LETTERS TO THE EDITOR

Intramuscular or intravenous adrenaline in acute, severe anaphylaxis?

Editor,—The consensus guidelines on the emergency medical treatment of anaphylactic reactions by the Project Team of the Resuscitation Council (UK) are an excellent guide for first medical responders, whether general practitioners or emergency department staff.1 They are pragmatic, safe, and emphasise the importance of first line treatment with oxygen, adrenaline (epinephrine) and fluids, and as Hughes and Fitzharris in their BMJ editorial suggest, rightly deserve to “...adorn the walls of emergency departments, general practitioners’ surgeries, and outpatient clinics.”

The guidelines usefully remind us that a panic attack or a vasovagal syncopal episode may be confused with anaphylaxis with the danger of inappropriate treatment. Additional differentiating features not mentioned in the text that suggest a faint rather than anaphylactic collapse are the rapidity of onset, maintenance of a central pulse, and prompt response to the recumbent position.2

It is refreshing to see the debate over the delivery of adrenaline move forward a stage, with the subcutaneous route no longer recommended as the absorption is delayed and variable, at least in well children with a history of anaphylaxis. Literature suggests that a higher level of senior supervision, routine access to the minimum standards of monitoring suggested above, and widespread collective expertise in managing anaphylaxis is now time to consider in any monitored area, whether the emergency department, intensive care unit, or high dependency unit, in experienced hands low dose, high dilution intravenous adrenaline is the optimal care for a patient with severe or rapidly progressive, life threatening anaphylaxis whether from shock or acute respiratory distress. Administration of 0.75–1.5 µg/kg of 1:100 000 adrenaline intravenously at 1 ml/kg per minute reverses all the life threatening effects of anaphylaxis and inhibits further mast cell mediator release by raising intracellular cAMP.3 The 1:100 000 dilution, as the guidelines suggest, not only allows precise titration to response, but avoids inadvertent rapid or excessive dosage. In addition, the therapeutic response to the adrenaline is immediate and assured.

The Project Team of the Resuscitation Council (UK) must be congratulated on an important document that will undoubtedly improve first responders’ knowledge and outcome, and indeed be of benefit to all.

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Medical treatment of anaphylaxis

Editor,—We have read with grave concern the project team’s recommendations for the medical treatment of anaphylaxis4 and believe very strongly that the advice against using intravenous adrenaline (epinephrine) is potentially very dangerous. We also find the omission of reference to guidelines for the management of anaphylaxis in the accident and emergency (A&E) department published in the same journal5 as very regrettable if deliberate, or puzzling if the project team had no knowledge of their existence.

The project team’s guidelines have also failed to emphasise the relevance of grading the severity of anaphylaxis and that its treatment should be directed to the severity of the attack encountered.

We agree that the project team’s guidelines should be used by the inexperienced and invariably pre-hospital responders. We also agree that the subcutaneous route is unreliable and should be abandoned. However, to suggest that A&E seniors or supervising trainees and well supported juniors lack clinical credibility to administer high dilution intravenous epinephrine carefully titrated against response in the fully monitored patient in the resuscitation room is insulting to the specialty of A&E. It also shows that in spite of having A&E representation the project team fails to understand fundamental principles of A&E involvement in the management of the critically ill.

To suggest that patients with clinical signs of shock should be administered intramuscular epinephrine as epinephrine can be rapidly absorbed is in physiological terms most bizarre advice.

We conclude that the project team’s guidelines need urgent revision as they will lead to patients dying due to failure to urgently administer intravenous epinephrine. We will continue as we hope the majority of A&E departments will do similarly, to use the published A&E guidelines6 and we believe that they are currently the best available guidelines for treating anaphylaxis in the A&E department.

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(adrenaline) should have been given intramus- 
cally.3 We believe this to be true, but it was 
most certainly not our intention to condemn 
all use of intravenous adrenaline by experi-
enced medical practitioners either in emer-
gency departments or elsewhere. In retrospect 
we should have been more explicit on this 
point. We agree totally with Dr Brown’s state-
ment that adverse outcomes for 
adrenaline occur when it has been given too 
rapidly, inadequately diluted, or in excessive 
doosage. We also recognise that emergency 
medicine has progressed a long way in the last 
decade with a much higher level of senior 
supervision and greater possibilities for treat-
ment under monitored conditions. 
Our guidelines were intended specifically for 
those first medical responders who are 
inexperienced in the management of this 
emergency. They are unlikely to have monitor-
ing facilities available. For these, cautious rec-
ommendations are appropriate with intra-
venous use of adrenaline restricted to 
emergencies judged to be immediately life 
threatening. 

The examples that we gave for indications for 
intravenous adrenaline were clearly not 
intended to be comprehensive, and experi-
enced physicians in monitored areas will 
appropriately make their own decisions. We 
did mention the value of infusions of 1:10000 
intravenous adrenaline—such as 
oxogenation and nebulised inhaled bronchodil-
tors. Dr Brown’s comments do, of course, add 
to our own guidelines by making sound 
recommendations for expert management 
that was outside the remit of our article. 

The concerns of Mr Gavalas and his 
colleagues were similar, but there seems also 
to be an element of misreading of our 
document. They say that they “believe very 
strongly that the advice against using intra-
venous adrenaline (epinephrine) is potentially 
very dangerous”. We must reiterate that we 
did not advise against its use, but urged only 
that it should be used in the most serious cases 
and by experienced clinicians. 

Our guidelines stated in paragraph 4.4 that: 
“Intravenous epinephrine (adrenaline) in a 
dilution of at least 1:10 000… is hazardous and 
should be reserved for patients with 
profound shock that is immediately life threat-
ening and for special indications”. 

We also added in paragraph 5.2: 
“The use of epinephrine (adrenaline) by the 
intravenous route in the special circumstances 
given in paragraph 4.4 should usually be 
reserved for medically qualified personnel 
who have experience of it, who know that it 
must be administered with extreme care, and 
who are aware of the hazards associated 
with its use”. 

The footnote to the legends state very 
clearly: 
“Consider slow intravenous (IV) epi-
phrine (adrenaline) 1-10 000 solution. This 
is hazardous and is recommended only for 
an experienced practitioner who can also obtain 
IV access without delay”. 

There are some practitioners who have 
made the habit of always using adrenaline 
intravenously, while others have preferred the 
subcutaneous route, and many are afraid to 
give it at all. We believe that we have given 
the correct emphasis—that intramuscular adrena-
line is the norm for the emergency treatment 
by first medical responders, with IV adrena-
line reserved for special and life threatening 
situations. This is far from advising against its 
use! There is one charge to which we must plead 
guilty. Of course we were aware of the 
previous paper published in the Journal of 
Accident & Emergency Medicine in 1998, and it 
was indeed our intention to reference it 
together with the other specialist recommen-
dations. That omission was not deliberate, and 
one of us (DAC) must take responsibility for 
that important last minute oversight. 

We do not accept that the guidelines need 
urgent revision. Neither does the Project 
Team with its wide representation accept that 
the recommendations were interpret-
ing to the specialty of accident and emergency. 
We are conscious that we all have the same 
aims: better and safer treatment of an 
important medical emergency.

Future inpatient management of patients with minor head injuries 

EDITOR,—We read, with interest, the letter 
from Pau and Buxton, regarding the need for 
nursurogical referral of patients with an 
admitting diagnosis of minor head injury.1 We 
agree that these patients are a low risk group. 

We performed an audit of patients admitted to 
our observation ward with the primary 
diagnosis of minor head injury. From October 
1997 to July 1999, 668 such patients were 
admitted under our care. Of these patients, 
only two were subsequently transferred to 
the regional neurosurgical unit after the finding of 
intracranial haematoma on computed tomog-
raphy. This finding, and our general experi-
ence, leads us to agree that patients with an 
admitting diagnosis of minor head injury do 
not require neurosurgical referral, in the first 
instance. However, we suspect, given that only 
12% of responding accident and emergency 
(A&E) departments (71% response rate) in 
the UK have on-site neurosurgical facilities,3 this 
practice is not widespread anyway. 

Pau and Buxton’s conclusion is in keeping 
with the recommendations of the Report of 
the Working Party on the Management of 
Patients with Head Injuries.1 One of the logistical 
concerns raised by this report, and highlighted 
in Pau and Buxton’s letter, is the fact that 
observation wards have a finite capacity. Our 
observation ward is full. These patients with an 
admitting diagnosis of minor head injury do 
not require neurosurgical referral, in the first 
instance. 

We as an emergency specialty, however, 
have a responsibility in accident prevention 
and injury protection. We all need to be active, 
as I have been, in the local press recently high-
lighting, for example, the need for cyclists to 
wear helmets for motorcyclists, and the seat belt 
legislation concerning road traffic. The 
driving test modified for awareness of cyclists to other road users. The 
government, as suggested, should subsidise 
cycle helmets and promote them through the 
media by advertising. The car driver is not 
interested, but we need better cycle routes 
 nation-wide.

Our government is committed to reduce 
incidents from accidents (see Our Healthier 
Nation). The main cause of death in children 
is trauma. But I have personally discussed at 
length the benefits of wearing a helmet with 
children who, unhelmeted, have suffered a 
fractured skull in a cycle accident. Many 
children still remain unconvincing! Parental 
control is weak. So voluntary action to increase 
the wearing of cycle helmets in this age group 
is unlikely to succeed. 

My answer is that the compulsory wearing 
of cycle helmets is needed now. This should be 
pursued as part of accident prevention and 
injury protection—for example, the 
breakthylaws, compulsory crash 
helmets for motorcyclists, and the seat belt 
legislation. These are still supported by 
publicity. 

Our legislation could be expanded to 
include cycle helmets—teaching, better routes, 
helmet subsidies, and increased awareness through 
publicity. The number of cyclists may well 
reduce initially but more importantly head 
injuries will become fewer too! However, in 
the future, the population of cyclists naturally 
will then increase as cycling at last becomes 
safer and so even more enjoyable. 

There has been successful government 
legislation concerning road traffic accident 
prevention and injury protection—for exam-
ple, the breathalyser laws, compulsory crash 
helmets for motorcyclists, and the seat belt 
legislation. These are still supported by the 
public. 

We as an emergency specialty, however, 
have a responsibility in accident prevention 
and injury protection. We all need to be active, 
as I have been, in the local press recently high-
lighting, for example, the need for cyclists to 
wear helmets. We recognise this problem only 
too well. 

Our department has a nurse who teaches 
young school children talking about accident 
prevention and injury protection—particularly 
the wearing of cycle helmets.
Playing in the back seat

EDITOR,—We read with interest the letter of Playing in the back seat

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1 Carnall D. Cycle helmets should not be compulsory. BMJ 1999;318:1905.


Oesophageal rupture

EDITOR,—Drs Onyeka and Booth present an interesting case of tension pneumothorax associated with Boerhaave’s syndrome.1 They have previously described a similar case in a 47 year old man who survived his ordeal in 1996.2 As the authors note, awareness of the condition is the mainstay of diagnosis.

Aside from these two cases, tension pneumothorax has been described in association with rupture of a Barrett’s oesophagus3 and after rupture of an oesophageal diverticulum.4 It is worth noting that by far the commonest cause of oesophageal rupture is endoscopy. Regardless of the cause of rupture I agree with the authors that a gastrografin oesophagram is the diagnostic procedure of choice.

Conservative management of oesophageal rupture is now a well established option in iatrogenic rupture and has been described in Boerhaave’s syndrome,3 although as the authors note, immediate surgery comprising drainage and repair is the mainstay of curative treatment.

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Carbon monoxide poisoning

EDITOR,—I read with interest the article by Turner et al, providing an update on carbon monoxide poisoning.1 The authors correctly point out that hyperbaric therapy remains controversial, and that no controlled clinical trial had been conducted comparing hyperbaric oxygen (HBO) with normobaric oxygen (NBO).

Since the date of acceptance of their paper a prospective, blinded, randomised trial comparing NBO with HBO has been published.2 This trial also included severely poisoned patients and incorporated shamt treatments. This study found in 191 patients that three days of HBO (2.8 atmospheres for 60 minutes) offered no advantages compared with three days of NBO (100 minutes of 100%). Another study is continuing in the United States and the interim results2 have found no difference in the incidence of persistent neurological sequelae between those treated with HBO compared with NBO, although there is an increased incidence of delayed sequelae in one of the blinded treatment arms.

The authors also recommend carefule neurological and cognitive re-examination. It is worth highlighting that cognitive testing in carbon monoxide poisoning is far from standardised. Many studies utilise different screening tests, different time intervals to re-screening, and different HBO regimens. This lack of standardisation makes it difficult to compare studies and no doubt contributes to our inability to provide definitive recommendations in the management of carbon monoxide poisoning.

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The authors reply

We also read with interest the paper by Scheinkestel et al, which was published after acceptance of our article.1 Scheinkestel’s paper was accompanied by a detailed editorial which documents a number of criticisms that preclude implementation of its findings until further data are forthcoming.2 Recommendations from poison information centres, as described in our article, have not been changed and still provide useful guidance on selecting patients for hyperbaric oxygen.

We believe that careful neurological examination, including specific testing of cognitive function, is vital in the management of patients. Physicians should use tests with which they are familiar and apply them serially to the same patient. Standardisation of formal cognitive testing for trials was beyond the scope of our clinically orientated article.


Evidence based and guideline based medicine

EDITOR,—Evidence based and guideline based medicine is justifiably emphasised in current accident and emergency (A&E) medicine practice. At St James’s University Hospital in Leeds, the A&E trainees participate in regular evidence based critical appraisal sessions as part of education development, and such skills are assessed in our Foundation Accident and Emergency Medicine exit examination.

One source of valuable literature is Sackett et al,3 particularly their appraisal cards on the validity, importance, and applicability of a particular type of study. Lacking a photographic memory, I put forward simple acronyms that have helped me to facilitate timely and efficient appraisal for everyday use when selectively scanning relevant journals. Preceding these specific acronyms is a “stand-
ards acronym that follows Crombie's suggestion that standard questions should be used as a filter for all papers. I hope they are of use to fellow practitioners of evidence based medicine, and further suggestions will be gratefully received.

**Standards**

- **Stated aims?**
- **Tests and measures appropriate?**
- **Arithmetic (do the numbers add up?)**
- **Null findings (were they considered?)**
- **Design appropriate?**
- **Appropriate statistics?**
- **Relevance to your practice?**
- **Different results from previous reports?**
- **Sample size/power adequate?**

**Diagnosis**

- **Diagnostic test needed?**
- **Independent blind comparison?**
- **Appropriate population?**
- **Gold standard used regardless of test result?**
- **Numerogram (2×2 table) constructable?**
- **Sensitivity and specificity important?**
- **Inferences possible?**
- **Safe, cheap, and helpful?**

**Prognosis**

- **Prospective study?**
- **Representative sample?**
- **Objective and blinded outcome criteria?**
- **Groups adjusted for prognostic factors?**
- **Numbers recruited and followed up adequate?**
- **Outcomes likely?**
- **Study findings precise?**
- **Inferences possible?**
- **Similar patients to your own?**

**Guidelines**

- **Guidelines needed?**
- **User friendly?**
- **Identified risks and benefits?**
- **Decision options clear?**
- **Evidence based decisions?**
- **Large variations in current practice?**
- **Implementable?**
- **NHS benefit?**
- **Economical?**
- **Safe?**

**Therapy**

- **Trial ethically approved?**
- **High recruitment and follow up?**
- **Equal treatment and assessment in each group?**
- **Randomised and how?**
- **Appropriate population?**
- **Potential benefits for patients?**
- **End points applicable?**
- **Absolute risk reduction/number needed to treat?**

**Systematic review**

- **Systematic search strategy?**
- **Randomised and relevant trials?**
- **Each trial assessed?**
- **Valid results in all trials?**
- **Inconsistent populations or results?**
- **Evidence of benefit via odds ratios/number needed to treat?**
- **Was hypothesis satisfied by the review results?**

