

Adverse Bee Sting Reactions.

An elderly bee keeper once told me that for centuries it had been known that deaths occurred in the Spring on return to the hives and that being stung regularly over winter reduced the risk of reactions. The risks from stings and the principles of desensitization have been known, long before the medical profession got involved.

Bee venom contains many proteins, mostly enzymes that will cause tissue damage with swelling, pain, and redness. These proteins are foreign to our bodies, so our immune system will react against them to remove the “threat”. Unfortunately in some people, at certain times those reactions can be exuberant leading to various levels of allergic reaction.

About 50% of the population is “Atopic”. Their immune system can produce allergic antibodies (called Immunoglobulin E or IgE) in response to a foreign protein. That is called sensitization and can be detected though skin prick tests or blood tests often called RAST or CAP. A positive test only proves sensitivity, not that you will necessarily have an allergic reaction, so blind testing is unhelpful.

People do not react on first sting, but in some the sting leads to sensitivity and some of those people react adversely on re-exposure. Timing between stings and conditions (many unknown, but illness, temperature, stress, various drugs possibly alcohol) can all influence how the immune system reacts on this second challenge. Happily only a few people who produce IgE actually end up having reactions, our immune system has many built in protective systems too. Allergy occurs when the IgE mediated reactions leads to tissue damage.

Allergic reactions can be either a local response or a generalized reaction. Local reactions involve redness, itch, pain and swelling at the site of sting. This is a nuisance but generally does not cause harm. Ice cubes work as well as anything in reducing the symptoms. 17% of the population develops large swellings after bee and wasp stings.

Clearly a sting in the mouth or throat could cause problems but as this develops slowly there is no need to worry, an antihistamine such as Cetirizine or Loratadine (most supermarkets none drowsy hay fever tablets) may help and seek medical advice if concerned. Many people report large swellings with each sting. The old wives tale that the next sting will be worse however is rarely correct. If anything having a large local swelling to a sting suggests you have a lower risk of a generalized reaction than others.

Generalised reactions (ie something occurs away from the sting site) are often called anaphylaxis. There are three levels of severity.

Mild:	generalized itch, hives a “nettle-rash” anywhere on the body, general redness, swellings such as the lips or at previous sting sites
Moderate	mild asthma, abdominal pains/diarrhoea, minor throat constriction, larger swellings, worse rash
Severe	bad asthma, laryngeal oedema with difficulty breathing and swallowing, fast heart rate and low blood pressure, feeling faint, sense of doom and sometimes loss of consciousness

I believe the term anaphylaxis is best reserved for the severe reactions

Generally the symptoms start within minutes with itch then rash this spreads all over, swelling of the lips, mouth and throat may develop, people feel breathless maybe wheezy, chest feels tight then people feel faint, and may have a feeling of fear. Occasionally this reaction can be delayed by 20-60 minute, these tend to be milder. Reactions occurring two hours or more later are probably not allergic, although some people do get a second reaction four to eight hours later.

We all fear anaphylaxis , national records suggest that six people die each year from venom stings. Most have other medical conditions. So most people survive anaphylaxis, however it is important to prevent it from recurring.

During such a reaction try not to rush or panic, seek urgent help, telephone 999 for a paramedic ambulance man stating “Ana – phil – ac - tic shock”. Lie down elevate the legs if faint. If you have antihistamines take one although it will do little immediately, the asthma inhaler salbutamol (Ventolin) can improve breathing, indeed 20 puffs into the throat is as effective as an injection of adrenaline (eg JEXT, Epi-pen 300 micrograms) in treating anaphylaxis.

You must go to hospital to be checked out, even if you recover quickly. The Casualty should assess your risks, make sure it was an anaphylactic reaction by measuring your serum mast cell tryptase at 1-2 hours and ensure you leave with an adrenaline injector that you have been shown how to use. In the ideal world they should refer you on to your local Allergy clinic, but the way the NHS is funded it often requires them to direct your GP to refer. All beekeepers with a generalised reaction (not large local swellings) should be referred to an Allergy clinic, to assess risk, exclude confounding factors ensure has appropriate emergency treatment and knowledge of how and when to use it, has advice on how to avoid stings and finally the chance to discuss the role of desensitisation to prevent future reactions.

The old adage that the next will be your last is wrong. Only 1/3 of those with a mild reaction will have any reaction next sting and most of those are mild. In those who have had a severe reaction 50-60% will have a further severe reaction if stung soon, 20-25% will have a mild reaction and 20-25 % will have no reactions. The longer the time between stings the less is the risk, at 10 years only 25% of those with a history of a severe sting reaction have a generalised reaction when stung.

Several factors can make reactions worse so it is best if this situation is avoided. The confounders include current infection, heat, exercise, alcohol, aspirin type drugs. Some blood pressure medications can make swellings worse, particularly ACE inhibitors (eg drugs name ending inpril) and beta blockers (drug names end in.....lolol) prevent adrenaline from working. So if you have had anaphylaxis your GP ideally should take you off beta blockers unless they feel the risk of sting is low and the clinical benefit from the drug outweighs the risk of being stung. A difficult area for Beekeepers when most receive several stings a year. The lay public is rarely stung by bees, although family members of beekeepers are at increased risk of stings.

If the GP is in doubt they should seek advice from the local Allergy clinic. Whilst waiting for the Allergy appointment all measures should be taken to avoid stings, you should carry your adrenaline and if you have to work with your bees do it with someone else, never alone. Ideally you GP should measure your Bee (and Wasp) specific IgE levels at about 6 weeks after the reaction and make the results available for the Allergy clinic. This information will help them to come to a management decision which otherwise may be delayed whilst awaiting the results.

In the Allergy clinic a full history of the event, previous stings, other allergic diseases, other significant disease and current medication will be taken. Please attend with all the relevant information. That could include the Casualty discharge note or the photocopy left by the ambulance crew. These often contain important information such as the blood pressure, heart rate, oxygen levels which helps the Allergy Clinician make the correct decision. Most clinics will perform skin prick tests to venom and anything else identified in the history. Some rely on blood tests for Component Resolved diagnostics. Venom contains many potential allergic proteins some only cause mild reactions others anaphylaxis and in the future it may be possible by looking at which parts of these proteins you react to we can predict your future risks.

Few clinic nowadays rely on challenge testing to provoke a reaction!

The clinic will probably repeat your serum mast cell tryptase, so it is always helpful if the GP or the original hospital has provided the original result. Although we have an NHS, its IT links are poor and the Allergy Clinic will not be able to access other hospitals laboratory data or their notes of the events. The better prepared you are, the more meaningful is the consultation.

A raised baseline mast cell tryptase, suggests you have a condition called Mastocytosis where it was the sting and its stress that caused the reaction rather than simply due to allergy. This makes treatment complicated and desensitisation may not be successful. It also requires a full Haematology work up first.

The Allergy clinic will determine and talk through the management options. These are determined by the severity of the reaction, risk of being re-stung, ease of avoidance other illnesses such as ischaemic heart disease that may confound and even age.

Children do not die of anaphylaxis and most lose their allergy so desensitisation is not indicated. Pregnancy or likely pregnancy during initial therapy is a relative contra-indication. Drugs that pose risks may be changed.

There are four key aspects to management strategy:.

De-sensitisation	For those with a severe reaction, significant risk of sting
Adrenaline	Moderate reaction and high risk of sting or severe reaction and low risk of sting or not wanting desensitisation, truly negative allergy tests but had anaphylaxis

Avoidance	Mild/moderate reaction with low risk of sting.
Personal choice	Always appropriate but must be tempered by clinical realism.

Desensitisation is produced by series of injections of increasing dose of bee venom over a period of time that re trains the immune system to react in a more normal manner when someone is stung. There are various regimes. The one we use in Medway, Kent has an induction phase of 2 or 3 injections every week over 7 weeks followed by maintenance 4-6 weekly injections of a dose of venom equivalent to two stings for three years. In induction we have to wait 30 minutes between injections and then observe for an hour. So it is very time consuming, difficult to fit in, if in employment. To complicate matters there are very few Allergy clinics in the UK and many of my patient travel up to sixty miles to attend the clinic. So for some people avoidance and having the ability to manage reactions is all they want and is often appropriate. It is rare for none bee keepers to be stung!

We only offer injection desensitisation to those with severe reactions, evidence for allergic antibody (blood tests or skin prick tests) and a risk of re sting. Most tolerate the injections well but there is a risk of suffering generalised allergic reactions. By dose manipulation these can usually be worked through and desensitisation is successful in 95% of people. The reactions are usually mild and develop during the up-dosing induction phase. They are the reason why it has to occur in hospital where staff are trained to a manage anaphylaxis.

5% of people keep reacting and the decision to give up bee keeping then has to be addressed. Even in these people the reactions are usually less severe than the original field sting reaction

Hunt in 1976 showed successful desensitisation in 95% of those receiving venom as opposed to 42% in those getting placebo or a bee body preparation. Several studies show similar results maintained over 8 years providing the initial course lasted for a least three years. We find most people soon return to their bees after the induction course and are mildly surprised when nothing happens with field stings. However we tend to advise people to carry their adrenaline until they have completed their course and are happy that they have not reacted to a field sting.

Those with moderate or severe reactions but not being desensitised should be offered access to adrenaline. I always suggest they could take an antihistamine on sting, get the adrenaline ready, seek help, get into a place of safety but the adrenaline should only be used if a significant reaction is happening. This is an anxious time and it can be difficult to separate feelings of anxiety from those of a reaction. Adrenaline should be injected into the outside aspect of the thigh if there is difficulty in breathing due throat tightness severe asthma or if feeling light headed. If in doubt it is better to use the adrenaline. Salbutamol inhalers can also be effective and carry the advantage that it is not all or nothing and smaller amounts can be taken tailored to the severity of symptoms. This is not a licensed indication and is practical if no adrenaline available.

Adrenaline must be injected into the muscle not the fatty tissue under the skin. Hence it is best to expose the thighs, press firmly. If you are a large person it would be preferable for your GP to give you Emerade. This is a slightly different device, gives more adrenaline and has a longer needle. It also has a longer shelf life.

One of the main problems with Adrenaline auto injectors is their short shelf life before they need replacing. So register your Adrenaline, the companies who supply offer a web site and will send you a reminder when it is about to time expire.

If you are having anaphylaxis and you find that your Adrenaline is time expired you need to make a decision on how severe the reaction is, how far a paramedic/medical help is away. It will probably still work but carries small risk that with time it contains breakdown products or toxins that might make you feel less well, but at least the anaphylactic reaction should lessen. That is clinical pragmatism rather than correct. Always best to keep your adrenaline in date.

People who only have mild or local reactions could take anti histamines before working with their Bees. This is effective for most but carries a small risk that it could mask early warning symptoms of a severe reaction.

Bee anaphylaxis is important; however it can be prevented and treated. There is no absolute need to give up Bee keeping but clearly you should be referred to your local Allergy Clinic for advice and management. I look forward to becoming a bee keeper on my retirement!