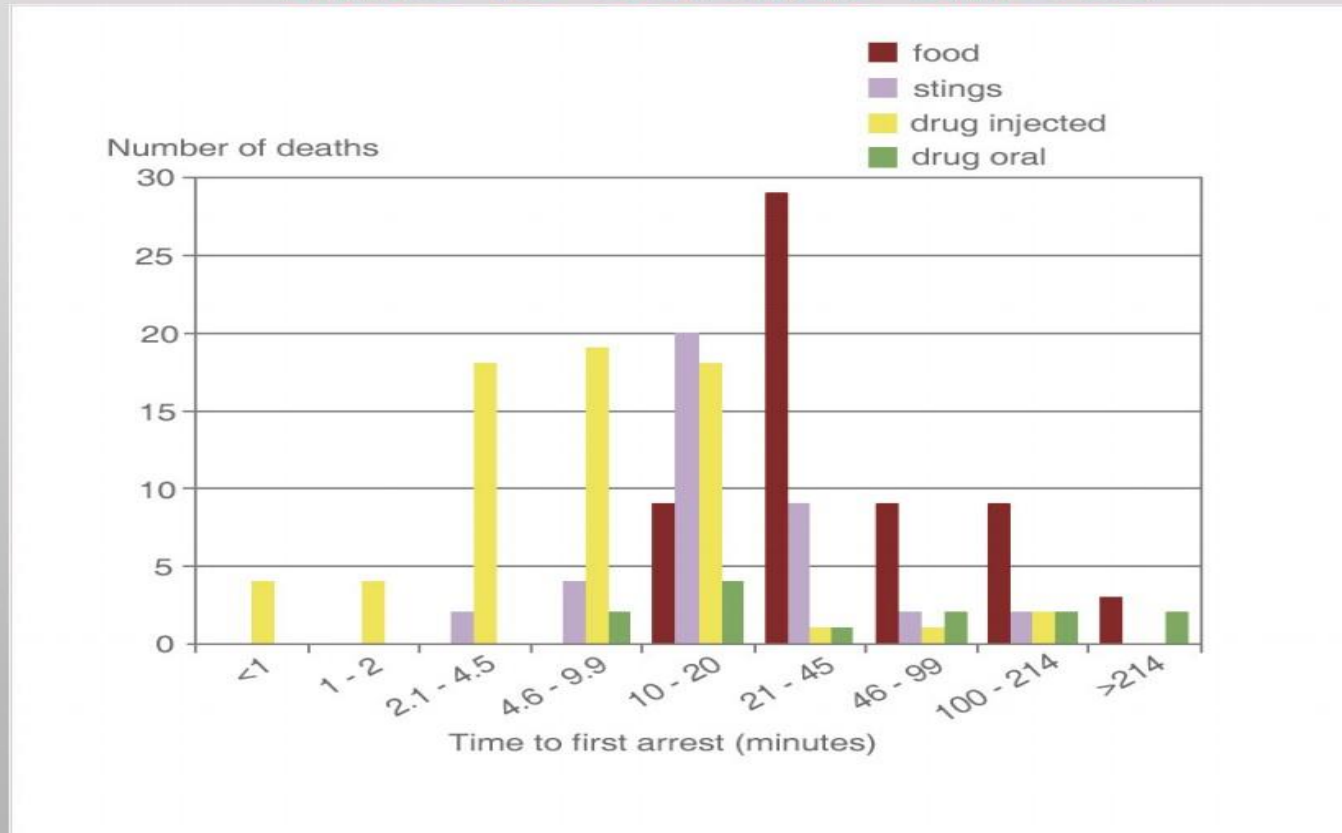
✎ >6-12 years: 300 micrograms IM (0.3 mL)
✎ <6 years: 150 micrograms IM (0.15 mL)



PLEASE NOTE

Half doses of adrenaline (epinephrine) may be safer for patients on amitriptyline, imipramine, monoamine-oxidase inhibitor (MAOI) or beta-blocker.

Time to cardiac arrest



Adapted from Pumphrey RS. Lessons for management of anaphylaxis from a study of fatal reactions. *Clin Exp Allergy* 2000;30(8):1144-50.

RECOVERY

Biphasic anaphylaxis

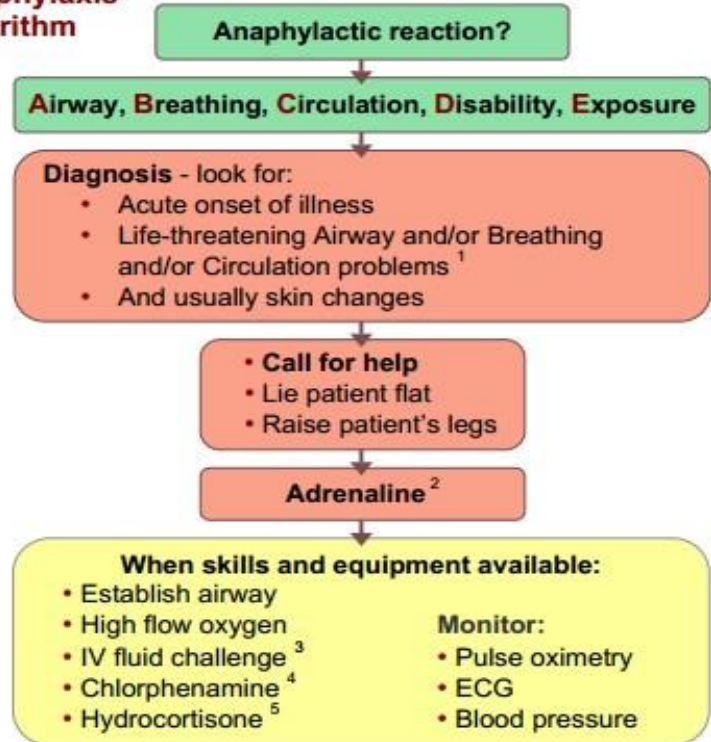
A ***biphasic reaction*** is a recurrent episode of anaphylaxis, even where the patient appears to have made a full recovery. Biphasic reactions normally present a few hours following original onset but in rare cases can take up to 72 hours post initial event. As a precaution anyone who suffers an anaphylactic reaction needs to be observed in hospital after they recover from the event of a biphasic reaction.

REFERRAL FOLLOWING SUDDEN ONSET OF ANAPHYLAXIS WITH NO PREVIOUS HISTORY

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. Patients need to know the allergen responsible where possible and how to avoid it. If the allergen is food-based they need to know what products are likely to contain it and all the names that can be used to describe it. Where possible they also need 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 usually advised to 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 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.

Anaphylaxis algorithm



1 Life-threatening problems:
Airway: swelling, hoarseness, stridor
Breathing: rapid breathing, wheeze, fatigue, cyanosis, SpO₂ < 92%, confusion
Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma

2 Adrenaline (give IM unless experienced with IV adrenaline)
 IM doses of 1:1000 adrenaline (repeat after 5 min if no better)

• Adult	500 micrograms IM (0.5 mL)
• Child more than 12 years:	500 micrograms IM (0.5 mL)
• Child 6 -12 years:	300 micrograms IM (0.3 mL)
• Child less than 6 years:	150 micrograms IM (0.15 mL)

Adrenaline IV to be given **only by experienced specialists**
 Titrate: Adults 50 micrograms; Children 1 microgram/kg

3 IV fluid challenge:
 Adult - 500 – 1000 mL
 Child - crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

	4 Chlorphenamine (IM or slow IV)	5 Hydrocortisone (IM or slow IV)
Adult or child more than 12 years	10 mg	200 mg
Child 6 - 12 years	5 mg	100 mg
Child 6 months to 6 years	2.5 mg	50 mg
Child less than 6 months	250 micrograms/kg	25 mg