Understanding Anaphylaxis

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What is Anaphylaxis?

Anaphylaxis is a sudden, severe allergic reaction. Anaphylaxis is triggered when the immune system overreacts to a usually harmless substance causing mild to severe symptoms that affect various parts of the body.

The symptoms are caused by the sudden release of chemical substances, including histamine, from cells in the blood and tissues where they are stored.

The release is triggered by the interaction between an allergic antibody called Immunoglobulin E (IgE) and the substance (allergen) causing the anaphylactic reaction.

This mechanism is so sensitive that minute quantities of the allergen can cause a reaction.

Within minutes or hours of being exposed to the allergy trigger, the body starts a chain reaction that widens the blood vessels and lowers the blood pressure.

It can cause hives and swelling, especially around the face and throat. The person may have trouble breathing, talking, or swallowing.

Anaphylaxis requires immediate medical treatment, including an injection of epinephrine and monitoring by a medical practitioner.

If anaphylaxis is not treated properly it can be fatal. Sometimes symptoms go away, and then return a few hours later, so it is important to take these steps as soon as an anaphylactic reaction begins and for the person to remain under medical observation for as long as the reaction and symptoms continue.

Biphasic anaphylaxis is a recurrence of symptoms within 72 hours after full recovery of anaphylaxis with no further exposure to the allergen. It is managed in the same way as anaphylaxis.

What causes Anaphylaxis?

Any substance can cause an anaphylactic reaction but the most common causes are:

Eggs, bee stings, peanuts, shellfish and medication.

Food: Any food can cause an allergic reaction, but foods that cause the majority of anaphylaxis are peanuts, tree nuts, shellfish, fish, milk, eggs and preservatives. **More than half of all cases of food-related anaphylaxis are caused by peanuts.**

Other foods known to trigger anaphylaxis include:

- Nuts – such as walnuts, cashew nuts, almonds, brazil nuts and hazelnuts
- Milk
- Fish and shellfish
- Eggs
- Some types of fruit – such as bananas, kiwi fruit, grapes and strawberries

Stinging insects: Insect sting venom from bees, wasps, hornets and fire ants can cause severe and even deadly reactions in some people.

Medications: Almost any medication can cause an allergic reaction. Common medications that cause anaphylaxis are antibiotics and anti-seizure medicines. Certain post-surgery fluids, vaccines, blood and blood products, radiocontrast dyes, pain medications and other drugs may also cause severe reactions.

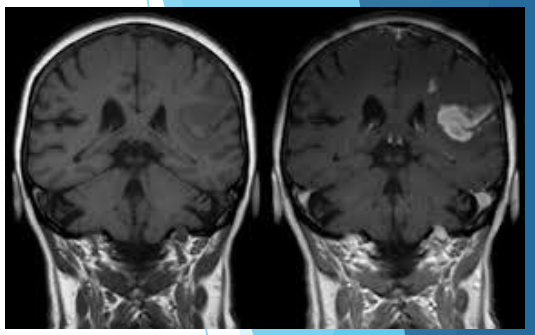
Medicines known to trigger anaphylaxis in a small amount of people include:

- Antibiotics – particularly penicillin-like antibiotics
- Muscle relaxant medicines used during surgery (general anaesthetic)
- Non-steroidal anti-inflammatory drugs (NSAIDs) – a type of painkiller that includes ibuprofen and aspirin

People sensitive to these types of medicines will usually develop anaphylaxis as soon as they begin a course of treatment, although they may have safely received them in the past.

The risk of anaphylaxis using these types of medicines are very small, so in most cases the benefits of treatment outweigh the potential risk. For example, the risk of developing anaphylaxis:

- After taking a NSAID-type painkiller is around 1 in 1,480
- After taking penicillin is around 1 in 5,000
- After being given a general anaesthetic is around 1 in 10,000



Contrast Agents: Contrast agents are a group of special dyes used in some medical tests to help certain areas of your body show up better on scans such as X-rays.

For example, a contrast agent injected into a blood vessel will help show up any problems in the vessel, such as a blockage, on the X-ray. This is known as angiography.

The risk of developing anaphylaxis after being injected with a contrast agent is thought to be less than 1 in 10,000.

Latex: Some products made from natural latex contain allergens that can cause reactions in sensitive individuals. The greatest danger of severe reactions occurs when latex comes into contact with moist areas of the body or internal surfaces during surgery.

Less than 1 in 100 people in the population has a natural rubber latex allergy. Healthcare, hair, beauty, catering and motor industry workers are more likely to have a latex allergy. Those with a history of hay fever, asthma and eczema and with certain medical conditions, like Spina bifida, are more likely to be affected.

Exercise: Although rare, exercise can cause anaphylaxis. Oddly enough, it does not occur after every exercise session and in some cases, only occurs after eating certain foods before exercise.

Idiopathic Anaphylaxis: Sometimes, despite extensive testing, no trigger can be found for anaphylaxis, and the cause remains unknown. This is known as idiopathic anaphylaxis.

Risk factors

There aren't many known risk factors for anaphylaxis, but some things that may increase your risk include:

- A personal history of anaphylaxis. If you've experienced anaphylaxis once, your risk of having this serious reaction increases. Future reactions may be more severe than the first reaction.
- Allergies or asthma. People who have either condition are at increased risk of having anaphylaxis.
- A family history. If you have family members who've experienced exercise-induced anaphylaxis, your risk of developing this type of anaphylaxis is higher than it is for someone without a family history.

How is Anaphylaxis Diagnosis?

Anaphylaxis is diagnosed based on its symptoms. People with a history of allergic reactions may be at greater risk for developing a severe reaction in the future.

Skin testing may help confirm the substances that cause severe allergic reactions.

Skin Allergy Test

Prevention

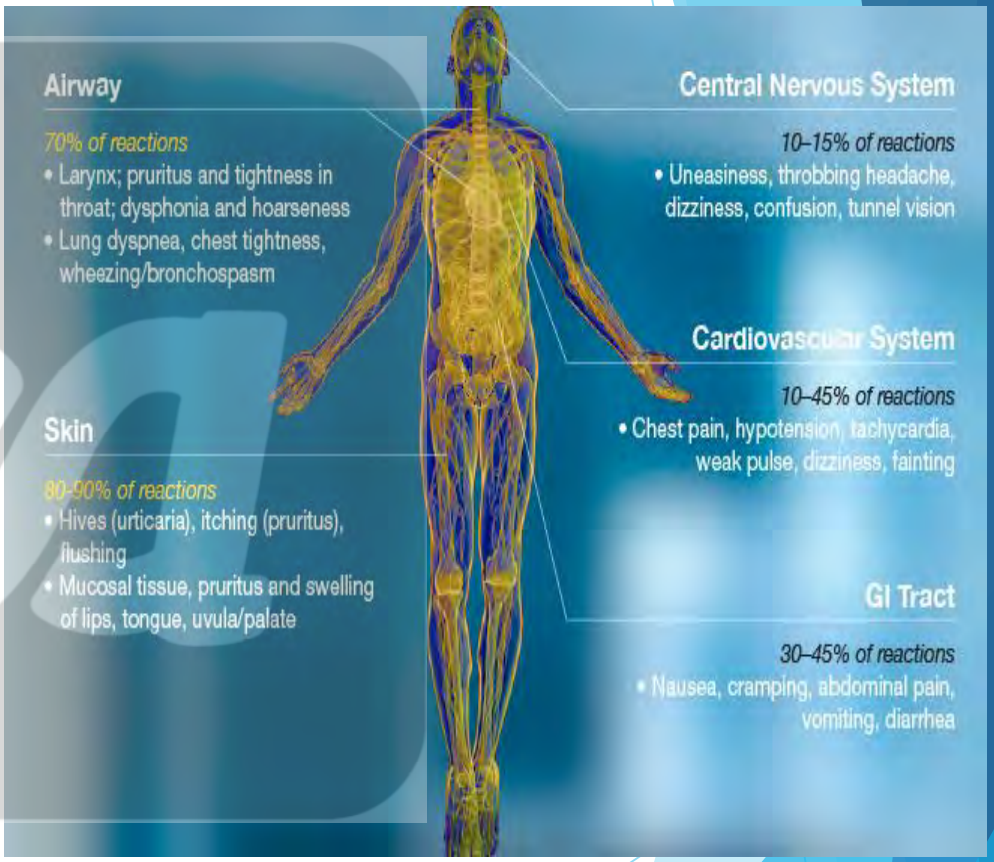
The allergist will provide information about avoiding the allergen as well as a treatment plan. Avoiding the allergen(s) is the main way to remain safe, but requires a great deal of education.

Specific advice may include:

- Food: how to interpret ingredient labels, manage restaurant dining, avoid hidden food allergens
- Insects: not wearing perfumes, avoiding bright coloured clothing and high risk activities; wearing long sleeves/pants when outdoors
- Medications: which drugs/treatments to avoid, a list of alternative medications

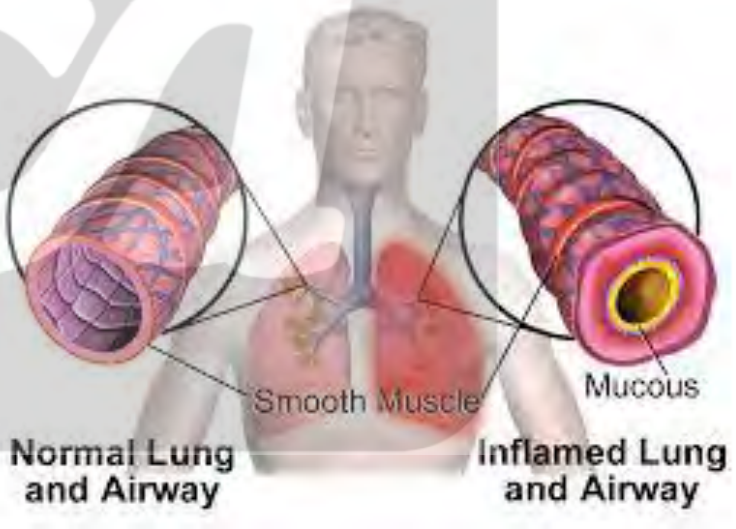
Symptoms

Anaphylaxis symptoms occur suddenly and can progress quickly. The early symptoms may be mild, such as a runny nose, a skin rash or a "strange feeling." These symptoms can quickly lead to more serious problems, including:



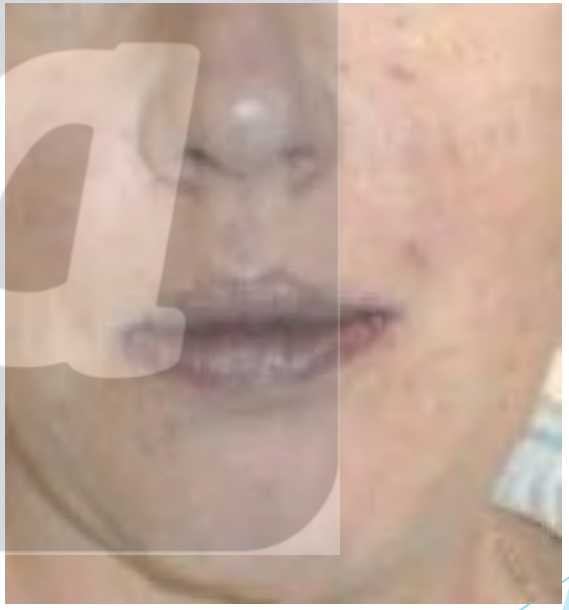
Airway Symptoms:

- Airway swelling causing difficulty in breathing and swallowing
- Tightness of the throat
- Hoarse voice
- Stridor



Breathing Problems:

- Shortness of breath – increased respiratory rate
- Wheeze
- Patient becoming tired
- Confusion caused by hypoxia
- Cyanosis
- Respiratory arrest



Circulation Problems:

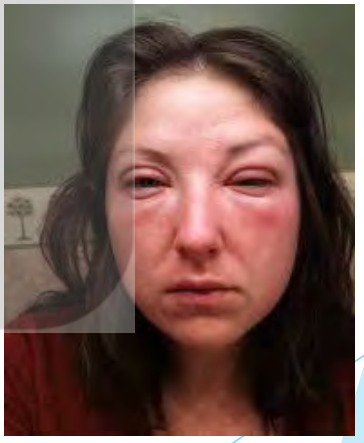
- Signs of shock – pale, clammy
- Increased pulse rate
- Low blood pressure, feeling faint, collapse
- Decreased conscious level or loss of consciousness
- Cardiac arrest

Skin and/or mucosal changes:

- Often the first feature in over 80% of anaphylactic reactions
- Can be subtle or dramatic
- May be just skin, just mucosal or both skin and mucosal changes
- There may be erythema – 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 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.





There can also be gastrointestinal symptoms e.g. vomiting, abdominal pain and incontinence.

Although skin problems can be worrying or distressing for the patient, 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 anaphylactic reaction.

Anaphylaxis Management

If you think that somebody is experiencing symptoms of anaphylaxis, you should use an adrenaline injector if one is available. Dial 999 immediately afterwards.

Adrenaline (also known as epinephrine) acts quickly to constrict blood vessels, relax smooth muscles in the lungs to improve breathing, stimulate the heartbeat and help to stop swelling around the face and lips.

- **Use the adrenalin auto-injector** - This can be done by the person with anaphylaxis, but sometimes (if it's a young child or someone who is unconscious) another person may need to give the injection. Before attempting the injection, make sure you know what to do. You should read all of the instructions carefully when you, or the person you are responsible for, are first prescribed the injector.

- After injecting, the syringe should be held in place for 5-10 seconds. Injections can be given through clothing.

- Call 999 stating that the person is having an anaphylaxis reaction

- Most people should experience a rapid improvement in symptoms once the adrenaline has been used. If there's no improvement after 5-10 minutes, you should inject a second dose of adrenaline, if one is available. This should be injected into the opposite thigh.

- Lay the person flat with their legs raised to help maintain their blood pressure. Unless the person is having breathing difficulties than then sit the person up. If the person is unconscious, then place them in the recovery position. (see appendix 1)

- If the person stops breathing start BLS (see appendix 2)

Adrenaline (epinephrine) Dosage

The appropriate dose of adrenaline (epinephrine) 1:1000 (1mg/ml) solution should be administered immediately by IM injection (see Table 8.2). If there is no clinical improvement, the dose given may be repeated after about five minutes.

In some cases, several doses may be needed, particularly if improvement is transient.

Dose of Adrenaline (epinephrine) by age – Green Book August 2012

*A suitable syringe for small volumes should be used

Age	Dose of Adrenaline (epinephrine) Volumes stated are 1:1000 adrenaline
Under 6 months	150 micrograms IM (0.15mls) *
Over 6 months but under 6 years	150 micrograms IM (0.15mls) *
6 to 12 years	300 micrograms IM (0.30mls) *
Over 12 years including adult	500 micrograms IM (0.50mls) (300 micrograms IM if the patients is small or prepubertal)

Be S.A.F.E. Action Guide

Allergists and emergency physicians have teamed up to create the **Be S.A.F.E.** action guide to help you remember steps to take during and after an allergic emergency.

S

Seek immediate medical help. Call 999 and get to the nearest emergency facility at the first sign of anaphylaxis, even if you have already administered epinephrine, the drug used to treat severe allergic reactions. If you have had an anaphylactic reaction in the past, you are at risk of future reactions.

A

Identify the Allergen. Think about what you might have eaten or come in contact with – food, insert sting, medication, latex – to trigger an allergic reaction. It is particularly important to identify the cause because the best way to prevent anaphylaxis is to avoid its trigger.

F

Follow up with a specialist. Ask you doctor for a referral to an allergist/immunologist, a physician who specializes in treating asthma and allergies. It is important that you consult an allergist for testing, diagnosis and ongoing management of you allergic disease.

E

Carry Epinephrine for emergencies. Kits containing fast-acting, self-administered epinephrine are commonly prescribed for people who are at risk of anaphylaxis. Make sure that you carry an epinephrine kit with you at all times, and that family and friends know of your condition, your triggers and how to use epinephrine.

Consider wearing an emergency medical bracelet or necklace identifying yourself as a person at risk of anaphylaxis. Teamers and other caregivers should be informed of children wo are at risk for anaphylaxis and know what to do in an allergic emergency.

Appendix 1

Recovery Position

Kneel on the floor to one side of the person

Place the person's arm that is nearest you at a right angle to their body, so it is bent at the elbow with the hand pointing upwards. This will keep it out of the way when you roll them over.

Gently pick up their other hand with your palm against theirs (palm to palm). Now place the back of their hand onto their opposite cheek (for example, against their left cheek if it is their right hand). Keep your hand there to guide and support their head as you roll them.

Use your other arm to reach across to the person's knee that is furthest from you, and pull it up so that their leg is bent and their foot is flat on the floor.

Gently pull their knee towards you so they roll over onto their side, facing you. Their body weight should help them to roll over quite easily.

Move the bent leg that is nearest to you, in front of their body so that it is resting on the floor. This position will help to balance them.

Gently raise their chin to tilt their head back slightly, as this will open up their airway and help them to breathe. Check that nothing is blocking their airway. Stay with them, giving reassurance, until they have fully recovered.

Adult Basic Life Support – Resus Council 2015