LETTERS TO THE EDITOR

Fireworks related injuries: does changing legislation make a difference? A thought for next Hallowe'en

EDITOR,—In August 1996 there was a change in legislation. The Explosives Act (Northern Ireland) 1970 (as amended by the Explosives (Amendment) (Northern Ireland) Order 1996) allowed over the counter sale of fireworks to anybody over 16 year of age.¹ Prior to this, it was illegal to buy fireworks in Northern Ireland.

For the same four week period (11 October–11 November) for the years 1994 and 1995, all accident and emergency notes were reviewed retrospectively and patients with firework related injuries were identified. The years 1996–1998 were collected prospectively. The patients' age, sex, date of presentation, injury, site of injury and follow up were recorded.

Thirty five patients presented to the department with fireworks related injuries over the study period. This consisted of 27 men and eight women (fig 1). Men in their late teens (mean age 18 years, 77% of all males) were the predominant group. Fifty five per cent of all injuries involved the hand.

There has been a threefold increase in the number of injuries presenting to this department after the change in legislation ($\chi^2 = 20.61$, $p < 0.001$).

In this hospital, firework injuries presented most commonly on Hallowe'en night (31 October) and the following night (fig 2). This is due to the people of Londonderry celebrating "the biggest Hallowe'en party in Europe". This peak is not reflected in national figures as the trend is for the injuries to occur around the 5th of November (Guy Fawkes night).² With this in mind, campaigns should run to target periods that are identified locally.

Figure 1 Sex difference of the injured.

Figure 2 Dates of firework related injuries over the study period.

Firework injuries in Northern Ireland are not included in the national yearly figures published by the Department of Trade and Industry (DTI).² Firework injury reporting has only been monitored in Northern Ireland since 1996, but the figures are collected and sent yearly to the DTI.

Legalising the sale of fireworks has resulted in an increase in the number of fireworks related incidents. This is not in keeping with the trends noted in Great Britain. Northern Ireland firework injury figures, albeit collected, are not included in the national reported figures.

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1 The Explosives (Amendment) (Northern Ireland) Order 1996.

2 Department of Trade and Industry. Consumer Safety Research. Firework Injuries 1994–1998.

Survey of the use of rapid sequence induction in the accident and emergency department

EDITOR,—The paper by Walker and Brenchley¹ highlights a crucial area of emergency medicine practice. The key issues are "How are skills maintained?" and "What is an acceptable period of training?"

The authors state in their conclusions that the majority of accident and emergency (A&E) consultants thought that rapid sequence induction (RSI) would be undertaken by A&E staff if an anaesthetist were unavailable. If the A&E staff are only performing this procedure rarely then they will become de-skilled and will have a higher complication rate than a colleague performing the procedure on a regular basis. Anaesthesia is defined as an essential secondment for training, why have this secondment if the skills are not going to be actively used.

In order to be given the responsibility of "on call" the anaesthesia minimum requirement is three months of supervised training. I feel that it is no coincidence that this also is the length of our secondment.

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1 Survey of the use of rapid sequence induction in the accident and emergency department. Walker A, Brenchley JJ. *J Accid Emerg Med* 2000;17:95–7.

EDITOR,—As a doctor with a background in both anaesthesia and accident and emergency (A&E) medicine, and currently working in an emergency medicine environment, I read the paper by Walker and Brenchley with interest.¹ I have been aware for some time now of the debate among emergency physicians, and anaesthetists, over their respective roles in emergency airway management. I suspect that anaesthetists are probably guilty of being of blindly territorial, and somewhat condescending, over the issue. However, I am also aware that among emergency physicians there is a slightly concerning "gung-ho" element to their approach to this procedure, which I believe betrays a lack of understanding of the technique, and of the risks involved. In illustration of this, I remember seeing in an A&E department of a hospital I have worked

in, the abbreviation RSI expanded to "rapid sequence intubation".

The use of RSI of anaesthesia to facilitate intubation of the trachea is an inherently risky technique. So that the risk of regurgitation and aspiration is minimised, the patient is paralysed before control of the airway is assured. Furthermore, unlike in any other anaesthetic technique, the drugs used are given as a rapid bolus of a predetermined dose. These agents have real potential for causing harm and a thorough understanding of their actions is necessary to appropriately tailor the choice, and dose, of drugs used. While I accept that in most cases the technique is safe and effective, and that the complication rate is low, I would suggest that the risk of problems, serious problems, remains real. It requires not only training (such as the Advance Airway Course), but also experience (such as an anaesthetic attachment and supervised emergency intubations) in order to anticipate, and avoid, these problems, and to be able to safely retrieve any difficult situations that can be encountered despite this.

It is this need for experience gained in practice that would seem to pose the major problem in UK emergency departments. The number of cases in the UK where drugs are required to facilitate "immediate airway protection" must be comparatively low and these cases are conceded to be the most testing, even for experienced anaesthetists.¹ Additionally in the more common cases where airway protection is less urgent, and where subsequent management is likely to be the responsibility of the anaesthetists or ITU staff, it would seem appropriate that the team delivering definitive care is involved from the outset. Opportunity, therefore, for any one individual A&E physician to practise and maintain the skills they have been trained in would inevitably be infrequent. When faced with a case requiring RSI, even the most junior of on call anaesthetists is likely to have practised the technique more recently.

With all of this in mind I would still maintain that there probably is a place for A&E physicians taking on advanced airway management in the UK. However, I feel this process must be approached with respect for the technique and a grasp of the need for practice and experience. Similarly anaesthetists should welcome this desire to share the responsibility for the "head end", should not seek to unnecessarily shroud their art in mystery, and rather offer to facilitate the acquisition and maintenance of these skills.

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1 Survey of the use of rapid sequence induction in the accident and emergency department. Walker A, Brenchley JJ. *J Accid Emerg Med* 2000;17:95–7.

EDITOR,—I read with interest the article by Walker and Brenchley regarding the use of RSI by accident and emergency (A&E) medical staff.¹ Emergency medicine is characterised by the ABC approach with airway management as the first priority, which by definition includes performing RSI where necessary. Thus it is essential that A&E staff can do this competently and completely. Regular and routine practice of RSI will help prevent skill deterioration as will the use of patient simulators for airway training as described by Ellis and Hughes.² Hence, A&E

should manage all RSIs and not just occasional attempts in acute situations.

Walker and Brenchley rightly point out that A&E patients "represent a distinct high risk subgroup" and that anaesthetists are concerned that "critically ill patients requiring immediate airway protection are the most difficult to manage". Why then are operating department assistants (ODA) present at less than 50% of RSIs performed by A&E staff? The help of an ODA is of immense value to new anaesthesia SHOs as well as experienced consultants. Neither would presume to undertake an anaesthetic in a controlled theatre environment without an ODA present so why do A&E staff presume they can? Most emergencies arrive by ambulance and a radio warning of an impending arrival is received. At this point an ODA should be requested and anaesthesia and A&E departments should have clear policies to facilitate this. In all but the most unexpected and direst of airway emergencies an ODA should be present for a RSI.

A&E medicine overlaps with many specialties and as anaesthetists we should stop being protective over RSIs and instead strive to share our airway expertise and our experience in using patient simulators for training.

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- 2 Ellis C, Hughes G. The use of human patient simulation to teach emergency medicine trainees advanced airway skills. *J Accid Emerg Med* 1999;16:395-9.

Authors' reply

We agree with the comments made by Wright and White.

Cadamy notes that training and experience are essential. Part of the programme to introduce these skills in A&E would obviously include both inhouse training and courses such as the Advanced Airway Course, which is being introduced into the UK. We would suggest that emergency physicians should routinely undertake RSI in the department to maintain skills. Only attempting RSI of patients "in extremis" is clearly a recipe for disaster.

Trained assistance is obviously the ideal, but may not always be available for the same reasons as anaesthetic help is not immediately accessible in all circumstances. There may be scope to train A&E nurses in these basic skills.

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Treatment of hyperkalaemia in the emergency department

EDITOR,—I congratulate Dr Ahee and Dr Crowe on their excellent article on the treatment of hyperkalaemia in the emergency department.¹ I have one query. The authors advocate the use of calcium gluconate 10% for its stabilising influence on the myocardium. The Resuscitation Council (UK) however, recommend that calcium chloride 10% be used in the treatment of electromechanical dissociation attributable to hyperkalaemia. I am under the impression that calcium chloride is preferable to calcium gluconate in the

treatment of hyperkalaemia on account of its greater bioavailability.

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- 1 Ahee P, Crowe AV. The management of hyperkalaemia in the emergency department. *J Accid Emerg Med* 2000;17:188-91.

Clearing the cervical spine in the unconscious trauma patient

EDITOR,—We read with interest Mike Clancy's comprehensive review of clearing the cervical spine in adult trauma victims.¹ It highlights the current diverse methods of treating cervical spinal injury in the UK and USA, the difficulties of confidently excluding an unstable cervical spine injury in unconscious patients, and the problems associated with unnecessary cervical spine immobilisation. We report our initial experience with the use fluoroscopy to dynamically clear the cervical spine in obtunded patients.

Since 1994 the following protocol has been adopted by the trauma service in Oxford for clearing the spine in the unconscious trauma patient. Anteroposterior and lateral radiographs are taken of the cervical, thoracic and lumbar spines, which may include one attempt at a swimmer's or an oblique view if the cervicothoracic junction is not seen. All patients undergo computed tomography of C1 and C2 cervical vertebrae, as well as at C7 and T1 if the cervicothoracic junction is not adequately visualised. The open mouth "peg view" is extremely difficult to achieve in the collared and intubated patient and has been abandoned in our unit. Unless an unstable injury is identified by the above imaging, the cervical spine is then screened dynamically at the earliest convenient opportunity (using a mobile C-arm BV29 Philips Image Intensifier) by a consultant trauma orthopaedic surgeon putting the neck through a progressively increasing range of movement until full flexion and extension has been achieved.

Between April 1994 and October 1997, 78 adult patients underwent dynamic screening of the cervical spine performed at a median of one day (range 0-12) after admission.

Five of these patients (6.4%) had a cervical fracture or instability; fractures in three patients were readily apparent before dynamic screening and this test was used to confirm stability and allow collar removal. One stable spinous process fracture was identified during dynamic screening that had previously been missed. One patient was demonstrated to have had gross atlantoaxial instability in the absence of a fracture, and subsequently underwent surgical internal fixation; complete rupture of the interlaminar ligaments was confirmed.

Dynamic cervical screening was negative in 73 unconscious patients. Of these, 12 died mainly secondary to associated major intracerebral injury at a median of 4.5 days after injury. In the remaining 61, the cervical spine was cleared at a median of three days (range 5-33) before extubation and one day after admission to ITU. A total of 314 "days in collar" were saved over the study period. None of the deaths in the negatively screened patients were attributable to cervical injury and there

were no adverse sequelae from screening in the survivors.

Dynamic cervical screening, unlike other imaging methods, has the advantage of providing direct evidence of cervical movement under controlled and increasing stresses. It can detect new injuries as well as evaluate the stability of known or suspected fractures identified by plain radiographs. The procedure can be readily and rapidly performed in the resuscitation room, angiography suite, theatres, or the intensive care unit. The many benefits of early collar removal have been emphasised in Clancy's excellent review.¹

The method does, however, require specific training and experience, and may not be feasible in a small proportion of patients because of their shape and size.

Our findings add support to the observations of others^{2,3} that dynamic fluoroscopy is safe, sensitive and specific when used as part of the described spinal injury imaging protocol to identify unstable cervical spinal injuries in unconscious patients.

We have since implemented an identical spinal injury imaging protocol for unconscious injured children, the results of which are being currently analysed.

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- 1 Clancy MJ. Clearing the cervical spine of adult victims of trauma. *J Accid Emerg Med* 1999;16:208-14.
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- 3 Sees DW, Rodriguez Cruz LR, Flaherty SF, *et al*. The use of bedside fluoroscopy to evaluate the cervical spine in obtunded trauma patients. *J Trauma* 1998;45:768-71.

Author's reply

The letter by Black *et al* is very welcome in that it usefully adds to the limited literature on dynamic fluoroscopy in the obtunded patient. We need more information on the safety of this procedure as well as its performance as a diagnostic test. Injury to the brainstem or spinal cord may result from movement of the spine if there is unsuspected fracture of the dens, disruption of ligaments, traumatic disc extrusion or epidural haematoma.¹ Given the apparent low frequency of these problems large numbers will be required to show its safety. What the letter from Black and colleagues demonstrates nicely is the ability of fluoroscopy to clear patients and also identify those with instability. This group of 78 adults combined with the 116 of Davis *et al*,² 20 of Sees *et al*,³ and 48 of Adjani *et al*⁴ indicates a growing body of evidence about this technique. There have been no false negative results reported for a total of 242 survivors. What is essential is that all patients who undergo dynamic fluoroscopy should be followed up and their outcomes reported. The next question may well be which is best—MRI (expensive, difficult to undertake for this patient group but no false negatives reported for ligamentous instability and avoids the risks of dynamic fluoroscopy) or dynamic fluoroscopy (cheaper, bedside test) to clear the cervical spines of this difficult group of patients?

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Intranasal midazolam. An alternative in childhood seizures

EDITOR,—The fitting child is a common problem presenting to the emergency department. Prolonged fitting is potentially harmful and early treatment of seizures may reduce actual mortality and morbidity.

The gold standard against which new treatments have to be compared has been rectal diazepam or intravenous lorazepam.

Obtaining intravenous access in a fitting child can be difficult. The rectal route has become popular both in hospital and before hospital admission. There are however difficulties with this route: absorption may be variable¹ and non-medical staff may be reluctant to administer rectal drugs.

Recently interest has been shown in the use of midazolam administered via the buccal route to treat fits in the prehospital environment. It was shown to be efficacious and safe though no significant reduction in time to seizure cessation was found in comparison with rectal diazepam.² A further trial set in an emergency department compared intranasal midazolam (0.2 mg/kg) with intravenous diazepam.³ Time to seizure control from admission was found to be less in the midazolam group.

Midazolam via the intranasal route has been successfully used for pre-procedural sedation of children and has confirmed anti-epileptic properties. Indeed EEG evidence of anti-epileptic action within two to five minutes of intranasal administration of midazolam has been demonstrated.⁴

We have successfully used intranasal midazolam on two fitting paediatric patients who proved difficult to obtain intravenous access. The dose chosen was 0.5 mg/kg; one that has been used successfully for procedural sedation with no respiratory compromise.⁵

CASE 1

A 15 month old male epileptic had been fitting for two hours before admission despite administration of rectal diazepam (2 × 5 mg). He was given 0.5 mg/kg intranasal midazolam. Fitting stopped within five minutes of treatment.

CASE 2

A 3 year boy had been fitting for 15 minutes. Fitting was seen to stop within 2.5 minutes of administration of 0.5 mg/kg of intranasal midazolam.

No patient suffered any respiratory depression, or any other adverse effects.

We feel that the intranasal administration of midazolam warrants further evaluation as a treatment of the fitting child.

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Communication skills training for emergency department doctors

EDITOR,—It is good to read the two papers in the journal concerning communication training for emergency department doctors.^{1,2} As a trained general practitioner I feel that this is a subject that could be given more importance in the training of emergency doctors who spend a large part of their working day consulting with patients. I agree with the authors stating its importance due to; the number of communication based complaints and the stress/anxiety that dysfunctional consultations can cause the doctor. However, difficult consultations in the emergency department have the potential to be a source of huge job satisfaction. The key is in preventing it turning dysfunctional and ensuring that all issues are swiftly resolved from both patient and doctor point of view but culminating in two happy people, rather than two stressed and unhappy people with one of them likely to complain.

However, I wonder how much improvement in consultation skills can be gained at very junior doctor level before the necessary acquisition of hard medical facts and experience has occurred. General practice registrars spend their practice trainee year dedicating a lot of time to learning about and improving their consultation skills—but only after a minimum of two years spent in hospital medicine. Also as the authors mention; consultation deficiencies are not confined to junior doctors.³ A secondment to general practice would be the ideal environment for emergency doctors to improve these skills assisted by the teaching of general practitioner trainers who are by far the most experienced in this area. Time could be spent in studying various consultation models as described by many authors over the years (Balint M 1957/Byrne and Long 1976/Pendleton, Schofield, Tate, Havelock 1984/Neighbour R 1987) along with retrospective analysis of videoed consultations and joint surgeries. A secondment to a training general practice as part of any SpR training programme or even possibly as consultant con-

tinuing professional development would in my opinion be potentially invaluable.

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Why do children vomit after head injury?

EDITOR,—Fiona Brown and colleagues¹ studied outcomes in 463 children and found no increase in skull fracture in the presence of post-traumatic vomiting (PTV). They concluded that "vomiting alone does not have a role in decision making regarding further investigation of skull or brain". These conclusions should be applied with caution. Our own series of 5416 patients included 2581 children.² The incidence of PTV in our study was similar to that of Brown and colleagues (12% versus 15%) but the incidence in children with a skull fracture was 33% (95% CI 20%, 48%). A single episode of vomiting after a head injury in children was associated with a relative risk of fracture of 3.61 (95% CI 1.8, 7.23). In alert children the fracture rate was more or less doubled, although the confidence limits indicated a trend not quite reaching statistical significance. A number of other published studies have demonstrated an association between PTV and skull vault fractures.³⁻⁵

Authoritative guidelines, soon to be published, will suggest that the PTV is included as an indication for skull radiography after head injury in adults, and possibly also in children (personal communication, Mr Ian Swann). Vomiting may be regarded as a fairly sensitive, though not very specific, indicator of fracture risk in alert children after head injury. To ignore this symptom is to risk overlooking a fracture of the skull vault, which substantially increases the risk of intracranial complications.

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