

CURRENT PRACTICE

Guidelines for the management of anaphylaxis in the emergency department

M Gavalas, A Sadana, S Metcalf

Abstract

An algorithm for the emergency treatment of anaphylaxis is presented. The need for early hands-on involvement of senior personnel is stressed. Continuous assessment, monitoring of response to treatment, and a low threshold for hospital admission for observation and further treatment if necessary are required.

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Anaphylaxis may be unpredictable in onset and may have a fulminant course. Fifty per cent of deaths occur in the first hour¹ yet prompt treatment is usually highly effective. There is evidence that senior house officers in emergency departments cannot deal with anaphylaxis effectively² and from our own research many emergency departments do not display guidelines for its management.

Acute allergic conditions commonly present to the accident and emergency (A&E) department where severe or life threatening anaphylaxis (the minority of cases) must be distinguished rapidly and effective treatment initiated without delay. Clinically, anaphylaxis should never be labelled as minor in severity.

We present clinically tested anaphylaxis treatment algorithms which facilitate the management of this deadly but often preventable emergency, as well as providing a basis for audit. Like anaphylaxis, these guidelines are non-static and distinguish between the severity grades of anaphylaxis, emphasising that treatment in the emergency departments should be directed to the specific grade of severity as it is encountered. Early hands-on involvement of senior personnel is stressed. Continuous assessment, monitoring response to treatment, and a low threshold for hospital admission for observation and further treatment if necessary are required.

The guidelines

These guidelines distinguish minor allergic reactions (grade I) from true anaphylaxis (grades II-IV) (fig 1), initial treatment being determined by a high index of suspicion and clinical features on presentation. As there is no quick diagnostic laboratory test for

anaphylaxis,³ treatment in the emergency department should be directed to the specific grade as it is encountered. However, continuous assessment and monitoring is required to detect those who are deteriorating and require more aggressive treatment.

Well localised skin manifestations (urticaria, flushing) are an allergic reaction but not true anaphylaxis; classification as grade I emphasises the point that even mild and well localised allergic symptoms can herald life threatening respiratory compromise and cardiovascular collapse.

Patients with symptoms and signs of true anaphylaxis with or without urticaria and flushing should be admitted and monitored for eight to 24 hours after stabilisation; 20% of these patients relapse four to eight hours after initial response to treatment⁴ (biphasic anaphylaxis) and a smaller number may have a prolonged attack with continuous and protracted disease. Although urticaria and angio-oedema are common features of anaphylaxis, absence of these symptoms does not preclude a diagnosis of a severe or life threatening episode. The features of severe or life threatening disease (grades III-IV) are bronchospasm, laryngeal oedema progressing to upper airway occlusion, and hypotension with impaired tissue and organ perfusion (shock), all of which may lead to cardiorespiratory arrest. Gastrointestinal features include nausea and abdominal cramps progressing to vomiting and uncontrolled defaecation.

Patients with anaphylaxis (grades II-IV) should be managed in the resuscitation room with high inspired oxygen, intravenous access, ECG and pulse oximetry monitoring, and a senior doctor should be summoned. Patients will be frightened and need reassurance.

ADRENALINE

Although sympathomimetics are not necessary where changes are restricted to the skin (grade I),⁵ the most important specific treatment for anaphylaxis is adrenaline.⁵

Adrenaline should be given by the intramuscular route to patients with moderate anaphylaxis⁶; the recommended dose by this route is 10 µg/kg (for example, 0.7 ml of 1:1000 adrenaline intramuscularly for a 70 kg adult and 0.3 ml for a 30 kg child). There is some evidence that the intramuscular route is

Department of
Emergency Medicine,
University College
London Hospitals,
University College
Hospital, London
WC1, UK
M Gavalas
S Metcalf

Department of
Emergency Medicine,
Whipps Cross
Hospital, London E11,
UK
A Sadana

Correspondence to:
Mr Manolis Gavalas,
Accident and Emergency
Directorate, University
College Hospital, Grafton
Way, London WC1E 6AU,
UK.

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superior to the subcutaneous route, reducing the requirement for repeated doses. Nurses in the United Kingdom favour the intramuscular route for giving drugs parenterally. Adrenaline can also be given by nebuliser⁵ if dyspnoea does not respond to nebulised β_2 adrenergic agents.

In severe or life threatening anaphylaxis (grades III and IV), especially if there is evidence of shock, the intravenous route is favoured.^{3 5 7-10} Up to 5 $\mu\text{g}/\text{kg}$ is recommended, a lower dose than with the intramuscular route (for example, 3.5 ml of 1:10000 adrenaline for a 70 kg adult and 1.5 ml for a 30 kg child). Half of this should be given very slowly while fully monitoring the patient's vital signs,^{7 10} and the rest should then be given in small aliquots if there are no adverse effects.

Adverse effects are more common when adrenaline is given intravenously,^{5 11} but the intravenous route is critical when there is poor response after intramuscular administration or if the patient is deteriorating. Reports that have condemned the intravenous route can be criticised on the grounds that they have not stated the dose or rate of injection, or that they failed to exclude causes other than adrenaline for the adverse effects witnessed.^{12 13}

An adrenaline dilution of 1:10 000 or greater (1:100 000) is recommended for the intravenous route to facilitate titration of dose against effect.^{5 7 12} Intraosseous injection is an alternative in children if obtaining venous access is difficult or delayed.¹⁴

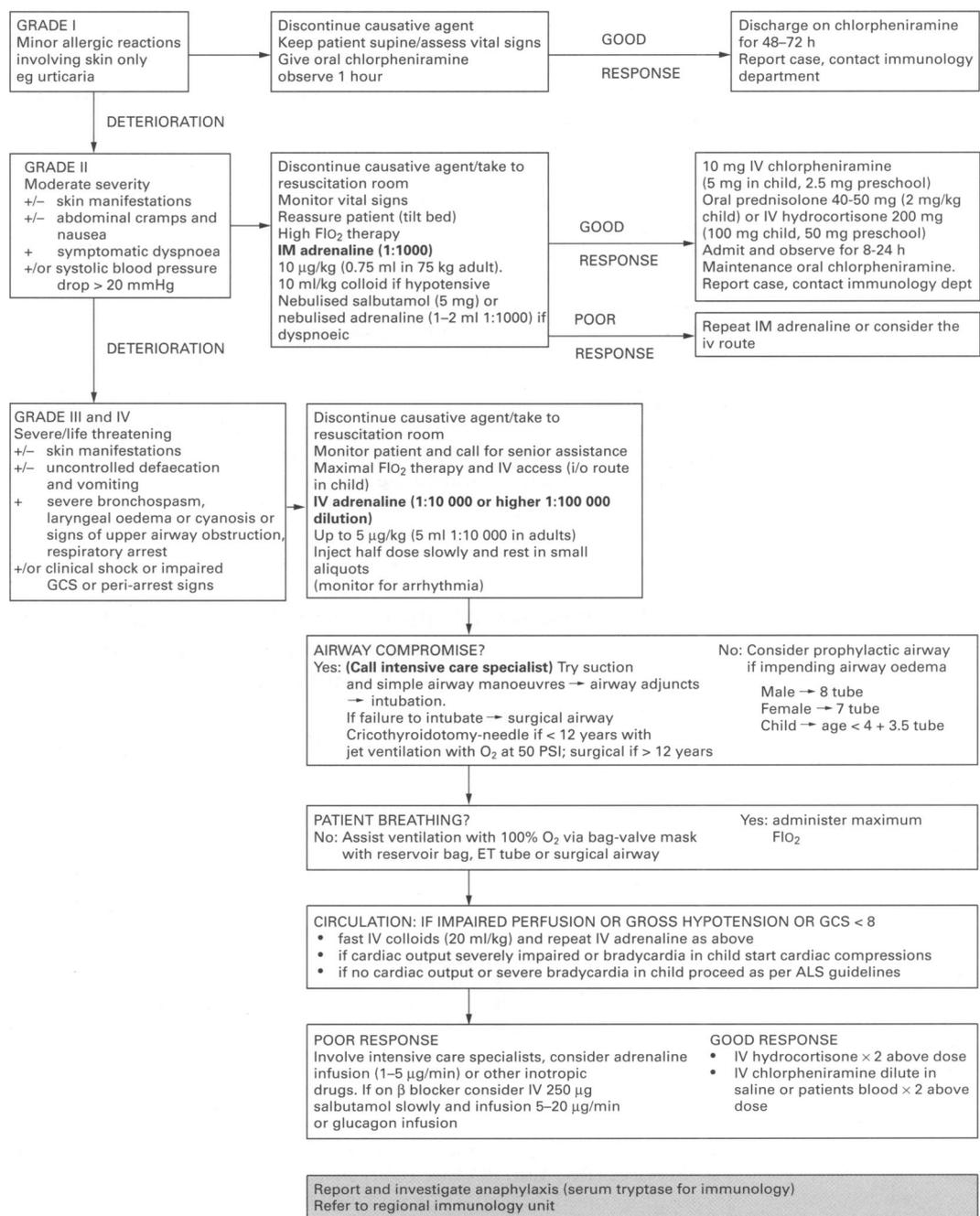


Figure 1 Algorithm for emergency management of anaphylaxis. IM, intramuscular; IV intravenous; GCS, Glasgow coma scale; FiO_2 , inspired oxygen concentration; I/O, intraosseous; PSI, pounds per square inch; ET, endotracheal; ALS advanced life support.

GENERAL RESUSCITATION

The ABCs of resuscitation are rigidly adhered to in severe or life threatening anaphylaxis, with emphasis on prophylactic intubation if impending laryngeal obstruction is suspected. An endotracheal tube one or more sizes smaller than usual is recommended.¹⁵ If endotracheal intubation cannot be achieved a surgical airway maybe a life saving procedure.

Adrenaline and infusion of intravenous fluids have a synergistic effect in the treatment of anaphylaxis.^{5 7 10} Significant hypotension (fall in systolic blood pressure of more than 20 mm Hg) and tachycardia are features of moderate (grade II) anaphylaxis and should be treated with 10 ml/kg colloid intravenous fluid. Higher volumes (20 ml/kg) should be infused in severe cardiovascular collapse (grades III–IV).

As soon as airway problems appear likely, or for adrenaline resistant anaphylaxis, the involvement of an intensive care specialist is critical. Adrenaline infusion,^{5 7 11} measuring filling pressures, and using other sympathomimetic drugs⁵ (for example, a noradrenaline infusion) may be beneficial. If the patient is on a β blocker, intravenous salbutamol or glucagon, or both, should be used. Glucagon is well established and should be considered in protracted anaphylaxis¹⁶: 1 mg boluses up to 3 mg (half doses in children) should be followed by an infusion of 1–5 mg/hour. Consolidating treatment with antihistamines and steroids should follow.

Conclusions

Key points which need re-emphasising are that for severe or life threatening anaphylaxis with cardiovascular collapse, immediate but careful

administration of high dilution (1:10 000 or 1:100 000) intravenous adrenaline in a controlled titrated manner is required, with early involvement of senior doctors, and there should be a systematic approach to allergic emergencies with attention to prevention of future episodes.

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