ABSTRACTS

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EMRS/SSL International plc
Prize Session

Use of plasma DNA analysis to derive early prediction rules for post-traumatic organ failure
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Background—The discovery of effective treatments preventing or mimising post-traumatic complications may be hampered by our inability to target high risk patients early after injury. The purpose of this study was to derive a guideline for the prediction of post-traumatic organ failure using cell free (plasma) DNA and other predictors of post-traumatic complications.

Methods—The research ethics committee approved a prospective, observational study investigating molecular responses of patients to injury. Plasma DNA was measured using a real time, quantitative, polymerase chain reaction assay for the β globin gene in 84 patients (mean age 38 (SD 16) years; 83% male) triaged to an emergency department resuscitation room within a median time of 60 minutes (interquartile range 50, 90; range 30–240) from injury. Other variables were injury severity scores, white cell count (WCC) and shock index (SI). Organ failure (OF) and multiple organ dysfunction syndrome (MODS) occurred in 21 of 84 (25%) and 9 of 84 (11%) cases respectively. After univariate and receiver operator curve analysis, data were further analysed using a classification and regression tree.

Results—Within four hours of injury, OF could be correctly predicted (predictive value positive, PV+) in 85.7% cases (n = 18 of 21; 95%CI 62.6% to 96.2%) by: (1) cell free DNA > 140 000 genome equivalents/ml, (2) injury severity score (ISS) > 27 and (3) WCC > 13.4 (x109/l). OF could be correctly excluded (predictive value negative, PV−) in 87.5% cases (n = 60 of 63; 95%CI 85.8% to 98.8%) by: (1) cell free DNA ≤ 140 000 genome equivalents/ml, (2) ISS ≤ 27 and (3) WCC ≤ 13.4. Sensitivity and specificity were 85.7% (95%CI, 62.6% to 96.2%) and 95.2% (95% CI, 85.8% to 98.8%) respectively.

MODS could be correctly predicted (PV+) in 87.5% cases (n = 7 of 8; 95%CI 46.7% to 99.5%) by: (1) cell free DNA > 108 000 copies/ml, (2) maximal abbreviated injury score (MAIS) > 3, and (3) SI > 0.72. MODS could be correctly excluded (PV−) in 97.3% cases (n = 71 of 73; 95%CI 89.6% to 99.5%) by: (1) cell free DNA ≤ 108 000 copies/ml, (2) MAIS ≤ 3.0 and (3) SI ≤ 0.72. Sensitivity and specificity were 77.8% (95% CI, 40.2% to 96.1%) and 98.6% (95% CI, 91.5% to 99.9%) respectively.

Conclusions—Plasma DNA analysis allows the development of early accurate guidelines for the prediction of post-traumatic OF and MODS. These guidelines now require prospective validation.

The effects of in vivo haemodilution with 0.9% sodium chloride and Gelofusine on whole blood coagulation and platelet function
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Introduction—In vitro haemodilution with Gelofusine reduces clot quality in contrast with saline, which has a procoagulant effect. These coagulation changes are poorly understood but may involve alterations in platelet function. The Sonoclot analyser allows measurement of a number of parameters of whole blood coagulation. After platelet activation CD62P (P selectin) expression is increased on the surface membrane of the platelet. CD42a (GPIX) is also expressed on the platelet surface and CD45 on leucocytes but not platelets. Platelet-leucocyte aggregates (CD45-CD42a positive events) may be increased in thrombotic states. Monoclonal antibodies to these antigens can be conjugated to fluorescent molecules and analysed by flow cytometry.

Aim—The purpose of this study was to investigate the effect of in vivo haemodilution with 0.9% sodium chloride and Gelofusine on whole blood coagulation, platelet activation and platelet-leucocyte interaction.

Methods—The study was performed as a randomised, controlled, crossover study. Eight adult volunteers received 1000 ml of each solution over 30 minutes on separate occasions with a one week washout period between tests. Atraumatic blood sampling was performed from a free flowing upper limb vein before and immediately after fluid infusion. Fresh blood was used for Sonoclot analysis. Blood for platelet analysis was collected into sodium citrate containing vacutainers and analysed within 10 minutes of collection.

Results—Mean Sonoclot values and platelet molecule expression pre/post solution are presented in table 1.

Conclusions—In vivo haemodilution with Gelofusine significantly prolongs the time to reach maximum clot strength. Other whole blood coagulation parameters are unaltered. Both platelet activation and platelet-leucocyte interaction are impaired by Gelofusine in contrast with saline, which promotes these changes.

A prospective randomised controlled trial to investigate the clinical and cost effectiveness of emergency physiotherapy
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Background—Musculoskeletal problems account for a high proportion of patients attending emergency departments. As many as one third of patients have musculoskeletal problems. The most common pathway is for patients to be placed on an outpatient waiting list with considerable delays. The result is that acute physiotherapy is rarely provided. An alternative pathway is for emergency department physiotherapy delivering treatment earlier than would otherwise be possible. Earlier intervention may not only reduce the duration of acute symptoms and length of treatment but also affect the long term outcome. There is evidence to suggest that this is the case.

Objectives—To investigate the clinical and cost effectiveness of an emergency physiotherapy service.

Design—Prospective randomised controlled trial.

Setting—An inner city teaching hospital.

Subjects—Adult patients attending the emergency department with soft tissue injuries of the knee, ankle and neck that are assessed as suitable for physiotherapy by the emergency physician. Patients were randomised into either an emergency physiotherapy group or a traditional late physiotherapy group.

Main outcome measures—Clinical outcome was assessed using the short form-36, and the EuroQol questionnaires. The cost of each patient episode was determined from patient data.

Results—Each patient subgroup was randomised producing three separate trials. Analysis was performed using the different dimensions of the SF-36. There were significant differences between the emergency group and the traditional treatment group (p< 0.05) in the ankle and knee subgroups. There was no significant difference in the neck subgroup.

Conclusions—This study has demonstrated that the early treatment of soft tissue injuries of the knee and ankle is more effective than...
Identifying and managing risks in emergency medicine

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Objectives—To investigate the underlying causes of clinical risks in emergency departments (EDs). To suggest appropriate countermeasures to these underlying causes.

Design—Prospective observational study involving identification of critical incidents in EDs by staff incident reporting, by direct observation, and by daily review of patients’ records. Derivation of causal trees for each incident identified with classification of root causes, obtained from the causal trees, using a risk management tool known as MECCA (Medical Errors Complications and Causal Analysis). Comparison of root causes between different EDs by Kruskal–Wallis and Mann–Whitney tests. Production of countermeasure profiles for each ED using a matrix derived for this purpose.

Setting—Four UK EDs, studied for six matched one week periods.

Main outcome measures—Root cause profiles of critical incidents in each ED.

Results—349 critical incidents were studied, giving 852 root causes. Some 3.6% of root causes were human (42.1%) or organisational (34.6%) in nature. The remainder of root causes involved patient related factors (8.9%) or were unclassifiable (4.8%). Significant differences (p<0.001) were detected between EDs for three subcategories of root cause. These were root causes relating to lack or inadequacy of protocols or guidelines in use within the EDs; those relating to collective behaviour; and those relating to organisational factors outside the departments (mainly attributable to bed shortages). The countermeasure profiles for each ED differed, reflecting the different underlying causal factors of risk in each ED.

Conclusion—Most critical incidents in EDs are related to human or organisational factors. MECCA analysis can detect significant differences in the causal factors of risk between EDs, and thus focus countermeasures appropriately.

Can serum S-100B level predict an adverse outcome following head injury?

Can serum S-100B level predict an adverse outcome following head injury?

S-100B is a protein expressed almost exclusively in astroglial cells of brain tissue that crosses the blood brain barrier in measurable quantities following brain injury. The aim of this study is to evaluate serum S-100B level as a predictive test for adverse outcome following head injury of any apparent severity at presentation.

Method—Patients with head injury of any severity (GCS 3–15) attending the emergency departments of two hospitals in Manchester were included in this prospective study. Serum S-100B levels were measured within six hours of injury, and patient outcome assessed at one month using the extended Glasgow Outcome Score (GOSE).

Results—94 patients have been recruited to date, and 24 of these have now been followed up. A further 300 will be recruited in the next four months. Initial data analysis shows a significant correlation between serum S100B level and GOSE (Spearman’s p = 0.564, p = 0.004). Analysis of data for the subgroup of patients attending with initial GCS 15 (n = 20) revealed a significant correlation also (Spearman’s p = 0.450; p = 0.047).

Conclusion—In a heterogeneous population with predominantly mild head injury we found a significant correlation between S-100B level measured within six hours and neurological outcome at one month. S-100B level may have a role as a predictor of adverse outcome.

The effect of the right and left lateral recovery positions on vena cava diameter

The effect of the right and left lateral recovery positions on vena cava diameter

Nasal diamorphine for acute paediatric pain: a multi-centre randomised controlled trial

Nasal diamorphine for acute paediatric pain: a multi-centre randomised controlled trial

Can serum S-100B level predict an adverse outcome following head injury?

Magnetic resonance imaging in the management of paediatric scaphoid injuries

Can serum S-100B level predict an adverse outcome following head injury?
Children were discharged from care. None of this group has been represented.

Conclusions—MRI can be routinely used in a busy paediatric emergency department to avoid unnecessary immobilisation and treatment. The use of MRI for scaphoid injuries reduces patients’ attendance at hospital, improves diagnostic accuracy and improves patient care.

Whiplash associated disorder in children—an emergency department based study
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Aims—To determine the incidence, severity and course of whiplash associated disorder (WAD) in children aged 4–16 years after involvement in a road traffic accident (RTA).

Methods—Prospective surveillance of all paediatric attendances to three UK urban emergency departments following RTAs for a six month period. An initial structured telephone interview at day 2 after the RTA was followed by selective clinical review utilising the Quebec Task Force criteria for outcome assessment.

Results—One hundred and one children were identified as having been involved in a RTA as a passenger. Forty three experienced symptoms of a WAD (42.5%). Thirty six experienced a WAD of grade 1 with seven experiencing grade 2 severity. There was no significant age difference between the children who did and did not develop WAD symptoms. Twenty five of the children developing WAD were female (58%). The mean duration of symptoms was 8.5 days (range 3–70, SD 14.8). Sixty one children developed symptoms within 24 hours (60%) with the remainder developing symptoms by 48 hours.

Conclusions—Despite the paucity of published evidence, WAD does occur in children. The incidence of WAD in children is in fact similar to that found in adult studies. This study suggests that the clinical course however is more favourable in children than that in adults.

Limitations of this study—This pilot work lacks sufficient numbers to enable meaningful statistical analysis of subgroups. Inherent bias exists relating to the selection bias of children presenting to the emergency department. What do the patients feel is new to the field?—This is the first prospective study of the incidence and clinical course of WAD in a paediatric population.

What is a normal systolic blood pressure and pulse rate in an injured child?
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Objective—To determine the effect of injury on “normal” age related systolic blood pressures and pulse rates in children.
Method—The study was based on Trauma Audit and Research Network data from 1994–98 inclusive. Revised Trauma Score (RTS), Injury Severity Score (ISS), age and pre-existing disease (PMC) status were recorded in 35,954 cases. Logistic regression models were produced for four configurations using a split sample validation technique. A Standard TRISS components (age 0–54, 55–64, 65–74, 75–84, 85+); B=PMC status (present, absent, not recorded); C=with age profile 50–64, 65–74, 75–84, 85+; D=PMC status (present, absent, not recorded); PMC was defined as respiratory, renal, liver or ischaemic heart disease, diabetes mellitus or congenital coagulopathy.

Results—The results are shown in table 2. Hosmer-Lemeshow (H-L) score is a goodness of fit statistic. A lower score indicates a better fit of data. All results were highly significant (p<0.0001) but this is to be expected because of the very large sample size. ROC is the receiver operating characteristic curve that compares sensitivity and specificity in graphical form. The area under the curve should approach unity.

Discussion—The addition of PMC status (model B) to the standard TRISS model A appears to give a better prediction according to both the H-L score and the area under the ROC curve. There is a greater gain, especially with the ROC curve, from refining the age groups into deciles above age 55 (model C) to the standard TRISS model A (model B) to the standard TRISS model A.

Mathematical modelling in the development of a trauma system

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Current systems of emergency care are often based on historical accident rather than design. The London Severe Injuries Working Group has reviewed trauma care in Greater London. To test the effects of different configurations of trauma system a novel approach was adopted—mathematical modelling.

The inputs to the model were: (1) the geographical distribution of injury (from ambulance service data); (2) the critical and definitive interventions for each type of injury; (3) the optimum timing of interventions and specialists/facilities required (from a clinical consensus conference); (4) the relative proportions of different combinations of injuries (from UK national trauma data); (5) the locations of hospitals and the specialist services available in each; (6) the time taken to move a patient to various trauma hospitals (from mapping and drive time software); (7) flow charts for possible treatment routes for the 19 commonest types of injury.

Key outputs from the model were (a) the time taken to achieve critical interventions and (b) the time to definitive intervention (for example, surgery).

The different configurations of trauma system that were then tested included: (1) decreasing the length of time spent pre-hospital by the ambulance service; (2) decreasing the time taken in hospitals before reaching specialist care; (3) pre-hospital triage to bypass local hospitals if appropriate specialist care was within 20 minutes travel time from the accident scene; (4) inclusion of the London Helicopter Emergency Medical Service (HEMS). Maps were then drawn to illustrate numbers and geography of patients meeting clinical targets. For example, the proportion of patients with intracranial haematoma that reached a neurosurgeon within four hours was 20% if all patients were transported to the nearest hospital, 52% if both ambulance and hospital times decreased and HEMS was included, and 90% if all patients within a 20 minute radius of a specialist centre were taken there rather than the nearest hospital.

This is a novel approach to the development of trauma services. The method is time consuming, but once programmed the mathematical model allows the clinical effect of different options to be tested, and quantifies the trade-offs between time to critical intervention and time to definitive intervention.

Role of neutrophil L-selectin in post-traumatic organ failure

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Objective—To determine whether early numerical and functional changes in circulating neutrophils, the expression of neutrophil and soluble L-selectin predict the development of post-traumatic complications.

Methods—Ethical approval was obtained for a prospective, observational study to investigate the immune response of patients to injury. Neutrophil counts, expression of L-selectin (mean channel fluorescence, mcf) and soluble L-selectin (s-L-selectin) were measured using cell counters, flow cytometry and ELISA in...
164 trauma patients (mean SD age 39 (15) years; 81% male) triaged to an emergency department resuscitation room within four hours of injury (median 60 minutes; interquartile range 50, 90; range 30–240). The primary outcome measures were organ failure (SOFA), multiple organ dysfunction syndrome (MODS; n=20), acute lung injury (ALI; n=10) and mortality (n=21). All values (means SD) were analysed with the Mann-Whitney U test.

**Results**—Neutrophil counts were higher in those who died of MODS (9.5 (5.1) × 10^9/l; p<0.05) and ALI (10.1 (5.6) × 10^9/l; 19.7 (9.2) (3.2); p<0.05). Soluble L-Selectin levels were lower in those who developed OF (7.9 (3.4) × 10^9/l; p<0.05) and during re-infusion of shed blood. After haemorrhage, a negative Al was associated with the worst haemodynamic profiles. This pattern of change indicates that wave reflection towards the left ventricle from the lower limbs is reduced during haemorrhage and gradually replaced by a predominant reflection site originating from within the trunk arterial system. Such changes may not favour optimal arterial-ventricular coupling during the evolution of haemorrhagic shock.

**Conclusions**—Pressure wave reflections within the systemic arterial circulation are known to be important in determining aorto-ventricular coupling in health and in chronic systemic hypertension. In this study, pressure wave reflection measured at the inputs to the systemic circulation and the trunk circulation were reduced during survivable haemorrhage and recovered after re-infusion of shed blood. After haemorrhage, a negative Al with conservation of a positive Al was associated with the worst haemodynamic profiles. This pattern of change indicates that wave reflection towards the left ventricle from the lower limbs is reduced during haemorrhage and gradually replaced by a predominant reflection site originating from within the trunk arterial system. Such changes may not favour optimal arterial-ventricular coupling during the evolution of haemorrhagic shock.

**Patients admitted from accident and emergency departments to intensive care units: a descriptive analysis using the ICNARC database and quantification of the effect of admission to a ward prior to intensive care unit, compared with direct admission from accident and emergency Howard Simpson, Caroline Goldfrad, Kathy Rowan, Mike Clancy Accident and Emergency Department, Southampton General Hospital, Tremona Road, Southamton SO16 6YD

**Introduction**—This is the first UK study to describe accident and emergency/intensive care unit (A&E/ICU) activity. The hypothesis is tested that admission to a ward prior to ICU leads to poorer outcome compared with direct admission from A&E to ICU.

**Methods**—A retrospective analysis of the Intensive Care National Audit and Audit and Research Centre (ICNARC) database was performed. Ninety two ICUs have submitted data between 1996 and 1999. Admissions were categorised according to source of direct admissions from A&E to ICU; indirect admissions who were admitted to a ward between A&E and ICU; and non-A&E admissions to ICU. The case load, case mix and outcome of the three admission groups are described. Multivariate analysis is used to calculate the additional risk of death associated with admission to a ward.

**Results**—Of 46 587 ICU admissions, 9389 were direct admissions from A&E to ICU, 2789 were indirect admissions from A&E to a ward before admission to ICU; and 31 190 were non-A&E admissions to ICU. Direct admissions were younger, more likely to be male, less likely to have a serious past medical history, more likely to present with trauma, more likely to be admitted out of hours and at weekends, and had the lowest predicted mortality and the shortest length of stay compared with the other two groups. Indirect admissions were more likely to present with respiratory and cardiac conditions, had the highest mean APACHE II scores, the highest predicted mortality, the greatest length of stay for survivors, and the highest mortality compared with the other two groups. Multivariate analysis demonstrated an excess mortality of 34% (95% confidence intervals: 19%, 52%) associated with admission to a ward before ICU after adjustment for case mix (type and severity of illness).

**Conclusions**—The case mix and case load of the three admission groups are as anticipated. However, the process of care among indirect admissions from A&E to ICU must be investigated further to explain this apparent anomaly.

**Respiratory emergencies and others**

**Effects of mask type, and method of ventilator triggering on tolerability of non-invasive ventilation in patients with chronic obstructive pulmonary disease after exercise I M Still*, S G Ellum**, J Moirham**

**Abstracts**

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stable COPD (3F 6M), mean age 68, FEV1 0.85 litres completed a questionnaire of 12 visual analogue scales (VAS), after use of each of eight modalities of NIPPV (randomised, single blind) for five minutes after successive exhaustive treadmill walks. The NIPPV modalities included two comparisons: (a) between different triggering/flow delivery systems; and (b) between different masks/mouthpiece. The NIPPV modalities included: a conventional flow triggered ventilator (Nippy 2), Proportional Assist Ventilation (PAV), which advances support from one breath to the next, and a ventilator with software improved triggering (Respironics Vision), continuous positive airways pressure (CPAP) and a prototype ventilator in which the clinician controls the triggering with both a button as observation of the patient may allow accurate synchronisation. The following physiological parameters were also recorded each minute during ventilator use: O2 saturation, pulse, respiratory rate and breathlessness (Borg scale). The 12 VAS scales were aggregated into their underlying three themes: (a) the help given by the ventilator, (b) panic arising from using the ventilator, and (c) sense of loss of control of breathing. Results—The results are shown in Table 5. All of the physiological parameters recovered most rapidly when using PAV. In conclusion there was a strong trend for PAV to be the best tolerated form of ventilation, and the one with the most rapid recovery of the physiological measures recorded. This project was supported by the National Health Service R&D (South Thames).

### Table 5

<table>
<thead>
<tr>
<th>NIPPV modality</th>
<th>Help (max 40)</th>
<th>Panic (max 40)</th>
<th>Loss of control (max 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (CPAP 2 cm H2O)</td>
<td>31.2 (2.4)</td>
<td>6.3 (1.7)</td>
<td>8.0 (2.1)</td>
</tr>
<tr>
<td>CPAP 5 cm H2O</td>
<td>32.4 (4.4)</td>
<td>6.3 (3.7)</td>
<td>5.7 (4.3)</td>
</tr>
<tr>
<td>RV PAV</td>
<td>34.6 (2.5)</td>
<td>6.5 (3.6)</td>
<td>6.7 (4.0)</td>
</tr>
<tr>
<td>Clinician trigger</td>
<td>30.2 (6.5)</td>
<td>9.3 (5.1)</td>
<td>7.9 (4.5)</td>
</tr>
<tr>
<td>RV</td>
<td>32.5 (5.9)</td>
<td>9.0 (8.8)</td>
<td>6.5 (5.0)</td>
</tr>
<tr>
<td>Nippy 2: face mask</td>
<td>28.8 (9.3)</td>
<td>11.3 (6.4)</td>
<td>7.1 (4.8)</td>
</tr>
<tr>
<td>Nippy 2: nasal mask</td>
<td>31.2 (7.3)</td>
<td>5.7 (3.5)</td>
<td>6.7 (5.2)</td>
</tr>
<tr>
<td>Nippy 2: mouth piece</td>
<td>27.1 (7.3)</td>
<td>9.9 (6.3)</td>
<td>9.9 (6.0)</td>
</tr>
</tbody>
</table>

RV = Respironics Vision.

Using an elective orthopaedic model of trauma we investigated the effects of four different intravenous fluids on plateau aggregation and measures of coagulation as well as bleeding time and postoperative blood loss. This provided an effective and standardised degree of trauma and enabled pre-trauma measurements to be made without the confounding effect of factors such as sepsis, hypothermia and acidosis.

We studied 55 patients undergoing primary total hip arthroplasty. Two litres (as ATLS standard) of 4.5% albumin, or Gelofusine or Haemaccel or saline were given during the operation. Blood was taken and bleeding time performed immediately before start of surgery (PRE), at the end of surgery (POST) and two hours after the end of surgery (LAST). Platelet aggregation was determined in response to a variety of agonists. Gelofusine and Haemaccel completely abolished aggregation in response to ristocetin at the POST (p<0.001 and p<0.001) and LAST time points (p=0.001 and 0.006). Albumin inhibited aggregation (in response to collagen) at POST (p=0.004) and LAST time points (p=0.006).

There were persistent increases in prothrombin F1+2 complex and thrombin/antithrombin III complexes (p<0.0017 and p<0.0013 for all fluids) showing that the response to injury in our model was significant. Persistent reduction of fibrinogen and increase of INR was seen for all fluids (p<0.0146 and p<0.0125 respectively), and persistent reduction of factor XIII for the colloid fluids (p<0.0077). APTT and factor VIII activity only fell at the POST time point when colloids were used (p<0.0105 and p<0.0166). Bleeding time increased in all colloid fluids (p=0.0324) at the POST time point, returning back to baseline by the LAST time point. There were no significant effects on postoperative blood loss. Plasma viscosity was persistently depressed only by saline and albumin (p<0.0001).

Overall colloid fluids inhibit certain aspects of platelet function and the coagulation system. This may be clinically useful as trauma is associated with a pro-thrombotic state.

**Endotracheal intubation in the accident and emergency department**

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**Introduction**—Definitive airway control is fundamental to effective resuscitation. Endotracheal intubation represents the gold standard of airway management. It may be performed by both anaesthetists and emergency physicians with or without drugs. **Objective**—The aim of this study is to characterise endotracheal intubation in the accident and emergency (A&E) departments in six Scottish teaching hospitals. **Methods**—A prospective multicentre observational study was set up under the auspices of the Scottish Trauma Audit Group. A protocol was completed at the time of intubation and subsequently checked by a local investigator in each site. This analysis reports on the first complete year of data collection (1999). **Results**—There were 773 intubations registered during the first year of this study. A&E doctors performed 536 intubations (69%). A total of 277 patients were in non-traumatic cardiac arrest on arrival and they were intubated without the administration of anaesthetic drugs. Intubation without anaesthetic drugs was undertaken in a further 123 patients, 21 of whom had maintenance sedation given. These two groups are excluded from further analysis. Rapid sequence intubation (RSI) was performed on a total of 373 patients. Trauma patients constituted 45% (167) of the RSI group. RSI was performed on 107 patients (29%) within 15 minutes of arrival, and anaesthetists intubated 194 patients (52%). The overall complication rate was 7.5%. There was no statistically significant difference in complication rates between A&E and anaesthetists when undertaking this procedure. **Conclusions**—Endotracheal intubation and rapid sequence induction are performed by A&E doctors at least as frequently as by anaesthetists in the emergency department. The complication rates for both specialties are low and are comparable.

**Facial continuous positive airway pressure therapy for cardiogenic pulmonary oedema: a study to assess its efficacy in an accident and emergency department setting within the UK**

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**Introduction**—Recent studies outside the UK suggest that patients with acute cardiogenic pulmonary oedema (CPO) may benefit from facial continuous positive airways pressure (CPAP) support in emergency departments. The aim of this pilot study was to assess the impact of facial CPAP on patients with CPO within a UK A&E department. **Methods**—A prospective powered study comparing CPAP with supplemental oxygen at ambient pressure, using historical controls matched for CPO severity. Forty patients with CPO within a UK A&E department were consented and measures of coagulation as well as physiological manifestations of CPO. A larger powered study is underway to assess the impact of CPAP on intubation rate, length of inpatient stay and hospital mortality.

**Comparative studies on plateau function and haemostasis in patients undergoing surgical trauma: effects of four intravenous fluids in patients undergoing hip replacement. A prospective double blind randomised study**

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We studied 55 patients undergoing primary total hip arthroplasty. Two litres (as ATLS standard) of 4.5% albumin, or Gelofusine or Haemaccel or saline were given during the operation. Blood was taken and bleeding time performed immediately before start of surgery (PRE), at the end of surgery (POST) and two hours after the end of surgery (LAST). Platelet aggregation was determined in response to a variety of agonists. Gelofusine and Haemaccel completely abolished aggregation in response to ristocetin at the POST (p<0.001 and p<0.001) and LAST time points (p=0.001 and 0.006). Albumin inhibited aggregation (in response to collagen) at POST (p=0.004) and LAST time points (p=0.006).

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Overall colloid fluids inhibit certain aspects of platelet function and the coagulation system. This may be clinically useful as trauma is associated with a pro-thrombotic state.

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Whole blood coagulation analysis of 40% haemodilution with resuscitation fluids

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Introduction—Severely injured patients have altered haemostasis that may be compounded by the type of resuscitation fluid used. In vivo haemodilution in excess of 40% can occur during fluid resuscitation. The Sonoclot analyser measures the quality of a developing blood clot, including the rate of fibrin formation (RATE) and the time to reach maximum clot strength (PEAK).

Aim—To examine in vitro the effect of 40% haemodilution with various resuscitation fluids on whole blood coagulation by Sonoclot analysis.

Methods—Each of 10 volunteers had nine fresh blood samples taken from a free flowing upper limb vein and added to solution to make a 40% dilution. The solutions studied were 0.9% sodium chloride, Hartmann’s, 5% dextrose, gelofusine, haemaccel, dextran, hydroxyethyl starch (HES) and albumin. One undiluted sample was taken as control.

Results—Rate and PEAK measurements for control and the various solutions are presented in table 6.

Table 6

<table>
<thead>
<tr>
<th>Solution</th>
<th>PEAK (seconds)</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1172</td>
<td>20.7</td>
</tr>
<tr>
<td>NaCl</td>
<td>966</td>
<td>19.0</td>
</tr>
<tr>
<td>Hartmann’s</td>
<td>1745</td>
<td>15.2</td>
</tr>
<tr>
<td>Haemaccel</td>
<td>897†</td>
<td>17.5</td>
</tr>
<tr>
<td>Gelofusine</td>
<td>1979†</td>
<td>11.5</td>
</tr>
<tr>
<td>HES</td>
<td>2353†</td>
<td>8.5</td>
</tr>
<tr>
<td>Albumin</td>
<td>1703</td>
<td>10.4</td>
</tr>
<tr>
<td>Dextrose</td>
<td>&gt;2500‡</td>
<td>3.4</td>
</tr>
<tr>
<td>Dextran</td>
<td>&gt;2500‡</td>
<td>3.5</td>
</tr>
</tbody>
</table>

*P<0.008, †P=0.019 Wilcoxon signed rank test, solution v control; ‡PEAK measurement possible.

Conclusions—The colloids gelofusine, HES, albumin and dextran all impair whole blood coagulation. In contrast haemaccel promotes coagulation. Unlike blood diluted with 0.9% sodium chloride, clot quality is reduced by haemodilution with 5% dextrose and Hartmann’s.

What is the effect of reporting all emergency department radiographs?

I B RINGER, I D LYBURN
Emergency Department, Frenchay Hospital, Bristol BS16 1LE

Objective—To evaluate the effect of formal radiological reporting of emergency department (ED) radiographs on clinical practice and patient outcome.

Methods—All radiographs taken in a single ED over a six month period were prospectively studied simultaneously in both the emergency and radiology departments to detect discrepancies between the ED interpretation and final radiologist’s report. Where a discrepancy was detected the patient was followed up to determine the source of the discrepancy, the correct interpretation and the clinical impact of the reporting process.

Results—During the study period, 19,468 new patient attendances generated 11,749 radiographic examinations. Discrepancies were detected in 175 patients (0.9% of new attendances and 1.5% of radiographic examinations). Of these, 136 were subsequently shown to have been incorrectly interpreted in the ED, with 40 patients undergoing a change in management as a result. In the remaining 39 the ED interpretation was judged to be correct, with 16 patients undergoing further investigations or visits to the ED to confirm this. Review of the discrepant cases suggests that some groups of ED radiographs (such as those interpreted by an ED consultant and certain peripheral limb films) may not require formal radiological reporting.

Conclusion—Radiological reporting of ED radiographs detects a small number of clinically important radiological abnormalities that would otherwise be overlooked, but also generates an appreciable proportion of false positive interpretations requiring further investigation. The adoption of a selective reporting policy may reduce the false positive rate and radiology workload without compromising patient care.

Emergency nurse practitioners in the UK—effectiveness and cost

SAMMY, O GOODALL, J WINDLE
Accident and Emergency Department, Hope Hospital, Salford M6 8HD

Objectives—To assess the effectiveness, competence and costs of emergency nurse practitioners (ENPs) compared with SHOs in accident and emergency (A&E).

Methods—A retrospective study of A&E case notes, covering a six week period. A total of 643 study subjects and 1295 controls were included. Costs were calculated using hourly rates for both groups of clinicians as obtained from the Trust’s finance department. These were related to rate of work of doctors and nurse practitioners. Costs of training and work generated per consultation are also discussed.

Results—Patients seen by ENPs and SHOs were comparable in terms of age and sex, but were significantly different with respect to triage category, time of attendance and anatomical site of injury/illness. Patients seen by nurse practitioners were seen quicker than those seen by SHOs. There was no significant difference between the number of radiographs ordered by nurse practitioners and SHOs. The number of radiographs “misdiagnosed” in both groups was similar. The number of patients with misdiagnosed radiographs who required recall was also similar. SHOs were more likely to refer patients to inpatient teams. But the rate of admission for referred patients was similar for SHOs and nurse practitioners. Nurse practitioners were more likely to request senior advice than SHOs. The trainees suggested that publication of at least one research article was comparable with that of SHOs.

Conclusions—ENPs in A&E medicine are motivated to undertake research. A regional research forum could help to meet their research activity needs and channel their enthusiasm.

Study comparing use of plain abdominal films among accident and emergency doctors of varying experience

RUSSELL McLAUGHLIN
Newtonabbey

Objective—To determine whether appropriateness of request and documentation of findings varied with accident and emergency (A&E) experience of referring doctors.

Methods—Over six weeks, a list of plain abdominal films (PABs) requested by the A&E department of Belfast City Hospital was obtained from the radiology department. Charts were reviewed by an A&E SpR whereby radiological findings of the A&E doctor were recorded and the appropriateness of the indication was determined using RCR
Abstracts

How well do accident and emergency departments resuscitate patients? A postal questionnaire to assess the views of burns and intensive therapy units
E C CROWHURST, N O’CONNOR, P A EVANS
Accident and Emergency Department, Leicester Royal Infirmary NHS Trust, Leicester LE1 5WW

Background—Patients requiring transfer to burns units or intensive therapy units (ITUs) from the emergency and accident and emergency department should be resuscitated and adequately analagised before transfer to the specialist unit.
Methods—All burns unit consultants and ITU consultants in the UK and Republic of Ireland were sent questionnaires on their assessment of A&E management prior to transfer. If inadequate, they were asked to specify all deficiencies that applied. Consultants were identified as those listed in the 1997 Directory of Emergency and Special Care Units.
Results—Response rates: burns survey. First capture January 1999 41%. Second capture June 1999 54%. Three satisfactory emergency and accident and emergency department should be resuscitated and adequately analagised before transfer to the specialist unit.
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range of symptoms is wide and many are “soft” signs. Diagnosis is important as those causing mass effect require surgery.

Methods—We report a case of a child presenting with localised headaches following minor head trauma. Computed tomography demonstrated an arachnoid cyst with evidence of haemorrhage and mass effect, which required surgical intervention. Other cases presenting to our hospital or reported in the literature are reviewed with respect to presenting symptoms and signs.

Results—Localised headaches, behavioural or cognitive changes and ataxia are more commonly associated with this pathology than nausea, vomiting, visual disturbances or seizures in the cases we reviewed.

Conclusion—This range of symptomatology following minor head trauma may warrant computed tomography when other criteria for this investigation are not met.

Table 10 Results of initial investigations

<table>
<thead>
<tr>
<th>Results or lateral compression, facet, pedicle, laminar single vertebral bone, including burst, anterior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataset of 110 129 patients collected prospectively and mechanism of injury.</td>
</tr>
<tr>
<td>The Trauma Audit &amp; Research Network (TARN) database was analysed to ascertain spine fracture prevalence, distribution and mechanism of injury.</td>
</tr>
<tr>
<td>The median database ISS was 10. The fractures within thoracic and lumbar segments (473/66.7%). Second are cervico-thoracic fractures (153/21.6%).</td>
</tr>
<tr>
<td>Conclusions—Unlike other spine injury reports, we identified falls as the main cause of spine fractures even if &lt;2 m. We documented a large burden of thoraco-lumbar fractures, which is frequently underestimated. These results are gathered from a broad mix of hospital and patients and are therefore representative. Prospective data collection of trauma patients is essential for the ongoing analysis of trauma pattern and the subsequent evolution of trauma care.</td>
</tr>
</tbody>
</table>

Spinal boards in accident and emergency—their use and abuse

K Murail

Accident and Emergency Department, City Hospital, Birmingham B187QH

Introduction—The spinal board is a transport device used predominantly in the pre-hospital setting. Prolonged retention of an injured patient on a spinal board in the accident and emergency (A&E) department can potentially lead to complications.

Aim—To determine the pattern of use of spinal boards in a busy inner city A&E department, draw up a protocol and reassess the usage pattern after implementation of the protocol.

Method—This study is a prospective longitudinal study done in two phases. Data were collected using a proforma in both the phases. Phase two was after implementation of an agreed protocol.

Results—The results are shown in table 9.

Conclusion—Significant reduction in patient time on the spinal board has been achieved after the introduction of a protocol. More importantly, a perceptible change in the attitude to the use of spinal board has been achieved. But continuing education and monitoring is emphasised to maintain the positive change.

The use of ultrasound in the initial assessment of blunt diaphragm rupture

Shobhan Thakore*, Allstar Todg**

*Ninewells Hospital, Dundee DD1 9SY, **Raigmore Hospital, Inverness

Rupture of the diaphragm occurs in approximately 5% of cases of blunt abdominal trauma requiring laparotomy, and is considered a marker of severity. Late diagnosis is associated with herniation and possibly strangulation of abdominal contents. It is therefore important to detect the injury with early investigations. Chest radiographs and computed tomography are commonly used but there are few reports describing the use of ultrasound. We have collected six cases showing clinical situations in which ultrasound may be useful and one that demonstrates a potentially significant pitfall.

Cases were collected at Raigmore Hospital in Inverness (table 10). Ultrasound preceded computed tomography in all cases where both investigations were performed. Four cases did not undergo computed tomography, with the decision for operative intervention based on the ultrasound report, chest radiographs and clinical characteristics. The only false negative ultrasound and CT scans were performed on the same patient. The ultrasound showed the left hemidiaphragm to be moving with respiration and it was therefore felt to be intact. We suggest that this sign depends on spontaneous respiration, where diaphragm movement is produced by its own contraction. Positive pressure ventilation causes movement of the diaphragm and inferior structures by expanding the overlying lung. This can lead to the false impression of an intact hemidiaphragm. In diaphragm rupture, chest radiographs can be helpful, but are diagnostic in only 27–64% of left and 17% of right sided injuries. Computed tomography is frequently used, however reports show wide ranging sensitivities. Ultrasound is used in the initial assessment of blunt abdominal trauma with sensitivities similar to computed tomography. It is portable and relatively rapid and hence can be used in the resuscitation room while

Table 9

<table>
<thead>
<tr>
<th>Phase one</th>
<th>Phase two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean waiting time to be seen by the A&amp;E doctor 17 minutes 13 minutes</td>
<td></td>
</tr>
<tr>
<td>Mean time to remove spinal board (1–57 minutes) 31 minutes 8 minutes</td>
<td></td>
</tr>
<tr>
<td>Mean time on the spinal board when removed after the primary survey only (3–235 minutes) 29 minutes 8 minutes</td>
<td></td>
</tr>
<tr>
<td>Mean time on the spinal board when removed after the primary survey and radiographs (median 10 minutes) 147 minutes 3–22 minutes</td>
<td></td>
</tr>
</tbody>
</table>

Table 10 Results of initial investigations

<table>
<thead>
<tr>
<th>Case</th>
<th>Chest radiograph</th>
<th>Ultrasound scan</th>
<th>CT</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Raised RHD</td>
<td>High liver with fluid visible above and below</td>
<td>Not done</td>
<td>Ruptured RHD with liver herniation</td>
</tr>
<tr>
<td>B</td>
<td>Indistinct LHD</td>
<td>LHD completely disrupted</td>
<td>Not done</td>
<td>Ruptured LHD with herniation of stomach, colon and omentum</td>
</tr>
<tr>
<td>C</td>
<td>Extensive right haemothorax, multiple rib #s, raised RHD</td>
<td>RHD and liver elevated. Rupture “not excluded”</td>
<td>RHD rupture with liver herniation</td>
<td>RHD rupture with herniation of liver and liver laceration</td>
</tr>
<tr>
<td>D</td>
<td>Right pneumothorax and indistinct RHD</td>
<td>Poor views of RHD. Dome of RHD unsighted with considerable free fluid in Morrison’s pouch</td>
<td>Liver laceration, elevated RHD suggesting rupture</td>
<td>RHD rupture, liver and spleen laceration</td>
</tr>
<tr>
<td>E</td>
<td>Indistinct LHD</td>
<td>Poor views but LHD seen to move with respiration</td>
<td>Poor views but no evidence of rupture</td>
<td>LHD rupture at operation 7 days after admission</td>
</tr>
<tr>
<td>F</td>
<td>Right haemo-pneumothorax, # ribs</td>
<td>RHD rupture</td>
<td>Not done</td>
<td>RHD rupture with liver and greater omentum herniation and liver laceration</td>
</tr>
<tr>
<td>G</td>
<td>Loss of definition of RHD and right cardiac border, raised RHD</td>
<td>Liver elevated, no diaphragm seen, liver intervened and liver and lung, liver failed to move with respiration</td>
<td>Not done</td>
<td>RHD rupture with liver herniation</td>
</tr>
</tbody>
</table>

LHD, left hemidiaphragm; RHD, right hemidiaphragm.
potentially life saving interventions are on going. This series supports the role of ultrasound in the diagnosis of blunt diaphragmatic rupture when it is suspected on clinical grounds or after the initial chest radiograph. Potential pitfalls should be borne in mind and the misuse recorded by experienced operators to maximise sensitivity. An ultrasound scan supporting the diagnosis of diaphragmatic rupture can negate the need for computed tomography and hence reduce any potential delay to operation.

Traumatic haemarthrosis of the knee
M A ANSARI
City Hospital NHS Trust, Dudley Road, Birmingham

Objective—To evaluate the injuries sustained following haemarthrosis of the knee in a relatively younger population and to assess the need of doing culture of aspirated blood.

Patient and methods—Notes of 510 patients who were retrospectively studied to record age, sex, mechanism of injury final diagnosis and management. Reports of culture of aspirated blood were collected from the department of pathology.

Results—Most cases were of 20–30 years of age group and the male to female ratio was 4:1. Slipping on the floor, pavement or stairs was the major cause of haemarthrosis. Sports injuries accounted for 38% haemarthrosis. On final discharge, 40% patients had idopathic arthritis, 45% were diagnosed as rheumatoid arthritis and 12% had inflammatory conditions. The use of recreational drugs in society is becoming a widespread problem increasing the workload of all the emergency services. γ Hydroxybutyric acid is one of these, a drug used primarily for its euphoric effect. Toxic effects of ingestion include Bradycardia, slow respiration or apnoea, coma and death. We present seven cases, all of which had consumed γ hydroxybutyric acid either alone or in conjunction with other drugs and alcohol. The presentation, clinical features and management of these cases is described. All health care personnel involved in the emergency setting need to know of its existence, toxic effects and initial management with particular reference to airway control and possible assisted ventilation.

Under-recording of deaths due to drug misuse?
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Academic Department of Accident and Emergency Medicine, St Mary’s Hospital, South Wharf Road, London W2 1NY

Drug misuse is an increasing cause of morbidity and mortality in Britain. The current official figure of 1800 deaths per year due to drug misuse is based on death certificates and coroners’ reports. We suspected that these figures are an underestimate, and carried out a hospital-based survey of all the deaths occurring in an inner city hospital over a one year period (1 January–31 December 1999). The mean age of all patients under 70 years of age who died in the hospital were examined to determine whether the patient had been an illicit drug user, and the course of illness and cause of death as recorded on the death certificate were noted. Three independent doctors reviewed each case to determine whether the cause of death could be attributed to drug misuse.

There was a total of 955 deaths. Of these seven were recorded as due to drug misuse and reported to HM Coroner. Of the remaining 683 available sets of notes, 17 had a history of drug misuse. In 12 cases these were reported to the coroner, but in none of these cases was drug misuse recorded as implicated in the death. Of the remaining five, drug misuse was not mentioned in any of the death certificates. The three independent doctors attributed death to drug misuse in 6 of the 17 cases with a high degree of confidence.

Deaths due to drug misuse are probably under-reported. Further work is needed to establish its extent. Drug misuse should form a part of history taking and be recorded in the interests of the patient to ensure a correct diagnosis. This will also lead to better recording and reporting of the consequences of illicit drug use.

Detection of alcohol misuse: attitudes of junior doctors
J S HUNTLEY, C BLAIN, R TOUQUET
Department of Accident and Emergency Medicine, St Mary’s Hospital NHS Trust, Praed Street, London W2 1NY

Introduction—Alcohol misuse is a major burden on the emergency system. Despite the developing one minute Paddington Alcohol Test (PAT), the effectiveness of interventions and the possibility of medicolegal consequences, the detection rate of misuse remains low. We sought to assess SHO attitudes (one possible problem) to PAT usage and the detection of alcohol misuse.

Methods—A questionnaire was given to St Mary’s accident and emergency (A&E) SHOs, in their last month of employment. Questions pertained to the overall epidemiology of PAT possibility/positivity, attitudes to detecting/referring alcohol misuse, and self evaluation of PAT positivity/miss rate. Currently, data are available from three serial teams (n = 13, 12, 12; total = 37).

Results—SHOs varied widely in their prevalence estimations of PAT possible comments, but were unanimous on the importance of early detection, that detection should lead to intervention, and that treatment could be successful. The majority thought A&E to be appropriate for PATs (35 of 37), that drinking alcohol was part of our culture (32 of 37), but did not think that it should be negligent to miss a PAT possible condition (30 of 36). SHOs (12 of 13) found audit increased awareness of alcohol as a root cause; 11 of 13 thought they identified more PAT positive patients. Lack of time was identified as a limiting factor. The fact that 16 of 37 SHOs thought themselves PAT positive, with 25 of 37 admitting alcohol misuse >1/month, is an indication of the extent to which alcohol (mis)use is an accepted part of our culture.

Conclusions—SHOs are committed to the principles underlying the PAT and the importance of early detection of alcohol misuse.

Transatlantic differences in the management of alcohol intoxication
SENTH SALLATURAY, JOHN A HENRY
Department of Accident and Emergency, St Mary’s Hospital, South Wharf Road, London W2 1NY

The large cultural differences between Britain and the United States of America led us to compare policies towards violent or intoxicated patients in four hospitals in New York and four hospitals in London. Each hospital was visited and answers to a 15-point questionnaire were obtained from a junior staff member. The four New York hospitals had similar policies. In each, intoxicated patients were restrained to prevent them leaving the department, if necessary by applying restraint bandages until they were deemed to have zero alcohol levels as judged either by breath alcohol levels or by calculating the decline from an initial blood alcohol level. The four London hospitals were similar in that each attempted to exclude potentially serious conditions before allowing the patient to leave when clinically judged to be in no danger of immediate harm. Blood or breath alcohol levels are not routinely measured. In contrast with New York, violent or dissipative patients...
were usually ejected from the department. This tale of two cities demonstrates how widely differing approaches may be used towards the same problem. The New York approach appears to be a defensive policy based on minimising the risk of subsequent legislation against the potential consequences of an alcohol intoxicated patient being allowed to leave. In Britain there seems to be a policy of balancing the duty of care towards an intoxicated patient with the duty of care towards other patients in the department, so that a seriously disruptive patient is ejected even though intoxicated.

An in vitro assessment of the mechanism of adverse reactions to pharmaceutical acetylcysteine

RAI BANERJEE, PHILIP D ARCY, JOHN A HENRY
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Background—Paracetamol overdose is common, leading to 30 000 hospital admissions and 345 deaths each year. Acetylcysteine (AC) was shown to be effective if given early enough after overdose. However, its administration may be complicated by anaphylactoid reactions. Parvolex is a commercial preparation of AC for intravenous administration that contains 250 mg AC together with Na-EDTA 33 mg/ml as a stabiliser. As part of a research programme into the mechanism of toxicity of AC we have examined its effects in rat mesentery mast cells. Our objective was to determine whether Na-EDTA contributed to the toxicity of the intravenous preparation.

Methods—Rat mesentery was isolated and treated with various concentrations of AC, Na-EDTA and Parvolex. The mesentery was then placed on a slide, stained, dehydrated and fixed. Cells were examined under blinded conditions from a video record to determine whether they were intact or degranulated—that is, whether they showed disruption of histamine granules. The extent of disruption was calculated as a percentage of that observed at the highest dose of AC administered.

Results—EDTA showed minimal effect on mast cell degranulation, with a mean granulation of 7% (range 6–9%) at doses 0–1290 mM. AC showed a dose dependent increase in mast cell degranulation ranging from 20% at 10 mM to 100% at 80 mM. Parvolex also showed a dose dependent effect on mast cell degranulation ranging from 15% at 10 mM to 100% at 80 mM. Our findings showed that AC had a dose dependent, and therefore, anaphylactoid effect on mast cells, while Na-EDTA had no such effect, either alone or when formulated with AC. A change in formulation is unlikely to affect the severity of reactions, but our results and clinical experience suggest that a lower initial dose might reduce the severity of the reactions, which are dose dependent.

Compliance of activated charcoal

S K SHUBBER, F DUNN, L A MCKINNEY, J STEELE
Altnagelvin Area Hospital, Londonderry BT47 1SB

Objective—To assess the compliance of activated charcoal in adults and children.

Design—A questionnaire was sent out to one consultant in each of the 260 accident and emergency (A&E) departments nationwide in the United Kingdom and the Republic of Ireland per BAEM directory 1999/2000. The questionnaire asked firstly whether compliance of activated charcoal was a major problem in adults and/or children and secondly what proportion of the prescribed charcoal was ingested on average by the patients both in adults and children respectively. It also looked at the commercial types of activated charcoal dispensed in the departments.

Results—131 (50%) departments responded to the questionnaire. Only 40% felt that compliance of activated charcoal was a major problem in adults compared with 76.2% who felt compliance was a major problem in children. It was perceived that 68.82% of the prescribed activated charcoal would be swallowed in adults compared with 39.7% in children. Vomiting was perceived to be the most important problem.

Conclusion—Compliance of activated charcoal is perceived to be greater problem in children than in adults.

Poison information in the accident and emergency department

S K SHUBBER, F DUNN, L A MCKINNEY, J STEELE
Accident and Emergency Department, Altnagelvin Hospital, Londonderry BT47 1SB

Objective—To assess the availability of poison information.

Method—A questionnaire was sent out to each consultant led A&E department in UK and Ireland as seen in the BAEM directory 1999/2000. The questionnaire asked how poison information was accessed giving three main options, phone, Internet Toxibase and previous printed sheets.

Results—260 consultants were sent a questionnaire, 130 replied, of these 11 (8.4%) were鼍iously ill and eight (14.5%) had plans to install the Internet Toxibase. Toxibase was used in 67 (51.5%) of the departments still using only the phone to access the information though eight (14.5%) had plans to install the Internet Toxibase. Printed sheets were used in 14 (10.7%) but only one (0.7%) department used them on their own. The Internet Toxibase was used in 67 (51.5%) of the departments in which 31 (46%) department still used the phone. Conclusion—Approximately 63 (48.4%) of the departments still do not have Internet Toxibase installed.

Can a CD-ROM teaching programme improve the confidence of accident and emergency SHOs in assessing deliberate self harm patients?

ALISON WALKER, JANICE BRINCHLEY
General Infirmary at Leeds, Great George Street, Leeds, West Yorkshire LS1 3EX

Background—Studies have shown that the assessment of deliberate self harm patients in the accident and emergency (A&E) department is often inadequate. Many A&E SHOs have little training in the assessment of deliberate self harm patients.

Methods—Three scenarios involving acute paediatric emergencies were simulated. Each scenario had key points. Each doctor was taken through the scenario twice. On the second occasion the algorithm was placed in front of the SHO. The algorithms were similar to APLS guidelines and had been collated into a flip chart.

Results—All SHOs improved markedly with the copy of the algorithm in front of them. In particular choice of drug and drug dose were correct.

Conclusion—Simple and readily accessible improve the quality of simulated paediatric resuscitation. For departments with paediatric attendances such algorithms could result in better outcomes until definitive help and care arrive.

Audit of antibiotic usage in a district accident and emergency department: before and after introduction of guidelines

O O JIBUIKE* , ROGER SAGH* , BARBARA BIRD**, MICHAEL DANNE**
*Accident and Emergency Medicine University Hospital of Wales, Cardiff, **Basildon Hospital, Basildon, Essex

Objective—To evaluate the effectiveness of antibiotic guidelines in an accident and emergency (A&E) department, three months after their introduction.

Methods—Patients receiving antibiotics were traced on computer, October 1998 prior to introduction and January 1999. Antibiotic regimens used were located in the A&E records and dose, date, indication, and

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duration of course for various conditions were noted. Changed prescribing habits were evaluated in the re-audit by the number of patients receiving entirely appropriate regimens as stipulated in the guideline. 

Results—The results are shown in table 11. For discussion purposes we subdivided the conditions into two groups: (1) skin and subcutaneous conditions. Correct prescribing improved for lacerations and bites, but not in treating cellulitis. (2) Throat, ear, chest conditions. Correct prescribing improved in real time. There was little change in chest infection.

Discussion—3.6% to 4% of our A&E attendances received antibiotics—1 per 26 attendances on average. Individually, the guideline changed the prescribing habits of A&E doctors to soft tissue conditions. Overall, there was statistically significant improvement in the appropriateness of prescriptions (p<0.01) (χ² test of significance).

Conclusion—Three months after introduction, overall, our antibiotic guidelines improved. Here, we report the results of a prospective audit of the impact of a new antibiotic guideline on the appropriateness of antibiotics prescribed in Accident and Emergency (A&E) department.

Abstracts

Table 11

<table>
<thead>
<tr>
<th>Clinical condition</th>
<th>October 1998 (n=224)</th>
<th>Number with appropriate antibiotic prescriptions</th>
<th>Number with appropriate antibiotic doses, frequency and duration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total number</td>
<td>Number with appropriate antibiotic doses, frequency and duration (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dosage and frequency (%)</td>
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</table>

| Laceration               | 14                     | 3 (21)                                            | 25                                                  |
| Bites                    | 18                     | 4 (23)                                            | 43                                                  |
| Cellulitis               | 30                     | 2 (7)                                             | 14                                                  |
| Tonsillitis              | 10                     | 1 (10)                                            | 18                                                  |
| Chest infection/pneumonia| 38                     | 6 (16)                                            | 37                                                  |
| Otitis media             | 13                     | 4 (31)                                            | 27                                                  |

Survival<7 days, was associated with age (≥84 years), presentation temperature (<32°C), and non-physiological correlation between IL6, PTH, and Ca²⁺.

Osteoporosis risk factors associated with fractured necks of femur

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Introduction—A recent report from the Royal College of Physicians (RCP) Osteoporosis: Clinical Guidelines for Prevention and Treatment represents the first definitive, evidence-based guide to managing the disease. The management of osteoporosis can be complex but the Primary Care Rheumatology Society recommends a minimum of activity that all practices should be considering. The guidelines state that as a minimum those patients receiving osteoporosis prophylaxis should include: (a) previous osteoporotic fracture; (b) early menopause (age 45 years or less); (c) patients taking prednisolone greater than 7.5 mg daily for three months over age 50 years; (d) nursing home elderly should be on calcium and vitamin D tablets. The aim of this study is to look at 100 consecutive patients attending accident and emergency (A&E) with fractured necks of femur and to determine whether they have risk factors for osteoporosis and whether they are taking osteoporosis prophylaxis.

Results—Up until 1 April we have the results of 51 patients and it is clear that few patients take osteoporosis prophylaxis despite risk factors. Twenty one patients had a previous osteoporotic fracture and only three were taking prophylaxis. Eleven patients had early menopause (or hysterectomy) before the age of 45 (four of these patients also had a previous osteoporotic fracture, none of whom were taking osteoporosis prophylaxis). A number of patients were also residents of nursing homes.

Conclusion—There is very little point in the Department of Health commissioning the osteoporosis report by the RCP if their advice is not implemented. Orthopaedic staff should be aware of the guidelines and patients with osteoporotic fractures assessed for osteoporosis prophylaxis before discharge from hospital. A&E should perhaps notify GPs that their patients have sustained an osteoporotic fracture and should be considered for osteoporosis prophylaxis. The osteoporosis risk in daughters of elderly patients should also be considered. The RCP report recommends that primary care take a case-finding approach to osteoporosis using bone density measurement as a cost effective tool for identifying individuals at high risk of fracture.

www.jnluem.com
Meningococcal disease in accident and emergency: characteristics and management. Can diagnosis and care be improved?

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Objectives—(1) To identify the sensitivity of the characteristics of meningococcal disease at the time of presentation in accident and emergency (A&E) to assess their diagnostic values.

(2) To evaluate the quality of current management in A&E.

Methods—A retrospective analysis of the notes of patients identified as having had meningococcal disease who came through A&E over a 21 month period.

Results—60 case notes were available (88%); results refer to where information was recorded. Twenty one (35%) were adults and 39 (65%) were children under 16. Sixteen (27%) were GP referrals of whom 12 (75%) had received antibiotics. Forty nine (89%) saw a doctor within 30 minutes, (mean 16 minutes) and mean time to antibiotics after presenting was 24.8 minutes with 25 (71%) within 30 minutes and 34 (97%) within one hour. Headache, fever, vomiting and rash were the most sensitive features, but occurred in no more than 79% of patients (lower 95% confidence interval parameters, see charts). The diagnosis was made/suspected in 45 (75%) patients. Thirty six (60%) were referred to a ward team, 23 (38%) to PICU/ITU, and none discharged with one (2%) not recorded. Eight (29%) patients sent to a ward ended up on ITU/ITU and none discharged with two (3%) were transferred and two (3%) died.

Conclusions—At initial A&E presentation there are no highly sensitive features to this disease. Current A&E protocols based on symptoms/signs are unfeasible and are not substitute for clinical judgement based on sound teaching. Despite the inconsistency in presentation definitive treatment of identified cases is achievable within 60 minutes of presentation. All such patients need definitive resuscitation and treatment in A&E. ITU/HDU referral should be considered for all suspected cases. No research from the A&E perspective is needed.

Test lung comparison of the triggering of non-invasive ventilation ventilators under conditions simulating acute exacerbations of chronic obstructive pulmonary disease

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There is increasing evidence that the ability of non-invasive ventilation (NIPPV) ventilators to synchronise with the patient’s breathing is an important determinant of success with NIPPV, and that the available ventilators vary considerably in this respect. Comparisons between ventilators are conventionally made using “test lungs” to ensure stable test conditions and to avoid the need for invasive monitoring if patients were used. In this collaborative medical/engineering project, a new electronically controlled test lung was developed, able to mimic the tidal flows of acute exacerbations of chronic obstructive airways disease, and in which the physiological factors likely to affect triggering could be independently varied. Thirteen ventilators were tested under a range of conditions selected to be increasingly challenging to ventilator triggering. Condition A: “low” airway resistance (R<sub>A</sub> = 3.5 cm H<sub>2</sub>O/l/s at 60 l/min), functional residual capacity (FRC) 3.3 litres, 2 mm leak, tidal volume (V) 782 ml, condition B: “high” R<sub>A</sub> = 20.0 cm H<sub>2</sub>O/l/s at 60 l/min), FRC 3.3 litres, V<sub>2</sub> 629 ml, with three leak sizes: 0, 2 and 4 mm diameter leaks; and condition C: “high” R<sub>A</sub> = FRC 6.3 litres, 4 mm leak, V<sub>2</sub> 422 ml. For each ventilator, under each condition, the test lung was run for one minute, and the mean (ci) (ms) inspiratory and expiratory trigger delay times over 20 breaths were calculated; these being the delays from the onset and end of the test lung inspiration to the appropriate ventilator responses.

Results—The results are shown in table 12. Conclusions—(a) NIPPV triggering varies markedly between ventilators, and (b) for most ventilators is poorer under the more challenging conditions that may be encountered in acute exacerbations of chronic obstructive pulmonary disease to an extent that is likely to be clinically important for many of the ventilators tested.

The diagnosis and management of deep venous thrombosis

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Introduction—The outpatient treatment of deep venous thrombosis (DVT) was initiated in the UK in 1996 by the Haematology and Accident and Emergency (A&E) Departments at St Peter’s Hospital, Chertsey. The outpatient treatment of DVT is safe and leads to substantial savings in bed costs but many hospitals still do not treat the majority of patients in the community. The aim of this study was to develop evidence-based algorithms for the diagnosis and management of DVT and to evaluate an A&E consultant based service.

Method—Since November 1999 all patients with possible DVT are seen by an A&E consultant or registrar. Diagnostic algorithms have been evaluated using selective screening with SimpliRED<sup>®</sup> d-dimer tests and “near patient” testing in accident and emergency (A&E). The aim of this study was to evaluate the use of this test when performed by A&E staff.

Results—Thirty patients with a negative d-dimer test initially had a venogram, two of these patients a venogram was requested because of the disparity between a positive ultrasound and a negative d-dimer test. Both of these venograms confirmed the absence of a DVT. In the third patient a repeat ultrasound by a consultant radiologist confirmed a thrombosis in the superficial short saphenous vein rather than a deep vein. The sensitivity, specificity, negative predictive value and positive predictive value of the SimpliRED<sup>®</sup> d-dimer test were 100%, 79%, 100% and 69% respectively.

Conclusion—Duplex ultrasound is operator dependent and is known to produce false positive results (6–8% of scans). The d-dimer tests for this study cost £169 (63 tests at £3 each) and detected three false positive results with duplex ultrasound. If it had not been for...
this test three patients would have been treated with warfarin for three months with substantial cost to the NHS, inconvenience and anticoagulation risks to the patients. From a clinical and risk management point of view duplex ultrasound should perhaps be combined with a SimpliRED D-dimer test to help prevent false positive results. In this study 34 of the 63 patients with a negative D-dimer test could have been discharged from A&E without an ultrasound investigation and no DVT would have been missed.

Eliminating barriers to rapid thrombolysis in accident and emergency. Are the targets appropriate and achievable? 

In the study. Seventeen were excluded because what children use to treat acute asthma in the community. As children should keep a supply of medications in school an audit at school would provide useful information on what is used to treat acute asthma in the community.

Method—76 schools were visited with 19485 pupils aged 4–12 years. Results—It is estimated that 10–15% of schoolchildren suffer with asthma but in this study only 962 (4.9%) of total schoolchildren took bronchodilators to school. In the age group 4–12 years virtually all children should be using a spacer or BAI (for example, Bricanyl Turbuhaler, Evans Clickhaler, Ventolin Easi-breathe) as most children aged less than 12 would not have the coordination to use an aerosol correctly without a spacer. In this study only 23% (2.8%) of children were using spacers or a BAI whereas 414 (2.1%) children were using bronchodilators without spacers. Steroid inhalers should be used twice a day prophylactically (at home). A total of 147 children were recorded as requiring inhaled steroids. It is estimated that 4–12 years 1/3 of children taking inhaled steroids were using them in the school premises to treat acute exacerbations of asthma as many children did not also have a bronchodilator.

Conclusion—Many children are using inappropriate medications and devices. Although GPs would prescribe spacers many children do not use them as they are quite cumbersome to carry around and children do not like to be seen to be different from their peers. A&E should encourage the use of BAI's and although they are more expensive than aerosols “the most expensive inhaler is the one that does not work”.

Characteristics and management of children and adolescents presenting to accident and emergency with deliberate self harm

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Objectives—The aim of this study was to study the characteristics and management of children and adolescents presenting to accident and emergency (A&E) with deliberate self harm.

Method—Descriptive analysis of data collected by reviewing the notes of all children and adolescents aged 16 years and under, presenting during the period of study (1 January to 31 December) with a history of deliberate self harm. Results—100 children (18 boys, 82 girls) were responsible for 117 episodes of deliberate self harm. Some 69% were accompanied by immediate family, while 21% children had presented alone. Some 49% presented between 5 pm and midnight. Twenty five per cent had prior or current contact with Child & Adolescent Mental Health Services (CAMHS). Assessment included investigations of physical complications (88.9%), reasons for the self harm (83.8%), social circumstances (68.4%) and previous history of self harm (54.7%).

After assessment, 72 were discharged from A&E and 36 admitted to paediatric or medical wards. Of those not admitted, 40 were referred to the local CAMHS for further assessment, 24 being seen in the A&E in the first instance and 26 given a first appointment in the CAMHS outpatient clinic.

Conclusion—Children and adolescents presenting with deliberate self harm to A&E frequently present alone or are accompanied by people who are not the members making assessment and treatment difficult. The time of presentation is usually out of hours, further complicating this process. Many are already known to CAMHS. Assessment tends to focus on the physical consequences of the attempt. At present no guidelines produced by the Royal College of Psychiatrists recommend that admission to hospital is desirable, this did not occur in two thirds of the cases. The guidelines also recommend assessment by CAMHS in all cases but this was followed in only one third of cases presenting to A&E.

The management of alcohol and drug misuse in children and young people—a Salford Health Action Zone (HAZ) initiative

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Introduction—A report by a joint working party of the Royal College of Physicians and the British Paediatric Association made the following recommendations: (1) There should be a well defined multi-disiplinary young peoples alcohol and drug service in each district to which referrals can be made. (2) Research into alcohol problems in the young is exceedingly small in relation to the size of the problem. Retrospective audits of intoxicated teenagers has shown that their treatment at accident and emergency (A&E) departments and their subsequent follow up is inconsistent. Typically such children attend A&E late at night where they are allowed to sober up before discharge. Most A&E departments would not routinely screen for drug misuse or carry out a formal psychiatric assessment or arrange follow up.

Method—Funding has been obtained from the HAZ Initiative for a school nurse (HAZ Fellow) who will follow up referrals from A&E. All young people aged less than 16 (or if in full time education under the age of 19) attending A&E as a consequence of alcohol or drug misuse will be referred to the HAZ Fellow. Links have been established between an alcohol counsellor for the young and the Drug Advisory Service. The HAZ Fellow will refer to these agencies if indicated.

Results—Data being collected include: (1) Extent of problem—we will have data that will provide information on the numbers of patients attending A&E and the time spent at accident and emergency (A&E) as a consequence of alcohol or drug misuse. (2) Recurrences—data will be collected about recurrent A&E attendances before and after intervention. (3) School attendance—data will be collected before and after intervention. (4) Preliminary cost analysis. The cost/benefit of screening for drugs and the domino effect on other services will need to be considered.

Conclusion—This study is at an early stage and so it is too early to draw conclusions.
Presentation to accident and emergency with crying or screaming and likelihood of child protection registration

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Aim—To determine whether children aged less than 2 who present to accident and emergency (A&E) with crying or screaming as the only complaint, are more likely to be placed on the child protection register in later years than children who do not attend with crying or screaming as their sole complaint. Controls were taken from children who presented with any other complaint. Matches were made for sex, postcode and date of birth. All names were anonymised against anticipated dates of past or present child protection registration. In January 2000, the children's age ranged from 3 to 10 years. The mean follow up period was six years (SD one year seven months).

Results—In January 1992, 450 children made 462 attendances to A&E with crying or screaming as their only complaint. Of these, 12 had been placed on the child protection register. Ten of the 450 control children had been registered. The odds ratio of subsequent child protection registration if a child presents in Sheffield with crying or screaming alone is 1.21 (95% confidence intervals 0.52 to 2.82).

Discussion—Presentation of young children who cry or scream for no clear reason is relatively common. It has been suggested such children are at risk of abuse. Although child protection registration is not the same as abuse, it is the closest surrogate marker we have. This study shows there is no increased likelihood of child protection registration for children who present with crying or screaming alone. This applies to all ages of these children, if held, are inappropriate.

Children and pain in the neck—should we take them seriously?

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It is not uncommon for children to present to the accident and emergency (A&E) department with neck pain. Minor trauma, viral or upper respiratory infections are the commonest causes. Clinicians managing these children are often inclined to treat them as torticollis or in the absence of any other complaint to dismiss them. Less common but more sinister underlying causes may present as neck pain in childhood. The aim of this paper is to draw attention to these unusual conditions masquerading as neck pain and to emphasise the need for early recognition and appropriate management.

We describe a series of five patients who presented with pain in the neck to our A&E department over a period of 12 months. Our department serves 34,000 new patients a year. The cases we report emphasise that the presence of neck pain especially if persistent and associated with abnormal neck posturing or gait abnormalities should act as a possible indicator of other less common but potentially more sinister diagnoses such as posterior fossa tumour, eosinophilic granuloma or discitis. Appropriate evaluation of such cases is discussed.

Children and magnets—an almost fatal attraction

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Children imitating adults often seem to indulge in harmless fun, however at times these activities have more serious implications. The recent fashion of body piercing by using small powerful magnets across parts of their body including nose, ears, penis and tongue. Some swallowed the magnet while attempting to use them.

Several of them have had complications, including one who had near fatal surgical complications.

We describe the details of the patients, the procedures used to detect the magnets and the management of the different complications encountered.

The accident and emergency process

Should ambulant patients be directed to reception or triage first?

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Objectives—Developments in triage have lead to patients being directed to triage rather than reception upon arrival in accident and emergency (A&E). We aimed to determine whether attending triage or reception first, was preferable in terms of timeliness, clarity and safety.

Methods—We compared two consecutive four week periods during which patients were directed to attend triage first and then reception first. Observers recorded their actions on arrival. Questionnaires recorded the patients’ perceptions of each strategy. High priority triage categories were audited during the reception first phase.

Results—1850 patients were observed in the triage first phase with a mean door to triage time of 10.6 minutes, triage to reception time of 5.3 minutes and door to reception of 15.8 minutes. Altogether 1522 patients were observed in the reception first phase with a mean door to reception time of 0.5 minutes, reception to triage 12.4 minutes and door to triage of 12.9 minutes. Patients were more likely to present to the appropriate place during the reception first phase (88% v 34%) and reported shorter waiting times and better understanding of instructions. No case given triage category one or two suffered an adverse outcome resulting from delay associated with attending reception first.

Conclusion—Directing patients to attend reception first is timely and less confusing. It is also safer providing there does not delay assessment by more than 15 minutes.

The changing management of acute medical patients

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Introduction—Emergency medical admissions in Britain are rising. A report by the Councils of International Hospitals in 1996 recommended the development of acute assessment units. Some of the recommendations in the Royal College of Physicians Working Party report include appointment of a doctor who has overall management of the unit or a weekly consultant in charge, and twice daily consultant ward rounds.

Objectives—To assess if medical assessment units that are already established meet the recommendations of the report in 1996, and to assess the new report from the Royal College of Physicians.

Method—A list of all hospitals with a CCU and/or ITU in Britain was compiled from the directory of emergency and special care units. It was assumed these hospitals would be treating acute medical patients. The questionnaire was composed of 13 questions and then requested general comments.

Results—So far, 40% of units have a named doctor in charge of the unit, and the majority of these doctors are from internal medicine. Although, some units are managed by accident and emergency and ITU doctors. Of the remaining units, only 10.4% of these rotate through a consultant in charge for the week. Some 5.8% of units have no consultant ward rounds, 42% have one ward round and 50.7% have two.

Conclusions—Many hospitals have already developed medical assessment units. The main area of deficiency regards medical staff. The majority of departments do not have a doctor in overall charge of the unit. This is likely to have adverse effects in both efficiency and risk management. Also, many departments do not have additional staff to on call doctors. Medical assessment units are still in the early stages of development, and continued improvements can be made.
This represents 12.5% of the total survivors to discharge from hospital. The pre-hospital times in relation to survival were examined. In addition to continuing to highlight the importance of urgent action by the public, steps need to be taken to reduce the delay to defibrillation. Early defibrillation has been shown to improve survival in cardiac arrest. Studies show that the best survival rates are achieved in two or three tiered EMS response systems compared with a single response as currently exists in the UK. The involvement of the police, fire brigade and where appropriate the voluntary ambulance service as first responders equipped with automated external defibrillators in Britain would be a major step forward in improving our survival rates in cardiac arrest.

Does live television football affect attendances at accident and emergency departments

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**Aim**—To determine if live terrestrial television football broadcasts affect patient attendance at an accident and emergency (A&E) department.

**Method**—Glasgow Rangers football club, the Scottish league champions, were competing in the European Champions League season 1999/2000. The competition was played for six weeks, either on a Tuesday or Wednesday evening. The matches were broadcast live on Scottish television, the programme commencing at 1930 and ending at 2200. Patients attending the A&E department during these hours on each match night were noted prospectively. Only self-presenting patients were noted. All specialty receiving patients were excluded. The patients attending on all other week nights during these hours were noted and a weekly average figure calculated.

**Results**—Attendance was reduced on four of the six match nights. The reduction was most marked on the night of the first and last game, both deemed to be crucial matches, with attendance being 63% and 51% respectively of the weekly average.

**Conclusion**—The results demonstrate that there is an apparent decrease in patient attendance during match nights, although not exclusively. Other factors, for example, weather, time of year, also require consideration.

A retrospective study on ENT presentation and its appropriateness of management in accident and emergency departments

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**Objectives**—To determine the management by accident and emergency (A&E) staff of patients attending an A&E department with ENT problems and to identify problems with patient management or patient disposal.

**Method**—This retrospective analysis of the patients presenting with ENT problems to A&E department. One hundred patients were randomly selected from patients attending over a six month period. They were assessed on time of attendance, mode of presentation, management and appropriateness of such management.

**Result**—The ages of patients seen ranged from 2–94 years. The vast majority (86%) of attendances were between the hours of 9 am and midnight. The commonest presenting symptom was a nose bleed (26%). Some form of treatment was carried out in 68% of all cases. No treatment was required in 32% of the cases, where the problem had resolved or where no significant problem was detected.

The use of other hospital resources (that is, radiology and other laboratory services) was uncommon and referral to ENT department occurred in less than half the patients (44%). Review of the casenotes suggested that the management was entirely appropriate in 86%.

**Conclusion**—This study reveals that the majority of the patients were managed satisfactorily with appropriate follow up. It could be argued however, that in view of the infrequent use of acute hospital resources that a significant number of these patients could be treated by their own GPs, thereby reducing the workload on hospital A&E departments.

**Table 13**

<table>
<thead>
<tr>
<th>Trauma score</th>
<th>Car</th>
<th>Ambulance</th>
<th>Helicopter</th>
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Injury severity scores and mode of transfer of patients after a major incident, the Omagh bomb

MARK J BENKINS, ALAN MCKINNEY
Ulster Hospital, Belfast

**Aim**—To correlate injury severity scores of patients involved in the Omagh bomb and their subsequent method of transfer.

**Method**—All patients involved in the Omagh bomb transferred from one of the Tyrone County hospital for further ongoing treatment were identified. Injuries were recorded from their notes. Anatomical injury scores and subsequent injury severity scores (ISS) were calculated. The mode of transfer from hospitals to area and regional centres were identified from notes and Northern Ireland Ambulance Service records.

**Results**—Three hundred and nine patients made immediate contact with the hospital services after the explosion. Sixty seven patients required transfer to area and regional hospitals. Forty two went by ambulance, 6 by car and 19 by helicopter. The patients within the car group, self triaged and only one of this group was seriously injured with an ISS of 14 (range 1–14, median 3). Ambulance patients had an ISS range of 1–34 and helicopter patients had an ISS range of 6–75. An ISS of >16 indicates serious trauma, 9 helicopter patients and 11 ambulance patients had these scores.

**Conclusion**—Helicopter transfer for the geographical isolation was an ideal method of transfer for the patients from the Omagh bomb and staff from Tyrone County hospital tried to do this. Such transfer is hampered by problems of staff availability to other patients and a desire to fill available space in the helicopters even if this meant sending less seriously injured to make up the numbers.

Deaths among car drivers and their passengers

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Deaths among car drivers and their passengers in Lothian and Border regions of south east Scotland between 1994 and 1998 were identified in a prospective study involving collaboration between Forensic Medicine, Scottish Trauma Audit Group and accident and emergency (A&E). The circumstances surrounding each death were examined using police reports held by the Procurator Fiscal. Ambulance and hospital records provided information about the treatment provided and time of death. Detailed necropsies were performed using a standardised approach.
fashion from which a list of all the injuries sustained was prepared, enabling them to be scored using the Abbreviated Injury Scale (1990 revision).

One hundred and fifty nine deaths (122 male, 37 female) occurred during the five year period. Various forms of "human error" were implicated in causing the majority of deaths, which included combinations of the following: excessively fast driving, driving under the influence of alcohol, attempting dangerous overtaking manoeuvres and failure to wear an available seat belt. Most of those who died were found dead at scene. There were 72 people with unsurvivable injuries (AIS = 6, Injury Severity Score = 75) causing immediate death at scene, which mainly involved injury to the brain, brainstem, thoracic aorta and upper spinal cord.

The results of this study confirm the continuing role of road traffic collisions in causing premature death in south east Scotland. The predominance of prehospital deaths and the frequency of unsurvivable injury underlines the importance of injury prevention measures in the future prevention of such deaths. Given the background to many of the collisions it is clear that efforts need to be aimed at changing the behaviour of both car drivers and their passengers.

Intravenous fluid use in accident and emergency departments: effects of published studies in medical literature

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Background and methods—In view of the continuing controversy over the safety of colloids and albumin since the meta-analyses published in the British Medical Journal in 1998 we sought to assess prescribing practice by means of postal questionnaires. These were sent to all accident and emergency (A&E) consultants (459) in the UK and Republic of Ireland around the time of the first meta-analysis with a follow up in 1999. Similar questionnaires were then sent to all consultants in burns units (205) and intensive rtherapy units (ITUs) (1444). In the A&E survey consultants chose the one fluid they would use: for burns and ITU, they ranked fluids (1=first choice, etc).

Results—Overall response rates: 88% initial and 64% follow up A&E surveys, 55% burns and ITU surveys. For trauma: A&E consultants preferred crystalloids: Ringer's lactate (46% adults, 43% children), normal saline (25% adults, 23% children). In ITUs the first choice was Gelofusine (mean rank 4.6) in adults and normal saline (4.5) in children. For burns: In adults: A&E consultants preferred crystalloids: Ringer's lactate (37%), normal saline (25%). For children and all ages at the burns unit: albumin is the preferred fluid (34% for children at A&E, rank orders 4.0 adult, 4.5 children at burns unit).

Conclusions—Since the meta-analyses consultants have changed their practice. Those who have stopped using colloids: in A&E for trauma: 11% adults, 13% children. In ITU practice: 1.5% adults and 1.7% children. For burns in A&E: 13% adults, 14% children. At burns units: 7% changed their practice in view of the colloid meta-analysis. Those who have stopped using albumin: in A&E for trauma: 1.7% adults, 7.2% children. In ITU practice: 31% adults, 18% children. For burns in A&E: 12% adults, 16% children. At burns units: 14% changed their practice in view of the albumin meta-analysis. Thus the published meta-analyses have had a marked impact on intravenous fluid use resulting in a significant reduction in the use of these fluids in clinical practice.

Studies on the effects of resuscitation fluids on platelet aggregation in vitro

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Continuing controversy exists over fluids used for trauma and burns and their haemostatic effects. In this study, effects on platelet aggregation were determined in whole blood and compared with results obtained after diluting blood with autologous plasma. This acted as a non-crystalloid, non-synthetic colloidal control.

The fluids or plasma were added to hirudinised whole blood from volunteers (n=10) in the ratio 2:3 (to model the ATLS protocol). Aggregation was measured in response to ADP, collagen, adrenaline and ristocetin. Results were compared with those for undiluted blood and expressed as mean (SEM) percentage aggregation. Ionised Mg$^+$ and Ca$^{2+}$ were measured using an AVL Analyser (table 14).

Reducing the cell count by adding autologous plasma to whole blood, reduced aggregation in response to collagen and adrenaline, but not ADP. Saline and Gelofusine enhanced aggregation in response to ADP, collagen and adrenaline, possibly as a consequence of lowered Ca$^{2+}$. Haemaccel always inhibited aggregation further, probably through increased Ca$^{2+}$ and, like Gelofusine, abolished ristocetin induced responses. Compared with saline and Gelofusine, albumin usually limited enhancement of aggregation consequent to creating a low Ca$^{2+}$ environment. Therefore we anticipate that the effects of these fluids in clinical practice will depend largely on the extent of changes in blood cell counts and the rapidity with which homeostatic mechanisms correct any changes in plasma Ca$^{2+}$.

Table 14

<table>
<thead>
<tr>
<th></th>
<th>ADP</th>
<th>Collagen</th>
<th>Adrenaline</th>
<th>Ristocetin</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Whole blood</td>
<td>58 (9)</td>
<td>91 (1)</td>
<td>38 (5)</td>
<td>28 (9)</td>
<td>1.16</td>
<td>0.46</td>
</tr>
<tr>
<td>Plasma</td>
<td>55 (9)</td>
<td>57 (12)*</td>
<td>19 (3)*</td>
<td>13 (5)</td>
<td>1.16</td>
<td>0.50</td>
</tr>
<tr>
<td>Saline</td>
<td>69 (4)+</td>
<td>80 (7)</td>
<td>35 (6)+</td>
<td>65 (11)+</td>
<td>0.77+</td>
<td>0.30+</td>
</tr>
<tr>
<td>Haemaccel</td>
<td>32 (7)+</td>
<td>42 (11)</td>
<td>11 (2)+</td>
<td>–8 (3)+</td>
<td>0.77+</td>
<td>0.36+</td>
</tr>
<tr>
<td>Gelofusine</td>
<td>82 (3)+</td>
<td>88 (2)+</td>
<td>45 (8)+</td>
<td>4 (3)</td>
<td>0.70+</td>
<td>0.28+</td>
</tr>
<tr>
<td>Albumin</td>
<td>70 (4)+</td>
<td>74 (5)</td>
<td>26 (5)+</td>
<td>38 (11)+</td>
<td>0.67+</td>
<td>0.26+</td>
</tr>
</tbody>
</table>

*p<0.05 cf whole blood. +p<0.05 cf dilution with autologous plasma.