ARTICLE

Safe use of adrenaline autoinjectors

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SUMMARY

Adrenaline is the first-line treatment for anaphylaxis. Adrenaline autoinjectors enable non-medical people including patients to treat anaphylaxis.

When a patient is known or suspected to be experiencing anaphylaxis, adrenaline should be given as soon as possible. Delayed administration of adrenaline increases the risk of death.

Patients with anaphylaxis may require further doses of adrenaline. It is therefore important to monitor them in a medical facility for at least four hours after the last dose of adrenaline.

Patients and carers need to be instructed how to use the device they have been prescribed as there are two different brands of autoinjectors available in Australia. They should have an ASCIA Action Plan for Anaphylaxis which is appropriate for their device.

Introduction

Adrenaline autoinjectors are automatic injectors designed to give a single fixed dose of adrenaline. They can be used by non-medical people to treat anaphylaxis. There are two brands of adrenaline autoinjectors available in Australia – EpiPen and Anapen. While there are some similarities, differences exist between the devices (Table 1). EpiPen was redesigned in 2011.

Fig. 1 **Examples of adrenaline autoinjector administration**

EpiPen

Anapen

Both devices can be injected through a single layer of clothing (not through seams or pockets)

How are adrenaline autoinjectors used?

EpiPen and Anapen have different methods of administration. Trainer devices should be used to educate patients on how to use the adrenaline autoinjector prescribed. Adrenaline autoinjectors are not brand substitutable, therefore the device prescribed is what should be dispensed. This is particularly important given the different methods of administration.

EpiPen is designed to be held in the mid-section with the fingers and thumb forming a fist around the device (Fig. 1). The device is activated by removing the safety release and pressing firmly against the outer mid-thigh until a click is heard. Colour-coded ends have been used in its design to facilitate correct administration. The orange needle sheath of the new look EpiPen extends after use to prevent needle-stick injury after the device has been activated.

The administration of Anapen requires the removal of the black needle shield and grey safety cap. Anapen is held firmly against the outer mid-thigh and is activated by depressing a red button with the thumb, so it clicks (Fig. 1).

Both devices should be held in place for 10 seconds after activation. The injection site should be massaged after the device is withdrawn.

Prescribing guidelines

Adrenaline autoinjectors are recommended for people at risk of anaphylaxis (Table 2). As EpiPen and Anapen are Schedule 3, they are available without prescription at full price. They are also available on the Pharmaceutical Benefits Scheme (PBS) by authority prescription when the risk and clinical need have been assessed by, or in consultation with, a clinical immunologist, allergist, paediatrician or respiratory physician. They can also be prescribed on discharge from hospital or an emergency department after patients have been treated with adrenaline for anaphylaxis. Adults and children are able to obtain two adrenaline autoinjectors (same brand) on PBS authority prescription. If there is a delay in access to an immunology or allergy specialist, general practitioners can contact the specialist for approval to prescribe the initial adrenaline autoinjector. The patient must be referred to a specialist for diagnosis, education and assessment for immunotherapy (for example for bee sting anaphylaxis). Once a patient has been prescribed an adrenaline autoinjector by authority prescription, subsequent prescriptions can be provided by general practitioners.

Dose guidelines

There are three available doses of adrenaline autoinjectors. The doses relating to bodyweight given in the product information are different from the recommendations of the Australasian Society of Clinical Immunology and Allergy (ASCIA). The following ASCIA recommendations are based on consensus and standard practice by ASCIA members:

- for children under 10 kg (under one year) adrenaline autoinjectors are not usually recommended. (In some circumstances a 0.15 mg adrenaline autoinjector device may be prescribed)
- for children 10–20 kg, 0.15 mg adrenaline autoinjector device
- for children over 20 kg and adults, 0.3 mg adrenaline autoinjector device.[1]

Anapen 0.5 mg will be available in Australia in 2012. Consideration may be given to prescribing Anapen 0.5 mg for any patient over 60 kg. Assessment of the need for a 0.5 mg dose should be undertaken by the prescribing physician, taking into account risk factors for anaphylaxis and the presence of comorbidities. For detailed information see the ASCIA Guidelines for Adrenaline Autoinjector Prescription on the ASCIA website (www.allergy.org.au).

Table 1 **Adrenaline autoinjector feature comparison**

FEATURE	EPIPEN	ANAPEN
Adrenaline dose	Single pre-measured	Single pre-measured
Colour of 0.15 mg device label	Green	Green
Colour of 0.3 mg dose device label	Yellow	Yellow
Colour of 0.5 mg dose device label	Not available	Magenta
Viewing window to check adrenaline for discolouration or precipitate	Yes	No
Availability	S3 (over-the-counter at full price) 2 devices on Pharmaceutical Benefits Scheme authority prescription	S3 (over-the-counter at full price) 2 devices on Pharmaceutical Benefits Scheme authority prescription*
Activation of device	Press firmly against outer mid-thigh	Depress red button when device on outer mid-thigh
Safety	Blue safety release Orange needle end automatically extends over needle after use	Grey safety cap Black needle shield can be replaced over needle after use
Trainer devices	Available from distributor of device	Available from distributor of device
Expiry reminder service	EpiClub	Analert

* At the time of writing this article, an application for PBS authority prescription for 0.5 mg Anapen had been submitted

Table 2 **Guidelines for prescribing adrenaline autoinjectors** *

PATIENT HISTORY	RECOMMENDATIONS
History of anaphylaxis	Always recommended
History of generalised allergic reaction, other than anaphylaxis, with one or more of the following risk factors: Age (children over 5 years, adolescents and young adults) Specific allergic triggers: • tree nut/peanut allergy • stinging insect allergy in adults (bees, wasps, jumper ants) Comorbidity: asthma (concurrent or past history), history of arrhythmia Limited access to emergency medical care	Sometimes recommended
Asthma with no history of anaphylaxis or generalised allergic reactions	Not normally recommended
Elevated specific IgE only (positive serum allergen specific IgE test (formerly known as RAST) and/or skin test) without a history of clinical reactions	
Family (rather than personal) history of anaphylaxis or allergy	
Resolved food allergy	
Generalised skin rash (only) to bee stings – in children	
Local reactions to insect stings – in adults and children	

* Abbreviated from Australasian Society of Clinical Immunology and Allergy guidelines for adrenaline autoinjector prescription [1]

What needs monitoring?

As with adrenaline ampoules, the expiry date on the adrenaline autoinjectors needs to be checked regularly. By the time of dispensing the shelf life is usually less than two years. Adrenaline is heat sensitive and should be stored at room temperature. Adrenaline autoinjectors should never be refrigerated as this can affect the autoinjector mechanism. EpiPen has a viewing window enabling patients to check if the adrenaline is discoloured or contains a precipitate, which may reduce the effectiveness of the adrenaline.

Common adverse effects and important precautions

After an adrenaline injection, transient and minor adverse effects occur in most patients. They include anxiety, fear, restlessness, headache, dizziness, palpitations, tremor and pallor. Studies have shown minimal cardiovascular effects in children.[2] Serious adverse effects are rare.

Intramuscular adrenaline (1:1000) in doses of 0.01 mg/kg is not associated with clinically significant cardiotoxicity, even if given inadvertently in the absence of acute anaphylaxis.[3] The reluctance to give adrenaline due to fear of adverse cardiac effects should be countered by the awareness that coronary artery spasm, myocardial ischaemia and infarction, and dysrhythmias can occur in untreated anaphylaxis.[4,5] However, patients on non-selective beta-blocking drugs may experience severe hypertension[6] and bradycardia when they are given adrenaline.

Precautions are relative as adrenaline autoinjectors are intended for use in life-threatening anaphylaxis. There are no absolute contraindications to the administration of adrenaline for anaphylaxis.[7]

Patients should be monitored by a health professional for a minimum of four hours after the last dose of adrenaline. This is in case further doses are needed.

ASCIA Action Plans

ASCIA Action Plans and anaphylaxis e-training for health professionals are available from the website www.allergy.org.au. These action plans include the signs and symptoms of anaphylaxis and provide instruction on when and how to use an adrenaline autoinjector. All patients who are prescribed an adrenaline autoinjector should be given a personal ASCIA Action Plan for Anaphylaxis completed by their medical practitioner. Patients should be educated to **always** carry their adrenaline autoinjector and ASCIA Action Plan.

There are three types of ASCIA Action Plans:

- ASCIA Action Plan for Allergic Reactions (green) is provided to patients with mild or moderate allergic reactions who are not considered at risk of anaphylaxis and who have not been prescribed an adrenaline autoinjector
- personal ASCIA Action Plan for Anaphylaxis (red) is provided to patients at risk of anaphylaxis to any allergen who have been prescribed an adrenaline autoinjector
- general ASCIA Action Plan for Anaphylaxis (orange) is useful as a poster or for storage with an adrenaline autoinjector in first aid kits.

Conclusion

Anaphylaxis is potentially life threatening and must be treated as a medical emergency. Adrenaline autoinjectors enable prompt administration of adrenaline in an anaphylaxis emergency. Patients must be dispensed the adrenaline autoinjector prescribed, and be shown how to administer it using a trainer device. They should also be advised to always carry their device and ASCIA Action Plan. ASCIA Action Plans for Anaphylaxis provide instructions on when and how to give the adrenaline autoinjector.

Conflict of interest: none declared

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SELF-TEST QUESTIONS

True or false?

7. Adrenaline should not be used to treat anaphylaxis in patients taking beta blockers.

8. Patients with high concentrations of IgE, but no history of anaphylaxis, should carry an adrenaline autoinjector.

Answers on page 71

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FURTHER READING

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