Anaphylaxis and anaesthesia

We thank Drs Patel and Turner for providing new audit data about the prevention of aspiration. Frankly, we were astonished to see that nobody in the Belfast City Hospital admitted to preferring the LMA in obese patients, as there is a substantial body of knowledge supporting its use in this situation. Perhaps more than anything, however, these new data illustrate the wide variation in clinical practice among institutes. In Cairns Private Hospital, for instance, where one of us works, more than 90% of patients undergoing laparoscopic surgery, or who are obese, or who have had reflux, are managed with the ProSeal LMA.

We agree that aspiration with the LMA is under-reported and that a confidential database should be created; however, this database should cover all airway devices, as the majority of aspiration events is associated with non-LMA devices,12 and it is only by comparing the frequency of aspiration among different airway devices in specific clinical situations that we can begin to determine best clinical practice.

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Anaphylaxis and anaesthesia

Editor—We read with interest the recent Editorial outlining the current state of anaphylaxis and anaesthesia.1 What remains unclear is the pathophysiology behind the variability in features and severity of anaphylaxis under anaesthesia, and why, despite widespread use of the Association of Anaesthetists of Great Britain and Ireland (AAGBI) guidelines,1 10% of reactions reported to the UK Medicines Control Agency are still fatal. It is unfortunate that the authors of the AAGBI guidelines made no mention of the use of pure alpha agonists in their anaphylaxis drill for the treatment of severe anaphylactic reactions unresponsive to epinephrine. This was first described by Higgins and Gayatri in 1999,2 3 in a series of case reports by ourselves and others in 2001,4 and in two further case reports from Australia.5 The possible mechanism for the dramatic response to pure alpha agonists in this setting has been discussed.4

We have recently successfully treated another case of severe anaphylaxis with the pure alpha agonist phenylephrine during open heart surgery while the filling status and contractility of the heart remained visible throughout the management of the reaction.

A 76-yr-old gentleman, with a history of coronary artery disease and insulin-dependent diabetes mellitus, underwent elective coronary artery bypass grafting. Following successful weaning from cardiopulmonary bypass, he had an anaphylactic reaction to protamine resulting in sudden cardiovascular collapse with an arterial pressure of 55/35 mm Hg, central venous pressure 4 mm Hg and pulmonary artery diastolic pressure 8 mm Hg. There was no change in arterial oxygen saturation or airway pressure. Both the right and left ventricles appeared to be contracting vigorously and were visibly under-filled. Initial management consisted of stopping the administration of further protamine, ensuring adequate mechanical ventilation with oxygen 100% and rapid infusion of i.v. fluid. A total of phenylephrine 500 µg was given in bolus doses with a modest effect in restoring haemodynamic stability. Epinephrine 100 µg was then given with no significant effect. In response to direct observation of the visibly under filled and vigorously contracting ventricles, treatment continued with alpha agonists, i.v. fluids and secondary therapy. Phenylephrine was administered to a total dose of 10 mg over a period of 5 min followed by noradrenaline and dopamine infusions, initially at 1 µg kg−1 min−1 and 10 µg kg−1 min−1, respectively. Over the next 2 h haemodynamic stability was restored and surgery was completed. The patient made an uneventful recovery.

Immunological investigations revealed a significantly elevated serum mast cell tryptase at 1 and 6 h post-event consistent with an anaphylactic reaction. Further assessment revealed that the patient had been receiving a protamine-containing insulin preparation for many years.

It is logical to administer epinephrine as the first line drug of resuscitation during anaphylaxis on the basis of its action on the immunological and cardiovascular systems.6 7 However, case reports by ourselves and others make it clear that continued epinephrine administration may not produce return of spontaneous circulation.3–5 From direct observation of the empty, vigorously contracting heart in this case of anaphylaxis, it was obvious that restoration of systemic vascular tone was of paramount importance. This was achieved with large doses of phenylephrine while avoiding the potentially harmful β1 inotropic and chronotropic and β2 vasodilatory effects of large doses of epinephrine.

The AAGBI guidelines are not alone in failing to advocate pure alpha agonists in severe anaphylactic reactions unresponsive to epinephrine. Recent reviews in both the US and UK literature continue to make no mention of the recent case reports outlining this life saving therapy.8 9 The Executive Summary in the AAGBI guidelines states ‘there are no clinical trial data and no evidence base is available or likely to become available (for the management of anaphylaxis). Recommendations follow analysis of case reports and summaries of experience.’10 On the basis of case reports such as this, we believe that guidelines on anaphylaxis should include the administration of a significant bolus of a pure alpha agonist before
resuscitation is discontinued, and preferably after the second dose of epinephrine if no response is obtained.

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Editor—We are grateful to Drs McBrien, Breslin, and Webb for their interest in our Editorial, and congratulate them on their successful management of a difficult clinical problem. Their patient probably suffered an anaphylactic reaction to protamine, although no details of skin testing or the allergist’s opinion are provided. Phenylephrine was used in resuscitation, before and after a single bolus of epinephrine.

Clearly, instances arise when a selective α-adrenergic agonist might be used preferentially to non-selective epinephrine; in their somewhat unusual case, β-adrenergic effects were unnecessary, as the heart could be seen contracting vigorously. β-Agonists may indeed have been harmful to the recently revascularized myocardium.

The Association Guidelines do state that, in some patients, an alternative catecholamine may be required, although this appears in the text of the document and not in the ‘model operating procedure’ in Appendix 2; indeed, we have incorporated this into our own departmental guideline. We believe that the Association Guidelines are correct to emphasize the timely use of epinephrine in appropriate, and, where necessary, repeated doses. This represents, in the majority of cases, and especially for our trainees, safe and effective practice; frequently, β-adrenergic effects are required, especially where there is bronchospasm. We do not question the use of an α-adrenergic agonist on the rare occasion that epinephrine is ineffective, but would reinforce the most important message in treating anaphylactic reactions: that epinephrine be given immediately, and usually in repeated doses.

On a practical note, it seems difficult to produce a guideline, which may be extant for some years, incorporating drugs which are then withdrawn (methoxamine), or become sporadically unavailable (phenylephrine). One must remember also that, since its regular use in anaphylaxis began in the 1970s, epinephrine has saved countless lives.

In our Editorial, we had hoped to illustrate issues relating to the diagnosis and investigation of anaphylactic reactions during anaesthesia, and in particular the patchy and uncoordinated reporting of such reactions in the UK, when many of our Australasian, French, and Scandinavian colleagues have in place excellent systems. To perform a clinical trial comparing the effectiveness of different vasopressors in anaphylaxis will never be possible. However, one might speculate that, if a national database were established, a more rational analysis of drugs used in anaphylactic reactions might be performed. We eagerly await this development.

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CobraPLA as a conduit for flexible bronchoscopy in a child under general anaesthesia

Editor—A 2-yr-old, 17 kg girl presented with episodes of cough and stridor. The chest X-ray was negative. No other significant medical history was reported. A possible diagnosis of foreign body aspiration was made and a bronchoscopy under general anaesthesia was planned.

Anaesthesia was induced with sevoflurane in oxygen 100%. i.v. access was established and a size 2 LMA® was inserted without difficulty. Ventilation was easy, with a peak pressure of 17 cm H2O. A paediatric bronchoscope was introduced through the LMA while the patient was breathing spontaneously isoflurane 1.5% in oxygen 100% but the vocal cords could not be visualized—score 1 on the Brimacombe scale.1 The LMA was removed and reinserted, ventilation was satisfactory, but vocal cord visualization failed again. At this stage a CobraPLA size 1.5 was inserted without difficulties, ventilation was easy with a peak pressure of 28 cm H2O. The bronchoscope was introduced through the CobraPLA, the cords visualized (score 4 on the Brimacombe scale) and advanced into the larynx. No foreign body was found. The isoflurane was discontinued, the CobraPLA was removed and the patient recovered without complications.

CobraPLA (Engineered Medical System, Indianapolis, IN, USA) is a new supraglottic device that may have some advantages over the LMA: (i) it may be easier to insert than the LMA with no need for any airway manipulation;2 (ii) it may be more stable owing to the CobraPLA’s ‘head’, which lies on the posterior pharynx and does not allow rotation; (iii) it has a good airway seal, permitting use of higher airway pressure in case positive pressure ventilation is necessary;3 and (iv) larger tube diameter and shorter tube length than the LMA permitting positioning of a larger endotracheal tube.4

An LMA is a safe and effective adjunct to fibreoptic bronchoscopy under general anaesthesia in children.4 In one study,5 appropriate positioning, as judged by fibreoptic laryngoscopy, was achieved in 49% of patients. CobraPLA was compared with the LMA and PAXexpress in adult patients, and proved to have a more effective seal and a better fibreoptic score.6 In adults, Akça and colleagues7 found both LMA and PLA gave an equally good laryngeal view. In children, the there are no comparative data available and conclusions cannot be drawn from a single case.

1LMA® is the property of Intavent Limited.