

# Faculty of Accident and Emergency Medicine annual scientific meeting

## SSL Prize session

### COST-EFFECTIVENESS OF MANAGEMENT STRATEGIES FOR PATIENTS WITH ACUTE, UNDIFFERENTIATED CHEST PAIN

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**Background:** Patients presenting to hospital with acute chest pain, undiagnosed by electrocardiograph and clinical assessment, have a low, but important, risk of significant myocardial ischaemia. Strategies for detecting ischaemia in this situation have received little formal evaluation and vary from low cost, poor effectiveness (discharging all home) to high cost, high effectiveness (admission and intensive investigation). This study aimed to compare the relative cost-effectiveness of potential diagnostic strategies.

**Methods:** Decision analysis modelling was used to determine the incremental cost per life saved for each of five strategies, compared to the next most effective alternative, or a baseline strategy of discharging all patients home without further testing.

**Results:** The incremental cost per life saved increased with the complexity of each diagnostic strategy, relative to the next most effective. Cardiac enzyme testing alone cost £92,352 per life saved compared to discharge without testing. Adding 2-6 hours of observation and repeat enzyme testing cost an extra £99,277 per life saved. Adding exercise testing to this strategy cost £163,755 per life saved. A strategy of overnight admission, enzyme and exercise testing was markedly more expensive with a marginal cost of £707,066 per life saved, while a strategy consisting of overnight admission without exercise testing was subject to extended dominance. Sensitivity analysis revealed that the results were sensitive to variation in the cost providing each strategy.

**Conclusion:** Strategies consisting of 2-6 hours observation and repeat enzyme testing, either with or without exercise testing, incur similar costs per life saved to presently funded interventions for coronary heart disease, while strategies requiring hospital admission may be considered to be prohibitively poor value for money. Empirical validation of the true costs and effects of these strategies is essential prior to widespread implementation.

### RANDOMISED, CONTROLLED STUDY OF NON-INVASIVE VENTILATION IN THE TREATMENT OF A&E PATIENTS WITH ACUTE, CARDIOGENIC PULMONARY OEDEMA (POSITIVE PRESSURE IN PULMONARY OEDEMA (3PO) STUDY)

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**Aim:** To evaluate the use of two types of non-invasive ventilation in the treatment of patients attending Accident and Emergency with acute, cardiogenic pulmonary oedema (LVF).

**Study design and patients:** A pragmatic, randomised trial of CPAP versus BiLevel versus standard face mask oxygen in patients presenting with acute, cardiogenic pulmonary oedema. We included patients with clinical acute LVF with a respiratory rate above 23 breaths per minute (bpm), arterial blood pH < 7.35 and in whom a chest x-ray confirmed pulmonary oedema.

**Interventions:** All patients received oxygen, frusemide, nitrates and/or opiates. The CPAP group received continuous airways pressure via face mask at 10 cmH<sub>2</sub>O; the BiLevel group received 15 cmH<sub>2</sub>O inspiratory pressure and 5 cmH<sub>2</sub>O expiratory pressure. The control group received oxygen via a non-rebreathing face mask.

**Main outcome measure:** This was treatment success within two hours of study entry; i.e. reversal of acidosis (pH > 7.35) with a respiratory rate of less than 22 bpm and oxygen saturation of 90% or above.

**Results:** The table describes physiological changes observed in the three groups over the study period.

In the BiLevel group 7 of 16 (44%) reached treatment success at two hours compared to 3 of 20 (15%) in the control group (p=0.07; Fishers Test); in the CPAP group this figure was 7 of 19 (37%)

Parameter Mean (SD)	Face Mask (n=20)		CPAP (n=19)		BiLevel (n=16)	
	0 mins	120 mins	0 mins	120 mins	0 mins	120 mins
Resp Rate (breaths / min)	30 (6)	24 (7)	27 (8)	20 (6)	30 (6)	20 (6)
Blood Ph	7.20 (0.08)	7.35 (0.04)	7.17 (0.11)	7.33 (0.077)	7.22 (0.07)	7.35 (0.07)
O <sub>2</sub> Saturation (%)	91.3 (8.2)	96.1 (3.3)	89.6 (10.6)	93.7 (6.1)	89.1 (12.2)	95.2 (4.8)

(p=0.16). These improvements were mainly explained by greater reductions in respiratory rate in patients treated with non-invasive ventilation. There were no differences between the groups in terms of intubation rate, myocardial infarction rate, length of hospital stay or survival to discharge.

**Conclusions:** Non invasive ventilation leads to a more rapid improvement of important physiological variables in the early treatment of LVF within the Accident and Emergency department.

### A RANDOMISED TRIAL OF THE SAFETY AND EFFECTIVENESS OF MINOR INJURIES TELEMEDICINE

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**Objectives:** 1. To determine the safety of minor injuries telemedicine in comparison to current practice and a gold standard. 2. To assess the clinical effectiveness of minor injuries telemedicine through the medium of a prospective, randomised and blinded clinical trial

**Methods:** A telemedicine consultation system was installed between a representative peripheral unit and its associated Emergency Department (ED). Recruited patients were separately assessed via the telemedicine link, by an on-site ED specialist and also by a general practitioner (GP) wherever possible, allowing a series of independent treatment plans, blinded to all others, to be drawn up. These were compared with a gold standard established at review to identify potential discrepancies, which were then submitted to an independent expert panel for assessment. Each patient was randomly assigned to follow one of the three treatment plans and reviewed 5-10 days later to assess a range of outcomes related to safety, clinical effectiveness and process of care.

**Results:** The mean duration of a telemedicine consultation (5.8 min.) was almost twice as long as an onsite ED (3.1 min.) or GP consultation (3.4 min.) (p<0.0001 in both cases). Telemedicine and onsite ED consultations resulted in very similar rates of X-ray (59.2 vs. 60.5%), but significantly more patients were given a follow up appointment following telemedicine (35.8% vs. 27.5%; p<0.0001). GPs X-rayed significantly less patients (53.1%; p<0.0001), but followed up considerably more than either onsite ED or telemedicine (65.0%; p<0.0001). There were 73 discrepancies, with 12 significant over-treatments and 11 significant under-treatments. No consultation modality was found to be clearly better or worse than any other, and the outcomes measured at 5-10 days showed no significant differences between the three groups.

**Discussion:** These results indicate that minor injuries telemedicine is feasible and has a safety profile similar to conventional practice. No difference was detected in a wide range of clinical outcome measures, regardless of the treatment plan followed. Nevertheless, telemedicine consultations took significantly longer, occupying the time of senior medical staff, and were not universally successful, suggesting that where minor injuries telemedicine is adopted alternative arrangements may also need to be established.

### BLUNT CERVICAL SPINE INJURIES IN SCOTLAND 1995-2000

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**Background:** In the Accident & Emergency (A&E) Department, the management of patients who have sustained head injuries (HI) is often made more complicated by the suspicion of a cervical spine

injury (CSI). Published literature quotes very variable incidences of CSI associated with HI. This study aimed to evaluate the incidence of CSI in patients sustaining blunt head injuries in a Scottish population.

**Methods:** Retrospective analysis of prospectively collected data for a five-year period from the Scottish Trauma Audit Group (STAG) database. Analysis included using logistic regression and other comparisons to investigate the relationship between Glasgow Coma Score (GCS) and the probability of a CSI.

**Results:** 5154 patients sustaining blunt head injuries met the inclusion criteria for the STAG database. 273 of the HI patients had associated CSI giving an overall incidence of 5.3%. When patients with GCS=3 were excluded, there was no evidence of an increase in incidence of CSI with a lower GCS (logistic regression  $X^2 = 0.09$ ,  $p=0.75$ ). However, when the GCS=3 group is included, statistical significance is reached because this group is almost three times more likely to have a CSI compared to the GCS 4-15 groups ( $X^2$  (with continuity correction) = 62.9,  $p \leq 0.001$ ).

**Conclusions:** When the admission GCS is above 3, the likelihood of having a CSI in patients with blunt head injuries is not predictable from admission GCS alone as there is no correlation between the level of GCS and the incidence of CSI. Patients with blunt head injuries who present with a GCS of 3 are much more likely to have a concomitant CSI. The overall incidence of 5.3% compares with published series from other countries.

## THE EFFECT OF WRIST RESTRAINT ON CARDIORESPIRATORY FUNCTION

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**Introduction:** Emergency departments and the police sometimes encounter violent, agitated individuals for whom physical restraint is sometimes necessary. Case reports in the 1980s began to highlight deaths associated with restraint positioning, with subjects in many cases fighting up to the point of collapse. There are numerous factors contributing to the demise of restrained patients that remain undefined. This study aims to examine the effects of wrist restraint on cardiorespiratory responses during maximal exercise.

**Methods:** This is a randomised crossover experimental study. Twelve volunteers underwent an incremental maximal exercise test on a cycle ergometer, randomised to exercise either with their wrists restrained behind their back, in front or unrestrained. Outcome measures included minutes exercised, exercise stage reached, heart rate, Borg rating of perceived exertion and blood lactate level at each stage.

**Results:** Mean exercise time unrestrained was 18 min 44 secs (SD 2min 58sec), wrist restraints in front of the body 18 min 37 secs (SD 3min 1sec), wrist restraints behind the back 17 min 9 secs (SD 2min 49sec). The difference between wrist restraint behind the back compared with in front or unrestrained was statistically significant;

$p=0.036$  and  $p=0.001$  respectively. There was no difference in heart rate or Borg ratings between positions, however an increased blood lactate level was seen in the later stages of exercise (stages 3-5) when subjects had their hands restrained behind their back when compared to the unrestrained position ( $p=0.01$ ,  $p=0.001$ ,  $p=0.01$  respectively).

**Discussion:** This study has shown that when the wrists are restrained behind an individuals back, maximal exercise is limited. Higher lactate levels produced in this restraint position suggests that earlier anaerobic metabolism occurs when under conditions of maximal exercise. For violent individuals handcuffing in front of the body maybe safer.

## A DIAGNOSTIC STUDY USING A MODIFIED RISK ASSESSMENT TOOL TO RULE OUT DVT IN PATIENTS PRESENTING TO AN EMERGENCY DEPARTMENT

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**Aims:** The aim of the study was to assess the validity of a modified risk assessment tool in patients presenting to the emergency department with symptoms and signs suggestive of a DVT.

**Methods:** Consecutive patients over 18 years of age attending the department were enrolled into the study. Exclusion criteria were inability to or refusal of consent, current anticoagulation therapy, or requirement of admission. At the time of assessing the patient the enrolling physicians undertook a structured risk assessment based upon the Wells score. Patients who had previously been treated for DVT or were current intravenous drug abusers were automatically considered to be high risk. All patients had a laboratory based D-dimer assay performed (IL Test D-Dimer) and were treated according to the result. A raised D-dimer level prompted a compression ultrasound scan (CUS) the same day. Patients with a normal D-dimer were discharged without anticoagulation and had a delayed CUS performed on day seven. Delayed CUS was the reference standard.

**Results:** The reference standard was applied to 294 patients. There were 72 patients diagnosed with DVT (prevalence 24%). The results are shown in the table.

	Sensitivity	Specificity	NPV	NLR
D-Dimer alone	96% (94-98)	62% (57-68)	98% (96-100)	0.07
D-dimer and Wells score	96% (94-98)	59% (53-65)	98% (96-99)	0.07
D-Dimer and Modified Wells	99% (97-100)	50% (44-56)	99% (98-100)	0.03

NPV=negative predictive value, NLR=negative likelihood ratio, figures given in brackets are the 95% confidence intervals.

**Conclusion:** The results using the D-dimer assay alone are impressive but given the potentially fatal consequence of missing a DVT a more robust method must be found. Using the modified risk assessment tool can improve the safety of a rule out protocol.

## Oral presentations

### Cardiovascular medicine

#### THE INDIVIDUAL VALUE OF DIAGNOSTIC TESTS USED IN A CHEST PAIN OBSERVATION UNIT PROTOCOL

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**Background:** The Northern General Chest Pain Observation Unit (CPOU) protocol tests selected patients presenting with acute chest pain using serial ECG/ST segment monitoring, CK-MB(mass) (at baseline and at least two hours later), troponin T (at least six hours after symptom onset) and exercise stress test (EST). This combination effectively detects acute coronary disease. We aimed to separately evaluate the individual constituents of the protocol.

**Methods:** All CPOU patients from 1/3/99 to 30/9/00 were followed up by case note review, for those admitted, and outpatient follow-up at three days for those discharged. Six months after attend-

	Sensitivity	Specificity	+ve predictive value	-ve predictive value
Serial ECG/ST monitor	31.0% (17.3-49.2)	95.3% (93.4-96.6)	22.5% (12.3-37.5)	96.9% (95.3-98.0)
CK-MB(mass) ( $\geq 5$ ng/ml)	100% (88.3-100)	95.6% (93.7-96.9)	50.0% (37.5-62.5)	100% (99.4-100)
Troponin T ( $\geq 0.1$ ng/ml)	82.8% (65.5-92.4)	98.8% (97.7-99.4)	75.0% (57.9-86.7)	99.3% (98.3-99.7)
Troponin T ( $\geq 0.04$ ng/ml)	92.6% (76.6-97.9)	97.4% (95.9-98.4)	59.5% (44.5-73.0)	99.7% (98.9-99.9)

ance evidence of cardiac events were sought by computer search, case note review, and general practitioner contact. ECG and blood tests were compared in their diagnostic performance for acute myocardial infarction (AMI) by World Health Organisation criteria. All tests were compared for their ability to predict subsequent cardiac events over six months.

**Results:** 706 patients were assessed, 29 (4.1%) with AMI and 15 (2.1%) with a subsequent cardiac event. Diagnostic performance (95% confidence intervals in parentheses) of serial ECG/ST monitoring, CK-MB(mass) and troponin T are shown in the table below.

Of all the tests, only EST predicted cardiac events over six months (relative risk, 6.63; 95% confidence intervals 1.14 to 38.5).

**Conclusion:** Using conventional thresholds CK-MB(mass) has optimal sensitivity to rule-out AMI while troponin T has superior specificity. However, a lower threshold for troponin T may be more appropriate in these low-risk patients. Serial ECG/ST monitoring adds little to our CPOU protocol. EST adds longer term predictive power once AMI is ruled out.

### 'EVOLVING' MYOCARDIAL INFARCTION IN THE EMERGENCY DEPARTMENT TRUE SYNDROME OR TIME FOR BETTER EDUCATION?

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**Background:** The National Service Frameworks for Coronary Heart Disease (NSF-CAD), has set high standards for the commencement of thrombolysis after arrival in the Emergency Department for patients with acute myocardial infarction (AMI). Previous work from this group has identified that a significant proportion of these patients have delays to their thrombolytic treatment due to 'evolving changes' on their initial electrocardiogram (ECG).

**Objective:** To identify if there had been a delay in thrombolysis in this group of patients because of 'evolving changes' or due to incorrect interpretation of the initial ECGs by medical staff.

**Methods:** A structured retrospective study was carried of patients who had been thrombolysed over a one year period. Notes of patients who had more than one ECG prior to initiating thrombolysis 'patients with evolving myocardial infarction' were obtained. The ECGs of these patients was then given to 2 blinded senior clinicians. The senior clinicians were asked to decide on which of the ECGs they would have commenced thrombolysis, and the reasons why.

**Results:** A total of 54 patients were identified as having 'evolving myocardial infarctions' during the study period out of 280 patients that were thrombolysed. The median time to thrombolysis was 52 (9-290) minutes in these patients. The 2 senior clinicians agreed that they would have instituted thrombolysis at an earlier stage in 46 of these cases (85.1%). Earlier decision making would have reduced the median time to thrombolysis to 20 (0-197) minutes. Patterns of 'missed' changes were identified.

**Conclusions:** A significant proportion of patients with 'evolving' changes of AMI could have been recognised earlier. A more focused educational package for Emergency Medicine staff and early senior involvement could improve their decision making and the time to thrombolysis.

### BODY SURFACE ELECTROCARDIOGRAPHIC MAPS IN INDUCED MYOCARDIAL ISCHAEMIA IN HUMANS

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**Introduction:** The standard 12 lead ECG has remained unchanged for over 50 years, and its limitations in the diagnosis of infarction and ischaemia are well known. Body surface mapping (BSM) is a technique using 80 unipolar electrodes to sample from all areas of the thorax. Previous work has suggested that BSM has a greater sensitivity and specificity for the diagnosis of myocardial infarction. However, its ability to detect rapid transient ischaemia is unknown. The ability of BSM to detect rapid changes in myocardial perfusion is essential if it is to be used in the assessment of chest pain patients.

**Aim:** The aims of this study were to determine 1) If body surface mapping can detect transient changes in myocardial perfusion. 2) If characteristic changes in the body surface maps appear when different coronary vessels were occluded.

**Methods:** Patients had the BSM harness attached prior to the procedure. Transient ischaemia was induced during the balloon inflation phase of the angioplasty. The balloon was inflated for 1 minute. Maps were taken at 30 second intervals for 5 minutes or until the ischaemia had resolved. Ethical committee approval was obtained.

**Results:** 5 of the 7 patients recruited so far show clear and rapid transient change in their body surface maps. 1 patient developed a myocardial infarction during the procedure and shows continuing change in their maps. There are clear differences in maps taken from different arteries.

**Conclusion:** Body surface mapping shows rapid change in transient myocardial ischaemia. The maps show characteristic changes dependent upon which coronary artery is occluded.

### AN ONGOING RANDOMISED, DOUBLE BLIND, PLACEBO-CONTROLLED PILOT STUDY TO INVESTIGATE THE SAFETY OF RECOMBINANT HUMAN INTERLEUKIN-1 RECEPTOR ANTAGONIST IN PATIENTS WITH ACUTE STROKE

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Inflammation is important in the pathophysiology of neuronal injury after acute ischaemic stroke. We have recently completed a prospective study of 37 patients with ischaemic stroke who presented to the Emergency Department within 12 hours of symptom onset, which demonstrated that peripheral markers of inflammation are increased after cerebral ischaemia. Brain inflammation after ischaemic stroke is thought to be initiated by a complex cascade of pro-inflammatory mediators including cytokines e.g. interleukin-1 (IL-1), interleukin-6 (IL-6) and tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ). Manipulation of the IL-1 system in rodent models of stroke provides strong evidence for its involvement in the pathogenesis of cerebral ischaemia. Peripheral administration of IL-1 receptor antagonist (IL-1ra) significantly reduces infarct size in rats. A prospective, randomised, double-blind, placebo controlled pilot study is currently ongoing to investigate the safety of recombinant human interleukin-1 receptor antagonist (Anakinra) in patients with acute stroke who present within six hours of symptom onset. To date 12 patients have been randomised with no serious adverse events reported. This treatment may confer a neuroprotective effect by blocking the inflammatory cascade that occurs after stroke, thus reducing cell death in the ischaemic penumbra.

For novel stroke therapies to be effective it is likely that they will need to be administered within a very short time of symptom onset. For this reason collaboration is necessary between emergency physicians, stroke physicians and neurologists to ensure the feasibility of larger scale efficacy trials.

### ASSESSMENT OF rVlla AS A UNIVERSAL HAEMOSTATIC AGENT IN A MODEL OF HAEMODILUTION

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Haemostatic failure, secondary to large volume fluid replacement, is a major component to mortality and morbidity associated with blunt trauma. Recombinant factor VIIa (rVIIa) is seen increasingly as a possible universal haemostatic agent that could act to reverse or prevent haemostatic failure associated with both the direct and dilution effects of the fluids used within the "Golden" hour of haemorrhagic shock.

**Methods:** We conducted a preclinical study to evaluate the potential role of rVIIa as a universal haemostatic agent in a model of large volume fluid replacement using thrombelastography (TEG). TEG is a method of global haemostasis assessment, providing information on the rate of clot formation, clot strength and durability. Whole blood samples from normal donors were tested undiluted or diluted to 50% and 80% with haemaccel and 50% and 80% with normal saline. Global haemostasis was then assessed in the TEG analyser  $\pm 90\mu\text{g/kg}$  rVIIa added. Scanning electron microscopy was in addition used to assess the pattern of the fibrin network and deposition.

Results: 62 samples were analysed.

- In general, dilution had a major effect on TEG parameters, these effects being ameliorated by the use of haemaccel rather than saline.
- Assessment of each group individually  $\pm$  rVIIa, showed that addition of rVIIa significantly improved TEG parameters for the dilutions (see table) but no statistically significant change in TEG parameters for undiluted whole blood.

#### Addition of rVIIa to replacement fluids

	50%(haem)	80%(haem)	50%(NaCl)	80%(NaCl)
Initiation time	p=0.1617	p=0.1006	p=0.0507	Significant p=0.0256
Kinetics clot formation	Significant p=0.0257	p=0.0767	p=0.0593	p=0.3572
Platelet reactivity	Significant p=0.0171	Significant p=0.0081	Significant p=0.043	p=0.068
Time to Maximum clot strength.	p=0.1508	p=0.4265	p=0.27	Significant p=0.0482

- Scanning electron microscopy of samples demonstrated increased fibrin deposition with the addition of rVIIa.

**Conclusion:** Addition of rVIIa appears to improve markers of global haemostasis as well as demonstrating increased fibrin deposition in this model of large volume fluid replacement with associated haemodilution. Further work is required to assess its potential value as a universal haemostatic agent in the setting of trauma with large volume fluid replacement.

#### CAPILLARY REFILL: REASSESSMENT OF AN OLD TEST? A PRELIMINARY REPORT

C. R. FitzSimmons, J. Morcombe, K. Gracie, D. P. Burke. *A&E Department, Sheffield Children's Hospital, Western Bank, Sheffield S10 2TH.* Capillary refill is a simple clinical test advocated for use in the assessment of circulatory status in the ill or injured child by the APLS, PALS and ATLS courses. However its validity has recently been questioned by several sources. We are currently undertaking a programme to assess and validate the use of a variety of physiological and clinical parameters in the initial assessment of children in A&E. As part of a larger study of capillary refill (including an assessment of the reliability of the end-point) we set up a study to determine the normal range for the test in the paediatric A&E population.

**Literature review:** References exist to 'skin blanching to pressure' in the circulatory assessment of the shocked patient as far back as 1947. The first description of capillary refill as it is now known was in 1980 when Champion used it as one of the five physiological parameters in the Trauma Score. It was subsequently eliminated from the Revised Trauma Score in 1990. In 1988 Baraff stated that the two second upper limit for refill time was in fact arbitrary. Since then studies have been done in neonates, infants and adults to define the normal range. Only one study was found defining the normal range in children and no reference could be found to any studies in an A&E setting.

**The normal range for capillary refill:** We undertook a prospective review of capillary refill times (CRT) in children triaged on presentation to the A&E department at Sheffield Children's Hospital. All refill times were measured with a stopwatch to the nearest 1/10th second in a standardised manner, pressure being applied to the child's forehead for a timed 5 seconds. All attenders were included. 272 (54.7%) attended with injuries/minor trauma and 225 (45.3%) with medical complaints. The results for the first 497 children are as follows: Male : female ratio 1.5 : 1; Median age 5 years; Median CRT 0.9 seconds (range 0.2s-2.6s); Number of times over 2 seconds: 4 (2.1s, 2.1s, 2.3s and 2.6s)

**Conclusion:** An upper limit of two seconds for normal capillary refill seems to be acceptable, if not a little high in the general paediatric A&E population. The four abnormal results were all found to be in children under 1 year and none of them were seriously unwell.

## Trauma and Others

#### ROLE FOR ULTRASOUND IN THE CLINICAL MANAGEMENT OF CHEST INJURY

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**Background:** Emergency physicians are frequently unable to determine whether musculoskeletal chest wall injury involves a fracture and whether fractures adversely affect prognosis compared with soft tissue injury alone.

**Objectives:** Firstly, to compare initial clinical assessment, plain radiography and early ultrasound in the diagnosis of chest wall fracture using late ultrasound as the gold standard; secondly, to determine whether chest wall fracture is associated with significant respiratory complications or delayed return to work.

**Design:** Prospective observational study.

**Setting:** Emergency department of a university hospital in the New Territories of Hong Kong.

**Subjects:** Patients (aged > 10years) with blunt chest wall injury.

**Main outcome measures:** Primary outcome measure was the presence or absence of thoracic wall fracture. Secondary outcome measures were respiratory complications and time to return to work.

**Results:** 115 subjects, 70 (61%) male, mean age 47.8 years (SD 19.5). In univariate analysis, the odds of detecting rib/sternal fractures were: 4.3 (95%CI 1.76-10.53) for age > 40 years; 4.49 (CI 1.72-11.75) for pain on coughing; 2.96 (CI 1.24-7.11) for delayed presentation >24 hours; 8.18 (CI 1.05-64.05) for clinical suspicion alone; and 27.7 (CI 5.3-144.1) for early ultrasound. Multivariate logistic regression analysis demonstrated that the likelihood of detecting a fracture with pain on coughing was 4.95 (p=0.03) and with early ultrasound was 13.71 (p=0.0002). The correct classification rate for detecting a fracture was 97.14%, for predicting no fracture was 33.33%, with an overall correct classification rate of 87.80% (overall likelihood ratio 27.1, p<0.0001; Pearson Goodness-of-Fit 43.6, 0.9989). In patients with a fracture the odds of a persistent cough was 3.61 (CI 1.13-11.49) but there was no significant difference in sputum production, exertional dyspnoea or infective symptoms. The mean time off work for patients with fractures was 26.2 (SD 32.3) days compared with 7.1 (SD 13.0) days in those patients without fractures (p=0.0007).

**Conclusion:** Increasing age, pain on coughing and delayed presentation may be associated with a significant risk of chest wall fracture. Early ultrasound detects fractures accurately and patients with fractures are likely to require prolonged absence from work.

#### EVALUATION OF FOCUSED ASSESSMENT WITH SONOGRAPHY IN TRAUMA IN THE EMERGENCY ROOM - THE FASTER TRIAL

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**Background:** A limited ultrasound scan to document the presence of intra-peritoneal fluid in patients following blunt abdominal trauma is an accepted part of resuscitation in the USA and continental Europe. The technique is used to identify the presence of intra-peritoneal free fluid which would indicate a significant injury. There are no studies to describe the use of this technique in the UK emergency department setting.

**Objective:** To determine the accuracy of the technique when performed by a group of emergency physicians in the United Kingdom.

**Setting and subjects:** The emergency department of a large teaching hospital seeing 105,000 new patients per year. All patients over the age of 16 admitted to the resuscitation room as a result of blunt trauma.

**Methods:** All eligible patients had a focussed ultrasound scan performed by a senior emergency physician at the end of the primary survey. The results were non-contributory to management unless free fluid was seen in a patient who would otherwise have had no further abdominal investigation.

**Main outcome measures:** Results of the FAST scan are compared to current diagnostic methods including clinical examination, observation, CT, laparotomy (and post mortem).

**Results:** Thus far, 110 patients have been entered into the study. The mean age of the patients was 43.9 and mean ISS was 15 (range 1-66). Seven patients have had positive scans (mean ISS 29) including one false positive. There have been no false negative results and sensitivity is thus 100%. Specificity is 99% (NPV 100%, PPV 86%). Five patients went on to have a laparotomy.

**Conclusions:** FAST is a rapid non-invasive method to identify intra-abdominal injury. The technique can be easily taught and skills maintained in an emergency department setting in the UK.

#### RAPID SEQUENCE INTUBATION IN SCOTTISH URBAN EMERGENCY DEPARTMENTS

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**Background:** Airway care is the cornerstone of resuscitation. In UK practice, anaesthetists and emergency physicians provide this care. The aim of this study was to determine current practice for rapid sequence intubation (RSI) in emergency departments in Scotland.

**Methods:** Two year, multi-centre, prospective observational study of endotracheal intubation in the emergency departments of seven Scottish urban teaching hospitals.

**Results:** 1631 patients underwent an intubation attempt in the emergency department and 735 patients satisfied the criteria for RSI. Emergency physicians intubated 377 patients and anaesthetists intubated 355 patients. There was no difference in median age between the groups but there was a significantly greater proportion of males

(73.2% v 65.3%,  $p=0.024$ ) and trauma patients (48.5% v 37.4%,  $p=0.003$ ) in the anaesthetic group. Anaesthetists had a higher initial success rate (91.8% v 83.8%,  $p=0.001$ ), achieved more good views (defined as Cormack-Lehane Grade I and II) at laryngoscopy (94.0% v 89.3%,  $p=0.039$ ) and experienced fewer immediate complications than emergency physicians (8.7% v 12.7%,  $p=0.104$ ). Emergency physicians intubated a higher proportion of patients with physiological compromise (91.8% v 86.1%,  $p=0.027$ ) and a higher proportion of patients within 15 minutes of arrival (32.6% v 11.3%,  $p<0.0001$ ).

**Discussion:** Anaesthetists achieve more good views at laryngoscopy with higher initial success rates during RSI, but emergency physicians perform RSI on a higher proportion of critically ill patients and a higher proportion of patients within 15 minutes of arrival. Complications are fewer in the anaesthetists group, but this may be related to differences in patient populations. Training issues for RSI in the emergency department and emergency airway care will be discussed. Complication rates for both groups are in keeping with previous studies.

#### CAN EMERGENCY SENIOR HOUSE OFFICERS CLINICALLY DIAGNOSE STRUCTURAL PATHOLOGY ACCURATELY IN ACUTE TRAUMATIC KNEE EFFUSIONS?

J. P. Gray, R. Fitzpatrick, A. J. Liddicoat, G. R. Cherryman, P. A. Evans. *Emergency Department, Leicester Royal Infirmary, Infirmary Square, Leicester LE1 5WW, United Kingdom.*

**Introduction:** Acute traumatic knee effusion (ATKE) presents a diagnostic dilemma, even for the experienced emergency doctor. Accurate diagnosis of structural damage to the knee allows timely referral to definitive care, reduction in long term morbidity and an earlier return to full activity. The objective of our prospective study was to evaluate if SHOs can be taught to diagnose structural injury accurately in ATKEs, following induction, using a standardised protocol for knee evaluation. Magnetic resonance imaging (MRI) was utilised in this study as a reference diagnostic and is a non-invasive, rapid, non-irradiating diagnostic tool with 80-95% sensitivity, approaching that of arthroscopy.

**Methodology:** Following ethical committee approval, patients presenting with an ATKE were assessed by an Emergency SHO, who made a clinical diagnosis. All patients were reviewed by an Emergency Registrar or Consultant using the standardised protocol, by a mean of 48 hours from initial consultation. A clinical diagnosis was again made along with knee aspiration and dual echo sequence MRI performed.

**Results:** 57 patients were enrolled and assessed using clinical, needle aspiration and MRI criteria. There were 26 (45.6%) positive MRI scans for structural insult to the knee. SHOs identified 11 structural insults accurately (sensitivity=42.3%), while Registrar or Consultant identified 15 structural insults accurately (sensitivity=57.7%), when compared with MRI findings. There were 31 (54.4%) MRI scans showing no structural injury to the knee and all grades of clinician in this group diagnosed some structural abnormality to be present (specificity=0%). Mean aspirate volume was 39.3mls in the ATKEs with structural injury, compared to 35.9mls in the ATKEs with no structural injury.

**Conclusion:** Irrespective of grade of Emergency clinician, there was a significant shortfall in the diagnosis of specific structural injury and a complete inability to identify knees with no structural insult, compared with MRI. Surprisingly, there was no relation between volume or morphology of knee aspirate and presence or absence of structural impairment on MRI. Notably, more than half the ATKEs had no structural insult apparent on MRI. This study emphasises the challenge posed by ATKE in the Emergency Department setting.

#### INTEROBSERVER VARIABILITY IN EXAMINATION OF THE INJURED SCAPHOID

K. Gow, S. Carley, K. Mackway-Jones. *Department of Emergency Medicine, Manchester Royal Infirmary, Oxford Road, Manchester M13 9WL.*

**Introduction:** Scaphoid fracture is an important diagnosis to make in the patient presenting with an injured wrist. It is widely known that initial radiographs of the wrist fail to spot clinically important fractures and as a result the initial decision to immobilise or not is made on clinical grounds. A number of tests for scaphoid injury have been described. However, their reliability between examiners has not previously been investigated.

**Aim:** The aims of this study were to determine 1) the interobserver variability of doctors using different clinical tests for scaphoid injury 2) if the differences in observer findings were due to differences in pressure applied during examination.

**Methods:** Patients presenting with a suspected scaphoid fracture were eligible for the study. 2 doctors independently examined the patient for anatomical snuffbox tenderness (ASBT), thumb compres-

sion tenderness (TCC) and scaphoid tubercle tenderness (STT). Interobserver variability was calculated for these tests. The second doctor was blinded to the findings of the first. In addition a pressure sensor was placed in an anatomical model of a wrist. Doctors were asked to examine the wrist as they would when performing an ASBT test. The amount of pressure applied was recorded.

**Results:** 24 patients were examined. Substantial agreement between physicians was shown for ASBT ( $\kappa = 0.664$ ) and SCC ( $\kappa = 0.739$ ), TCC showed fair agreement ( $\kappa = 0.289$ ). The range of pressures measured on the anatomical model showed a wide range, with pressures of 4-80 Newtons being applied.

**Conclusion:** Clinical tests for the injured scaphoid show fair to substantial agreement between observers. The discrepancy between observers may be due to the difference in force used to apply the test.

#### THE EFFECTS OF ANAESTHETICS ON THE ACUTE BLOOD PRESSURE RESPONSES TO HAEMORRHAGE IN THE INJURED RAT

I. Igbinedion, E. Kirkman<sup>1</sup>, R. Little. *MRC Trauma Group, Manchester; <sup>1</sup>Department of Biological Sciences, Durham.*

The magnitude of blood loss and its compensation are important factors in determining outcome after injury. It is known that both brain and peripheral tissue injury can themselves modify the acute cardiovascular response to blood loss. Agents such as morphine, which are used in the early treatment of the injured patient can also modify the cardiovascular response and increase mortality. Anaesthetic agents are also used in the injured patient before the magnitude of blood loss is assessed and appropriate fluid resuscitation given. In the present study the effects of a number of anaesthetics (of physiological and clinical relevance) on the acute blood pressure response to haemorrhage have been studied in the injured rat.

32 male Wistar rats (241 - 258 g) were briefly (30 min) anaesthetised with isoflurane (3.5% and 2% in O<sub>2</sub> for induction and maintenance respectively) and cannulae placed in a lateral tail vein and the tail artery. The isoflurane was then discontinued and anaesthesia maintained with either chloralose (70mg/kg, n = 8), propofol (48-52.5 mg/kg/h, n = 8), or saffan (19-22 mg/kg/h, n = 8) intravenously or sevoflurane (3.5-4.5% in O<sub>2</sub>, n = 8) by inhalation. The rats were then allowed to stabilise for 1h before injury was produced by the application of bilateral hind-limb tourniquets. Ten minutes later a 40% haemorrhage was started at a rate of 0.12 ml/100g body weight/min (2% blood volume/min). Body temperature was maintained constant throughout the procedure.

The blood loss at which arterial blood pressure first fell was significantly (one way ANOVA,  $P<0.05$ ) lowest for chloralose ( $9.9 \pm 0.1\%$  blood volume, mean  $\pm$  SEM), intermediate for saffan ( $23.0 \pm 0.2\%$ ) and propofol ( $23.1 \pm 0.2\%$ ) and greatest for sevoflurane ( $26.3 \pm 0.2\%$ ).

In conclusion the ability to maintain arterial blood pressure during a progressive haemorrhage in the injured rat is differentially modified by different anaesthetic agents.

#### MEDICAL COUNTERMEASURES TO THE BIOTERRORIST THREAT: THE ROLE OF ACCIDENT AND EMERGENCY MEDICINE

R. C. Spencer, N. F. Lightfoot. *Public Laboratory Service, Level 8, Bristol Royal Infirmary, Marlborough Street, Bristol BS2 8HW*

The bombings of the World Trade Center, New York in 1993 and the Alfred P Murrah Federal Building Oklahoma City in 1995 were a rude and violent awakening for the Western World, to the threats now posed by the fundamentalist and religious apocalyptic terrorist groups. This real threat was re-emphasised, if any was needed, by the Aum Shinrikyo sarin attack on Toyko's subway system in 1995. Experts have argued that moral and political constraints have inhibited organisations from employing WMD. Recently however there has been increasing recognition that this model may not apply to all terrorist groups, who find mass murder consistent with their objectives. Although it would appear the risk of a biological attack remains low, the potential consequences could be overwhelming. The casualty numbers in biological terrorism are potentially enormous:  $10^3$ ,  $10^5$ ,  $10^6$ , rather than a few hundred. Yet a rational response must be available and preparedness has been identified as a priority by DH which has recently issued such guidelines to the NHS

The aim of this presentation is to raise awareness and define the role of accident and emergency departments in coping with the threat.

## Moderated Poster presentations

### Group T: Trauma

#### ARE ISOLATED STERNAL FRACTURES ASSOCIATED WITH CLINICALLY SIGNIFICANT CARDIAC CONTUSION?

P. Doyle, B. Garrihy, D. Gorman, J. Kendall. *West Midlands Deanery of A&E Medicine, clo Selly Oak Hospital, University of Birmingham NHS Trust B29 6JD.*

**Introduction:** Historically authors warned that the sternal fracture is the harbinger of serious intra-thoracic pathology and the sternal fracture's association with cardiac contusion has received much attention. It has been routine practice for the patient with a sternal fracture to be admitted to hospital in order to screen for this capricious syndrome; however, recently it has been suggested that an isolated sternal fracture is likely to be a benign injury.

**Aims:** To discover whether isolated sternal fractures are associated with clinically significant cardiac contusion.

**Methods:** Medline, Embase, The Cochrane Library, The Index Medicus and the articles' reference lists provided the 83 references used in this study.

**Results:** The search strategy produced 22 case-series relating to sternal fractures. These papers described 1,711 patients that had sustained a sternal fracture and 775 of these were known to be isolated injuries. Of the patients clearly described with an isolated sternal fracture, (no comorbidity, an otherwise normal clinical examination, normal ECG and only the fracture on the plain radiographs), not one suffered any significant morbidity and none died.

**Discussion:** The heterogeneous nature of the reporting of these injuries made the analysis difficult. It is clear that sternal fractures can be associated with significant intra-thoracic injury, (including cardiac contusion). Nevertheless, the available literature shows that the isolated sternal fracture is a relatively benign injury: the potential for adverse sequelae is evident at presentation. This study supports the recent proposals by Sadaba et al - (Ann R Coll Surg Engl 2000; 82(3): 162-166) - that patients with an isolated sternal fracture who have no past medical history of cardio-respiratory disease, have a normal chest x-ray, a normal ECG and will manage at home with oral analgesia, may be sent home from the emergency department without the need for in-hospital observation.

#### IS FULL SPINAL IMMOBILISATION NECESSARY IN PATIENTS WITH PENETRATING TRAUMA?

R. A. Connell, C. A. Graham, P. T. Munro. *Department of Accident & Emergency Medicine, Southern General Hospital, 1345 Govan Road, Glasgow G51 4TF.*

**Introduction:** Studies have suggested that full spinal immobilisation is rarely required for patients with isolated penetrating trauma. The aim of this study was to identify the incidence of unstable or potentially unstable spinal injuries requiring formal spinal immobilisation in penetrating trauma patients in Scotland.

**Design:** Retrospective analysis of prospectively collected data from the Scottish Trauma Audit Group (STAG).

**Methods:** Study patients were identified from the period 1992-1999 (data capture rate 95%). Information was obtained by examination of case records, theatre notes and post mortem information.

**Results:** 34,903 trauma patients were available for study: 32,974 (94.5%) resulted from blunt trauma and 1929 (5.5%) from penetrating trauma. 27 patients were identified as having penetrating trauma and concurrent spinal injury. 15 patients were excluded as initial review showed that there was a major blunt mechanism of injury also coded, the spinal component of the injury was trivial, or there was no injury to the spinal cord or column identified. In 12 patients there were four cervical and seven thoracic spinal injuries. One patient had both a cervical and thoracic injury. There were no injuries to the lumbosacral spine. 11 patients were male and all but one had been assaulted. One assault was due to a gunshot wound and the others were carried out with sharp weapons. Four complete transections of the spinal cord were identified along with nine partial cord lesions.

Three patients had a Brown-Sequard syndrome. All 12 patients who sustained spinal injury had obvious clinical evidence of a spinal injury on initial assessment or were in cardiac arrest due to the severity of their injuries (n=2). All had spinal immobilisation instituted.

**Conclusions:** Spinal immobilisation is not required in conscious patients (GCS=15) with isolated penetrating trauma unless there is any obvious neurological deficit at presentation.

#### INITIAL EVALUATION OF THE UCLH HEAD INJURY ALGORITHM BASED UPON AN EXTENDED GCS 15 CATEGORY

A. McGuinness, R. Tahmassebi, J. S. Batchelor. *Department of Accident and Emergency Medicine, UCLH, London.*

**Background:** The Department of Accident and Emergency Medicine at UCLH have been managing adult patients admitted with minor head injuries for just over a year. The department has also recently developed an extended GCS 15 category based upon a meta-analysis of previously published nested case-control studies. A head injury algorithm for adults has been developed based upon the extended UCLH GCS 15 Category.

**Objectives:** The aim of this study was to evaluate the impact of the UCLH extended GCS on patients admitted with minor head injuries.

**Methods:** The case notes and head CT reports where relevant of all patients admitted under the accident and emergency department team were reviewed during the period 01.08.2000 to 31.01.2001.

**Results:** 185 patients were admitted during the period of the study. 10% of patients had a GCS 15 throughout their period of admission. 56% of this group had either persistent nausea, vomiting or a moderate to severe headache. The CT abnormality rate (skull fracture or intracranial abnormality) in the subgroup with either persistent nausea, vomiting or a moderate to severe headache was 50%.

**Conclusion:** The use of the UCLH extended GCS 15 category has not resulted in an excessive number of head tomograms in GCS category 15 patients. The CT abnormality rate in patients admitted with persistent nausea, vomiting or moderate-severe headache was found to be appreciably high in this small but important subgroup of patients.

#### RCT: TAP WATER VERSUS NORMAL SALINE FOR THE CLEANING OF ACUTE TRAUMATIC WOUNDS

S. Pappasavvas, V. Joshi, K. Lendrum, I. K. Dukas. *Emergency Department, Russells Hall Hospital, Dudley, UK.*

Approximately 15% of our total annual workload is with open traumatic wounds. All open wounds are contaminated at the time of presentation in the A&E Department. Most measures taken to control wound infection attempt to influence wound contamination. Cleaning process although the least glamorous aspect of the wound care, remains the corner stone for good healing. N Saline is most widely accepted as the fluid of choice for wound irrigation. Tap water is the most common irrigant outside hospital environment. Already is used in dentistry and in chronic wound care without any side effects.

**Objective:** To determine if there is any difference in infection rate in acute traumatic superficial soft tissue wound cleaned by either saline or tap water.

**Study design:** Double Blinded Controlled Randomised Trial. Ethical committee approved the study.

**Setting:** Emergency Department, Russells Hall Hospital, Dudley, West Midlands between 8/99 & 11/00.

**Outcome measure:** Wound infection rate as indicated by presence of pus in the wound, with positive wound swab cultures.

**Results:** 94 patients enrolled in each leg of the study. In 23 cases (10 in saline and 13 in the tap water group) the data were incomplete. 8 cases were inappropriately entered in the trial and they were subsequently excluded (5 for saline and 3 in the tap group). The two groups are as follows: N SALINE: 79 & TAP WATER: 78 patients. The characteristics of the two groups were fairly similar in terms of sex age distribution, wounds' sizes and site. Hands were by far the most common site (65% overall) and 70% of the wounds treated in this trial were less than 3 cm. In each group 19 patients DNA the follow up clinic So we are left with 60 patients in the N saline group and 59 in the tap water group. Only in one case in the N. Saline group the

cultures were positive to E. Coli. Our results demonstrated that N Saline and Tap water are equally effective in cleaning acute superficial soft tissue wounds in adults.

### ARE CLINICAL SIGNS RELEVANT TO THE DECISION TO X-RAY ADULTS PRESENTING WITH FOOSH?

R. Wright, R. Patel, R. Sanford, D. Quinton. *Department of Accident and Emergency Medicine, Leicester Royal Infirmary, Infirmary Square, Leicester LE1 5WW*

**Introduction:** Current practice and textbook advice indicates that all adults presenting with wrist pain after a fall on outstretched hand (FOOSH) injury, need an X-ray. It was hypothesised that clinical signs may aid in refining this decision, reducing the number of X-rays taken. To assist in planning a prospective study an analysis of one month's X-Rays was made.

**Methods:** 99 adults (>18) median age 57 (18 to 94), were identified as having sustained a unilateral FOOSH from standing during December 2000. Patients' notes were searched for documented clinical signs. A consultant trauma radiologist reported all X-rays. The information was used to generate sensitivities and positive predictive values for the detection of bony injury.

**Results:** A total of 112 X-ray series (89 wrist, 23 scaphoid) were taken on 97 patients. A total of 66 fractures were identified (51 distal radius, 9 distal radius and ulnar, 2 scaphoid and 3 carpal avulsions).

X-ray indication	# identified	Sensitivity	+ve predictive value
Presentation post FOOSH	66	100%	68%
General Tenderness	17	26%	90%
Specific Bony Tenderness	43	61%	65%
Decreased Range of Movement	28	42%	85%
Swelling / Deformity	55	83%	86%

**Discussion:** FOOSH can result in a variety of wrist injuries, 68% in this study being bony. Of the 32 patients with no bony injuries detected, 14 were X-rayed as clinical scaphoid fractures. Thus only 18 (19%) could be considered radiologically normal. Given the implications of missing wrist injuries this proportion may be a small price to pay to maintain 100% sensitivity. Better correlation of subjective, objective and quantitative pain in a prospective study may confirm that localised pain and not simply presentation should indicate X-ray. Also more attention to these factors may reduce dual investigation. Clinical signs overall generate better positive predictive values at the expense of sensitivity. However, inconsistent and under recording of signs will have introduced error to the figures. Prospective subgroup analysis at different ages may reveal different values.

### OTTAWA V. LEICESTER: ARE THERE X-RAY RULES FOR FINGER FRACTURES?

S. Chillala<sup>1</sup>, R. Patel<sup>2</sup>, D. Quinton<sup>1</sup>, D. Finlay<sup>2</sup>. <sup>1</sup>Department of Accident & Emergency Medicine, Leicester Royal Infirmary; <sup>2</sup>Department of Radiology, Leicester Royal Infirmary, Leicester.

In 1990's, Steill et al, at Ottawa Hospital in Canada, proposed decision rules for the use of radiography in acute ankle injuries and subsequently acute knee injuries. To date no such rules have been proposed for finger fractures in adults. We therefore conducted a study to see if any rules could be generated for use of X-rays in acute finger fractures in adults.

Table 1

	Crush	Impact	Flex/ extension	Penetrating	Unknown	Total
Number with Finger #	5	30	7	4		46
Number without finger #	11	26	8	4	3	52

Table 2

	Swelling		Bruising		Laceration		Deformity		Focal bony tenderness		Joint instability		Can patient make a fist		Total Number
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Finger #	39	7	32	14	8	38	14	32	43	3	2	44	20	26	46
No finger#	34	18	30	22	18	34	4	48	39	13	2	50	35	17	52

**Methods:** Patients were assessed according to:

- Mechanism of injury: crush, impact, flexion/extension, penetrating or not known.
- Clinical findings: swelling, bruising, laceration, deformity, focal bony tenderness, joint instability, ability to make a fist.
- Severity of pain: Using pain scale ranging from no pain (0) to severe pain (10).

X-rays taken were correlated with clinical findings.

**Results:** 98 patients were examined and x-rayed.

- There was no significant correlation between the mechanism of injury and positive X-ray findings (table 1).
- There was no significant correlation between symptoms and positive X-ray findings. (table 2).
- There was no significant difference in pain severity between groups with a fracture and those without a fracture.

**Conclusion:** Our study demonstrates that, other than clinical suspicion, there is no way of differentiating patients with fractures, on the basis of clinical symptoms and signs.

### IMPLEMENTATION OF THE OTTAWA ANKLE RULES AT SHEFFIELD CHILDREN'S HOSPITAL: A PRELIMINARY REPORT

D. J. O'Carroll, C. Libetta, D. P. Burke. *A&E Department, Sheffield Children's Hospital, Western Bank, Sheffield S10 2TH.*

**Aim:** To evaluate the effect of implementing the Ottawa ankle rules on x-ray rates for ankle and forefoot injuries in a paediatric A&E department.

**Background:** We have previously shown that the Ottawa ankle rules are valid in children down to the age of two years. Following our validation study the rules were incorporated into our departmental guidelines. We undertook a prospective study to determine whether the rules performed as well in routine clinical practice as they did during the formal validation study period.

**Method:** All children aged 2-15 years presenting to Sheffield Children's Hospital A&E with isolated ankle or midfoot injuries in a five month period after the Ottawa ankle rules were implemented were included in the study. Details on age, sex, type of injury, whether x-rayed or not and result of x-ray, were recorded. Children who were not x-rayed on their first visit were followed up for three months to determine if they returned with a missed fracture.

**Results:** There were 761 patients in the validation study and 903 in the implementation study. The number (percentage) of patients x-rayed was 432 (56.8%) in the validation study and 475 (52.6%) in the implementation study. There was no significant difference in x-ray rate between the validation and implementation studies ( $X^2 = 2.78$ , d.f. = 1,  $p > 0.05$ ) The number of missed fractures was one in each study, 0.3% in the validation study and 0.2% in the implementation study.

**Conclusion:** The Ottawa ankle rules perform as well in general clinical practice as they do during a formal evaluation. The missed fracture rate in patients not x-rayed in both studies was low (<1%).

### RELOCATION OF HIP PROSTHESES IN A&E

D. Caesar, M. McKechnie, C. Robertson. *A&E Department, Royal Infirmary of Edinburgh, Lauriston Place, Edinburgh, EH3 9YW*

**Introduction:** Dislocation of total hip prosthesis is a recognised complication of hip arthroplasty, occurring in approximately 4% of primary hip replacements. Typically, having presented to an Accident and Emergency department, patients undergo reduction under general anaesthesia by orthopaedic surgeons in theatre. We undertook a 12 month retrospective review of patients with dislocated hip prosthesis, who underwent attempted reduction in the A & E department.

**Patients and Methods:** 78 consecutive patients, presenting between January and December 2000, were studied. All of these patients were treated in a resuscitation room and had X-ray to confirm the diagnosis. Sedation was provided with a combination of opioids, benzodiazepines, and entonox. Sedation and attempted reduction

were performed by senior A & E personnel. Post-procedure check X-ray was performed and sedation then reversed if required. The patient was then fitted with a canvas backslint, and either admitted for rehabilitation, or, occasionally, discharged home.

**Results:** The mean age of these patients was 73 years, with a mean number of dislocations on presentation of 3. The success rate of relocation in A & E was 69.2%. The average time from hip dislocation to attempted relocation was under 2.5 hours. Factors associated with successful relocation will be presented.

**Conclusion:** Relocation of hip prostheses under sedation in the A & E department appears to be a safe, simple and usually successful procedure, reducing both patient discomfort, and pressure on acute orthopaedic services.

## Group ED: Emergency diagnosis

### THE PULSE OXIMETER AS NON-INVASIVE MEASURE OF THE CARDIOVASCULAR RESPONSE TO LOWER BODY NEGATIVE PRESSURE

C. Ewe, K. Parker, P. White, J. A. Henry. *Academic A&E Medicine Department, St Mary's Hospital, ICSM, South Warf Road, London W2 1NY.*

**Objectives:** Current assessment of early haemorrhagic shock relies on non-specific and relatively unreliable parameters such as change in blood pressure and heart rate. The aim of this study was to evaluate the use of the pulse oximeter waveform (POW) as a non-invasive measure of early changes in the cardiovascular system. This was achieved by the simulation of graded hypovolaemia using lower body negative pressure (LBNP).

**Method:** LBNP of up to -40 mmHg was used to simulate a reduction in circulating blood volume of up to 15% in 12 healthy male volunteers in the supine position. A pulse oximeter probe was attached to the left index finger. Cardiovascular parameters were continuously monitored using a Propaq™ monitor and defined safety end point criteria were applied. The POW was recorded using Micro Medical™ pulse oximeter software and the traces analysed spectrally and non-spectrally on a customized Matlab™ programme.

**Results:** A rise in heart rate of 20 beats/min and a rise in diastolic blood pressure occurred at -40 mmHg. The amplitude of the POW did not change significantly but the ratio of peak to notch height changed significantly ( $p < 0.05$ ) at LBNP levels of -10 mmHg and -20 mmHg. Frequency domain analysis showed a mean increase in frequency ( $p < 0.02$ ) at -30 mmHg and -40 mmHg LBNP. Change in spectral power in the low frequency range analysed (0.01-0.1Hz) was not significant.

**Conclusions:** The pulse oximeter has been shown to be a sensitive indicator of POW response to early hypovolaemic stress. LBNP produced haemodynamic changes and sympathetic activation simulating a mild hypovolaemic state. However, its use as a model for studying changes in POW due to wave reflection may be complicated by the introduction of complex vascular responses originating from the lower body.

### CLINICAL PREDICTORS OF SECONDARY HEADACHE

T. Locker, S. Mason, A. Rigby. *Accident and Emergency Department, Northern General Hospital, Herries Rd, Sheffield S5 7AU.*

**Background:** It is unusual for patients to present to the Emergency Department (ED) with non-traumatic headache. In alert patients it can be difficult to determine which require investigation. Currently, little evidence exist to assist ED doctors in making this decision. We aimed to determine which demographic and clinical features were associated with secondary (organic) as opposed to primary headaches.

**Methods:** Alert, adult patients attending the ED of the Northern General Hospital, Sheffield between 1/1/00 and 31/12/00, with a chief presenting complaint of headache, were studied retrospectively. Demographic details, clinical features and final diagnosis were recorded for each patient. Three months following the patients initial attendance the hospital database was searched for any related attendances or diagnoses. Bayes' theorem was used to calculate likelihood ratios for each disease feature. Posterior odds (POs) were calculated by multiplying the likelihood ratios by the prior odds of secondary headache (=18.8%).

**Results:** Headache in alert patients accounted for 0.5% (n=353) of new patient episodes, 18.8% (n=65) of patients had a secondary headache disorder. It was not possible to make a distinction between primary/secondary disease in 8 patients. Older patients (>65 years) were more likely to present with secondary headache (PO = 47.5%), as were patients presenting with orbital pain (PO = 28.9%). Other features of secondary headache included being systemically unwell before attendance at ED (PO = 33.2%) and having a sudden symptom onset (PO = 21.4%). Dose-response effects were seen for blood pressure, temperature and pulse rate.

**Conclusions:** Headache is an uncommon presenting symptom but requires thorough assessment as there is a high incidence of pathology. We have identified features strongly associated with secondary headache. We aim to prospectively validate these findings and establish a clinical decision rule.

### GOING DIPPY OVER IVUS?

N. Arya, M. Shuaib, G.T. Manivannan, D. Potts. *Wycombe General Hospital, A&E department, Queen Alexandra Road, High Wycombe, South Bucks, HP11 2TT.*

From 40 patients (with 41 intravenous urograms) being investigated for renal/ureteric colic in an emergency department we compared the results of their urine for blood on the dipstix(R.) scale of +1 to +3 (+1=negative, +2=trace of lysed blood, +3=trace of in tact blood) to the results of their respective intravenous urograms (IVUs) to assess the possibility of urinary tract calculi.

#### Dipstix result

IVU results	+1	+2	+3
Conclusive negative	8	3	13
Probably negative	0	3	1
Conclusive positive	0	2	7
Probably positive	0	1	3

#### Results:

The results suggest to us that:

- +1 result on dipstix: there is little probability of a positive IVU
- +2 result on dipstix: the probability of a positive IVU is small but warrants investigation with a non-urgent IVU
- +3 result on dipstix: there is a reasonable probability of a positive IVU & justifies an urgent IVU.

### THE DIAGNOSTIC VALUE OF CLINICAL FEATURES IN ACUTE, UNDIFFERENTIATED CHEST PAIN

S. Goodacre, T. Locker, F. Morris, S. Campbell, K. Angelinin, J. Arnold. *Accident and Emergency Department, Northern General Hospital, Herries Road, Sheffield, S5 7AU.*

**Background:** Patients with acute chest pain and a nondiagnostic ECG present a common dilemma. Their risk of an acute coronary syndrome is low, but important. Cardiac enzymes are of limited value in the initial hours after onset of pain, so the clinician is reliant upon clinical features. We aimed to evaluate the diagnostic value of clinical features in these patients.

**Methods:** From 1/3/99 to 30/9/00 patients with acute chest pain and a nondiagnostic ECG were assessed on a chest pain unit. Presenting features were prospectively recorded on a standard proforma. Admitted patients were followed up by case note review. Discharged patients were followed up as outpatients three days later. Six months after attendance evidence of adverse events was searched for from the hospital computer database, case notes, and the patients general practitioner. We tested the power of each clinical feature to predict- 1) acute myocardial infarction (AMI) by World Health Organisation criteria, and 2) any acute coronary syndrome (ACS), evidenced by AMI; or positive cardiac test, event, death or revascularisation procedure over six months.

**Results:** 894 patients were assessed, 33 (3.7%) with AMI and 91 (10.2%) with ACS. Features useful in the diagnosis of AMI were (likelihood ratio in parentheses)- exertional pain (2.41); pain radiating to the shoulder or both arms (4.24); burning/indigestion type pain (3.34); and chest wall tenderness (0.31). Features useful in the diagnosis of ACS were- exertional pain (2.07); pain radiating to the shoulder, left arm or both arms (1.63); pleuritic pain (0.56); and chest wall tenderness (0.69).

**Conclusions:** Important differences exist when clinical features are investigated in selected patients with a normal ECG. In particular,

this study supports the observation of many experienced A&E clinicians that "indigestion" or "burning" pain is a worrying symptom.

#### DISCHARGE FROM A&E AFTER SMOKE INHALATION: INFLUENCE OF CLINICAL FACTORS AND EMERGENCY INVESTIGATIONS

F. Mushtaq, C. A. Graham. *Department of Accident & Emergency Medicine, Southern General Hospital, 1345 Govan Road, Glasgow, G51 4TF*

**Background:** Smoke inhalation has become the principle cause of death in domestic fires but there are few guidelines for investigation and management of smoke inhalation in the A&E Department. The aim of this study was to determine the spectrum of clinical presentations, investigations and outcomes in patients presenting to A&E with smoke inhalation and to identify which factors influence immediate management.

**Methods:** Retrospective case not review in three A&E Departments in the West of Scotland for the calendar year 1999.

**Results:** 118 patients were identified. Two patients left A&E prior to assessment. The remaining 116 patients were classified into one of the following five categories: no burns, normal vital signs and normal clinical examination (Group 1); no burns, abnormal vital signs or abnormal clinical examination (Group 2); minor burns (<15% TBSA) with or without abnormal vital signs or abnormal clinical examination (Group 3); major burns (>15% TBSA) (Group 4), n=2; in cardiorespiratory arrest on arrival to A&E (Group 5), n=1.

The table summarises Groups 1-3.

	Group 1	Group 2	Group 3	Total
Number of patients	68	40	5	113
Number discharged home from A&E	62	13	3	78
Mean age, years (range)	30	44 (2-85)	57 (31-81)	44
Mean time of exposure to fumes, minutes (range)	5 (1-240)	26 (1-180)	4 (2-10)	10

In groups 1 and 3, only two investigations performed were significantly abnormal (COHB OF 22% and 12%) and influenced management. In Group 2, arterial blood gases and COHb levels were abnormal in 25% of cases but did not influence decisions on admission or discharge. Initial chest radiographs and electrocardiographs did not influence the early management of patients in this study or the decision to admit or discharge from A&E.

**Discussion:** Arterial blood gas analysis, chest radiography and carboxyhaemoglobin estimation rarely influences immediate management of smoke inhalation victims. Patients who present with normal vital signs and clinical examination and a short exposure to fumes may be safe to discharge from A&E without further investigation, but this required further prospective study.

#### THE FAST E.R. TRAINING PROGRAMME. HOW MUCH IS ENOUGH?

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**Introduction:** A focussed ultrasound scan (FAST) is widely used in initial assessment of abdominal trauma in Europe and the United States, however training and quality assurance programmes vary considerably.

**Literature review:** Published studies on the FAST technique have involved widely differing training packages. The minimum was one hour didactic teaching and one hour practical. Some studies required a minimum of 500 supervised examinations prior to accreditation. A recent paper by Shackford et al documented the learning curve of non-radiologists in performing the FAST protocol and suggested that after ten scans the error rate stabilises. Prior to local introduction of FAST, a training programme was devised in conjunction with the University of Leeds.

**Teaching programme:** • Two sessions of didactic teaching (lectures on ultrasound physics, anatomy and basic technique, practice on normal volunteers and simulated patient volunteers (CAPD patients)).

- Ten videoed scans on normal volunteers (colleagues!)—these were reviewed after three scans and after ten.

- Following successful completion of the above programme, the emergency physicians were accredited to enter patients into the FASTER trial.

**Quality assurance:** All trial scans were reviewed by a blinded, experienced sonographer for quality of views obtained and presence or absence of free fluid. A proportion of the scans were also reviewed by a radiologist.

**Results:** 22 consultant and middle grade emergency physicians were accredited.

Seventy scans have been reviewed. There was agreement in all but one case. The differences seen on review would not have altered patient management. There is overall agreement on the presence or absence of free fluid, but assessment of quality varies.

**Conclusion:** After only a brief training programme emergency physicians can reliably perform the FAST technique and interpret the results.

#### HOW DOES THE RUPTURED ABDOMINAL AORTIC ANEURYSM PRESENT?

M. Lindley-Jones, A. F. T. Brown. *Accident and Emergency Department, Ipswich hospital, Heath Road, Ipswich IP4 5PD.*

**Background:** Ruptured abdominal aortic aneurysms (rAAA) that present with the classic triad of abdominal pain radiating to the back, shock and a palpable pulsatile mass are relatively easy to detect. Many, however, present with more subtle symptoms and signs, which has led to a misdiagnosis rate between 32-60% and an increased mortality from this condition. How is it possible to reduce the misdiagnosis rate and mortality for rAAA?

**Aim:** To determine the presenting symptoms and signs for patients with rAAA, to determine the misdiagnosis rate and the 'high risk diagnoses', for which rAAA is often mistaken.

**Method:** Retrospective analysis of 200 cases. Data collected included presenting symptoms, signs, investigations performed, initial diagnosis and outcome.

**Results:** Forty seven percent of patients presented with abdominal pain or abdominal pain radiating to the back. Of the remaining 53% of patients the pain was experienced in the back only, loin or had no pain at all. Twenty nine percent of patients did not have a palpable pulsatile abdominal mass. Thirty six percent of patients never had signs of shock, such as pallour, sweating, tachycardia, hypotension or collapse. The misdiagnosis rate was 36%, with renal colic accounting for 1/3<sup>rd</sup> of misdiagnoses. Other common misdiagnoses were musculoskeletal back pain, bowel obstruction or perforation, urinary tract infection and myocardial infarction.

**Conclusions:** A significant proportion of patients with rAAA do not present with the classical symptoms of abdominal pain radiating to the back, a pulsatile abdominal mass and signs of shock. This accounts for a high misdiagnosis rate. Clinicians should be particularly wary of diagnosing renal colic, UTI, and musculoskeletal back pain in patients at risk of having rAAA. A method of investigating patients where diagnostic doubt exists is suggested.

#### ARE ROUTINE SERUM PARACETAMOL AND SALICYLATE LEVELS CLINICALLY USEFUL IN CONSCIOUS PATIENTS PRESENTING WITH OVERDOSE WHO DENY ITS INGESTION?

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**Background:** Paracetamol attempts with Paracetamol are extremely common in the United Kingdom. Salicylate overdose is less common. Many patients deny taking Paracetamol or Salicylates but serum levels are usually checked regardless due to concerns about the reliability of the given history. The aim of this study was to determine the number of patients who had positive serum Paracetamol and/or Salicylate levels on routine testing and correlate that to the given history at the time of presentation.

**Methods:** Consecutive patients attending the Accident & Emergency Department of this hospital who had serum Paracetamol and/or Salicylate levels estimated as an emergency were eligible for the study. Patients were excluded if they had taken a staggered overdose or if the time of the overdose was not clear. Case notes were checked the day after admission and details obtained about age, sex, history, alcohol presence and the events surrounding the overdose. Initial results presented here are for the ten-week period starting 2 April 2001.

**Results:** 92 patients were eligible but nine were excluded for the above reasons (two staggered overdoses, seven unclear as to time of overdose). This left 83 patients, 44 of whom were male (53%). The results are in the table.

	Paracetamol level POSITIVE	Paracetamol level NEGATIVE
Paracetamol history POSITIVE	22 (26.5%)	18 (21.7%)
Paracetamol history NEGATIVE	0	43 (51.8%)
	Salicylate level POSITIVE	Salicylate level NEGATIVE
Salicylate history POSITIVE	4 (4.8%)	0
Salicylate history NEGATIVE	0	79 (95.2%)

**Discussion:** Patients who deny taking Paracetamol and/or Salicylate at the time of presentation with an overdose are likely to be telling the truth according to these initial results. Data will continue to be collected to confirm or refute the initial results. This may have implications on the routine nature of testing for these substances in all patients presenting with overdose.

## Group SD: Service delivery

### ASSESSING THE EFFECT OF A CHANGE IN LEGISLATION ON THE EMERGENCY CONTRACEPTION REQUESTS RECEIVED BY AN A&E DEPARTMENT

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**Introduction:** From 1st January 2001, a change in the status of levonorgestrel 0.75 mg from a POM to a pharmacy drug made it possible for women aged 16 and over to obtain emergency (post-coital) contraception from suitably trained pharmacists at a cost of £19.99. This change was introduced by the government as part of its strategy to achieve a 15% reduction in teenage pregnancy by 2004.

**Objectives:** To assess the early effects of this change on the number of emergency contraception requests made to our A&E department, especially amongst younger women.

**Method:** Data concerning two groups of patients who attended our A&E department requesting emergency contraception were compared retrospectively: Group A consisted of all attending between 1.1.00 and 30.4.00. Group B consisted of all attending between 1.1.01 and 30.4.01 (immediately after the change in legislation).

**Results:** A total of 132 patients attended for emergency contraception during the eight months studied. 61% of requests were made outside normal pharmacy opening hours. Overall there was no significant difference between the number of attendees in each group, however there was a significant rise in attendees aged nineteen and under; from 25 in Group A to 35 in Group B ( $p=0.01$ ).

**Conclusions:** There has been no significant decrease in requests for emergency contraception at our A&E department since the legislation of pharmacist-delivered levonorgestrel. Requests from teenagers, who are the government's target group, have increased significantly despite the initiative. This suggests that, so far, it has not been successful in improving the accessibility of emergency contraception and that A&E departments will continue to encounter demand for this service, particularly in view of the relatively high proportion of out-of-hours requests.

### VIOLENT INCIDENT REPORTING IN ACCIDENT AND EMERGENCY DEPARTMENTS

S. Bell, N. Nayeem, W. Smallman. *46B Handforth Road, London SW9 0LP.*  
**Objectives:** 1 To improve the accuracy of reporting of violent incidents. 2 To accurately determine the incidence of violence. 3 To accurately determine the demographics of violence.

**Method:** Prospective 7-week study involving a re-design of the nursing handover forms to include the facility for just the basic facts any violent incident to be reported. Retrospective follow-up of all incidents. Comparison with Trust statistics.

**Setting:** The Adult A+E department of University Hospital Lewisham (UHL).

**Subjects:** All staff, patients and visitors to UHL A+E department.

**Results:** This study demonstrated the annual incidence of violence in the adult A+E department was 775 (13 per 1000 attendances), compared to 59 from Trust statistics. 43% of incidents occurred in "minors", 32% occurred in "majors", and 40% occurred in the triage area, waiting room and reception area. 64% of offenders were older than 35 years, and 78% were male. 82% of offenders were patients, 16% relatives and 2% visitors. 96% of all incidents included verbal aggression, 31% the threat of physical violence, 16% actual physical violence, 13% damage to property, 4% sexual harassment, and 6% the use of a weapon. Contributory factors were waiting time 48%, drugs and alcohol 45%, treatment problems 30%, mental illness 20%, violent arrival 13%, and racial abuse 9%. 62% of incidents involved hospital security, and 36% involved the police.

**Conclusions:** 1. Reporting of violent behaviour by documenting the minimum data required on nursing handover forms is a better way of accurately reporting violence in the A+E department. 2. This study shows the levels of violence to be far higher than previously recorded by Trust methods. 3. The demographics suggest that men >35yrs waiting a long time after midnight are most likely to cause violence.

### INTRODUCTION OF A RADIOLAN LINKED INTRANET SITE FOR AN EMERGENCY DEPARTMENT HAND-HOLD: COMPUTER SYSTEM PROBLEMS AND SOLUTIONS

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**Introduction:** As part of our ongoing Information Technology (IT) and clinical governance strategy one area of concern raised was access to hospital guidelines. The existing Emergency Department (ED) handbook is updated every 6 months but it is not logistically possible to update it more frequently.

**IT solution:** A hand-held PC system was envisaged as one solution to this problem, linked by a wireless radio Local Area Network (LAN) to the hospital intranet. This is easier to install than a hard-wired LAN in areas such as ICU and theatres but there were concerns regarding Electromagnetic Interference (EMI) in such high dependancy areas so it was decided to trial the system firstly in the ED. An active system of instant reporting for EMI was set up.

**RoamAbout RadioLAN:** RoamAbout is a wireless LAN system which emits radio frequency electromagnetic radiation. Initially, concerns were of safety (EMI with other sensitive hospital monitoring equipment) and health (radio frequency radiation waves). The system operates within current guidelines found in radio frequency safety standards and recommendations. The power output of the system is reported to be approximately 1/20th that of the typical mobile phone (0.5W/sq. m). The Medical Devices Agency has concluded radiolans to be free from risks of EMI and state that their use not need to be restricted in any way.

**Hand-held PCs:** We use Compaq iPaqs with 64mB RAM. Access to the intranet is possible with the insertion of a radiocard into the card slot of the hand-held PC and with an 11megabit/sec download time, access is almost instantaneous. Linked to the intranet in this way doctors can access information continuously as they move around the department. Additional benefits include access to the internet, laboratory results, formularies such as the eBNF, on-line textbooks, e-mail, phonebook and department rotas. New guidelines can be e-mailed to users and once opened an audit trail is created confirming that information has at least been received.

**Evaluation:** The next stage of evaluation of the system is to assess its use by the junior doctors in the department and determine usefulness, reliability of access and any problems associated with the current format.

### IS A CAREER IN A&E MEDICINE ASSOCIATED WITH STIGMA?

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**Objective:** Many Accident and Emergency (A&E) staff report anecdotally that fellow hospital staff have a low opinion of A&E medicine. No research into this attitude has been published. The aim of this study is to determine whether there is stigma attached to A&E medicine and practitioners.

**Method:** A postal questionnaire of all medical staff at a district general hospital, to evaluate the presence or absence of eight perceptions associated with stigma. Each of these perceptions were formulated into a question, the responses then recorded on a five point Likert scale.

**Results:** The response rate was 49.5%, with the response rate decreasing with decreasing grade. Of the stigmatising themes tested in this study, six of the eight were demonstrated to be associated with negative attitudes, with the remaining two themes positive attitudes towards A&E medicine were suggested. The responses were similar irrespective of grade and speciality (where given by respondents), with a trend to more equivocal responses amongst more senior grades. Responses that were ambivalent or not completed varied between 25% and 48% in the returned questionnaires. Those who had more contact with A&E departments were more likely to give responses consistent with the presence of stigmatizing attitudes.

**Conclusions:** This paper demonstrates that stigmatising opinions towards A&E medicine exist and that these negative opinions may be widely, and consistently, held by hospital staff.

## DOES THE ACCIDENT FLYING SQUAD SAVE LIVES?

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**Objectives:** 1) To determine whether use of the pre-hospital accident Flying Squad (FS) at Lincoln County Hospital improves mortality in trauma.

2) To document the actual interventions of the Flying Squad in order to assess its true role

**Methods:** Retrospective analysis of hospital trauma data to compare the mortality of patients attended by the Flying Squad with those attended by paramedics/technicians. Study period 1/7/00 - 30/6/01. Includes all patients entered on TARN database. Logistic regression was used to control for differences in predicted survival (based on ISS and RTS) between FS and non-FS patients from same period.

**Results:** (Preliminary; analysis in progress) 90 calls for FS, 52 for trauma, 81 patients attended. 56 male, 24 female ( $p=0.003$ ), 1 unrecorded. Mean age 27yrs. Mean time away 31 minutes. 60 on TARN database. No significant difference in mortality for FS compared to non-FS. Average probability of survival of FS patients 92% compared to 97% for non-FS. 2 potentially life-saving interventions by FS. Reassurance, analgesia and IV access most common interventions.

**Conclusions:** FS mostly used for non-specialist skills in trauma. FS patients are usually not severely injured and have a high probability of survival based on ISS and RTS. Use of the accident Flying Squad in Lincolnshire does not improve mortality and is a costly resource in terms of personnel and funds.

## PRE-HOSPITAL RAPID SEQUENCE INTUBATION: IS THERE A ROLE IN SCOTLAND?

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Early definitive airway care is the corner stone of management in both trauma and critically ill medical patients. There remains a group of patients with airway compromise who cannot be intubated without anesthetic drugs. These patients represent a logistical problem both pre-hospital and in the Accident and Emergency department. There is little published data regarding the numbers and characteristics of this important patient group.

**Method:** Information was derived from a prospective observational study database. Data relating to a two year period for a single department were analysed. Patients requiring a rapid sequence intubation for airway compromise on arrival in Accident and Emergency were identified. Records were then cross-referenced with pre-hospital data and hospital notes.

**Results:** Of the 94 patients intubated over the study period. 48 required a rapid sequence intubation for airway compromise. This took place a median 19 minutes from arrival in A&E. 31 patients had suffered trauma, 17 patients had medical problems resulting in airway compromise. In the majority of cases airway compromise existed at the pre-hospital locus. The median time from call to arrival in A&E was 51 minutes with median journey time of 21 minutes representing a median distance of 10 miles from the receiving hospital.

**Discussion:** The Scottish Trauma Audit Group intubation database demonstrates that of the 1455 intubations carried out in a two year period 440 were rapid sequence intubations for airway compromise. Identification of the population of patients requiring this level of care is essential for planning and resource allocation when considering modernization and centralization of healthcare provision. Diverse solutions exist ranging from hospital 'flying squads' to helicopter based emergency medical teams. Addressing this problem both locally and nationally could lead to significant improvements in the care of the critically ill.

**Acknowledgements:** Thanks to Diana Beard and the STAG central office.

## INTUBATIONS IN TRAUMA PATIENTS IN UK EMERGENCY DEPARTMENTS

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**Introduction:** Airway management remains the first priority in the resuscitation of the seriously injured patient. The aim was to estimate the frequency with which trauma patients are intubated in the emergency departments in the UK using currently available data from the Trauma Audit & Research Network (TARN).

**Method:** This study was restricted to the data submitted by hospitals to the TARN network for all trauma admissions from 1989—December 2000. Data collected included: number of trauma patients submitted to database, number of patients intubated pre-hospital/in A&E, average annual attendances. A sub-group analysis was performed using ten years (1990-1999) worth of the data from eight core hospitals.

**Results:** Data was analysed from 124,805 cases using the database from 1989 to December 2000. The number of patients intubated and ventilated in the emergency department was 8749 cases (7% of all trauma patients). In the sub-group analysis of eight hospitals we found a total of 16,931 cases submitted. Of these cases 1497 (8.8%) had been intubated in the emergency department. The average number of new A&E attenders at these eight hospitals was 67,755. We estimated the average number of major trauma cases presenting to a UK hospital emergency department seeing 68,000 new patients a year. This gave an overall estimated incidence of 316 trauma cases of which approximately 8.8% would be intubated in the emergency department. This represents approximately 28 emergency trauma intubations per year in an emergency department seeing 68,000 patients per annum.

**Discussion:** This study attempts to estimate the number of trauma intubations in the UK. The data collected suggests that approximately 7-9% of trauma patients will require intubation in the emergency department. The majority of these patients require RSI (rapid sequence intubation). By these calculations an average emergency department of 68,000 attendances per annum would expect to be performing approximately 28 emergent RSIs in trauma patients per year. This equates to approximately 2 trauma RSIs per month. Whether this is sufficiently frequent to maintain skills remains open to debate.

## LARYNGOSCOPIC VIEW OBTAINED DURING RAPID SEQUENCE INTUBATION (RSI) IN THE EMERGENCY DEPARTMENT

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**Objective:** To document the views obtained at laryngoscopy during RSI in the emergency department by anaesthetists and emergency physicians, taking into account the medical seniority of the intubator.

**Methods:** Data were collected prospectively on every intubation attempt in seven urban Scottish emergency departments for two calendar years commencing 11 January 1999. Data included patient's age, sex, indication for intubation, grade and speciality of intubator, laryngoscopic grade (Cormack-Lehane), number of intubation attempts and complications. Analysis was performed using SPSS™ v9.0.

**Results:** 1663 patients were entered into the study and 733 patients were classified as having a RSI. Grade of intubation was documented in 91% (669/733). 68.2% of the intubations were classified as Cormack-Lehane grade I, 23.3% grade II, 6.1% grade III and 2.4% grade IV. Anaesthetists had a significantly higher percentage of "good views" (defined as grade I & II) than emergency physicians (see table).

	EM PHYS	ANAEAS	Total
Good view	316 (89%)	296 (94.3%)	612 (91.5%) (P=0.002)
Poor view	39 (11%)	18 (5.7%)	57 (8.5%)
Total	355 (100%)	314 (100%)	669 (100%)

Consultants, specialist registrars, senior house officers and staff grade doctors obtained similar percentages of "good views" on laryngoscopy (92%) but experienced senior house officers (SHO III) only obtained good views in 88% of cases.

**Conclusions:** Anaesthetists obtain better laryngoscopic views than emergency physicians during RSI. The chance of obtaining a good view does not appear to be related to operator grade in either

specialty. It may be related to anaesthetists having increased relevant training as well as familiarity and confidence with the Cormack-Lehane grading system, although other factors may be involved.

## Group AM: Acute medicine

### POINT OF CARE TESTING IN SUSPECTED PARACETAMOL OR SALICYLATE OVERDOSE

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Point of care (PoC) testing can save time and effort by allowing diagnosis to be made without waiting for laboratory results. In accident and emergency medicine, poisoning is common and 50 per cent of all self-poisoning involves paracetamol. Early treatment has been proven to be effective in preventing hepatotoxicity after paracetamol overdose and this efficacy declines with time from ingestion. However, delays in processing of blood samples in the laboratory can lead to delays in treatment.

This study has demonstrated that considerable time can be saved by the use of an immediate immunoassay test for paracetamol and salicylate. We also evaluated the sensitivity and specificity of the PoC test.

**Methods:** Subjects: Adult and paediatric patients presenting to A&E departments with suspected or confirmed paracetamol or salicylate overdose within 12 hours of ingestion. The attending doctor completed a timesheet detailing the times of ingestion, presentation, venesection and blood test result times along with the outcome of both tests. Serial dilution studies were carried out to assess the sensitivity, with samples from patients taking other medications being used for specificity studies.

**Results:** Patients presented on average 100 minutes after ingestion. 27/49 (55%) of patients tested negative for both paracetamol and salicylate and could therefore be discharged on the basis of this result. An average time saving of 108.5 (SEM 8.8) minutes could be made on the average total time (445.5 minutes) spent by patients in the department ( $p < 0.01$ ). In laboratory studies, the PoC test showed 100% sensitivity at 2mg/L for paracetamol and 13mg/L for salicylate. Specificity tests showed no cross reactivity with a number of common drugs.

**Conclusion:** The use of a qualitative PoC blood test in suspected paracetamol or salicylate overdose can reduce time to the initiation of treatment or the length of stay of patients in the A&E department.

### PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA: IS ADENOSINE A SAFE DRUG IN THE ASTHMATIC PATIENT?

S. F. O. Rourke, K. Parry, P. A. Evans. *Accident and Emergency Medicine, Leicester Royal Infirmary.*

**Introduction:** Adenosine is the first line antiarrhythmic drug for patients with supraventricular tachycardia. It has been shown to cause bronchospasm when given by inhalation<sup>1</sup> and case reports<sup>2-4</sup> highlight a possible risk to asthmatic patients when given intravenously. In the United Kingdom asthma is considered to be a contra-indication to its use<sup>5</sup>. A study was undertaken to assess the risk of bronchospasm in asthmatic patients treated with adenosine for supraventricular tachycardia. The need for DC cardioversion in this group of patients was compared with those asthmatics in whom adenosine was withheld.

**Method:** A five year retrospective study was undertaken of all asthmatic patients over 16 years of age with supraventricular tachycardia who presented to the Accident and Emergency department of the Leicester Royal Infirmary. Patients were treated according to the protocol of the Advanced Life Support group but there were no specific guidelines on the use of adenosine in asthmatic patients. An exacerbation of asthma was defined as an increase in respiratory rate, increased wheeze on auscultation and the need for nebulised bronchodilators after adenosine administration.

**Results:** 39 episodes of PSVT in 33 asthmatic patients were identified in the study period. Case notes were incomplete in 2 patients, 3 converted to sinus rhythm without treatment and 6 others responded to vagal manoeuvres. Of the remaining 28 episodes 17 were treated with adenosine, all of whom responded. One patient (6%) developed increased wheeze requiring treatment with nebulised salbutamol.

This patient was admitted for a period of observation and had an uncomplicated hospital course. 10 patients had adenosine withheld. 9 were treated with verapamil of whom 8 responded. The patient who did not respond was given adenosine without complication. One patient in whom verapamil was contra-indicated (hypotension) required DC cardioversion. There was no significant difference in the need for cardioversion between the two groups ( $p > 0.05$ ).

**Conclusion:** Adenosine is a safe drug in asthmatic patients. Withholding the drug in hypotensive patients may increase the need for DC cardioversion.

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### A QUALITATIVE STUDY OF DECISION MAKING BY PATIENTS WHO SUFFERED ACUTE MYOCARDIAL INFARCTION

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**Objectives:** To explore the process of decision making by patients with acute myocardial infarction when considering the need to seek urgent medical care and to identify the main factors that appear to influence the timing of this decision.

**Design:** Qualitative analysis of one to one semi structured interviews with patients admitted with a confirmed diagnosis of acute myocardial infarction.

**Setting:** The Coronary Care Unit in one general hospital in the UK. Participants - 9 patients admitted with a confirmed diagnosis of acute myocardial infarction within the previous 36 hours.

**The main outcome measures:** The factors influencing the decision to call for medical help, perception of heart attacks and awareness of the existence of thrombolysis before suffering a heart attack.

**Results:** Patients with classically severe symptoms of an acute myocardial infarction, had a short delay from their symptom onset to calling for medical help and suspected that they were having a heart attack. Symptom severity and persistence of symptoms were major factors in influencing how quickly patients called for medical help. All patients interviewed believed that heart attacks are a sudden and dramatic event, often associated with collapse and death. For the majority whose experience differed from their concept of a heart attack, there was delay in calling for help. There was a lack of awareness as to the existence of thrombolysis and the importance of reaching hospital quickly.

**Conclusions:** The major factor in influencing a patient's decision to call for medical help was the severity and/or persistence of their symptoms. Patients who did not have classically severe symptoms had a longer delay in calling for medical help. From the patients interviewed in this study, it was apparent that their knowledge of thrombolysis was non-existent. The implication of these findings are that future campaigns, which are aimed at reducing patient delay, could focus on the fact that: 1) Symptoms do not need to be severe in order to suffer a myocardial infarction. 2) The treatment of heart attacks is time dependent and patients are unaware of this fact. Greater awareness of thrombolysis may provide a powerful incentive for patients to seek earlier treatment.

### IMPROVING THE INVESTIGATION OF PULMONARY EMBOLISM IN THE EMERGENCY DEPARTMENT. DOES A CDU HELP?

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**Problem:** Previous studies have shown that patients presenting to an Emergency department for the investigation of pulmonary embolism are inconsistently managed.

**Design:** A structured retrospective case note review, before and after the CDU opened, evaluated the consistency of investigations and management for pulmonary embolism.

**Background and setting:** The new CDU in an Emergency Department of a university teaching hospital. The CDU is a 12 bedded area for patients awaiting investigations that will lead to early treatment/discharge decisions.

**Key measures for improvement:** Improving the standard and consistency of assessment and management of patients for exclusion of pulmonary embolism.

**Effects of change:** Percentage of patients having risk factors for pulmonary embolism assessed increased from 12% to 100%. Similarly the assessment of non-invasive observations/tests, such as temperature measurement, respiratory rate, ECG and oxygen saturations improved from 60% of patients to 98%. The number of patients requiring hospital admission (not to the CDU) for further investigation/treatment fell from 24% to 6%.

The mean length of stay on the CDU was less than 24 hours, as compared to > 2 days if admitted to hospital prior to the introduction of the CDU.

**Conclusion:** The introduction of a CDU has allowed a potentially life threatening condition to be investigated in a consistent evidence based manner. This has an implication both for risk management and utilization of resources.

## CLINICAL DECISION UNITS IN EMERGENCY MEDICINE. HOW TO MAKE THEM WORK?

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**Background:** A Clinical Decision Unit (CDU) has the potential to provide an efficient and effective approach to the management of patients with emergent conditions. Patients must have specific pathologies to be identified or excluded and have an early likelihood of discharge. A CDU allows patients to be assessed using evidence based strategies with optimal resource utilisation. The Department of Health has identified this approach as being a key component in the Emergency Care strategy for the UK. There are no studies thus far to evaluate the role of a CDU within an Emergency department setting in the UK.

**Objective:** To describe the development, throughput and evaluation strategy of two 12 bedded CDUs within a large teaching hospital Trust.

**Methods:** A cross city group of consultants in Emergency Medicine, senior nursing staff and managers devised a strategy for evaluation of the CDUs in the city. A quality assurance programme identified and attempted to solve the potential risks during the implementation and following the opening of the CDUs. A dedicated database aided this process.

**Results:** A total of 1,022 patients have been evaluated in the 2 CDUs (from February to the end of May 2001). Of these, 166 patients (16%) subsequently required admission to an in-hospital bed for further treatment. 856 patients were discharged home from the CDUs and there were 285 planned re-attendances. The three commonest groups of patients evaluated were assessment to exclude deep venous thrombosis (316 patients), chest pain to exclude an acute coronary syndrome (295 patients), and assessment to exclude pulmonary embolism (140 patients). The mean length of stay for these groups was 3 hours, 19 hours and 24 hours respectively.

**Conclusions:** The CDUs within the Departments of Emergency Medicine continue to develop as an integral component of the emergency care process for patients with certain low to moderate risk symptom complexes. At this stage of the evaluation process evidence suggests that patient processing and resource utilisation have improved.

## GHB CAUSING GBH IN RESUS

A. Walker, P. Gilligan. *Accident and Emergency Department, Jubilee Wing, The General Infirmary at Leeds, Great George Street, Leeds LS1 3EX.*

**Introduction:** Gamma-hydroxybutyric acid has been a drug of abuse since the early 1990s. Patients who overdose have symptoms of drowsiness and euphoria, and may rapidly become unconscious. They often present to emergency departments in coma (often of short duration, 1-5 hours) and demand a high level of nursing and medical care.

**Objective:** To examine the management and outcome of GHB overdose cases presenting to the resuscitation room of a regional emergency department.

**Setting and subjects:** The emergency department resuscitation room of a large teaching hospital (105,000 new patients per year) over a 13 month period. Patients with a history of GHB ingestion from friends or the patient (upon recovery) were included.

**Methods:** Case series.

**Main outcome measures:** The GCS on arrival, frequency of intubation, and destination on discharge from the resuscitation room.

**Results:** Twenty-nine patients had a history of GHB overdose, twenty-six notes were available for review (90%). 92% (24/26) were GCS 8 or less on arrival, 8% (2/24) of this group were intubated, 69% (18/26) had arterial blood gases taken 78% (14/18) were acidotic. 12% (3/26) were admitted to ITU (one with a co-incident head injury), 12% (3/26) to the emergency department observation ward, 38% (10/26) to a medical ward and 38% (10/26) took their own discharge from the emergency department. 73% had taken GHB in combination with other recreational drugs, 62% in combination with ecstasy. On the 18 dates of GHB admissions, there were 5 dates with more than one admission on the same day. As GHB is not formally included in a routine drug screen, these cases probably represent significant underreporting of the problem.

**Conclusions:** GHB overdose presents a significant demand on emergency department resources. Co-ingestion of other drugs is common. There is a need for guidelines for GHB overdose management.

## MALARIA IN THE MEDWAY TOWNS- IS THERE A RISK?

R. Ritchie, E. McGuire. *Clinical Audit Department, Postgraduate Building, Medway Maritime Hospital, Windmill Road, Gillingham, Kent, ME 7 5 NY.*

**Objectives:** To determine the geographic distribution of imported malarial cases within the Medway Towns relative to the mosquito population of the North Kent marshlands in the United Kingdom.

**Sample, Methods, and Results:** All 155 imported cases of malaria identified by the local hospital since 1984 were plotted on a map of the Medway Towns relative to the region's major mosquito habitat. Majority of the infection were in men from South-East Asia and Sub-Saharan Africa, with the onset and diagnosis of malaria being within one month. A high level of prophylaxis failure was identified, with majority of the cases living within a ten-mile perimeter of the region's main marshland area or in close proximity to local woodlands and other open sites. *P. vivax* and *P. falciparum* were identified from the South-East Asian and the Sub-Saharan African groups respectively.

**Conclusions:** This study suggests that if the environmental conditions are right, it is possible in the future for some of our cases of malaria to originate from endogenous spread. We propose the need for continuing vector and habitat surveillance and control, and enhanced public health education amongst targeted groups. There is also the need for increased international contact and co-operation between our European neighbours, and for additional studies to determine UK mosquito transmissibility of imported malaria.

## OUTPATIENT MANAGEMENT OF SPONTANEOUS PNEUMOTHORAX USING THE PLEURAL CATHETER AND FLUTTER VALVE: A RETROSPECTIVE REVIEW

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**Background:** The "gold standard" for treatment of spontaneous pneumothorax needing tube drainage has been thoracostomy tube (Portex F 24-32). Attendant with its use however is the discomfort and anxiety caused to the patient, and the compulsory use of hospital bed and resources. Since 1970, the use of small calibre chest tubes (No 9 French), fitted to a valvular device in the treatment of spontaneous pneumothorax has been reported, with safety and success rates comparable to that of the conventional chest tube and underwater seal device. Added benefits are patient comfort and safe outpatient management, making it both clinical and cost effective. Many doctors in the U.K remain either sceptical or uninformed about the use of small calibre chest tubes in this manner.

**Objective:** To compare the effectiveness of these forms of treatment of spontaneous pneumothorax, requiring a tube thoracostomy, at a District General Hospital's Emergency Department: I) Outpatient management using a small calibre pleural catheter and Heimlich valve, and II) As inpatients using a conventional thoracostomy tube (Portex), with underwater seal.

**Methods:** Patients requiring treatment for a spontaneous pneumothorax between July 1995 and July 2000 were identified by a computerised database query. Seven cases were excluded from the study, of which

six had a pneumothorax that was secondary to an underlying condition where the patients required hospital admission irrespective of the treatment modality employed. One patient's case notes were not retrievable.

**Results:** 45 patients (35 male, 10 female) with spontaneous pneumothorax and 15 episodes of recurrence (total 60) were reviewed. An 8.3 F pigtail catheter attached to a Heimlich flutter valve was used to treat 20 cases (33.3%) whereas a chest tube (Portex F 24—32) was used in 8 patients (13.3%). The remaining patients were treated with either needle aspiration (13.3%) or expectantly (40%). One patient treated with the pigtail catheter required hospitalisation because the pneumothorax failed to resolve (persistent air-leak). All the patients treated with Portex chest tubes were admitted to hospital, average bed days of 4.63 (range 2—7).

**Conclusion:** The small-bore pigtail catheter appears to be as effective as the conventional chest tube with underwater seal, in the treatment of spontaneous pneumothorax in this retrospective study. The chief benefit appears to be safe outpatient management of these patients that makes it both clinically and cost effective. A multi-centre and prospective randomised study is required to firmly establish the benefits of this form of treatment.

## Group MT: Major trauma

### CHARACTERISTICS OF PATIENTS DYING $\geq 30$ VS $\leq 30$ DAYS AFTER INJURY

T. Leckie, F. Lecky. *Trauma Audit & Research Network (TARN)*.

**Objective:** To determine whether the current (TARN) definition of a trauma death is appropriate by comparing in hospital trauma deaths both before (early) and after (late) 30 days following injury.

**Design:** Analysis of patient information held on the TARN database.

**Setting:** Hospitals participating in TARN.

**Subjects:** 4,482 patients who died in hospital following trauma in the five year period between 1995 and 1999.

**Methods:** Injury Severity Score (ISS), Revised Trauma Score (RTS) and demographic characteristics of early and late deaths were compared and multiple logistic regression used to determine which factors predict late death.

**Results:** 6.7% of deaths occurred more than 30 days following trauma. Older patients who were less injured and more stable on initial admission are significantly more likely to die late. (Odds ratios Age 1.015 ( $p = 0.0109$ ), ISS 0.959 ( $p < 0.0001$ ), and RTS 1.604 ( $p < 0.0001$ ). Female gender and comorbidity are associated with late death group but did not independently predict this outcome.

**Conclusions:** Deaths beyond 30 days after injury make up a small proportion of all trauma deaths. Later deaths have different injury and demographic characteristics from early deaths. Further analyses of trauma mortality should recognise these differences when choosing how to define a trauma death.

### FACTORS PREDICTING MISSED INJURY FOLLOWING MAJOR TRAUMA

A. Webster, P. Baines, S. Mason, S. Cross. *9 Bryn Terrace, Mumbles, Swansea SA3 4HD*.

**Introduction:** Missed injuries in trauma patients range from 5% to 28%. Numerous studies have suggested how these proportions could be reduced in the Emergency Department (ED), ranging from

- Using tertiary survey following the secondary survey
- Being methodical in completing thorough history, examination and investigation
- Ensuring that all doctors managing these patients have Advanced Trauma Life Support training.

**Aims:** To identify factors which predict the likelihood of having a missed injury following major trauma.

**Methods:** A retrospective analysis of the North Trent NTARN database (1994-2000) to identify missed injuries. The predictive factors used were demographic information, premorbid condition, injury type and severity, baseline physiological measures, time spent in the ED, and grade of doctor managing the patient. All factors were analysed individually against the outcome measure of missed injury

using a combination of t-tests or One-Way Analysis Of Variance. Only those variables which were significantly associated were included in multivariate analysis. Regression techniques identified factors which were significantly associated with missed injury at the  $p=0.05$  level.

**Results:** The database consists of 5,181 patients. Of these, 248 (4.9%) had missed injuries. The complication rate was significantly higher amongst those patients with missed injury (80.6% vs. 35.3%,  $p < 0.001$ ). Mortality was significantly higher among the missed injury group (31.4% vs. 7.1%,  $p < 0.001$ ). Predictive factors identified were age, anticoagulant therapy, mechanism of injury, bypassing the ED on admission, Revised Trauma Score and Injury Severity Score. These account for 7.0% of the variance in missed injury ( $p < 0.01$ ).

**Discussion:** Missing injuries is fortunately rare in modern trauma care. This data has shown that significantly more patients who have missed injuries succumb to complication or death. Further analysis has highlighted age, co-morbidity and injury severity as important predictive factors. This information should be acknowledged during trauma training if we are to reduce the risk to trauma patients.

### TAKING SCIENCE TO THE ROADSIDE: VEHICLE DEFORMITY INDEX AS A PREDICTOR OF INJURY SEVERITY

S. Hepburn, D. Pedley, J. Ferguson, J. Grieve, Hutchinson. *Accident & Emergency Department, Aberdeen Royal Infirmary, Aberdeen AB25 2ZN*.

Road Traffic Accidents (RTA) account for some of the most severely injured patients presenting to Accident and Emergency departments in the UK. Greater knowledge of accident scene characteristics has been shown to be useful in the initial management and triage of injured patients. The quality and communication of this information remains poor, to the frustration of both pre-hospital personnel and medical staff. A retrospective analysis of serious and fatally injured RTA victims demonstrated a close correlation between a collision assessment system, routinely used in police investigation, and severity of injury. This study concerns the prospective use of this system at the roadside exploring its ability to predict injury severity, and its potential as a pre-hospital triage tool.

**Method:** A collision assessment system based on the direction and distribution of impact as well as the vehicle deformity, gives rise to the 'vehicle deformity index' (VDI). This index was adapted for immediate use at the roadside and applied to all RTAs attended by Grampian Police Force over the six month study period. Information relating to the injured was drawn from hospital case notes, post mortem reports and the STAG database. The injury severity score (ISS), pattern and distribution of injuries was recorded for each vehicle occupant.

**Results:** 153 casualties from 138 RTAs were recorded over the study period. Complete records were available for 78 patients. Of these there were 10 were un-injured, 62 required hospital treatment and 6 vehicle occupant died as a result of their injuries. VDI predicted injury severity grouping in 85% of cases. VDI greater than 4 correlated with serious injury ( $p < 0.005$ ). Collision assessment correctly predicted injury to specific body region in between 67% (chest injury) and 96% (head injury) of cases.

**Discussion:** This study demonstrates that a simple crash scene assessment tool may be successfully applied at the roadside. Uniquely, data routinely collected by Police in attendance is utilized leaving Paramedics free for clinical duties. This tool may be useful in pre-hospital triage in establishing criteria for mobilizing both hospital based and pre-hospital trauma teams.

### DIFFERING INJURY PATTERNS BETWEEN DRIVERS AND FRONT SEAT PASSENGERS FOLLOWING ROAD TRAFFIC ACCIDENTS

S. Thakore, D. Pedley, M. Johnston. *Accident & Emergency Department, Nineveills Hospital and Medical School, Dundee, DD1 9SY*.

This was a descriptive study searching for differences in the pattern of injury between drivers and front seat passengers (FSPs) following road traffic accidents in Scotland.

**Method:** Cases were compiled from the Scottish Trauma Audit Group database. A search was performed for all drivers and FSPs. A comparison as then made of a number of different types of injury for eight body regions. A  $p < 0.05$  was assumed to correlate with a significant difference in rates of injury.

**Results:** 4189 drivers and 954 FSPs were included in the study. Mortality rates were 5.3% and 6.6% respectively for drivers and FSPs. Overall, there were significantly more injuries to the cervical spine (7.2% vs 4.4%), lumbar spine (7.4% vs 5.2%) and chest (41.4 vs 29%) in FSPs. When considering particular types of injury, there were

significantly more rib fractures (12.8% vs 9.4%), sternal fractures (18.1% vs 7.8%), mesenteric lacerations (2.1% vs 1.1%), cervical spine fractures (6% vs 3.3%) and lumbar spine fractures (7.3% vs 5%) in FSPs than drivers.

**Discussion:** This study presents useful descriptive data on the differing patterns of injury suffered by drivers and FSPs in the UK. The large numbers within the study lend weight to the results obtained. FSPs appear to be at increased risk of injury when compared to drivers. This especially so with injuries to the thoracic cage. This may be because the seatbelt exerts a more discrete force upon the chest than the steering wheel. It may also reflect a higher prevalence of drivers-side airbags than FSP air-bags. The higher rate of certain abdominal injuries may reflect a greater degree of force exerted by a lap belt in a FSP as they are thrown further forward during a collision than a driver who is restricted by the steering wheel. Drivers may use the steering wheel to brace themselves prior to impact hence reducing the direct force upon their chest and the amount of flexion produced in their lumbar and cervical spine. This information would suggest that better protection for FSPs should be considered in car design.

### A REGIONAL STUDY OF ADULT CRITICAL CARE TRANSFERS FROM A&E

A. Gray, S. Gill, P. Hirschowitz, M. Airey, R. Williams on behalf of the Yorkshire Critical Care Transport Project group. *Department of Emergency Medicine, St James's University Hospital, Beckett Street, Leeds, LS9 7TF*

**Aims:** To describe the nature, frequency and characteristics of adult critical care transfers originating from A&E

**Methods:** A one-year prospective regional descriptive study using multiple data sources of all critically ill adults transferred out of an A&E department and transferred into hospitals within the former Yorkshire Regional Health Authority area. Data was collected on: basic demographics; referring and receiving hospital, department and specialities; length of stay at both referring and receiving hospital, including HDU/ICU stay; mortality rate; reason and diagnosis on transfer; monitoring and critical incidents.

**Results:** 27 A&E departments transferred 346 (30% of all transfers) adults into the regional critical care facilities. The median number of transfers per department within the region was 19 (range 8 to 42). 15 were transferred from outwith the region. 254 patients (73%) were transferred for tertiary care and 77 (22%) for non-clinical reasons, 87% were admitted to ICU/HDU at receiving hospital and there was a 26% mortality rate. 166 patients (48%) had traumatic pathology of which 100 were principally transferred for management of a head injury. Other diagnoses on transfer were subarachnoid haemorrhage (42), primary intracranial haemorrhage (31) and overdose (29). Median time in A&E was 3 hours 5 minutes (range 11 minutes to 17 hours 47 minutes). In 161 (47%) patients the decision was primarily made by the A&E clinician. 72% were intubated during transfer. There was an 11% critical incident rate.

**Conclusion:** Trauma remains the commonest reason for transfer of the critically ill from A&E. However, a significant number of patients are transferred with a non-traumatic pathology and for non-clinical reasons. It is important that A&E clinicians have an understanding of recent changes in regional critical care organisation as a high proportion of all transfers originate in A&E.

### QUALITY OF CARE DURING THE TRANSFER OF THE CRITICALLY ILL AND INJURED ADULT

A. Gray, S. Gill, M. Airey, R. Williams on behalf of the Yorkshire Critical Care Transport Project group. *Department of Emergency Medicine, St James's University Hospital, Beckett Street, Leeds, LS9 7TF*

**Aims:** (i.) to evaluate the seniority and specialty of accompanying medical staff and the level and type of monitoring during the secondary transport of the critically and injured adult.

(ii.) to describe the level and type of critical incidents occurring during transport and to assess whether there was an association between critical incidents or mortality and other factors

**Methods:** A one-year prospective regional descriptive epidemiological study using multiple data sources. All critically ill adults transferred into, within or out of the former Yorkshire Regional Health Authority area between 15/11/99 and 14/11/00. Data was collected on the following parameters: patient status, seniority and specialty of accompanying staff, type of monitoring, number and types of critical incidents. Logistic regression analysis was carried out to assess

whether there was an association between intubation, seniority and specialty of medical staff, presence of medical staff, time of day of transfer, invasive monitoring and referring department and likelihood of critical incidents or in hospital death.

**Results:** 80% of patients had a medical escort (89% anaesthetics, 53% SHO). 790 (69%) people were ventilated of which 652 (82%) patients had invasive blood pressure and 214 (27%) had end tidal CO<sub>2</sub> monitoring. There were 171 critical incidents in 120 patients. The only factor significantly associated with level of critical incidents was the referring department. If the patient originated from a medical ward their odds of a critical incident were 3 (95% CI 1.5 to 6.2) times those of patients originating from ICU. Factors associated with death are described in the table:

Significant variable	Odds of death (95% CI)
Non-clinical transfer	1
Absence of critical care facilities	4.9 (1.6–15)
Absence of normal medical expertise	4.9 (1.2–19)
Specialist care	2.4 (1.7–3.6)
Critical Incident during transfer	1
No Critical Incident during transfer	0.4 (0.25–0.63)
Ventilation	1
Not ventilated	0.2 (0.1–0.38)

**Conclusion:** Critically ill patients are often transferred by junior members of medical and nursing staff with suboptimal levels of monitoring. Documented critical incident rates are high and are often related to poor preparation and organisation.

### THE INTERHOSPITAL TRANSFER OF THE CRITICALLY ILL AND INJURED ADULT IN YORKSHIRE

A. Gray, S. Gill, M. Airey, R. Williams on behalf of the Yorkshire Critical Care Transport Project group. *Department of Emergency Medicine, St James's University Hospital, Beckett Street, Leeds, LS9 7TF*

**Study aims:** To describe the nature, frequency, characteristics and short term outcome of interhospital transfer of the critical ill adult

**Methods:** A one-year prospective regional descriptive epidemiological study using multiple data sources of all critically ill and injured adults transferred into, within or out of the former Yorkshire Regional Health Authority (15/11/99 to 14/11/00). Data was collected on the following parameters: basic demographics; referring and receiving hospital; department and specialities; staff involved in decision making; length of stay at both referring and receiving hospital; including HDU or ICU stay, if applicable; mortality rate; reason for transfer and diagnosis on transfer and discharge.

**Results:** A total of 976 patients were transferred 1140 times (median age 57, range 16 to 91). 83 hospitals referred patients into a regional critical care facility (1 to 120 patients). Nineteen hospitals received patients within the region (1 to 450 patients). Most common referring departments were ICU (465 transfers) and A&E (346 transfers) and receiving departments were ICU (736 transfers) and A&E (133 transfers). Reasons for transfer included specialist facilities (579); no staffed ICU bed (320); repatriation (153) and investigational facilities (53). Monthly transfers varied between 75 and 132 per month (median 91) and daily variation 0 to 10 transfers (average 3, median 5). 39% of all transfers were within "normal" working hours. Mortality rate was 26%. The common diagnoses on transfer were respiratory failure (142), head injury (140), subarachnoid haemorrhage (95) and overdose (61).

**Conclusion:** A large number of patients are transferred for non-clinical reasons often at a time of day when resources are at their most stretched. Despite recent Department of Health attempts to organise transfers at a regional level the number of specialties and hospitals involved makes this extremely difficult.

### PLANNING FOR CHEMICAL INCIDENTS

I. W. F. Crawford, K. Mackway-Jones. *Emergency Medicine Research Group, Department of Emergency Medicine, Manchester Royal Infirmary, Oxford Road, Manchester M13 9WL*

**Aims:** To identify and improve areas of concern in all phases of chemical incident planning and response.

**Methods:** A three round Delphi study was conducted using a panel of 39 experts from specialties involved in the management of chemical incidents. Areas that did not reach consensus in the Delphi

study were presented as synopsis statements for discussion in four syndicate groups at a conference hosted by the DoH. All those originally approached to participate in the Delphi study were invited to attend, along with other stakeholders as identified by the DoH Emergency Planning Co-ordination Unit. A facilitator led each group discussion and the results were presented at a subsequent plenary session.

**Results:** A total of 177 out of 322 statements had reached consensus upon completion of the Delphi study. This represented 55% of the total number of statements. Of these, 137 reached consensus at >94% and 40 reached consensus at >89%.

Phase of chemical incident	Consensus	Non-consensus
Risk assessment & preparation	79	58
On-scene response	39	40
Hospital response	29	25
Specialist unit response	15	9
Post incident care & follow-up	15	13

The results of the process are presented as a series of synopsis consensus statements that cover all phases of chemical incident planning and response. For example 'consensus was reached that there should be an evidence-based, generic specification for PPE to be used by all NHS personnel, which should protect against skin & eye contact and inhalation and take into account usability'.

**Conclusions:** The use of a Delphi study and subsequent syndicate group discussions achieved consensus in aspects of all phases of chemical incident planning and response that can be translated into practical guidance for use at regional pre-hospital and hospital level. Additionally, areas of non-consensus have identified where further work is required.

## IDENTITY BADGE BASED ACTION CARDS: THEIR IMPACT ON DOCTORS' KNOWLEDGE OF A MAJOR INCIDENT PLAN

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**Objectives:** To investigate the effect of an identity badge based action card on the knowledge of a major incident procedure in doctors.

**Design:** 11 week, unmatched intervention trial.

**Subjects and Setting:** 94 doctors at a teaching hospital in Manchester, England.

**Intervention:** Summary cards produced for different roles as specified in MAJAX Plan. Stickers distributed to the relevant doctors, with instructions to attach the sticker to their identity badge.

**Main outcome measures:** Questionnaire variables included knowledge of the plan existing, previous exposure to plan, previous training, previous involvement in incidents, alert method, reporting instructions, role, direct involvement with casualties, mobile team member and feeling of confidence to fulfil relevant role. Supplementary questions addressed receipt of sticker, attachment of sticker, frequency of wearing ID badge.

**Results:** 69 subjects completed baseline questionnaire. 49 subjects completed questionnaire after the intervention (22 filled out both questionnaires). The mean baseline response was 5.9 correct answers out of 12. After the intervention this rose to 6.9 correct answers ( $P=0.052$ ). In the subset of doctors who actually had the sticker on their badges when sampled ( $n=13$ ), the average response rose to 8.1 correct answers ( $P=0.013$ ). Compared to the baseline group there was significant change in knowledge of the plan existing ( $P=0.022$ ) and in knowledge of where to report ( $P<0.001$ ). No significant differences in any of the other variables were observed. However the important variable of an increase in confidence to fulfil their relevant role approached significance ( $P=0.058$ ).

**Conclusion:** The distribution of summary card stickers for use on identity badges significantly enhances the knowledge of doctors about important aspects of the major incident procedure and may lead to an improved response for hospitals dealing with major incidents.

## Poster presentations

### RED TAPE AND NO RED DOTS

R. McLaughlin, A. Stewart. *Department of Accident and Emergency Medicine, Royal Victoria Hospital, Belfast.*

**Background:** The Ionising Radiation (Medical Exposure) Regulations 2000 (IRMER 2000) have been in effect in Northern Ireland for less than one year. These regulations allow practitioners (radiographers or radiologists) to challenge or veto radiography requests from referrers (medical or dental practitioners). The aim is to minimise unnecessary radiation exposure to patients and staff.

**Case:** A 20-year-old male presented the Emergency Department of the Royal Victoria Hospital, Belfast following an inversion injury to his right ankle. Requests for radiography of his right tibia and fibula and ankle were made. The radiographer felt that right tibia and fibula views were sufficient and ankle views were not performed. The doctor (a first term senior house officer) examined the radiographs and declared them as normal. She discussed the possibility of performing an ankle view with the radiographer and was told that this would constitute an unnecessary exposure and could be vetoed under IRMER 2000. The doctor accepted this and the patient was discharged. Two days later the patient returned complaining of ankle pain. The triage nurse sent him for an ankle radiograph which revealed an obvious bimalleolar fracture with talar shift. He was then admitted to fracture clinic for ankle reduction and immobilisation. A copy of the ankle view was then shown to the original doctor who immediately spotted the fracture without being given any history or clinical details. With hindsight the fracture is seen on the original film of tibia and fibula but it was missed by the doctor and the radiographer initially.

**Discussion:** We believe that if the doctor had been better informed regarding these regulations and insisted on the views requested this critical incident could have been avoided. Previous attempts at radiography reduction have been shown to miss serious pathology. We believe that this is the first reported critical incident directly attrib-

able to IRMER. Could this be the beginning of a tidal wave of missed diagnoses in Emergency Medicine?

### A CONSIDERATION OF EMERGENCY DEPARTMENT THORACOTOMY IN THE PATIENT SUSTAINING BLUNT TRAUMA

P. Doyle, B. Garrihy, D. Gorman, J. Kendall. *West Midlands Deanery of A&E Medicine, clo Selly Oak Hospital, University of Birmingham NHS Trust B29 6JD.*

**Introduction:** An Emergency Department Thoracotomy (EDT) is one procedure "in the ED as an integral part of resuscitating the patient in extremis." In the early 1970s a group of North American surgeons popularised open chest cardiac massage as a resuscitation procedure for patients who had sustained penetrating injury. The aim of the procedure was for the patient to be resuscitated sufficiently that he/she could be transported to the operating room. It was not long before it was used as a resuscitative aid irrespective of whether the patient had sustained penetrating or blunt trauma.

**Aims:** The study reviewed the available literature on EDT following blunt trauma and quantified the success rate.

**Methods:** Medline, Embase, The Cochrane Library, The Index Medicus and the articles' reference lists provided the 115 references used in this study.

**Results:** The search strategy produced 49 papers that included patients who had undergone EDT following blunt trauma. These papers were mainly retrospective case-series. A sum total of 2,064 patients underwent EDTs following blunt trauma and 54 (2.6%) of these patients survived. 14 of these survivors had neurological impairment and one was a late death resulting in a 1.9% functional survival rate. Only three of these survivors are known to have arrived in the ED without signs of life, (agonal respiration, pulseless electrical activity on the ECG, no swallowing or pupillary reflexes). A further eleven clearly had no recordable vital signs on arrival at hospital.

**Conclusion:** Patients who have sustained blunt trauma and undergo EDT have a 1.9% chance of functional survival. Patients arriving in the ED without signs of life have a remote chance of surviving an EDT following blunt trauma.

#### SHOULDER DISLOCATION: THE OXFORD CHAIR METHOD

K. D. Wright, P. J. Hornbrey. *Accident and Emergency Department, John Radcliffe Hospital, Headley Way, Headington, Oxford.*

**Introduction:** Dislocated shoulder is a common problem presenting to the emergency department. Standard reduction utilises sedation and analgesia in order to provide muscle relaxation. This can be time consuming and requires a period of post-procedural observation and discharge in the care of a responsible adult. In this poster we describe a method a reduction that uses a modified chair and requires no sedation. The results of two years of experience are described.

**Method:** Data was recorded over a two-year period for each shoulder dislocation that had 'the chair method' used. Patients are selected for the chair if they are able to comply with the seating position and are not requiring large doses of opiate for analgesia. Success or failure was documented along with complications. This data was analysed together with the patient's records. This data was studied retrospectively and patient's attendance cards were collated. Also noted from computer records were department demographics at the time such as workload and staffing.

**Results:** During the study period 35 reductions were attempted using the chair method. 29 of these were successful. Of the six failures 1 had fracture dislocation, 1 had recurrent dislocation and was on his 4<sup>th</sup> presentation. 4 of the successes were carried out in the same 30 minute period.

**Conclusion:** In selected cases the chair method provides an easy, sedation free shoulder reduction. Operator experience will determine the choice of reduction method. Traditional methods are still required if the chair method fails or the patient is not suitable.

#### AUDIT OF PRE-HOSPITAL RESPONSES BY AN EMERGENCY MEDICINE REGISTRAR

K. D. Wright, D. J. Potts. *Accident and Emergency Department, Wycombe General Hospital, Queen Alexandra Road, High Wycombe, Bucks HP11 2TT.*

**Aim:** To determine whether an immediate care doctor of specialist registrar grade based in an Accident and Emergency Department is a feasible working pattern.

**Method:** One year prospective study of all Immediate care responses of one doctor based in a busy district general hospital.

**Results:** The doctor was called to 38 incidents resulting in 34 mobilisations. The vast majority of incidents were entrapment road traffic accidents although some category 'A' calls were included when the doctor was considered the nearest responder. In each response the doctor was able to leave the department without compromising either the efficient running of the department or the patients within. In addition, patients who were unstable and requiring interventions such as chest decompression or rapid sequence induction/intubation arrived in the department resuscitated and stabilised haemodynamically so making their journey through the Emergency department smoother.

**Conclusions:** It is both feasible and desirable to have an immediate care doctor operating out of an Accident & Emergency Department. The role is beneficial for both patients and the department. The tasking of the doctor does not cause the resources of the department to be compromised and also provides a valuable input for specialist registrar training.

#### WHO WANTS A CAREER SHO POST IN A&E MEDICINE?

J. Ryan, F. Probst. *The Royal Sussex County Hospital, Eastern Road, Brighton BN2 5BE.*

**Aims:** To evaluate the Curricula Vitae of applicants for a one year SHO post comprising six months of A&E medicine and six months of orthopaedics in a District General Hospital.

**Methods:** We analysed the Curricula Vitae of all applicants answering an advertisement in the BMJ in June 2000. The advertisement stated that the post was suitable for doctors wishing to pursue a career in A&E Medicine and included a brief description of the department and staffing levels. Data were collected on applicants' age, years qualified, country of qualification, other qualifications, experience in A&E, audit, teaching, publications, prizes, ALS / ATLS and career intentions.

**Results:** There were 226 applications. 66% were male, 17% female and 17% not stated. The mean age was 29.2 years (median 28 years). Only 23% of the applicants graduated in the UK. 28.3% were

currently working in house jobs. 17% had a second undergraduate degree. 28% had passed a postgraduate examination. 37%, had published a paper in a medical journal. 36% had audit experience. 38% had received prizes. 35% described experience in teaching. 31% were certified in either (or both) ALS or ATLS. 26% had surgery as their career intention. 19% were clinical observers with no experience of working in the UK in the longterm.

**Conclusions:** The 1990s was a lean time for SHO recruitment, particularly for smaller A&E departments. There is now, apparently, a surplus of doctors available to fill SHO posts in A&E Medicine and Orthopaedics. Departments still experiencing difficulty in recruiting SHOs should question why this is. The calibre of doctors replying to this advertisement and their range of experience was extremely varied, some being over qualified for an SHO post and some being unsuitable for the post as advertised. The workload associated with short-listing might be reduced if medical staffing departments produced more specific advertisements. Furthermore, referees should offer appropriate guidance to doctors applying to posts for which they are clearly unsuited.

#### THE IMPACT OF AN OUT OF HOURS PRIMARY CARE CO-OPERATIVE ON AN ADJACENT ACCIDENT & EMERGENCY DEPARTMENT

J. Ryan, J. Petzold, I. Foster. *Accident & Emergency Department, Royal Sussex County Hospital, Eastern Rd, Brighton BN2 5BE.*

**Aims:** The aims of this study were to assess the impact of an out of hours primary care co-operative on an adjacent A&E Department.

**Methods:** A&E Records of patients who had been referred from the cooperative during one month were sought and examined. Records were examined for relevant information regarding a patient's triage category, diagnosis, treatment, discharge destination, and follow-up where any was arranged. A referral was regarded as appropriate if 1. hospital based diagnostic facilities were used 2. hospital facilities were needed for treatment, 3. a patient was referred on to a specialist team by an A&E doctor 4. a patient was admitted to hospital.

**Results:** During the study period 1966 patient consultations carried out by co-operative doctors. Seventy-six of these patients (3.9%) were subsequently referred to the A&E Department. 65% were referred following a doctor-patient telephone conversation. 24% had been visited by a doctor at their home. 62% patients were female. The age range was evenly distributed. 74% of referred patients actually attended the A&E department. 54% of patients were triage Category 4. Four patients did not wait to be seen by the doctor and left the department. 48% had a medical diagnosis and 27% were accidents. Half of all patients seen by the A&E doctors were subsequently referred to other specialities, mostly to the medical team. 56% had radiographs taken. A blood test was carried out on 48% of patients. An electrocardiogram was recorded in 36% of patients. 34% of patients had some treatment in the A&E department. 16% of triaged patients were sent home without follow-up after seeing the doctor in the A&E department. 27% of patients were discharged with some form of follow-up, most often to a GP. Other discharge destinations included the A&E review clinic, the fracture-clinic or another outpatient department. 29% of triaged patients were admitted to hospital mostly under the care of the on call medical team.

**Conclusions:** The out of hours primary care co-operative referred only 4 % of patient consultations to an adjacent A&E department, the majority of whom had low acuity problems. The vast majority of those patients who attended A&E were appropriately referred. We conclude that an out of hours co-operative which works adjacent to the A&E department does not appear to significantly increase the workload of an A&E department. The co-operative would appear to work very efficiently and refer appropriately. Indeed it may present an opportunity for shifting the workload of patients presenting with primary care problems in A&E departments to a more appropriate out-of-hours primary care service.

#### INFECTIONS IN INJECTING DRUG USERS PRESENTING TO AN ACCIDENT AND EMERGENCY DEPARTMENT

S. Curtis, J. Ryan. *Accident & Emergency Department, Royal Sussex County Hospital, Eastern Rd, Brighton BN2 5BE.*

**Aims:** To describe patterns of clinical presentation and microbiological findings for acutely ill injecting drug users (IDU) attending an accident and emergency department and to assess the appropriateness of routine diagnostic investigations and empiric treatment of such cases.

**Methods:** The study was conducted as a clinical audit of the microbiological investigation of IDU attending the Accident and Emergency department of a District General Hospital in southern England during a 6 month period.

**Results:** 51 cases (49 patients) were recorded. Two patients presented twice. After full evaluation, 10 cases were diagnosed as non-infected. The laboratory received microbiological specimens from 41 cases. The most frequent septic focus was injection site abscess (31/41, 75.6%). Abscesses occurred at the following sites: arm (36.1%); leg (25%); buttock (8.3%); hand (2.8%); multiple sites (2.8%). Other infections included cellulitis, 5/41 (12.2%), respiratory tract infection 3/41 (7.3%), endocarditis 2/41 (4.9%) and septic arthritis 3/41 (7.3%). Some patients had multiple septic foci. The most frequently isolated organisms were beta-haemolytic streptococci (14/41, 34.1%) and *Staphylococcus aureus* (11/41, 26.8%). Other isolates included anaerobes, alpha-haemolytic streptococci, (8/41, 19.5%) and *Candida tropicalis* (1/41, 2.8%). 14/41 (34.1%) were culture-negative. 7/41 (17.1%) cases yielded multiple isolates. All *S.aureus* isolates were resistant to penicillin but sensitive to flucloxacillin and one isolate was resistant to erythromycin. All group A streptococci were sensitive to penicillin and erythromycin. Abscess cultures yielded: beta-haemolytic streptococci, 9/31 (38.7%); *Staphylococcus aureus*, 9/31 (22.6%); other organisms (alpha-haemolytic streptococci, anaerobes), 6/31 (29%); multiple isolates, 6/31 (19.4%). 7/31 (22.6%) were culture-negative.

**Conclusions:** Most acutely ill IDU were suffering from infection. The most common infection was injection site abscess. The most frequently isolated pathogens were beta-haemolytic streptococci and *S.aureus*. Findings suggested that current empiric therapy for such patients (penicillin and flucloxacillin and surgical drainage) to be appropriate.

### TRIAGE IN THE DEVELOPING WORLD - CAN IT BE DONE?

M. A. Robertson, E. M. Molyneux. *Department of Paediatrics, Queen Elizabeth Central Hospital, Blantyre, Malawi.*

**Aim:** To assess guidelines for the Emergency Triage, Assessment and Treatment (ETAT) of sick children presenting to hospitals in the developing world. This study pre-tested the guidelines in Malawi, assessing their performance when used by nurses compared to doctors trained in Advanced Paediatric Life Support (APLS).

**Methods:** Triage was performed simultaneously by a nurse and assessing doctor on 2281 children presenting to the Under Five's Clinic. Each patient was allocated one of three priorities, according to the ETAT guidelines. Priority one (P1) was allocated to all children who were thought to need emergency treatments. Priority two (P2) was given to children who required an urgent assessment and priority three (P3) to those who could wait safely.

Any variation between nurse and assessor was recorded on the assessment forms.

**Results:** Nurses identified 92 children requiring emergency treatments and 661 with signs indicating a need for urgent medical assessment. One hundred and forty two (6.2%) had different priorities allocated by the APLS trained doctor, but these children did not tend to need subsequent admission. Ninety per cent of P1 were admitted, 32 % of the P2, and only 3.5% of the P3 patients. Eighty five per cent of admissions were prioritised to an emergency or urgent category.

**Conclusion:** Although there are no gold standards for comparison the ETAT guidelines appear to reliably select out the majority of patients requiring admission.

### DOES THE USE OF A PRE-PRINTED FORM IMPROVE THE ACCURACY OF DOCUMENTATION FOR ASTHMA PATIENTS IN A&E?

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**Objective:** To assess the effect of the introduction of a pre-printed recording sheet, for all patients presenting to A&E with acute asthma, as directed by the Scottish Intercollegiate Guidelines Network (SIGN) guidelines.

**Methods:** Prospective audit for the six months after the introduction of the form, compared with retrospective review of the casenotes of asthma patients from the previous six months.

**Results:** 103 suitable patients were recruited using the pre-printed form, compared with 99 patients found using diagnostic coding, whose casenotes were reviewed.

Documentation was improved using the form for the following parameters; grade of asthma (83% v 10%, p<0.001), respiratory rate (92% v 70%, p<0.001), peak expiratory flow rate (96% v 70%, p<0.001), speech (96% v 43%, p<0.001), oxygen saturation (91% v 83%, p<0.01), and cyanosis (96% v 9%, p<0.001). The form had no effect on the recording of pulse rate or of treatment delivered.

**Conclusions:** The use of a pre-printed recording sheet improves documentation in cases of acute asthma, increasing the use of an accurate grading system and thereby instituting appropriate treatment. Trends over time are also visible, and the recommendations of the SIGN guidelines are validated.

### RAPID SEQUENCE INTUBATION TRAINING FOR ASSISTANTS

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Rapid Sequence Intubation is an increasingly common procedure in the Accident and Emergency department. Whether performed by Anaesthetic or A&E staff, success is dependant on the assistance of skilled personnel. A recent survey of the major teaching hospitals in Scotland suggests few resuscitation room nurses have recent theatre experience or have received specific training in this area. This paper concerns the derivation and implementation of a training course to address this issue.

**Method:** An initial questionnaire was applied exploring the level of confidence and knowledge base of a cohort of Resuscitation room nurses. In this way, specific areas at which to target training were identified. A one-day course consisting of lectures, small group tutorials, skill stations and moulages was devised. Written material was distributed prior to attendance, and a further evaluation questionnaire submitted on completion.

**Results:** Thirty nurses completed the training program over two days. The topics of preparation, positioning and protection of the airway, anaesthetic drugs and post intubation care, were identified as key areas of interest. Although 40 % of participants felt confident in assisting in the procedure on initial questioning, only 10% felt they had received adequate training. Only 20 % of nurses felt they had adequate knowledge in the key areas. Following training all the participants rated their confidence and knowledge as high. Most felt training had improved their practice and rated the course as highly beneficial.

**Discussion:** Much attention has been paid to adequate training of medical staff for Rapid Sequence Intubation in our Accident and Emergency departments. Successful RSI is also greatly facilitated by nursing staff who are trained and confident in assisting with the procedure. A short training course results in marked improvements in self-rated competence for nurses assisting with RSI. While follow up testing is required to assess the persistence of acquired skills subsequent to training, nurse training in RSI appears to be an important area where targeting of resources may improve the delivery of care to critically ill patients.

### UVULITIS : A RARE COMPLICATION OF CANNABIS INHALATION

S. H. Boyce, M. A. Quigley. *176 Troon Avenue, Greenhills, East Kildbride G75 8TY.*

The use of cannabis in society is a common problem and the subject of medical and political debate. Symptoms of inhalation are initially excitement and euphoria before progressing to a period of calmness, drowsiness and coma. We present a case describing a rare complication of cannabis use where a 17 year old male, regular cannabis user, developed a localised allergic reaction following smoking cannabis resin, resulting in a large swollen uvula (uvulitis) and partial upper airway obstruction. Management involved a stooped forward position to aid breathing, intravenous chlorphenamine and hydrocortisone. Admission is indicated to detect early evidence of further airway compromise. Other known aetiologies of uvulitis are discussed.

### SPORTS INJURIES ATTENDING AN ACCIDENT & EMERGENCY DEPARTMENT

S. H. Boyce, M. A. Quigley. *176 Troon Avenue, Greenhills, East Kildbride G75 8TY.*

**Objective:** To assess the incidence of attendance, type of injury, sport involved and management of sports injuries in patients attending an Accident & Emergency (A&E) department.

**Method:** All patients, aged 16 years and over, presenting with an injury related to sport, were studied prospectively over a period of three months.

**Results:** 273 patients attended the A&E department with a sports injury during the study period. This represented 2.3% of the departments overall workload. Males (89%) were injured more frequently than females (11%). Injury rates in both males and females peaked in

the 16-20 age category. Football was the most common sport implicated in injuries (65%). Rugby (6.6%), Basketball (3.3%) and Badminton (2.5%) were the next most frequently involved sports. Soft tissue injuries dominated (70%). The lower limb was the most common anatomical area injured (60%). Other injuries involved the upper limb (25%), head and neck (10%) and the trunk (4%). Ankle sprains were the most common injury (19%). The majority of patients were referred to their General Practitioner for review (61%). 25% were reviewed at out-patient clinics, 5% were referred for physiotherapy, and 3% required hospital admission. The remainder required no follow-up. Two cardiac arrests are reported, one during a football game, the other whilst swimming. One of these patients died, the other was resuscitated but suffered significant brain damage.

**Conclusion:** Sports injuries present only a minor increase in the workload of an A&E department. Patients presenting to an A&E department with a sports injury will typically be male and under the age of 30 years. The majority of patients are referred to their GP for further management suggesting that either the injuries were of a minor nature or were inappropriately referred by the A&E department. The role of physiotherapy in the rehabilitation process following injury must be emphasised. A significant proportion of patients were reviewed in out-patient clinics raising the possibility of a hospital based sports injury clinic to review A&E and GP referrals.

### THE IMPACT OF A NEWLY OPENED PRISON ON AN ACCIDENT & EMERGENCY DEPARTMENT

S. H. Boyce, J. Stevenson, I. S. Jamieson. 176 Troon Avenue, Greenhills, East Kildbride G75 8TJ.

**Objective:** To determine the impact of a newly opened prison on an Accident and Emergency department (A&E).

**Method:** A new category B maximum security prison opened in April 1999, the first privately run prison in Scotland and the third largest in capacity. All prisoners referred to the A&E department for treatment were identified prospectively during the first year following the opening of the prison.

**Results:** 104 prisoners attended during the one year period. Ages ranged from 18 - 64 years with a mean age of 29.8 years. Presentations were as a result of deliberate self-harm (22%), injury following violence (18%), sports injury (15%), surgical condition (15%), medical illness (13%), accidental injury (9%), ENT problem (2%) and miscellaneous (6%). 37 prisoners (35.6%) were admitted to the hospital. Further review at out-patient clinics was arranged for 15 prisoners. One prisoner died, the result of suicide by hanging. The remaining prisoners were returned to the prison for further management by the prison medical and nursing team. 12 prisoners re-attended a total of 37 times, ranging from twice to a maximum of eight visits. 42.3% of attendances were during "working hours" (9am-5pm). 57.7% attended "out of hours" (5pm-9am). 24 referrals (23.1%) were deemed inappropriate by the prison medical team on retrospective review. 16 of these occurred "out of hours". 41 prisoners (39.4%) were known to have a history of intravenous drug abuse (IVDA). Including re-attenders, 59 presentations (56.7%) to the A&E department had a history of IVDA. Of the 41 prisoners, 11 (26.8%) were Hepatitis C positive, with eight of these having a positive PCR test. No prisoners had HIV and only one prisoner was Hepatitis B positive.

**Conclusion:** The opening of the prison provided only a slight increase in the workload of the A&E department. However, a significant proportion of prisoners were admitted to the hospital highlighting specific problems of managing people restrained and in custody. The majority of cases can be safely referred back to the prison health-care team for further management. Increased input is required from the prison medical team when dealing with deliberate self-harm, frequent attenders and "out of hours" referrals. All A&E staff must be aware of the increased risk of Hepatitis C infection when dealing with a confined prison population.

### SPORTS INJURY CLINICS ON THE NHS : A PATIENT SURVEY

S. H. Boyce, M. A. Quigley. 176 Troon Avenue, Greenhills, East Kildbride G75 8TJ.

**Objective:** To determine patients attitude to the treatment of their sports injury and whether they would prefer follow-up at a Sports Injury Clinic within the National Health Service (NHS).

**Method:** Forty people were selected at random from patients attending the Accident & Emergency (A&E) department of Crosshouse hospital, Kilmarnock, with a sports injury who were discharged to the care of their general practitioner (GP) for follow-up. A questionnaire was sent to each patient asking two questions: were you

happy with the treatment you received in the A&E department and if a specialised sports injury clinic was present at the hospital would you have preferred your injury to have received further treatment at this clinic rather than your local GP practice.

**Results:** A response rate of 47.5% was obtained. 89% of patients were happy with the treatment they received in the A&E department. The reason given for dissatisfaction was the waiting time and not the specific treatment of their injury. 89% also would have preferred their injury to be reviewed at a hospital based sports injury clinic and not their GP practice. The reasons given for this will be outlined.

**Conclusion:** The overwhelming majority of patients attending A&E with a sports injury in this survey would prefer to have their follow-up care by specialists at a sports injury clinic within their local hospital.

### UNITED KINGDOM SURVEY OF THE MANAGEMENT OF PATIENTS WITH ACUTE, UNDIFFERENTIATED CHEST PAIN

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**Background:** The National Service Framework for Coronary Heart Disease provides guidelines for the management of patients with diagnosed acute coronary syndromes. However, a substantial proportion of cases of chest pain have no clear diagnosis after clinical assessment and electrocardiograph, so appropriate management is unclear. We aimed to survey management of these patients in the United Kingdom (UK).

**Methods:** Postal questionnaire survey to the lead clinician or first named consultant in every major Accident and Emergency department in the UK.

**Results:** Responses were received from 177/ 238 departments (74%). 74 departments (42%) had formal guidelines, although many referred only to diagnosed coronary syndromes. Those that did refer to undifferentiated chest pain usually recommended observation for six to twelve hours followed by troponin T testing. Cardiac enzyme availability for all respondents is outlined in table 1. 38 departments (21%) had access to a short stay facility (17 under A&E control), while 55 departments (31%) intended to create a short stay facility. 38 departments (21%) had access to provocative cardiac testing. 45 departments (25%) employed specialist nurses, although only 20 were involved in managing patients with undifferentiated chest pain. Patients with undifferentiated chest pain were admitted by general physicians in 152 hospitals (86%) and cardiologists in 18 (10%). The estimated proportion of patients admitted was highly variable and is outlined in table 2.

Table 1 Number (percentage) of A&E departments with access to each cardiac enzyme

Creatinine Kinase	CK-MB	CK-MB (mass)	Troponin T	Troponin I	LDH
129 (73%)	89 (50%)	25 (14%)	57 (32%)	41 (23%)	52 (29%)

Table 2 Estimated percentage of patients admitted to hospital

Estimated % admitted	0-20%	20-40%	40-60%	60-80%	80-100%	No response
Number of departments	20 (11%)	33 (19%)	55 (31%)	26 (15%)	24 (14%)	19 (11%)

**Conclusion:** The management of acute, undifferentiated chest pain in the UK is characterised by wide variation in practice. This may be due to a lack of relevant data. Innovative technologies and diverse methods of service delivery are being adopted. These should be thoroughly evaluated to ensure that future development is more consistently evidence-based.

### A STUDY IN CHANGE: RESISTANCE TO THE INTRODUCTION OF AN OUTPATIENT THERAPEUTIC AND TREATMENT REGIMEN FOR DEEP VEIN THROMBOSIS (DVT)

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**Introduction:** Historically patients presenting to an Emergency Department with a suspected deep vein thrombosis (DVT) were admitted into hospital to undergo lengthy and at times unnecessary

investigations and treatment. However the evidence exists that this group of patients can be treated safely as outpatients and it was in light of this evidence that the Emergency Department at Manchester Royal Infirmary introduced an outpatient treatment protocol for patients presenting with suspected DVT. The introduction of this protocol involved a change in clinical practice and was immediately criticised by a group of doctors known as the Resident Medical Officers (RMOs) who became increasingly reluctant to use the protocol thus affecting the recruitment of patients.

**Aim:** This problem of reluctance therefore became the focus of an investigation using a methodology known as ethnography, which aims to describe and explain human social behaviour.

**Methods:** RMOs were interviewed and asked questions about the use of protocols in their clinical practice and how they make clinical decisions.

**Results:** The RMOs make clinical decisions on the basis of gut instinct, to the extent that they would be prepared to ignore laboratory results in favour of what their gut instinct tells them. Their opposition to protocols was formed on the basis of their desire to maintain clinical freedom and autonomy, as they believed that protocols restricted their function as clinical decision-makers. Furthermore, this group of doctors felt that they were sufficiently experienced enough not to need protocols or any other form of guidance. They also reported a lack of communication about and involvement in the setting up of the DVT protocol as a further cause of their reluctance to use it.

### OPINIONS OF PATIENTS PRESENTING TO A&E WITH FIRST TRIMESTER PV BLEEDING

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**Background/Objectives:** PV bleeding early in pregnancy is a stressful occurrence for women. Aiming to minimize anxiety during the patient's stay in A&E is worthwhile. One source of anxiety may be their feelings about the type of doctor they see.

**Method:** A structured questionnaire was devised to elucidate the opinions of women presenting with PV bleeding early in pregnancy focussing on the type of doctor they hoped to see and a reasonable time to wait to see that doctor. It was given to every eligible patient on arrival at a London teaching hospital A&E department over 3 months.

**Results:** 38 questionnaires were completed, some partially.

Gender: 22/38 (58%) expressed no preference. 16/38 (42%) preferred a female doctor (2 would wait up to an hour longer, 13 would not want to wait longer)

Seniority/Experience: 26/35 (74%) would prefer to be seen sooner rather than wait for a more senior doctor. 8/35 (23%) would wait up to 1 hour longer. 1/35 (0.03%) would wait longer than 1 hour

Gender vs. Seniority: 2/35 (6%) thought gender more important. 15/35 (43%) thought seniority more important. 18/35 (51%) expressed no preference

Pregnant Doctor: 6/36 (17%) would prefer to see a pregnant doctor (1 was prepared to wait up to 1 hour longer). 29/36 (81%) had no opinion. 1/36 (3%) preferred not to see a pregnant doctor if another female doctor was available.

Space for comments provided insight into the women's feelings.

**Conclusions:** The priority for most women is to be seen quickly by a qualified doctor. Though a significant number would prefer a female doctor, few would want to wait longer to see one. Seniority of the doctor and whether she happens to be pregnant are less important. To minimise the anxiety which these women experience, prompt assessment and careful explanation of the prognosis and management plan are paramount.

### DOCUMENTATION IN THE A&E CARDS AT UNIVERSITY HOSPITAL LEWISHAM: A RETROSPECTIVE AUDIT OF ASSESSMENT OF DOCUMENTATION OF TRIAGE DATA, CONSULTATION DATA, AND PRESCRIPTION DATA

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#### Objectives:

- 1 How good are we at documenting triage data?
- 2 How good are we at documenting consultation data?
- 3 How good are we at documenting prescription data?
- 4 How legible are our notes?

**Method:** A retrospective data collection using the ReMaSS. Three "majors" and three "minors" A&E cards were selected for each SHO working in the department totalling 72 A&E cards. Triage data, con-

sultation data, and prescription data were studied. Legibility was scored as the no of illegible word encountered in the first fifty words of text in an A+E card.

**Results:** For triage data in "majors" and "minors", we achieved over 70% documentation in all aspects, except first language (24% majors) and (9% minors). For consultation data in "majors", most modalities achieved high rates of documentation (>70%) except allergies (42%), Referral status (11%), and investigation results (53%). The data in "minors" was similar, with allergies documented in only 56%, and a final diagnosis was documented in only 68%. Legibility was excellent with 66% of A+E cards having no illegible words, and only 7% having more than five illegible words in the first fifty words of text. For prescription data, we achieved a high documentation rate for dating, signing and correct dosing for the drugs for both majors and minors, but we were less good in the documentation of the timing of the prescription (majors 29%, minors 21%), and for documenting the details of the administration of drug (majors 65%, 71% minors). The mean prescription rate per A+E card was 3 and 2 for majors and minors respectively.

**Conclusions:** Documentation in the A+E card is of crucial importance. The A+E card represents a legal record of the patient's interaction with the A+E department. We should aim towards a standard level of documentation, not only in our own department, but also in A+E departments locally and nationally. This study shows that we must improve our documentation of first language, final diagnosis, referral status of the patient and also we must improve our documentation of investigations that we request. We must take great care to improve documentation of patient allergies, a common source of litigation.

### ANALGESIC TREATMENT OF FRACTURES IN PAEDIATRIC ACCIDENT & EMERGENCY: A RETROSPECTIVE STUDY OF ASSESSMENT OF PAIN AND DELIVERY OF ANALGESIA

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**Objective:** To determine how effective we are at assessing, and accurately treating pain due to fractures in children in accordance with BAEM guidelines.

**Methods:** A retrospective audit using ReMaSS. Two, one-week periods (A and B) were selected to represented periods before and after the implementation of new A+E cards that had a separate area to record the pain score. The selected cards were analysed for presence of pain score, type of analgesia used, and time taken to administer the analgesic agent.

**Setting:** The Paediatric A+E department of University Hospital Lewisham.

**Subjects:** Children (0—16 yrs) diagnosed with a fracture.

**Results:** A total of 36 subjects were selected. 20 (group A), and 16 (group B). Prior to the new A+E card, pain scores were only documented in 45% (9/20) of cases, rising to 94% (15/16) with the inclusion of a separate area to document pain score in the A+E card. Analgesics were administered in only 55% (11/20) of cases for group A and 81% (13/16) for group B. Median pain scores for analgesic agents were Paracetamol alone (4), Ibuprofen alone (5), Paracetamol & Ibuprofen combined (6), and morphine (IV or PO) (8), thus there was poor correlation with the BAEM guidelines. The median time taken to administer any analgesic agent was 15 minutes, with no relationship to pain score and an inverse relationship to potency of analgesic agent.

**Conclusions:** This audit has demonstrated the benefit of a specific area to document pain scores in the A+E notes, but pain appears to be under treated in accordance with the BAEM guidelines.

### DEVELOPING OPTIMAL STRATEGIES TO EXCLUDE SUBARACHNOID HAEMORRHAGE IN PATIENTS WITH LONE ACUTE SUDDEN HEADACHE

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**Background:** Subarachnoid haemorrhage (SAH) is the cause of approximately 1% of all headaches seen in the emergency department, and up to a third of acute sudden headaches. Failure to recognise and appropriately investigate patients with lone acute sudden headache (LASH) is a significant source of clinical risk as SAH has a mortality rate of 50% at six months.

**Objectives:** To audit current management of LASH in an emergency department and to assess the implications of applying a mathematically derived model using lumbar puncture (LP) as the first-line investigation.

**Methods:** We performed a structured retrospective audit of non-traumatic headache and compared our current management with a published model for the investigation of LASH (Schull et al). This model allows for LP first in patients meeting the following criteria: acute sudden headache (onset within one minute), normal vital signs, normal neurological examination, normal level of consciousness and no neck stiffness. This requires spectrophotometry of the CSF to ensure sensitivity and allow for safe discharge.

**Results:** Data was collected on 365 patients attending the emergency department with non-traumatic headache. A sudden onset of headache was documented in 89 patients, 33 of whom would have fulfilled the LASH criteria enabling an LP-first approach. Of these 33, 8 were investigated with a CT scan and 5 went on to a lumbar puncture. A total of 10 patients were admitted for further observation and assessment under the medical teams.

**Conclusion:** Our study shows that the investigation strategy for patients with LASH needs to be improved significantly and variability amongst clinicians reduced. A clear management strategy will minimise clinical risk and use of the LASH criteria could lead to a proportionate reduction in the number of CT scans performed.

## TRAUMA COMMUNICATION BOARDS IN THE EMERGENCY DEPARTMENT

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**Background:** Communication boards are used successfully in speech therapy to communicate with non-speaking patients. They comprise visual displays of symbols, pictures letters or words.

**Objective:** To assess the accuracy of a Trauma communication board as a history-taking tool in simulated trauma scenarios where verbal communication is not possible.

**Methods:** A communication board was created using 47 line drawing and 4 body maps. The drawings related to basic demographic details, event history and clinical information as in the ATLS AMPLE history mnemonic. Twenty-five trauma scenarios were composed. Each was given to separate staff member volunteers to read. A blinded questioner using the communication board interviewed the individuals non-verbally about their scenario. The documented responses to thirteen questions were scored against the scenario contents.

**Results:** The communication board was 100% accurate in eliciting name, phone number, date of birth and pain score and more than 90% accurate for address, incident time, site of pain and timing of last food/drink. Past medical history, allergies, medications and tetanus status were more difficult to ascertain with accuracies of 60%, 88%, 76% and 32% respectively. The exact nature of the incident had an accuracy of 58%, 3 scenarios had no pictures for them, but in the others a basic mechanism of injury eg fall, was elicited in all(88%). All volunteers rated the tool highly.

**Conclusion:** The communication board performed well in this study using volunteer staff members. Testing the efficiency of this tool in eliciting information from non-English speaking trauma patients is proposed in a multi-centre clinical trial.

## BARKING UP THE WRONG TREE? A REVIEW OF DOG BITE PROTOCOLS IN YORKSHIRE

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**Objective:** To determine existing local protocols for the management of dog bite wounds, and to see if these follow evidence based practice.

**Background:** Studies have shown varying benefit and detriment from routine antibiotic prophylaxis in the management of dog bites wounds. Most randomised controlled studies identified involved rigorous wound care techniques including large volume irrigation (local anaesthesia if necessary), debridement and wound closure where appropriate and early follow up. In these patients antibiotics reduce the infection rate by only about 7%. Current evidence would suggest antibiotics are appropriate only for certain wound types and for confirmed infection.

**Design and setting:** Telephone questionnaire of A&E departments and minor injury units in North, East and West Yorkshire. In each department the nurse in charge was asked for details of existing protocols and a standardised patient scenario was presented.

**Results:** Of twenty-one departments surveyed, fourteen were Accident and Emergency (A&E) departments and seven were Minor Injury Units (MIU). Thirteen of the A&E departments and three of

the MIUs had Emergency Nurse Practitioners (ENPs). Thirteen departments had existing protocols for the management of dog bites. Fifteen departments routinely use antibiotic prophylaxis for all wounds, co-amoxiclav was the antibiotic of choice in thirteen. Only two departmental protocols advise irrigation of the wound and three departments close dog bite wounds. Twelve departments routinely follow these patients up.

**Conclusions:** Few departments included routine wound irrigation in the management of dog bite wounds. Routine antibiotic use was common. There is need for clear evidence-based protocols. Limiting antibiotic prescribing to infected wounds would have significant cost benefits.

## A RETROSPECTIVE STUDY TO COMPARE THE 'DECISION TIMES' BETWEEN TWO SENIOR HOUSE OFFICERS OF VARYING EXPERIENCE

K. I. Eleftheriou, G. Morris, J. S. Batchelor, M. Gavalas. *Department of Accident and Emergency Medicine, UCLH.*

**Background:** One of the factors which may determine 'patient flow' through an Accident and Emergency department is the 'decision time'. The decision time is defined as being the time the Doctor first saw the patient to the time that a definitive treatment or management plan was made.

**Aim:** The aim of this study was to compare the decision times of an in-experienced SHO (SHO1) with the decision times of an experienced SHO (SHO2).

**Method:** The logbook of both SHOs was reviewed at the end of their six-month attachment. Decision times were recorded chronologically on all patients seen by the two SHOs during this period (total number of patients seen: SHO1 n =1157, SHO2 =1449). SHO1 had only pre-registration house officer experience. SHO2 had several years as an SHO including previous A&E experience. Statistical analysis was performed using SPSS 9.0.

**Results:** Frequency distribution analysis showed that both SHOs had similar case mix profiles. The mean decision times per 100 sequential cases seen was calculated for both SHOs. For simplicity only the first 1000 patients were taken from both data sets. Non-parametric regression curve analysis of the sequential mean decision times (SHO1) showed an initial downward trend (reduction) for the first four 100 cases seen. For the fifth 100 case seen both SHOs had identical decision times. For the remaining four 100 cases seen, the regression lines for both SHOs showed some fluctuations but without any definite trends.

**Conclusion:** The results of this study suggest that the decision times for an in-experienced SHO can plateau to levels similar to an experienced SHO relatively quickly. Additional experience however was not found to reduce decision times for either SHO for the remaining duration of the post.

## EPIDEMIOLOGY OF PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT WITH HEADACHE

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**Background:** Headache is a surprisingly uncommon presentation to the Emergency Department (ED), accounting for 0.36-3% of all attendances. 16% of patients presenting to the ED with headache have significant intracranial pathology and 1% will have a subarachnoid haemorrhage (SAH). SAH often presents with the isolated but classical symptoms of headache and vomiting. The history is often the best predictor of intracranial pathology.

**Objectives:** To describe the presenting features in both history and examination, investigations performed and final diagnosis in ED patients presenting with non-traumatic headache.

**Methods:** Data was collected from ED patients presenting with non-traumatic headache to St James's University Hospital and Leeds General Infirmary from 1<sup>st</sup> February 2000—1<sup>st</sup> August 2000. Information was obtained on variables relating to the time and mode of presentation, history of typical or atypical features, examination findings, investigations, diagnosis and outcome.

**Results:** 445 patients (0.4%) attended the two EDs with non-traumatic headache (new attendances 100,137). 127 patients (3.8%) were admitted for further investigation and 5 patients (1.1%) were subsequently found to have had a subarachnoid haemorrhage. 15 patients (3.4%) were found to have other intracranial pathology.

However, many patients described typical features of SAH headache such as sudden onset (21.8%), severe (23.6%) and occipital (13.5%).

**Conclusion:** This study demonstrates the difficulty in identifying patients with significant intracranial pathology when presenting with isolated headache. Many patients with benign headache describe features similar to those of SAH. It is therefore important to maintain an element of suspicion in all patients presenting to the ED with headache regardless of examination findings. We hope to improve future detection rate of significant intracranial pathology by increasing awareness of the potential pitfalls of misdiagnosis in the patient presenting with a headache.

#### DEVELOPMENT OF A TRAINING RECORD FOR SENIOR HOUSE OFFICERS IN ACCIDENT AND EMERGENCY MEDICINE

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**Background:** For several years Senior House Officer in all specialties in Mersey Deanery have undergone a 'review of training' (ROT). This involved the Senior House Officer meeting with their named educational supervisor at the beginning and then the end of their post. At these meetings learning objectives would be set, study leave discussed and career advice given. At the final meeting feedback would be given to the Senior House Officer on their performance. Feedback to the educational supervisor would be given about the post.

**Development of a training record:** This was developed eighteen months ago and has been piloted and evaluated in Accident and Emergency departments in the Mersey Deanery. It sets out the aims of the post, a curriculum for Accident and Emergency and a section for the Senior House Officer to set their own objectives. Prior to their final review, the Senior House Officer must be assessed on the examination of five different patients (acute medical, trauma, paediatrics, hand problem, ankle problem). In addition, an assessment of their attitudes is completed. If the assessment is successful, the Senior House Officer is awarded a Review of in-training assessment (RITA)—pass.

**Evaluation:** Senior House Officers and Consultants were sent a questionnaire in May 2001- eighteen months after the pilot study began. The response rate was very poor for Senior House Officers (8/52) probably due to the fact that the majority had moved on to other posts. 10/14 (71%) of Consultants responded. Both Senior House Officers and Consultants found the curriculum useful. The patient assessments, when used, provided good feedback. The training record and review process has been refined and the changes will be incorporated to start on 1<sup>st</sup> August 2001.

#### WHAT HAPPENS TO PATIENTS WITH MINOR BURNS?

P. Knowles, A. Robinson. *Emergency Medicine, Warrington Hospital.*

A review of patients presenting to emergency departments (ED) and minor injury units (MIU) in the Mersey Region was undertaken during a six week period.

##### **Aims:**

- To examine management of patients with minor burns in the Mersey Region
- To establish the outcome for patients 1 year after the burn

**Methods:** Ten ED's and five MIU's participated in the study. A proforma was completed prospectively for every patient attending with a burn injury.

A year later all patients were sent a postal questionnaire to assess their progress since discharge from the hospital.

**Results:** 600 patients with burn injuries were seen during the study period, of which 40% were children. 21% of patients did not attend on the day of their injury. Of these, 44% presented the following day. 44% presented 2-7 days later. Most burns occurred at home, scalds being the most common injury seen. The hand was the most commonly injured site. Multiple sites were burnt in 15% cases. 89% were superficial burns, 6% had areas of full thickness burn. Over half the burns involved less than 1% total body surface area (TBSA). Most of the remainder had burns of 1-5% TBSA. Jelonet was the most commonly used dressing, with Flamazine being used in only 10% cases. Complication rates between the two dressings were comparable. 60% patients were seen in A&E review clinics after discharge, with a mean of 2.5 visits. 4% patients seen in review clinic suffered some sort of compli-

cation, most of these being local infection. Similar complication rates are seen in the community after discharge. (Community data still being analysed)

##### **Conclusions:**

- Burn injuries form a significant part of ED & MIU workload
- Most burns are managed appropriately in ED's and MIU's
- Few problems are seen once the patient is discharged to the community

#### A META-ANALYSIS OF OPEN VERSUS CLOSED PERITONEAL LAVAGE

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**Aims:** To elicit if there is superiority of one technique over the other, for routine use, whilst recognising that there are specific indications where one technique is indicated in preference to the other.

**Methods:** A medline search was performed using the key words "abdominal trauma", "blunt trauma", "peritoneal lavage", "open lavage", "closed peritoneal lavage". This identified papers which were then retrieved and examined. If relevant papers were referred to, which had not already been found on the search, these too were requested and examined.

The papers were examined for number of subjects involved, techniques used, complications (including failure of procedure), false positive rate, false negative rate and time taken to perform the procedure. The papers were also examined for methodological flaws. This led to fifty papers from which the results could be tabulated and the various values compared.

**Results:** This has suggested that closed and open peritoneal lavage produce similar false-positive and false-negative rates, while closed peritoneal lavage is significantly quicker and has fewer complications, particularly with the development of new techniques such as the use of the Veress needle.

**Implications:** The authors recognise that there are specific indications for the use of the open diagnostic peritoneal lavage technique, and as such this should continue to be taught to all surgeons in training. However, we would advocate that for routine use, the quicker and safer closed peritoneal lavage technique, preferably with the Veress needle, should be the method of choice.

#### UK EMERGENCY DEPARTMENT ATTENDANCES COMPARED WITH CURRENT STAFFING LEVELS - A REVIEW OF THE 2001 DATA

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**Introduction:** The Way Ahead document (British Association for Accident and Emergency Medicine, 1998) sets a standard of one service equivalent doctor per 35,000 new patients per year for A&E departments. It is recognised that this is an ideal. We undertook a study using BAEM data on A&E staffing levels and attendance rates to determine compliance with this standard in UK A&E departments.

**Method:** Using BAEMs own current data from the BAEM Directory 2001/2002 we produced a database of UK Emergency departments staffing levels and annual new attendance's. We calculated total junior grade equivalents by multiplying the number of staff in a particular grade (SHO, SpR, Clinical Assistant or Staff Grade) by the BAEM service equivalent weighting suggested in the Way Ahead document. This total was related to numbers of new attendance's.

**Data problems:** There are some obvious errors in the data in the handbook. Where it was possible to resolve these the data were included in the database. Where not the data were excluded from the database.

**Results:** As expected the number of SHOs, total medical junior grade equivalents increases with increasing size of department. The correlation between actual staffing levels and the BAEM recommended levels was closest for departments seeing less than 50,000 new patients per annum. As new patient attendance's increase above this level the actual medical total junior grade equivalents lag behind the BAEM recommended numbers. Data were further compared by region, consultant numbers and training/non-training grade ratio.

**Conclusions:** This suggests that although there is a correlation between departmental size and number total medical junior grade equivalents the larger departments are relatively disadvantaged compared to departments seeing less than 50,000 new patients per year when actual staffing levels are compared with the BAEM standard.

## AMBULANCE CREW DIAGNOSIS. DO THEY GET IT RIGHT?

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**Objectives:** To compare the accuracy of ambulance personnel diagnosis with A&E diagnosis for patients admitted to the 'major side' or resuscitation areas of A&E.

**Background:** Paramedics institute initial emergency treatment for patients during transfer to the A&E department. Although not formally asked for a definitive diagnosis, the treatment option chosen is clearly made on a provisional diagnosis by the paramedics. To date no study has examined the accuracy in terms of system diagnosis by paramedics and therefore the appropriateness of treatment given.

**Methods:** A single investigator interviewed paramedic crews on arrival at the A&E department of a large teaching hospital and completed a standard proforma. The crews were asked for their provisional diagnosis and 'illness score'. This was a Likert style question based on a nine point scale from not ill (1) to immediately life threatening (9). Obvious multiply injured patients were excluded. The crews' provisional diagnosis was compared with the A&E diagnosis where appropriate. The triage nurse was also asked for an assessment of illness severity based on the same scale.

**Results:** Fifty one patients were entered into the study. Twenty five were treated by paramedics and twenty six by EMT in each crew. Triage categories on arrival ranged from 1–4 (median 3). There was complete agreement between ambulance crew diagnosis and final A&E diagnosis in 36 patients and partial agreement (same system, not exact diagnosis—e.g. angina and myocardial infarction) in twelve patients. No agreement was seen in three patients. Complete or partial agreement was thus seen in 94% of patients. Illness severity score varied from one to nine. In 84% of cases the illness severity score was in agreement within two points.

**Conclusions:** Ambulance crews in this small study correctly classified the diagnosis in the majority of cases.

## CROWD SURFING. WHO IS AT RISK?

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**Introduction:** Crowd surfing is popular at music festivals. It involves launching oneself over the heads of the crowd in front, and 'surfing' on supporting hands towards the stage. Recently there have been concern over injuries and deaths at these events, but there is little documentation of injuries sustained in this manner in the UK.

**Objective:** To determine the level and types of injuries as a result of crowd surfing activity at a large music festival.

**Design:** Observational study.

**Setting:** A three-day music festival, with over 60,000 attendances per day

**Subjects:** All patients presenting to the first aid and medical stations during the festival, with a history of a crowd surfing injury. This included both the 'surfer' and members of the supporting crowd.

**Main outcome measures:** The site of injuries and their relationship to crowd surfing, patients requiring transfer to A&E, and final discharge.

**Results:** 66% of the injuries (29/44) were sustained by those in the crowd rather than the surfers themselves (15/44). Two crowd surfers (5%) were transferred to local A&E departments. No bony injury was identified on radiographs, and both were discharged the same day. There were no serious injuries sustained. All those in the crowd had contusions or lacerations to the head, neck or shoulders. The 15 crowd surfers sustained 17 injuries: (41%) head or neck sprains/contusions/lacerations, 6 (35%) lower limb sprains/contusions, 3 (18%) abdominal or back contusions and 1 (6%) chest contusion.

**Conclusions:** Crowd members are at risk of injury from crowd surfers, with a larger number of injuries to crowd members than surfers at this event. Although events in other countries have dealt with serious injuries related to crowd surfing, there were no serious injuries seen in this study.

## ULTRASOUND BY EMERGENCY PHYSICIANS TO DETECT AAA

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**Introduction:** Only about half of patients presenting to emergency departments with a leaking abdominal aortic aneurysm (AAA) survive to discharge. Presentation is often non-specific and AAA can often only be confidently excluded after radiology department investi-

gation. A focused ultrasound scan of the abdominal aorta can be used either to exclude the diagnosis of AAA, or to expedite surgery or further investigations where the clinical findings are equivocal and the scan reveals an AAA.

**Patients:** Symptomatic patients presenting to the emergency department of a large teaching hospital in whom the diagnosis of aortic aneurysm was considered.

**Training:** All emergency physicians using ultrasound were trained as part of the FASTER trial protocol involving lectures on physics, machine controls and basic anatomy. A further session was undertaken to specifically look at aortic anatomy.

**Technique:** The purpose of a limited ultrasound scan is merely to document the presence or absence of AAA. There is no attempt made to delineate the upper or lower extent of the aneurysm or to identify a leak. We present a series of patients in whom prompt diagnosis in the resuscitation room led to immediate operative intervention. In all cases the ultrasound diagnosis was confirmed at laparotomy.

**Results:** Five patients over the past year have had an aneurysm diagnosed by emergency physicians on ultrasound and were transferred immediately to theatre.

Ultrasound has also been used successfully in hypotensive patients to rule out AAA and allow management to concentrate on other diagnoses.

**Conclusion:** A limited ultrasound scan is a rapid screening test to detect AAA in the resuscitation room. Emergency physicians can reliably perform the technique after only a limited training period.

## CHEMICAL CONTAMINATION OF HEALTH CARE FACILITIES AND STAFF

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**Background:** Acute chemical incidents (CIs) occur as a result of fires, explosions, leaks, spills and direct contamination. CIs are often associated with chemical processing, manufacturing, storage, cleaning, transport and from the disposal of toxic waste. A&E staff may find it difficult to identify and prevent contaminated patients from entering their unit and thus secondary contamination occurs. From 1998–2000 the Chemical Incident Response Service [London] (CIRS) analysed A&E reported CIs, covering a UK population of 37.5 million.

### Results:

- Between 1998 and 2000, 1360 CIs (50% of all CIs reported to CIRS) showed that 6% (CIs=88) involved health care facility contamination.
- 5% (CIs=64) involved contamination of health care workers.
- 6 CIs initially involved only one contaminated patient but then resulted in between 8 and 25 health care staff being contaminated.
- The most common chemicals leading to contamination included CS gas, solvents and ammonia.
- Case histories are used to illustrate recent incidents.

### Conclusion:

- CIs have a major and unexpected impact on A&Es and potentially other hospital facilities.
- Full decontamination facilities may be lacking but simple decontamination may suffice to protect patients, staff and the unit.
- Failure to decontaminate increases the likelihood of hospital or unit closure through contamination.
- Contaminated staff may develop adverse health effects from exposure to chemically contaminated patients.
- A&E staff without serious clinical symptoms may have to be put off work, as the chemical exposure may covertly affect their performance and judgement.
- All A&E staff must retain an index of suspicion to ensure correct and timely identification of any potential source of contamination.
- A&Es major incident plans should be flexible enough to encompass CIs.

## LATERAL RADIOGRAPHS FOR PERTROCHANTERIC HIP FRACTURES. ARE THEY REQUIRED?

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**Objective:** To determine whether lateral radiographs of the hip are useful in decision making for patients with pertrochanteric hip fractures.

**Method:** A prospective study was carried out on all patients presenting with pertrochanteric hip fractures. Standard anteroposterior and lateral radiographs were taken. The lateral radiograph was placed in a sealed envelope and was not viewed by medical staff. Patients were admitted to the orthopaedic trauma unit and the orthopaedic surgeon in charge of the patient made a decision regarding surgical treatment. The lateral radiograph was not routinely viewed unless it was deemed necessary by the surgeon. Any change in the surgical decision based on the lateral radiograph was then recorded.

**Results:** There were 131 patients with a mean age of 81 years with pertrochanteric fractures. A decision based on the AP radiograph alone was made in 114 cases. The surgical procedure in all cases was carried out as planned with no change being required. In 13 (10%) cases lateral radiographs were reviewed. In 10 cases there was no change in the operative plan made on the basis of the AP view. In the remaining 3 cases (2%) the proposed operation was changed.

**Conclusion:** Lateral radiographs are painful for the patient, time-consuming to obtain and are often of poor quality. In this study they were unnecessary in 90% of cases and only influenced surgical decision making in 2%. We do not recommend routine lateral radiographs for pertrochanteric hip fractures and suggest a selective policy of obtaining them in cases of diagnostic doubt.

### ANALGESIA FOR THE ACUTE SURGICAL ABDOMEN IN THE ACCIDENT AND EMERGENCY DEPARTMENT

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"If morphine be given, it is possible for the patient to die happy in the belief that he is on the road to recovery, and in some cases, the medical attendant may for a time be induced to share the same delusive hope." Zachary Cope 1921

There has been extensive debate over whether the administration of analgesia to patients with an acute abdominal presentation might mask clinical signs. Most major authorities and textbooks now emphasize the importance of administration of adequate parenteral analgesia as early as possible during admission to hospital. This recommendation is made on the basis of both ethical and practical considerations. Randomized controlled trials generally show considerable benefit to the patient from pain relief with either no change in diagnostic accuracy or an improvement. It is unacceptable to fail to alleviate pain in a distressed patient when there is no evidence of early or improved diagnosis. Furthermore, analgesia can permit a more objective assessment of clinical signs, particularly in children.

In order to assess current practice we retrospectively reviewed all patients attending our A&E department over one year with acute abdominal emergencies. There were 78 patients. 35 had appendicitis, 10 bowel obstruction, 8 pancreatitis, 5 cholecystitis, and 30 had other conditions. 28(36%) received analgesia within 2 hours of arrival and 21(27%) received no analgesia. The analgesia used ranged from single oral analgesia in 6 cases (5%). Although opinion is now strongly in favour of giving analgesia for relief of abdominal pain, (Tait et al 1999, Wolfe et al 2000), current practice appears to lag behind this. Indications for analgesia should form a core component of every training programme.

### THE OUTCOME OF DRUG SMUGGLING BY "BODY PACKERS" AND RECOMMENDATIONS FOR MANAGEMENT

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**Background:** Drug smuggling by internal concealment is increasingly common and has become a world-wide problem. In this country the majority of patients seen are organised couriers or "mules" who smuggle numerous industrially wrapped packages of cocaine, 211 smugglers were detained in 1998. The vast majority of patients are from the Caribbean. In this address we present the outcome from 572 patients suspected of internally concealing illicit substances examined at Ashford Hospital, near Heathrow airport.

**Introduction:** Over a 4 year period from Jan 1996-Dec 1999 572 patients were brought to the Accident and Emergency Department on suspicion of internally concealing illicit substances for an abdominal Xray. 180 patients were found to be positive, of which 36 were admitted. 7 patients subsequently underwent surgical removal of packages.

**Results:** 5 patients suffered symptoms of gastric outflow obstruction and underwent gastrotomy and package removal. 1 patient developed large bowel obstruction secondary to rectal impaction of packages and underwent anal dilation and manual evacuation of

packages. 1 patient developed possible toxicity and underwent an emergency laparotomy with all packages being milked through to the rectum and subsequently removed. The remaining patients received oral purgation with picolax or clean prep. No patient needed medical management of toxicity. No patient has been admitted from police custody having developed complications, and no deaths have occurred.

**Summary:** Most patients do not need admission, providing they will be observed in experienced custody. Indications for surgery are: patients with large, poorly wrapped or disintegrating packages that fail to move distally from the stomach and those with signs of obstruction. Most patients can receive oral purgation despite abdominal pain providing obstruction is not present.

### AN EVALUATION OF A&E SHO TEACHING USING ACTION RESEARCH

D. Alao, J. Binchey. *A&E Department, Derriford Hospital, Plymouth.*

**Study objective:** To make senior house officers in accident and emergency department evaluate their teaching and make recommendation for improvement.

**Method and design:** Action research, a qualitative research method commonly used in social sciences was used. The action group comprising of seven members including the author discussed and approved the questionnaire used. A pilot study was conducted to test the final questionnaire. Information was collected through a combination of interviews and administration of the questionnaire.

**Main result:** There were 14 senior house officers involved in the study, which represent 100% response rate. Nine of the respondents felt their current teaching was very good while 3 said it was excellent. Nine of the respondents said they would like the teaching to be very interactive and not didactic while 6 would like to experiment with a different learning model such as problem-based learning and small group learning. Nine of the respondents were unable to attend more than 60% of the teaching sessions due to the full shift system. As a result of these findings changes were made in the senior house officer teachings.

### THE DETECTION OF SERIOUS PATHOLOGY AMONG PATIENTS PRESENTING WITH HEADACHE TO THE EMERGENCY DEPARTMENT

T. Locker, S. Mason. *Accident and Emergency Department, Northern General Hospital, Herries Rd, Sheffield S5 7AU.*

**Background:** Non traumatic headaches present a difficult clinical problem in the Emergency Department (ED). Although it represents a small proportion of the workload there is a high incidence of pathology. We aimed to identify the causes of acute headache presenting to the ED, assess the adequacy of history, examination and investigation, and determine the need for clinical guidelines or rule-out strategies.

**Method:** A retrospective study of alert (GCS = 14) patients presenting with headache, to an ED over a one year period. Patients were followed up at three months by review of the hospital database.

**Results:** Headache in alert patients accounted for 0.5% (n=353) of new patient episodes, 81.2% (n=280) of patients had a primary headache disorder. Median time from onset of symptoms to presentation was 3.5 hours (SD=6.2 hours). There was no significant difference in time to presentation for patients with primary and secondary headaches;  $t(107)=0.91, p=0.36$ . One patient (0.3%) had an adequate history documented. No patient had a complete examination documented. Seventy seven (21.8%) patients underwent computed tomography of the head; 80.5% (n=62) were normal. Lumbar puncture was performed in 23 (6.5%) cases; 18 (78.3%) were normal.

**Conclusion:** Headache is an uncommon symptom in alert patients presenting to the ED. The documented history and examination, and subsequent investigation do not comply with published standards. Improved training and clear guidelines may improve management and diagnostic accuracy in this patient group.

### OTTAWA KNEE RULE, A RETROSPECTIVE VALIDATION STUDY

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Ottawa Knee Rule (OKR) is a useful decision tool. We tried a retrospective validation of the rule using clinical data from patients records, our aim was to start implementing the rule locally.

**Method:** Computer generated search for patients with knee injury who had a knee x-ray was followed by a hand search of the records of the patients identified, over a period of 2 months. Inclusion criteria were; patients 16 years of age and over, trauma to knee and presentation within 3 days of injury. The patients that fitted the OKR were identified and the results of x-ray were noted.

**Results:** 154 patients had x-ray for knee injury over the study period. 5 records were missing and 54 patients were excluded leaving 90 patients who were studied. 67 patients had clinical features applicable to OKR. Of the whole study population only 15 x-rays showed a fracture of dislocation all of whom were within the OKR group. None of the patients excluded by OKR had significant finding on x-ray, a sensitivity of 100%.

**Discussion:** Although the number of patients was small and the study retrospective, our results compared well with results from larger prospective studies. The implementation of the rule will help emergency doctors in focusing their clinical examination and re-enforce the use of evidence based medicine in clinical decision as well as provide cost effective use of clinical resources.

**Conclusion:** 1. Ottawa Knee rule is a good decision tool. 2. The validation will help to build confidence in implementing the rule locally.

### NEW MILLENNIUM, NEW ANTIDOTES? AVAILABILITY OF ANTIDOTES TO ACCIDENT AND EMERGENCY DEPARTMENTS IN THE UK AND IRELAND

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**Introduction:** The judicious use of antidotes is key in the emergency management of cases of poisoning. The aim of our study is to determine the timeliness of availability of antidotes to Emergency Departments in the UK and Ireland.

**Materials and Methods:** The directorate of the British Association of Accident and Emergency Medicine was used to identify 'major' Emergency Departments. A checklist was devised based on guidelines produced by the International Programme on Chemical Safety in 1997. Antidotes were divided into standard, special and obsolete categories. Principal Pharmacists were requested to identify timeliness, location and quantity of each antidote in their centre.

**Results:** 235 Emergency Departments were identified. 96 replied in the first wave, giving a response rate of 40%.

- N-acetylcysteine, naloxone and flumazenil were available in a timely manner in all departments. Methionine was available in 91% of centres.
- The availability of antidotes to highly lethal toxins such as cyanide, toxic alcohols, iron and organophosphates was variable. Desferrioxamine and atropine were stocked in all centres. Intravenous ethanol was available in only 77%. Sodium nitrate and sodium thiosulphate were held in 73% and 86% of centres respectively. 6 departments held sodium nitrate but not sodium thiosulphate. Pralidoxime was available in 57% of departments.
- New antidotes such as DMSA, DMPS and fomepizole were held infrequently (7%, 8% and 22% respectively). Antidotes that could ideally be held at regional centres are being held locally. Sodium calcium edetate and viper antivenom were held locally in 95% and 79% of departments respectively.
- Of the obsolete antidotes, 57% of departments continue to stock Ipecac.

#### Conclusions:

- The availability of antidotes to Emergency Departments is variable
- Antidotes are not available in a timely fashion
- A co-ordinated approach is necessary to identify antidotes that should be held at local and regional centres.

### TRAINING ACCIDENT & EMERGENCY PHYSICIANS IN TRAUMA ULTRASOUND. THE DEVELOPMENT OF A FAST WORKSHOP

A. Brooks, J. Connolly. *Abstract and Emergency Department, Queen's Medical Centre, Nottingham.*

Ultrasound is progressively becoming the investigation of choice for the assessment for blunt abdominal trauma in the multiply injured patient. However the use of this technique is limited by the provision

of a rapid 24-hour radiology service. In Europe and North America this constraint led to ultrasound being devolved into the hands of Accident & Emergency (A&E) physicians and the development of a limited technique for the detection of intraperitoneal blood—Focused Assessment with Sonar for Trauma (FAST). In the United Kingdom there is currently no formal provision for training in ultrasound or FAST for A&E doctors.

We have developed a half-day FAST workshop to teach accident & emergency physicians the ultrasound skills to detect intraperitoneal and pericardial fluid. The course consists of presentations on ultrasound physics, the principles of ultrasound scanning and a discussion on the role of FAST in the assessment of abdominal trauma. This is followed by an introduction to the ultrasound equipment and 'hands-on' teaching on live patient models to demonstrate the four standard FAST views—perihepatic, perisplenic, pericardial and pelvis. Following the course, ten scans must be completed on volunteers before skills acquisition is evaluated by a post workshop assessment that includes both normals and patients with ascites (to simulate intraperitoneal blood). On successful completion physicians are allowed to perform FAST in the emergency room, but must participate in an on going controlled trial with continuous quality assurance through the evaluation of recorded images.

We have found that the workshop can successfully train physicians to perform FAST and detect intraperitoneal fluid. This format can be successfully integrated into an Accident & Emergency teaching program and should be an essential part of training for A&E physicians.

### DIAGNOSTIC PERITONEAL LAVAGE. SHOULD TRAUMA GUIDELINES BE REVISED?

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**Introduction:** Diagnostic peritoneal lavage (DPL) has been accepted as the gold standard for the investigation of blunt abdominal trauma since 1965. However the technique relies on the experience of the surgeon performing the investigation and the ability of the laboratory to process the sample. The practical ability to perform this investigation in UK hospitals has never been investigated.

**Methods:** A telephone interview of haematology technicians from forty acute hospitals was conducted. The technicians were interviewed to determine the ability of the laboratory to process a sample of fluid from a DPL. In addition a series of questions on the experience of surgeons performing DPL were included in a postal questionnaire on trauma experience sent to British general surgeons.

**Results:** 73% (29 of 40) laboratories were able to process a DPL sample during working hours (9am to 5pm) in a mean time of 14.8 minutes. Twenty centres had not analysed a sample within the previous twelve months. Out of hours 23% (9 laboratories) could process a DPL sample. 46% (831 of 1797) completed responses were received to the DPL questions. 18% of Higher Surgical Trainees (HST) had never performed a DPL. The majority of newly appointed Consultants (46%) and HSTs (62%) who had undertaken DPL had done so on less than 10 occasions.

**Conclusion:** Newly appointed surgical Consultants and HSTs in the UK have limited experience of performing DPL. If DPL is undertaken out of hours the laboratory is unlikely to be able to process the sample. Trauma guidelines need to be revised to reflect this.

### OXYGEN RATIONING IN COPD PATIENTS

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**Introduction:** Within medicine there is a persistent misconception that increasing supplemental oxygen therapy in patients with Chronic Obstructive Pulmonary Disease (COPD) is detrimental. The aim of this survey was to determine whether physician seniority or background correlated with erroneous oxygen 'rationing'

**Method:** The population sample consisted of 80 doctors of all grades and specialities working in a large teaching hospital. Participants were asked to read an identical clinical scenario about a patient with COPD. Included were arterial blood gases (Fractional Inspired Oxygen (FiO<sub>2</sub>) 0.24), which revealed : pH 7.30, pCO<sub>2</sub> 7.23kPa, pO<sub>2</sub> 7.01 kPa, BE -2.0, HCO<sub>3</sub> 24mmol. Participants were asked to choose the optimal supplemental oxygen therapy along with reasoning behind their decision.

**Results:** 49/80 questionnaires were completed after 2 mail-shots and telephone follow-up (response rate 60%). Four (1 medical house officer, 1 neurology senior house officer, 1 anaesthetic SpR,

1 anaesthetic consultant) opted to cease oxygen therapy and review the clinical effect with blood gases. Six (1 medical house officer, 3 medical SHOs, 2 medical consultants) chose a FiO<sub>2</sub> 0.24, and 6 (1 ITU SHO, 3 anaesthetic SpRs, 2 anaesthetic consultants) chose 0.35. 25 opted for FiO<sub>2</sub> 0.28 (4 medical HO, 1 surgical HO, 6 medical SHOs, 2 surgical SHOs, 1 anaesthetic SpR, 6 medical SpRs, 2 anaesthetic consultants, 3 medical consultants). 7 (1 surgical HO, 3 anaesthetic SHOs, 3 anaesthetic consultants) opted for a non-rebreathing Oxygen mask. One respondent would titrate the FiO<sub>2</sub> to maintain oxygen saturations above 90%. 5 respondents mentioned that the patient may be running on hypoxic drive (10%).

**Conclusions:** In this small study we found that 10 respondents (20%) would have treated the patient in a way that kept them hypoxic. In our study we found that specialities other than anaesthesia were unwilling to give the patient the highest FiO<sub>2</sub> possible. We would advocate national discussion across the various specialities involved in the care of these patients, lest they are deprived of one of the most useful drugs in our armamentarium.

## POISONING MEDICAL STUDENTS

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Carbon Monoxide (CO) is regarded as the silent killer. CO poisoning is difficult to diagnose with only vague symptoms often available to the clinician. It is the case that the diagnosis will only be made when the victim has collapsed or is found dead. The aim of this study was to quantify the level of understanding and awareness of preventative measures within a student population

**Method:** The second and fourth year students of the faculty of Medicine at Newcastle University were surveyed with regard to their awareness of the problem of CO poisoning. The survey was in written format with the questions requiring closed answers. Each year group was surveyed during a lecture where attendance was compulsory. The questionnaires were collected at the end of each session.

**Results:** 135(71%) of second year and 129(60%) of fourth year students completed the survey. (total 264(65%)) Overall 17.8% of students had a CO monitor where they lived, 63.6% did not and 18.6% did not know. Of those that had a monitor a quarter did not know if it worked or not. With regard to the safety of heating appliances 40% did not know whether or not their gas appliances had been checked during the last year. 7% of those returning the survey indicated that they could be suffering from CO poisoning.

**Discussion:** Carbon monoxide poisoning is a serious problem. Medical students are an intelligent but not always sensible group of individuals that the taxpayer has invested large amounts of money in to become doctors. Carbon monoxide alarms cost under £30 and can save lives. As a result of this study the Healthy Medical School Project is now looking at the issue of CO poisoning and the legislation surrounding it. The aim is that recommended rental accommodation should be safe.

## AIRWAY EQUIPMENT IN SCOTTISH EMERGENCY DEPARTMENTS

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**Background:** Airway management is the cornerstone of resuscitation. Emergency endotracheal intubation is more likely to be difficult in the accident and emergency (A&E) department setting compared with the operating room. A&E departments must have an appropriate selection of equipment to deal with difficult airway problems. The aim of this study was to determine the type and range of equipment for airway management in A&E departments in Scotland.

**Methods:** Two-page postal survey sent to consultants in charge of 24 A&E departments covering 98% of major trauma patients in Scotland.

**Results:** The response rate was 96% (23/24). Every department had equipment for basic airway management and all had laryngoscopes, stylets, gum elastic bougies and capnography. 96% (22/23) had equipment to perform a surgical airway and 74% (17/23) possessed laryngeal mask airways suitable for adults; only one department did not possess a suitable rescue device. 30% (7/23) of departments did not use capnography routinely to confirm correct placement of endotracheal tubes.

**Conclusion:** Airway equipment in Scottish A&E departments is adequate for basic airway care and endotracheal intubation. Nearly all

departments have access to a suitable rescue device for the failed or difficult airway. Capnographic confirmation of tube placement should be mandatory in A&E.

## MEDICOLEGAL WORK: HIGHER SPECIALIST TRAINING IN ACCIDENT & EMERGENCY MEDICINE

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Upto 40% of all medicolegal reports are prepared by Accident and Emergency consultants. It is therefore essential that appropriate training is received prior to becoming a consultant in order to maintain good standards. We carried out a survey in order to determine if specialist registrars in Accident and Emergency medicine receive any formal training in the preparation of medicolegal reports and court appearances and see if there is a need to address this issue.

**Methods:** A detailed questionnaire was sent to 150 specialist registrars, of all stages in training in Accident and Emergency Medicine, and in all regions of the United Kingdom. Candidates were asked if they had prepared medicolegal reports and/or attended court. Whether they had received any formal training. How they would like this training given (small group discussions, lectures, observers, mock trials, others) by whom (Consultants, legal advisors, lawyers, others) and when (house officer, senior house officer, specialist registrar, other).

**Results:** 93 out of 150 questionnaires were returned (63% response). 44% of registrars (41/93) had been involved in medicolegal reporting although 68% of this group had no formal training. The number who had attended court was 69%(64/93) of which 84% had received no formal training. All respondents felt formal training in medicolegal reporting and court appearances would be beneficial. That this should begin at specialist registrar level for medicolegal reports and senior house officer level for court appearances. Small group discussions and with the consultant delivering the training were stated to be the most popular choices.

**Conclusion:** Overall there appears to be a demand for training in medicolegal issues and court proceedings but at present opinions seem to reflect a degree of inadequate training in such areas. The curriculum for higher specialist training in Accident and Emergency medicine includes medicolegal issues. It seems justifiable, therefore, to explore this topic in more detail at local level and take appropriate action to rectify any deficiencies in the preparation for medicolegal reports and for court appearances.

## CALL TO NEEDLE TIME AUDIT JAN - DEC 2000

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**Objectives:** 1. To audit the "Call to Needle" time of all patients presenting to the Accident & Emergency department, treated with thrombolysis for presumed myocardial infarction, in a 12 month period  
2. To set in place an ongoing data collection and monitoring system  
3. To implement necessary change to improve the standards of care in line with the National Service Framework for Coronary Heart Disease.

**Background:** The NSF for Coronary Artery Disease has set a target of 60 minutes for Call to Needle time. The feasibility of this has not been tested in a UK setting.

**Method:** Patients were identified by computer search on the A&E system, the CCU admission book and the DDA book for morphine in the Resuscitation room where thrombolysis is administered. The London Ambulance Service was approached for timings on these patients from their data base.

**Participants:** All 115 patients treated with a thrombolytic agent between Jan and Dec 2000.

**Results:** 73 had complete data for Door to Needle time. 68 came by ambulance and 5 walked in. 46 had complete data from Call to Needle time. 35 had justified reasons for delay in thrombolysis. The median Call to Needle time was 81 minutes (N3). The median Call to Door time was 46 minutes (N1). The median Door to Needle time was 38 minutes (N2). Detailed analysis of each set of notes identified areas of concern to be addressed and changes to implement.

**Conclusions:** The results compare favourably with other published data of Call to Needle time, with room for improvement. Lessons learned have clear local implications but will be applicable to all A&E departments in the country, as the difficulties encountered are universal in departments under increasing pressure in a time of massive change within the NHS.

## PROTOCOL DRIVEN DIAGNOSIS IN A&E. AUDIT OF SUSPECTED DEEP VEIN THROMBOSIS

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**Background:** The Clinical Decisions Unit within the A&E department at St James' University Hospital was opened in February 2001 to provide nurse led protocol driven care for a variety of common medical conditions. The Deep Vein Thrombosis (DVT) protocol defines a management algorithm based on a compromise between current best practice and resources including clinical assessment, D-dimer (IL-DD) and ultrasound (USS).

**Aims:** The aim of this audit was to evaluate the effectiveness of the current management protocol for suspected DVT and in particular the use of D-dimer and the reassessment process.

**Methods:** All patients presenting with suspected DVT on the CDU between February and July 2001 were evaluated retrospectively. Data from the protocols on admission and at follow-up attendance were recorded in a database, including demographic data, Wells' score, D-dimer and USS results.

**Results:** 202 patients were evaluated. 32 (16%) had a DVT, 10 of these being managed as an outpatient. 50 patients were low risk on pre-test clinical scoring and a negative D dimer and were discharged to GP. 118 of 150 patients had a negative ultrasound on presentation. Only 55 (47%) patients were reassessed at seven days with only 21 of these patients undergoing repeat ultrasound. Only 2 patients had a DVT diagnosed on repeat USS evaluation. 54 patients with moderate or high risk on clinical pre-test scoring had a D-dimer measured

**Conclusions:** The current study has a positive diagnosis rate of 16%, equal to any other in the current literature. The study highlights the difficulties in reassessment of patients using protocol driven diagnosis. Often a more obvious diagnosis is apparent at reassessment and can confidently be made with an initial negative scan. The authors believe that if no alternative diagnosis is apparent at reassessment, formal Wells' scoring and D-dimer should be repeated.

## THE LIMITATIONS OF THE SPINAL BOARD

**D. S. Vickery.** *Emergency Department, Gloucestershire Royal NHS Trust, Gloucester GL1 3NN.*

**Introduction:** In the pre-hospital care of trauma victims the spinal board is the established gold standard for extrication and spinal immobilisation. There is published evidence that its use in subsequent hospital care is variable and at times inappropriate. This uncertainty in the Emergency Department may be due to a lack of understanding of the limitations of the spinal board, and be compounded by dogmatic interpretation of ATLS principles.

**Objectives:** The effect of prolonged patient immobilisation on the spinal board was examined, with particular reference to five clinically relevant categories: pressure sores; adequacy of spinal immobilisation and support; pain and discomfort; respiratory compromise; and quality of radiological imaging.

**Methods:** A comprehensive database search of the literature and review of relevant trauma texts. Papers were critically appraised along standard guidelines.

**Results:** Experimental studies of interface pressures and of transcutaneous oxygen tension supports the clinical evidence of an association between time on the spinal board and the risk of pressure sores. Lack of lumbar support and non-standardisation of cervical spine padding may jeopardise spinal integrity along with inadequately fastened straps. Experimental studies support the clinical finding of spinal board-induced pain and subsequent difficulty with accurate assessment. Reductions in pulmonary function have been shown in studies examining the influence of torso strap tension.

**Conclusion:** The spinal board should be removed in all patients soon after arrival in the Emergency department, ideally after the primary survey and resuscitation phases.

## SHO WITHDRAWALS FROM HOSPITAL POSTS: A QUESTIONNAIRE SURVEY

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**Objectives:** To assess the nature and number of unexpected withdrawal by SHOs after acceptance of a hospital post at interview, and to investigate the reasons and possible solutions.

**Design:** Postal questionnaire-based study.

**Subjects:** Medical staffing departments, Accident and Emergency consultants and withdrawing SHOs in England.

**Main outcome measures:** Unexpected withdrawals by hospital specialty, three-year trend in A&E departments, notice and reasons given, and action taken.

**Results:** 39% of medical staffing departments reported unexpected withdrawals in a broad spectrum of specialties for February 1998. In the specialty of A&E medicine this occurred in 34% of departments. Overall 72% of A&E departments had experienced this problem over a three year period, and the trend is increasing. The majority of A&E consultants (70%) took no action, and there was a lack of consensus amongst all respondents on the appropriate course of action to prevent this escalating problem.

**Conclusions:** Unexpected SHO withdrawal is a substantial issue in hospital medicine and has been increasing in A&E medicine. Measures to prevent this national problem are urgently needed.

## HOW SHOULD WE MANAGE FIRST RIB FRACTURE?

**M. Lindley-Jones.** *Accident and Emergency Dept, Ipswich Hospital, Heath Rd, Ipswich IP4 5PD.*

**Introduction:** First rib fracture is known to be associated with severe trauma. Recognised complications include, subclavian vascular injuries, brachial plexus injury and associated injuries to lung, media stium and cervical spine {1}.

**Case:** A case of bilateral first rib fracture in a 31-year-old male after a road traffic accident will be presented.

**Incidence of Complications of 1<sup>st</sup> rib fracture:** 2/3 of 1<sup>st</sup> rib fractures are associated with major thoracic injury. An Isolated and undisplaced fracture = 3% risk of vascular damage, usually to subclavian artery or vein. Displaced or at subclavian sulcus = slightly higher risk of vascular damage. Associated head, thoracic, abdominal or long bone injury = 24% risk of vascular damage. Delayed haemorrhage (usually associated with new pain, up to 6 days post injury). In one study 2 of 15 patients had brachial plexus injury. Other complications include Pneumothorax, Pneumomediastinum, cardiac and valvular tear.

**Investigation of patients with first rib fractures:** In view of the high rate of associated vascular injury the threshold for radiological investigation should be low. The gold standard is subclavian and aortic arch angiography, however spiral CT scanning with contrast is almost as sensitive and less invasive. Guidelines for further investigation are suggested.

**Conclusion:** Traumatic first rib fractures are most common after road traffic accidents, are the result of high-energy transfer and often have associated injuries. Commonly associated injuries are neurological or vascular deficit in the upper limbs, pulmonary contusion, pneumothorax and c-spine fracture. These injuries should be excluded in patients with first rib fracture and further radiological investigations are often warranted.