ANAPHYLAXIS

Introduction

Anaphylaxis is a systemic immediate hypersensitivity reaction to an allergen, which may be ingested, inhaled or injected (including bites/stings as well as medical treatment). Symptoms typically occur within 30 minutes of exposure (usually within 5 minutes). Onset can be fulminant and life threatening. Classic anaphylaxis results from IgE mediated mast cell degranulation releasing histamine and other mediators. Anaphylaxis has also been described following exercise or sudden cold exposure. Many cases are idiopathic. Non IgE mediated reactions (previously referred to as “anaphylactoid”) can be clinically identical and result from direct mast cell stimulation.

Anaphylaxis is a multisystem allergic reaction with respiratory and / or cardiovascular involvement. Other organ systems are often involved such as skin (itch, rash, flushing, angioedema) and the GI tract (vomiting, diarrhoea, tummy pain). Signs and symptoms that an allergic reaction is anaphylaxis include:

Respiratory:
- Difficulty/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough

Cardiovascular:
- Loss of consciousness
- Collapse
- Palor and floppiness (in young children)
- Hypotension

Differential Diagnosis

Anaphylaxis is sometimes confused with vasovagal syncope. Syncope produces pallor and bradycardia in contrast to the flushing and tachycardia of anaphylaxis. Hyperventilation may occasionally be interpreted erroneously as the early phase of anaphylaxis.

Anaphylaxis may evolve to being life threatening even if severe symptoms are not initially present. Other causes of hypovolaemic shock and airway obstruction should be considered in severe cases.
Management

See Flow chart below.

First line treatment of anaphylaxis is the administration of adrenaline. Adrenaline should be given immediately for any allergic reaction with respiratory or cardiovascular involvement. Many deaths from anaphylaxis are associated with delayed administration of adrenaline.

Adrenaline 0.01 ml per kg of 1:1000 (1mg/1ml) intramuscularly.
  Minimum dose 0.1 ml
  Maximum dose 0.5 ml

It is important to remember that:
- Adrenaline should be given IM not subcutaneously
- Antihistamines and steroids are second line therapies in anaphylaxis.
- Adrenaline is not indicated for simple generalised urticaria with no other system involved.
ANAPHYLAXIS

Treatment of Anaphylaxis

History consistent with anaphylaxis? (see above)

Yes

Consider other causes of shock, collapse, respiratory distress or obstruction

No

If possible, interrupt further absorption of antigen: e.g. stop IV injection, remove sting

Attend to immediate issues of basic life support:
- Airway
- Breathing
- Circulation
And call for help as necessary (phone 777)
See also CPR guideline

Adrenaline is first line treatment. Administer 0.01 ml/kg of 1:1000 (1mg/ml) solution intramuscularly
Minimum dose 0.1 ml
Maximum dose 0.5 ml

Intravenous adrenaline may be needed for the most severe cases (starting dose 0.1 ml/kg of 1:10,000) but do not delay IM adrenaline while awaiting venous access

- Move child to resuscitation area
- Attach monitors
- Ensure sufficient staff attend
- In areas other than PICU and CED always initiate a 777 team call out

Upper airway obstruction?

Yes

- Sit child upright
- Face mask oxygen
- Nebulised adrenaline (1:1000 solution, 0.5ml/kg, max dose 6ml. Dilute to min volume 4ml)
- Prepare for possible intubation

No

Poor perfusion, tachycardia, hypotension?

Yes

- Obtain IV access
- Give 20ml/kg 0.9% NaCl
- Repeat boluses as necessary, preferably changing to colloid such as haemacell or 4% albumin.
- May require multiple doses of IV adrenaline or inotrope infusion if failing to respond

No

Bronchospasm?

Yes

- Give nebulised salbutamol (5mg in 4ml, running with wall oxygen at 8l/min)
- Repeat as necessary
- Lower airway obstruction may be severe and require continuous nebulisers, IV salbutamol, and/or intubation & ventilation

No

- Obtain blood sample for tryptase within 1-2 hours from onset of symptoms. This may help to confirm an uncertain diagnosis (in retrospect)

Other drugs

1. Hydrocortisone 4mg/kg IV q6h to reduce delayed/recurrent symptoms. An oral steroid such as prednisone or prednisolone can be used in less severe cases.
2. Non-sedating antihistamine – H1-blocking antihistamines (e.g. loratadine or cetirizine) may be useful for itch or angioedema
3. Oral ranitidine 1-2 mg/kg max 150mg (H2-blocking antihistamines) may work synergistically with H1-blocking antihistamines in severe reactions.

Observation

All children should be carefully observed for a minimum of 4 hours after onset. Children who require more treatment than a single dose of IM adrenaline must be admitted for 24 hours.

IM adrenaline may need to be repeated after 10-15 minutes if symptoms are ongoing or recurring

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Editor: Dr Raewyn Gavin  Date Reviewed: March 2010

Anaphylaxis  Page: 3 of 6
ANAPHYLAXIS

Disposition from Emergency Department

Children requiring treatment with adrenaline should be observed for at least 4-6 hours as life-threatening manifestations can appear after apparent remission. All children who require more than a single dose of adrenaline should be admitted because of the possibility of recurrent symptoms. 24 hours.

Children with less severe disease, good family supervision, transport and telephone can be discharged after 4-6 hours observation with oral antihistamine. They should be instructed to return immediately if there are any recurrent symptoms.

For those patients who have had anaphylaxis:
Follow up should be arranged with the Paediatric Allergy/Immunology Service. Provide the family with an emergency action plan and Adrenaline autoinjector ordering information before leaving the emergency department (see below).

Adrenaline Autoinjectors

Ensure that the family obtains and is instructed in the use of an autoinjector. There are 2 devices available in NZ. EpiPen® and AnaPen®.

The autoinjector teaching kit is in a box in the right hand side cupboard under the fax machine in the doctor’s work station. Follow the check list on the lid of the box. Autoinjectors are not funded.

See Page 5 & 6 for Autoinjector ordering information

Be mindful that EpiPen® comes in different doses.
Suggestions below from ASCIA (Australasian Society for Clinical Immunology & Allergy):
- EpiPen® Adult for children >20kg (package insert says over 30kg)
- EpiPen® Jnr for children 10-20kg (package insert says 15-30kg)
- Recommendation of an EpiPen® to a child weighing <10kg should be discussed with senior medical staff

An adrenaline autoinjector is appropriate for those:
- with anaphylaxis to non-avoidable triggers e.g. Beestings and most food
- with less severe allergic reaction (i.e. not anaphylaxis) but with other risk factors for anaphylaxis (e.g. asthma, living in remote locations, peanut allergy). This decision can usually be made at Outpatient Clinic.

Please complete an ACC form, this may assist the family with ambulance and autoinjector costs.

Patients with urticaria without an identifiable trigger do not necessarily need referral (see Urticaria guideline).

Action Plan

You can print an action plan form from the ASCIA website http://www.allergy.org.au/content/view/10/3/. There is a separate insect sting version, as well as a “non adrenaline” version.
**ANAPHYLAXIS**

**Adrenaline Autoinjector Information Sheet**

**Patient information re adrenaline autoinjector ordering**

EpiPen® and AnaPen® are both adrenaline autoinjector devices. Neither device is funded by PHARMAC. A comparison of the devices is on the other side of this page.

You can obtain your EpiPen® or AnaPen® from:

**Your GP:** Some GPs are happy to order the device direct to their practice from the distributor. You will need to check with your GP whether they will assist with this.

**Pharmacy:** It is worth shopping around to check the costs as this will vary by pharmacy.

Some pharmacies have little/no mark up on EpiPen® or AnaPen® (such as Quay Park Pharmacy in central Auckland, or [http://www.allergypharmacy.co.nz](http://www.allergypharmacy.co.nz). Allergy Pharmacy also has trainer pens available for purchase).

If you need to use your adrenaline autoinjector to treat an allergic reaction make sure the doctor you see fills out an ACC form, as ACC will cover the replacement cost of the pen.

Please keep the receipt for the purchase of your device as this may be required for an ACC claim.

When your EpiPen® or AnaPen® has expired it is a good idea to practice with it by injecting into a pillow or mattress. The device will then need to be discarded in a sharps box (such as at your GP).


Make sure you and other caregivers review your action plan and how to use your EpiPen® or AnaPen® regularly.
## ANAPHYLAXIS

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<thead>
<tr>
<th>AnaPen®</th>
<th>EpiPen®</th>
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<tr>
<td><strong>Doses</strong></td>
<td><strong>Doses</strong></td>
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| - Junior: 0.15mg (for 10-20kg)  
- Adult: 0.3mg (for >20kg) | - Junior: 0.15mg (for 10-20kg)  
- Adult: 0.3mg (for >20kg) |
| NB – Once your child is over 20kg ASCIA suggest changing from a junior to adult pen when your device is due to be replaced, though package insert suggests 30kg | NB – Once your child is over 20kg ASCIA suggest changing from a junior to adult pen when your device is due to be replaced, though package insert suggests 30kg |
| **Expiry** | **Expiry** |
| - 20 months at manufacture  
- Variable at dispensing – check before purchase | - 20 months at manufacture  
- Variable at dispensing – check before purchase |
| **Costs** | **Costs** |
| - Varies by pharmacy  
- $125 (allergypharmacy march ‘11)  
- $120 (Quay Park Pharmacy, Beach Rd, Ph 919 2320, March ‘11) | - Varies by pharmacy  
- $149 (allergypharmacy March ‘11)  
- $145 (Quay Park Pharmacy, Beach Rd, Ph 919 2320, March ‘11) |
| **Club** | **Club** |
| [www.anapen.co.nz](http://www.anapen.co.nz)  
On registering your device you can get a free trainer pen plus reminders of expiry date |

Other useful web sites:

Australasian Society of Clinical Immunology and Allergy (ASCIA)

Allergy New Zealand
[www.allergy.org.nz](http://www.allergy.org.nz)