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Anaphylaxis

The word *phylaxis* is the Greek for ‘protection’, so *anaphylaxis* is the opposite to this. Anaphylaxis is the most severe form of allergic reaction. It is a medical emergency characterised by symptoms including shortness of breath, low blood pressure and collapse of the circulatory system that carries blood to the various organs. In extreme cases it is potentially life-threatening.

Although there is a wide range of symptoms that can occur in anaphylaxis, not all of them will be experienced on each occasion.

WHAT ARE THE CAUSES OF ANAPHYLAXIS?

Anaphylaxis, or an anaphylactic reaction, can have any of several causes, outlined below.

Certain foods Any food can cause anaphylaxis but the most likely culprits are nuts, peanuts, sesame seeds, fish, shellfish, cow’s milk and eggs.

Exercise-induced anaphylaxis This usually arises only after eating a particular food, generally just before or just after exercise, although there may be a delay in some people. This type of anaphylaxis is therefore known as *food-dependent exercise-induced anaphylaxis*. Some susceptible people may be able to tolerate exercise alone or to eat a certain food with only a mild reaction or no reaction at all. However, exercise shortly before or after ingesting this food causes an allergic reaction. Finding out which food is having this effect may require allergy tests, and referral to an allergy clinic is essential for diagnosis and management.

Idiopathic Anaphylaxis that has no known cause, even after extensive testing, is known as idiopathic anaphylaxis.

Insect stings Every year in the UK there are between two and nine deaths from bee and wasp stings; hornets are another common cause of insect allergy. The risk of being stung can be minimised by taking precautions as outlined in the factsheet produced by the

Anaphylaxis Campaign (address in Appendix 1) or ask your specialist or GP.

Latex Gloves, condoms, balloons, elastic bands, rubber-soled shoes and many more items that are made from natural rubber latex can provoke a life-threatening allergic reaction. Latex allergy can also be associated with an allergy to certain foods; this ‘cross-reactivity’ is discussed in Chapter 12.

Medicines In susceptible individuals some medicines can cause anaphylaxis. Common examples are drugs containing salicylate (e.g. aspirin) and certain anaesthetics, but most drugs have the potential to cause an allergic reaction and are, in fact, the most common cause of anaphylaxis.

AT WHAT AGE CAN ANAPHYLAXIS START?

Anaphylaxis can start at any age. There are no rules, except that it is more likely to occur in an atopic person – someone who has inherited the susceptibility to allergy from a first-degree relative (parent).

WHAT ACTUALLY HAPPENS IN THE BODY?

When a susceptible person comes into contact with an allergen that causes an anaphylactic reaction to occur, that allergen becomes bound to the surface of the mast cells (see Chapter 1). The binding of the allergen to the surface of the mast cell causes it to release a number of different chemicals, or mediators, which have a profound effect on the organs of the body. In the skin they cause leakiness and relaxation of the small blood vessels, leading to flushing, swelling and characteristic rashes (urticaria and angioedema). In the lung they cause muscle spasm and narrowing of the airways, which become blocked and filled with mucus. In the gut there is also muscle spasm and leakiness of the blood vessels, causing colic and diarrhoea. The coronary arteries, which supply blood to the heart muscle, go into spasm, and damage to the muscle can occur. The veins collecting blood from the other organs of the body lose their tone and become larger and leaky, no longer doing their job properly. The blood pressure falls and the blood supply to all the major organs is compromised.

WHAT ARE THE SYMPTOMS?

The symptoms of anaphylaxis can vary in both severity and the speed with which they happen (speed of onset), even in the same person. Any of the following symptoms may occur:

- tingling of the lips or in the mouth,
- flushing of the skin or a generalised rash,
- swelling of the lips, mouth, face or throat, or hands and feet,
- nasal congestion,
- sweating and/or dizziness,
- difficulty in swallowing or speaking,
- abdominal cramps, nausea, vomiting and diarrhoea,
- wheezy chest,
- feeling of faintness and deep anxiety,
- weakness,
- collapse,
- loss of consciousness.

WHAT FACTORS INCREASE THE SEVERITY AND SPEED OF AN ALLERGIC REACTION?

It is thought that certain factors can increase the severity and speed of an allergic reaction. They are:

- poor general state of health,
- alcohol,
- exercise,
- ingesting a larger amount of allergen,
- stress,
- poorly controlled asthma.

WHAT IS THE TREATMENT?

Prompt treatment of anaphylaxis is essential and may be life-saving. Although histamine preparations may be used in the early stages of an allergic reaction, the mainstay of treatment is an injection of adrenaline (also called epinephrine). It is a very safe drug, which must be given as early in a reaction as possible. If prescribed, an asthma-relieving inhaler can be given as well.

It is also helpful if oxygen is given once medical help is available.

Antihistamines

Antihistamine medication is often used as the first line of treatment for the relief of a mild to moderate allergic reaction. The symptoms are caused by the chemical histamine, which is produced during the end-stages of an allergic reaction. Antihistamines work by blocking the action of this chemical, which thus reduces the symptoms of redness, itching, mucosal swelling (e.g. swelling tongue), excess secretions (e.g. runny nose) and allergic skin rashes.

You can buy certain antihistamines ‘over the counter’ (without a prescription), but there are many different types, so it is essential that you discuss with your pharmacist or your GP or allergy specialist the most appropriate choice for you. This is particularly important if you are taking any other medication. You should also get advice about when to take the antihistamine. Remember that, if the symptoms get worse, you *must* proceed to adrenaline (see below).

Side-effects of antihistamines

Modern antihistamines (e.g. acrivastine, cetirizine, loratadine) have very few side-effects. Be aware, though, that some of the older antihistamines can make you feel drowsy and affect your ability to operate machinery and to drive. At present there is no legislation governing the use of medicines when undertaking these tasks, but it is your responsibility not to do so if you have symptoms or side-effects that could affect your judgement. (This is also the case for some other medications and alcohol.)

Other side-effects associated with the use of certain antihistamines

In 1990 and 1992 the Medicines Control Agency (part of the Department of Health) issued safety warnings that terfenadine and astemizole could, in certain circumstances, be associated with the development of abnormal heart rhythms. The effect is rare and was found only in people who exceeded the manufacturer’s daily dose or were taking other drugs that interacted with the histamine. Nevertheless, terfenadine and astemizole have been withdrawn from use.

Adrenaline

Adrenaline (epinephrine) in its natural form is a stress hormone that is produced in your body by the adrenal glands. Adrenaline causes the ‘fight or flight’ reaction, which prepares your body for any stress-

ful activity by speeding up your heart and increasing the flow of blood to your muscles.

The medical form of adrenaline is given by injection during a severe allergic reaction in order to aid the reversal of the life-threatening symptoms that are associated with anaphylaxis.

Remember *always* to go to your nearest Accident & Emergency Department if you have an anaphylactic reaction, even if you feel better after using the adrenaline, because its actions are short-lived (see below). You may also have a secondary, delayed reaction or complications, so you need medical attention to ensure that all is well or to deal with any problems.

How does adrenaline work?

In anaphylactic shock, the blood vessels leak, the airways (bronchial) tissues swell and the blood pressure drops, causing suffocation and collapse. Adrenaline acts within seconds to constrict blood vessels, to relax muscles in the lungs and to stimulate the heart beat. This results in improved breathing, reduced swelling and improved circulation.

The EpiPen and Anapen are the most usual ways to inject adrenaline. They are available as a pre-loaded syringe that administers a single predetermined dose of life-saving adrenaline into the thigh. In most cases the beneficial effects are felt within seconds.

Anyone who is at risk of having an anaphylactic reaction is usually advised to carry two adrenaline injector pens. This is because the duration of action of adrenaline is short (about 10 minutes) – if there is a delay in obtaining medical attention the effects of the initial dose of adrenaline may wear off and a second dose may be required.

Larger adults may also need more than one because the amount of adrenaline required is related to body weight.

If you need to carry an EpiPen or Anapen, do practise often with the trainer pen so that you are completely familiar with it. Also practise on an orange with an expired pen – this feels quite different from the trainer pen.

EpiPen The EpiPen has a spring-loaded, concealed needle that delivers the dose when the pen is jabbed against the outer thigh and then held in place for 10 seconds. Available only on prescription, it comes in two forms: EpiPen and EpiPen Junior.

- The *EpiPen* delivers a dose of 0.3mg of adrenaline for adults and children weighing over 30kg.

- The *EpiPen Junior* delivers a dose of 0.15mg for children 15–30kg.

Babies and children under 15kg will be prescribed adrenaline in the most appropriate form.

EpiPen trainer pens are available to practise with. As well as having one at home, it is a good idea to have one in the child's pre-school or school setting, so that those responsible for administering it can familiarise themselves with it. In addition, the EpiPen website (details under Alk-Abelló in Appendix 1) has a video clip showing how to use it correctly.

Instructions for administering the EpiPen and EpiPen Junior are given on the side of the injector:

1. pull off grey safety cap,
2. hold EpiPen near outer thigh with black tip pointing towards outer thigh,
3. swing arm away from thigh, then jab firmly into outer thigh – through clothing if necessary – until the pen clicks,
4. hold in place for 10 seconds,
5. remove pen and massage thigh.

Anapen The Anapen is another preloaded adrenaline syringe that carries a single measured dose of adrenaline. It has a mechanism whereby, on pressing a firing button, a spring-activated plunger pushes the needle into the thigh muscle. It is then held in place for 10 seconds.

- The *Anapen* delivers 0.3mg adrenaline for adults and children over 30kg.
- The *Anapen Junior* delivers 0.15mg for children weighing 15–30kg.

Lincoln Medical, the distributors of all the Anapen products, will supply the *Anapen trainer pens* on request, for a small fee. The Anapen and Anapen Junior can be obtained only with a prescription.

To use the Anapen:

1. remove the black needle cap,
2. remove black safety cap from firing button,
3. hold Anapen against outer thigh and press red firing button – through clothing if necessary,
4. hold in position for 10 seconds, allowing the full dose of adrenaline to be injected.

Care of your prescribed adrenaline

- Adrenaline should not be stored above 25°C. It should never be refrigerated or frozen. For suggestions on how to keep your adrenaline at the correct temperature in hot weather, see Chapter 16 ('Holidays and travelling').
- Adrenaline easily degrades when exposed to direct sunlight. If this happens, it may not work as effectively. For this reason, it should be kept in its outer case until it is required. You can buy special bags to carry your adrenaline and rescue medication (e.g. from Yellow Cross or Kidsaware; contact details in Appendix 1) or you can use an old glasses case or pencil case.
- The adrenaline should be a colourless liquid. If it becomes discoloured or contains a precipitate (solid matter), you will need to replace it. You can check the liquid through the observation window. If you have any concerns, take it to your pharmacist who will check it for you.
- Remember to replace your adrenaline injector by or even before it reaches its expiry date. (Take expired ones to the chemist or pharmacy for safe disposal.)
- Your prescribed adrenaline and rescue medication should be carried at all times.
- As with all medication, store it out of reach of children.
- Make sure that young people who do use medication know how to use it and look after it.

You should check your adrenaline injectors on a regular basis to ensure that they are in-date and in good condition (colourless and without precipitates). However, in an emergency, provided that it is in good condition, the use of out-of-date adrenaline is better than no adrenaline at all..

Side-effects of adrenaline

The most common side- (unwanted) effects of adrenaline are trembling, palpitations (an awareness of the heart beat), sweating, a fast heart beat, nausea, dizziness and a feeling of anxiety or tension. Despite these effects, don't be afraid to use this life-saving medication. They are the normal effects of adrenaline, which soon wear off. In fact, some people don't even notice them when adrenaline is administered in the recommended dose.