

Abstracts from the 'Free Papers' at the Trauma Care Conference, May 2011

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Introduction

Trauma Care's International Conference, held in Telford, UK in May 2011, once again featured a successful 'Free Paper' competition, which attracted abstracts and presentations from a variety of disciplines related to trauma. The overall standard was high but the winning presentation came from Adam Low (see p. 371). Presenting authors are marked by *.

Venous thromboembolism: reducing the risk. A complete audit cycle of current practice in the orthopaedics department at Hull and East Yorkshire NHS trust

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Introduction: It is estimated that 25,000 people in the UK die from hospital-acquired venous thromboembolism (VTE) every year. Thromboprophylaxis is important to reduce this risk; however this carries a risk of bleeding. The current practice in the Orthopaedics department at Hull and East Yorkshire NHS trust, is to fill VTE risk assessment forms for every admission to be compliant with the National Institute for health and Clinical Excellence (NICE) guidelines. This risk assessment also has financial implications for NHS trusts.

Aims and Methods: To audit the compliance of using VTE risk assessment forms by junior doctors through two retrospective audits conducted at the elective CHH (Castle Hill Hospital) and trauma HRI

(Hull Royal Infirmary) sites. These were presented locally.

Results: First cycle: 50 patients' case notes reviewed at CHH with (94%) compliance; however, patients treated as per protocol were 49 (98%). 56 case notes reviewed at HRI with (73.2%) compliance and (100%) patients treated as per protocol. Second cycle: 50 patients' case notes reviewed at CHH with (100%) compliance, 56 patients' case notes reviewed at HRI with (92.9%) compliance.

Conclusion: These audits achieved improvement in our practice by educating junior and senior medical staff about the importance of filling these forms to improve patient's safety and to reduce the risk of thromboembolism.

The relationship between head injury and the haemodynamic response to tracheal intubation

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Introduction: Tracheal intubation is frequently required in the early management of head injured patients. By providing a secure airway and allowing controlled ventilation, this intervention may reduce the incidence of secondary brain injury, a significant

cause of morbidity and mortality. The procedure itself may, however, provoke a potentially harmful sympathetic response in head injured patients. Although reduced consciousness is thought to suppress airway reflexes, the influence of head injury on these reflexes is unknown. We aim to describe the influence of head injury severity on the haemodynamic response to laryngoscopy and tracheal intubation.

Methods: We performed a retrospective analysis of 97 consecutive head injured patients who underwent tracheal intubation in a physician-led Helicopter Emergency Medical Service. Primary outcome was the acute haemodynamic response to the procedure. An adverse response was defined as a greater than 20% change from baseline recordings.

Results: The incidence of an adverse hypertensive response to laryngoscopy and tracheal intubation was 80%. In 11% of cases blood pressure increased by $\geq 100\%$. There was attenuation in the heart rate ($p=0.075$), mean arterial pressure ($p=0.066$) and systolic blood pressure ($p=0.024$) response with increasing head injury severity. In the most severe head injuries (GCS 3), the incidence of an adverse hypertensive response was 63%.

Conclusions: Head injury attenuates the haemodynamic response to laryngoscopy and tracheal intubation. This effect is unpredictable and insufficient to prevent an adverse haemodynamic response in even the most severe head injured patients. The need to attenuate the haemodynamic response should be assessed independently of head injury severity.

Impact of blunt and penetrating chest trauma management on the deliverance of cardiothoracic service in a busy tertiary care centre

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Introduction: Chest injuries constitute a continuing challenge to the cardiothoracic department. This study was conducted to outline the aetiological spectrum, injury patterns and short-term outcome of chest injuries and its impact on the deliverance of major and minor elective cardiothoracic surgical care in a tertiary care centre.

Methods: This was a retrospective study involving chest injury patients admitted to Royal Infirmary of Edinburgh over a 12-month (2010) period.

Results: A total of 70 chest injury patients were admitted. Males outnumbered females by a ratio of 10:2. Their mean age was 47.5yrs (± 17.5). The majority of patient's sustained blunt injuries (58), of which there were 16 RTAs and 30 falls. Twelve of them sustained penetrating injury of which 11 were stab injuries. Only 4 patients required operative intervention (VATS=2, Thoracotomy=2). Underwater seal drainage was performed in 28 patients (40%). The majority of patients (66) were treated successfully with non-operative approach. Chest wall wounds, haemothorax and rib fracture were the most common type of injuries. Eighteen associated injuries were noted, of which there were 5 head/neck, 10 musculoskeletal and 3 abdomen injuries besides the chest injury requiring further referrals. The mean LOS was 4.9 days (± 4.6) and mortality rate was 0%. 17 Patients required ITU/HDU care. There were 34 cancellations of major Cardiac/Thoracic elective operations due to unavailability of suitable ITU/HDU or ward bed during this period.

Conclusion: We conclude that there is a significant adverse impact of chest trauma on the delivery of elective cardiothoracic care in a busy tertiary centre.

Autologous cell salvage within an Emergency Department – a feasibility study

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Introduction: Autologous cell salvage is widely accepted within surgery (Niranjan et al., 2006) and obstetrics (McDonnell et al., 2010). However, there is no current convincing evidence or guidelines for cell salvage in the Emergency Department (ED) for patients with major traumatic injuries. The aim of our study was to investigate the feasibility of using cell salvage in an ED setting in the management of massive haemorrhage.

Methods: Retrospective data was collected using a data collection sheet from hospital admission notes on all trauma patients attending a regional major trauma centre from April to December 2010 using the ED database. The data was then examined to look for activation of the massive transfusion protocol. The cost effectiveness was also calculated.

Results: 739 patients presented to the ED in the eight month period as having sustained major trauma. This included both blunt and penetrating trauma. There were a total 43 patients who had a massive transfusion protocol activated. 16 of them received massive transfusion of 10 units or more. 8 would have benefited from cell salvage. The average cost for a unit of cross matched blood is £142 compared to £60–£80 for the disposables required for the integrated cell salvage collection system.

Discussion: The average yield is approximately 40% of collected volume and the salvaged blood must be used within 2 hours. We calculated this service to be cost effective from volumes of approximately 250–500ml of blood onwards. We are aiming to set up a cell saver in stand-by mode (only suction and reservoir with anticoagulant). Since the study we have started using normal saline in all our chest drains instead of water to facilitate cell salvage. Deployment of 'Stand-by cell salvage' is a realistic, practical alternative solution within the confines of an ED.

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Non-operative management of blunt renal trauma in very young children. Experiences from a dedicated South African paediatric trauma unit

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Blunt abdominal trauma results in renal injury in 10% of paediatric cases. Over the last twenty years, the management of paediatric renal trauma has shifted towards a primarily non-operative approach that is now well-established for children up to 18 years old. This retrospective study reviews our experiences of non-operatively managing blunt renal trauma in a very young cohort of patients up to 11 years old.

Between June 2006 and June 2010, 118 children presented to the Red Cross War Memorial Children's Hospital in Cape Town with blunt abdominal trauma. 16 patients shown to have sustained renal injury on abdominal computed tomography (CT) scanning were included in this study. Medical records were reviewed for the mechanism of injury, severity of renal injury, clinical presentation, associated injuries, management method and clinical outcomes. All renal injuries were graded (I–V) according to the American Association for the Surgery of Trauma Organ Injury Severity Scale. All renal trauma patients included in this study were aged between 1 and 11 years (mean of 6.5 years). 1 patient sustained grade V injuries; 2 grade IV, 6 grade III and 7 grade I injuries. The majority of injuries (9/16) were caused by motor vehicle crashes,

whilst 5 children fell from height, I was struck by a falling tree and I hit by a moving train. 1 of 16 patients was haemodynamically unstable on presentation as a result of multiple splenic and hepatic lacerations. He was resuscitated and underwent immediate laparotomy. However, his renal injuries were not indications for surgical management. 15 haemodynamically stable patients were non-operatively managed for their renal injuries. Following lengths of admissions ranging from 4 to 132 days, all 16 patients were successfully discharged with no mortalities. No significant complications of renal trauma, such as new-onset hypertension, were detected during their first follow up outpatient appointments. Our findings successfully extend non-operative management of haemodynamically stable renal injuries to a very young cohort up to 11 years old. However, we still advocate immediate resuscitation and surgical intervention for any haemodynamically unstable child who had sustained any abdominal injury. We also argue for a limited role for abdominal CT imaging for diagnosing renal injury and routine follow up, instead recommending a greater emphasis on clinical observations for possible complications.

Should paediatric supracondylar fractures go to theatre out of hours if there is no neurovascular deficit?

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Introduction: Some studies have demonstrated that outcomes are not compromised when surgery on paediatric supra-condylar humerus fractures with no neurovascular deficit is delayed beyond 8 hours. General opinion still favours operating on this injury within 6 hours and 'out of hours' instead of waiting until the next day. This study aims to investigate the timing of surgery on outcome.

Method: A retrospective case note review of paediatric supracondylar fractures requiring surgery that presented to a Scottish Trauma and Orthopaedic Department between 2004 and 2008 was performed.

Results: 68 patients (mean age 7 years; range 2–13 years; 29 female; 39 male) were included. Fracture types were classified: 19 Gartland type-II, 47 Gartland type-III and 2 Flexion type. 55 patients had no neurovascular compromise. Of these 40 patients had an operation during working hours (33% open reduction) and 15 patients had an operation 'out of hours' (60% open reduction) ($p=0.062$ Fisher's exact). Seniority of the operating surgeon was documented in 62 cases. In working hours 62% of operations were Consultant led compared to 37% in 'out of hours'. Open Reduction was performed in 42% of Registrar led operations compared to 39% of Consultant led operations.

Discussion: In cases of supracondylar fractures with no neurovascular compromise, patients had lower rates of open reduction if surgery was performed during the day by an experienced surgeon. These cases may be best kept in traction/backslab until the next day.

A years experience of emergency aero medical evacuations from a developing world conflict zone

A Low

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Background: Somalia has been without effective government for nearly two decades. The Transitional National Government, supported by the UN backed African Union troops, struggles to maintain a safe zone in Mogadishu. AMREF Flying Doctor Service provides air ambulance evacuations to Nairobi and beyond for specialist care from the level 2 field hospital in Mogadishu.

Aim: To describe the logistical management of civilian air ambulance crew evacuating peace keeping troops

from a conflict zone, and the describe the case mix requiring evacuation.

Methods: Medical transfer documentation and follow up were retrospectively analyzed from October 2009 – September 2010.

Results: 43 evacuation flights were flown, transferring 120 patients: 82 trauma cases (1 non-conflict related). Other cases included medical (12), ophthalmology (11 – 9 cases related to bomb blast), ENT/Maxfax (7), burns (4), neurology (3) and psychiatry (2). The trauma aetiology included long bones fractures, penetrating chest and abdominal injuries, multiple fragment injuries secondary to bomb-blast, pelvic and head injuries (ranging from mild to severe according to GCS). There was only a 4% mortality rate in patients evacuated.

Discussion: I will describe the management of these cases on ground and in-flight, how our service responded to two major incidents, and known follow up outcomes for the patients evacuated.

Conclusion: Evacuating patients from a developing world conflict zone presents unique challenges and logistical considerations for emergency medical teams/pre-hospital practitioners. Trauma cases made up the majority of evacuees

Management of scaphoid injury in the South West

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Introduction: The scaphoid is the most commonly fractured carpal bone (Boles, 2011). Initial examination and plain film radiography are neither specific nor sensitive for fracture making immobilisation, follow up, and further imaging necessary to prevent morbidity (Parvizi et al., 1998). There is evidence for a number of definitive investigations, which has led to a range of protocols to be applied regionally (Smith et al., 2010).

Methods: 15 EDs in the Southwest region were contacted by phone. Structured interviewing,

based on a clinical vignette describing a patient with clinical scaphoid fracture but normal plain film radiographs, was used to identify local protocol in managing the case described. Where follow up was not under the care of the ED the relevant department was contacted and the same questions were directed to the relevant Consultant.

Results: ED response: 15/15 (100%). Other department response: 5/7 (70%). One hospital performed CT scan at presentation, or next day if presenting out of hours. 14/14 EDs immobilised clinical scaphoid fractures. 2/14 used POP. Follow up was performed by 8 EDs, and 6 Orthopaedic Departments. At follow up 11/12 hospitals performed a second plain film radiograph. As a definitive investigation, 7/13 hospitals performed MRI, 5/13 performed CT. One hospital performed neither CT nor MRI.

Conclusion: Practice varies across the South West, with no use of bone scintigraphy or ultrasound. MRI is used more frequently as a definitive investigation. Local pressure for access to MRI and CT are likely to be contributing factors in this choice.

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A comparison of discharge diagnoses over the duration of three contrasting British music festivals

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Introduction: The three large British music festivals; Leeds, Latitude and Download present a challenging and unpredictable setting for medical services. The assessment of adequate care in varying festival settings is yet to be fully explored. This study aims to compare the discharge diagnoses, medical usage rates and the effects of environmental variables in the hope of identifying suitable health interventions that could be implemented in the future.

Method: A retrospective review of 12,428 anonymised Patient Report Forms (PRF's) from three festivals over the period; 2008–2010. All information is provided by 'Events Medical Services Ltd'; the medical cover at the festivals during the given time frame. The appropriate data was extracted from the PRF's to be analysed using SPSS statistics programme.

Results: The highest medical usage rate was found at Download 2009 (326 per 10,000) and 'environment' was the highest discharge diagnosis category; crude rate; 138.27 (CI: 116.85–163.04). For all other festivals studied from 2008–2010, 'trauma' was the leading category with the highest rate at Leeds 2010; crude rate 140.40 (CI: 118.69–165.21). Surprisingly, Leeds 2008 showed a substantially higher frequency and crude incidence rate; 3.9 (CI: 1.09–8.77) of morning after pill administration compared to the other festivals.

Discussion: The high prevalence of trauma may be due to the behaviour of festival attendees and crowd setting, alongside alcohol and drug intake. Environmental related incidents were common with weather being the major contributing factor. Areas have been recognised as potential health interventions such as pre-weather warnings and advice, distribution of sun cream and water, improved open fire control and provision of insect repellent. An unexpected finding particularly at Leeds was a high request of the morning after pill, compared with the other festivals. Promotion of safe sex practices and distribution of free contraception could be implemented.

Conclusion: Trauma and environment related incidents occur frequently and more adequate planning and preparation could reduce the number of patrons seeking medical attention.

An unusual case of acute compartment syndrome of the thigh following blunt sporting injury followed by a spontaneous haematoma formation in the substance of the vastus medialis

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We report a case of acute anterior compartment syndrome of the thigh following trivial blunt trauma to a football player to the thigh with direct impact injury to the lateral side. He complained of dull ache in his thigh since the time of injury now increasing in intensity. He was brought into the ED where examination of the right femur revealed a tender tense right thigh. Intra-compartment pressures measured in the ED of 69mmHg prompted the patient to be prepared for immediate surgical decompression which revealed profuse muscle oedema with no haematoma. A wound check and closure at 48 hours was done. There was re-admission with wound dehiscence and was taken to the OR for further washout and closure. His symptoms persisted postoperatively and prompted an MRI scan revealed a circumscribed homogenous opacity consistent with a haematoma in the vicinity of the vastus-medialis. He was taken to theatre finally and the vastus-lateralis was lifted and approximately 900 mls of fresh haematoma was expelled. A further washout and primary closure was done. There was complete resolution of symptoms. The initial intraoperative finding was of muscle oedema and a subsequent haematoma formation in the substance of the vastus-medialis days after the initial injury raises the suspicion of the extent of blunt injury not anticipated at the time of initial surgery. We recommend blunt injury causing compartment syndrome are associated with intramuscular bleeding in the compartment, which may accumulate slowly and should be

under surveillance for delayed onset of this potentially devastating syndrome.

The management of ankle fractures at a general hospital and the potential health economics of initial home therapy

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Introduction: Ankle fractures commonly present to A&E departments and swelling is a complication and frequently leads to the delay of an operation. A recent paper published by Lloyd et al highlights the cost effectiveness of sending patients home with ankle fractures that are too swollen for an operation.

Method: A retrospective audit was carried out looking at the management of ankle fractures at a busy district general hospital in south London. A proforma format was used receiving input from the patients medical notes along with electronic records and X-rays over a 3 month period.

Results: There were 28 patients included in the audit and an average length of time from admission to operation for all types of ankle fractures was 1.2 days. However for unimaleolar fractures the average length of time between admission to operation was 0.8 days compared to the bimalleolar of 1.4 days and trimalleolar of 2.4 days.

Conclusion: Ankle fractures are managed very effectively at this hospital with the majority having an operation on the same or next day. No financial gain would be seen from sending unimaleolar ankle fracture patients home with bimalleolar and trimalleolar ankle fractures with significant noticeable swelling there was a delay. The health economic impact of sending patients home with ankle fracture in this hospital would not be as impressive as other

hospitals due to the efficiency of the service. We propose that bimalleolar and trimalleolar ankle fractures with swelling which precludes the surgical intervention and are to be sent home.

Evaluation on the provision of feedback to ambulance crews from A&E departments within the West Midlands

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Background: Ambulance crews (ACs) form the initial link in the chain of continuing medical care that occurs during a patient's journey. Feedback to ACs is essential to allow for improvements in pre-hospital care. There is limited literature regarding feedback from A&E departments to ACs (Jenkinson et al., 2009). However, there is support for feedback systems within other medical professions (Clynes et al., 2008; Lambert et al., 2009).

Current Practice: The authors are not aware of a national framework on feedback provision from A&E departments to ACs. At a local level there has been a system in place at three established A&E departments; Birmingham Children's Hospital, Birmingham Heartland's Hospital and University Hospital North Staffordshire.

Objectives: The authors examined current methods of provision of feedback on patient outcome provided by A&E departments to ACs within the West Midlands.

Methods: Questionnaires were distributed to ACs and A&E departments over an 8 week period. 8 A&E departments were contacted to determine their provision of feedback to ACs.

Results: 101 questionnaires were collected (6 were incomplete). 32% of ACs receive some

form of feedback (only 11% receive 'formal' feedback). The most common form of feedback is 'word of mouth'. 99% of ACs would like to receive more formal feedback. Only Birmingham Children's Hospital currently provides a formal feedback service.

Recommendations: We believe that regional standards should be set on the provision of feedback to ACs from A&E departments. A&E departments and the Ambulance Service need to work together to allow implementation of an effective formal feedback service. Audit should take place once the system has become well-established.

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Laparotomy and laparoscopy for trauma – experience of a single institution

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Aim: The aim of this study was to review a single institution's experience of laparotomy and laparoscopy performed for trauma between 1 July 2000 and 31 December 2008.

Method: All patients who had undergone a laparotomy for trauma at our institution between 1 July

2000 and 31 December 2008 were identified from a prospectively collected trauma registry. A retrospective note review was then undertaken.

Results: The Royal Children's Hospital, Melbourne provides a tertiary paediatric trauma service to a population of 6 million. During the study period there were 16,789 admissions for trauma. 617 (3.5%) patients had abdominal and/or urological injuries. A study population of 66 (10.7%) patients was identified. Complete data was obtained for 59 patients. Incomplete data was obtained for 7 patients (charts unavailable: 3 missing; 4 involved in legal cases). 46 males and 19 females underwent a laparotomy. 1 female had a diagnostic laparoscopy. Median age was 10.5 years (range 2.68–16.4 years). Median ISS 10 (Range 4–75). 6(9%) patients had penetrating trauma. 37(56%) of patients presented initially to other hospitals. Median time from injury to theatre was 18.5 hours (range 2 hours–9 days). 38(57.6%) patients underwent surgery within 24 hours. Indications for surgery included perforation (31.8%), peritonitis (24.2%), renal injury (12.1%), haemodynamic instability (10.6%), penetrating injury (9.1%) and pancreatic injury (9.1%). A consultant made the decision to operate in 38(64.4%) cases. Median time in theatre was 120 minutes (Range 45 – 300 minutes). Only 1 patient had a splenectomy. 1 patient died intra-operatively (Grade V liver injury). 15(22.7%) patients were admitted to PICU (median stay 1.7days (range 7 hours – 47 days), whilst 50(75.8%) were managed on the ward. Median length of admission was 8.8 days (range 44 hours – 96 days). 16(24.2%) patients developed complications. 3(4.5%) patients died.

Conclusion: Laparotomy in the setting of paediatric trauma is uncommon. The majority of patients recover uneventfully.