

gases, and lactate levels were obtained pre-exposure, at 5, 15, 30, 60 min, 24, 48 and 72 hrs post-discharge.

Results: No acute or delayed cardiac arrhythmias were seen. Heart rate was not affected significantly ($p > 0.05$). A subclinical increase in troponin I was seen at 24 hrs post-discharge (0.040 ± 0.030 ng/ml, mean \pm SEM, $p > 0.05$). Central venous blood pH (7.432 ± 0.014) and pCO₂ (36.1 ± 0.9 mmHg) were not changed significantly ($p > 0.05$) during the 60 min post-discharge period. A moderate, significant increase in lactate occurred in the 5 min post-discharge group (4.9 ± 0.3 mmol/L, $p = 0.0179$). All blood chemistry and vital signs were normal at 24, 48, and 72 hrs post-discharge.

Conclusions: Although significant changes in some parameters were seen, these changes were small and of little clinical significance. Lengthy EID exposures did not cause extreme acidosis or cardiac arrhythmias. These findings may differ from those seen with other EID devices due to the unique MK63 waveform characteristics or to specific characteristics of the model systems.

355 Does Tourniquet Time Affect Venous Lactate?

Drew Watters, Anne Richter, Frederick Bartoletti, Michael Hudson, Alice Min, Mahmood Vahedian, Katherine Hiller.
University of Arizona

Introduction: Lactate is used to diagnose early or occult tissue injury in emergency department patients. Elevated lactate levels prompt further diagnostics and interventions. Many physicians believe that venous lactate can be falsely elevated if a tourniquet has been applied for a protracted length of time; for that reason some advocate routine arterial sampling. However, the effect of tourniquet time on venous lactate has not been studied.

Objectives: To test if prolonged tourniquet time would elevate venous lactate levels in healthy subjects.

Methods: Design: in an IRB-approved experiment, an automated tourniquet was inflated to 60 mmHg on each subject's arm. To simulate normal and extreme conditions, samples were drawn at one minute and ten minutes after inflation. The subjects consisted of thirteen healthy adults; the average age was 32 years old, 53% were male, 69% White. Exclusion criteria included age under 18, heart/lung disease, history of deep venous thrombosis, vascular disease, dialysis dependency, known clotting disorder, recent injury or strenuous activity (in previous 12 hours), and drug use in the past week.

Results: The average venous lactate level after one minute of tourniquet time was 1.76 mmol/L (normal range 0.8-2.2 mmol/L). After ten minutes the average was 1.90 mmol/L. There was no statistically significant change in the lactate level. Four subjects had elevated lactate levels after one minute (average 2.98 mmol/L).

Conclusions: In healthy adults, protracted tourniquet time did not elevate venous lactate. Clinicians should not assume elevated lactate is the result of tourniquet time. Four subjects were found to have elevation after only one minute of tourniquet use. This may represent a subset of patients who rapidly produce lactic acid,

with no underlying tissue injury. Further research is needed to explore that possibility, and delineate what, if any, difference arterial versus venous lactate could have in reducing falsely elevated results.

356 A Simple Scoring System Derived from FAST Findings and Vital Signs Predicts the Need for Urgent Laparotomy in Patients with Blunt Abdominal Trauma

Michael Manka, Ronald Moscati, Krishnan Raghavendran, Aruna Priya.
State University of New York at Buffalo School of Medicine and Biomedical Sciences

Objectives: The FAST exam is routinely used to identify intraperitoneal free fluid in victims of blunt trauma. For patients with positive FAST exams, the decision to forego further imaging and proceed directly to laparotomy is highly physician dependent. We set out to derive a simple scoring system utilizing both ultrasound findings and immediately available physiologic data that would predict which patients require a laparotomy.

Methods: We performed a prospective observational study on victims of blunt trauma who presented to our level one trauma center. A previously published ultrasound scoring scale of 0-8 was utilized to score FAST exams. 20 variables including pre-hospital and ED vital signs and lab values were collected. Records were reviewed by a trauma surgeon to determine which subjects required an urgent laparotomy. Logistic regression analysis was used to determine which combination of variables had the strongest correlation with the need for laparotomy. A simple scoring scale was derived to predict the need for laparotomy.

Results: 1,384 patients were enrolled of whom 40 required urgent laparotomy. Combining ultrasound score, ED pulse, and ED blood pressure in a three variable model produced an AUC of 0.852. A scoring system was derived with a minimum score of 0 and a maximum of 6. Patients with a score of >3 had an odds ratio of 35.1 (95% CI = 17.6 to 70.3) for requiring laparotomy. Applying this scoring system to our database resulted in a specificity of 0.969.

Variable	Score
Ultrasound Score	
0	0
1	2
>1	3
Pulse	
<120	0
≥ 120	2
BP	
<90	1
≥ 90	0

Conclusions: While the FAST exam easily identifies free intraperitoneal fluid in blunt trauma patients, it often fails to convince our surgical colleagues to take patients directly to the operating room. Our simple scoring system provides a tool that combines FAST findings with

physiologic data to predict with a high specificity the need for laparotomy within minutes of ED arrival.

357 **The Association of Coagulopathy and Traumatic Brain Injury**

Shahriar Zehtabchi, Samara Soghoian, Yiju Liu, Kristin Carmody, Lekha Shah, Brian Whittaker, Richard Sinert.

Department of Emergency Medicine, State University of New York, Downstate Medical Center

Background: The emergence of prothrombotic agents (e.g., activated factor VII) to treat Traumatic Brain Injury (TBI) requires better understanding of the association of coagulopathy with TBI.

Objectives: To investigate the association of TBI and coagulopathy in Isolated Head Injury (IHI) while controlling for possible confounding variables.

Methods: Prospective, observational study of trauma patients in an urban level I trauma center. Inclusion criteria: Adult (13 years and older) patients with IHI. Exclusion criteria: known coagulopathy and anticoagulant therapy. Predictor Variables: TBI (head abbreviated injury severity score >2, or brain hematoma on CT scan), age, gender, mechanism of injury, Glasgow Coma Score (GCS), and loss of consciousness (LOC). Outcome variables: Coagulopathy defined as elevated International Normalized Ratio (INR > 1.3). We divided subjects into two groups of patients with and without coagulopathy. Statistical Analysis: Fisher's exact test and Mann-Whitney-U were used to compare data where appropriate (α ; = 0.05, 2 tails). A multinomial logistic regression model was generated for identifying predictor variables associated with the coagulopathy.

Results: From July 2005 to December 2006, 276 patients with IHI were studied. The mean age was 39 ± 19 years (79% male, 88% blunt trauma). 8% had coagulopathy (95% CI = 5% to 12%). We observed no significant difference between coagulopathic and non-coagulopathic groups with respect to age, gender, and mechanism of injury. The INR was significantly higher in TBI patients compared to those with no TBI (p:0.03). The logistic regression analysis revealed that coagulopathy was associated only with TBI (odds ratio: 4.4, 95% CI = 1.2 to 16.1, p:0.02) and not with age, gender, mechanism of injury, GCS or LOC.

Conclusions: A coagulopathy demonstrated by elevated INR is associated with TBI after isolated head injury. This study paves way for trials testing the use of prothrombotic agents in the subset of coagulopathic TBI patients.

358 **Gender and Outcome after Mild Traumatic Brain Injury**

Jeffrey Bazarian, Shannon McLellan.

University of Rochester School of Medicine

Objectives: To estimate the independent effect of gender on outcome after mild traumatic brain injury (mTBI).

Methods: Prospective, observational study of a convenience sample of mTBI patients presenting to an academic ED between January 2003 and September 2004. Research assistants collected in real-time information on demographics, symptoms, physical exam features,

mechanism of injury, associated features, and head CT results. Three months after the ED visit, outcome was determined by post-concussive symptom self-report over the telephone using the Rivermead Post Concussion Questionnaire (RCPQ). Each of 16 post concussive symptoms were rated on a Likert scale ranging from 0 (absent) to 4 (severe). Total scores ranged from 0-64. Scores greater than 4 were considered post concussive syndrome (PCS). The relationship between gender and outcome was analyzed using multivariate logistic regression (outcome PCS) and multiple linear regression (outcome RCPQ score) with control for race, ethnicity, age, prior TBI, GCS, mechanism of injury, presence of associated injuries/illness, abnormal head CT, chronic use of analgesics before injury, receipt of analgesics in ED, and involvement in litigation over injury.

Results: Of the 1,912 subjects enrolled, 1,438 (75%) could be contacted at 3 months; 13 had missing variables leaving 1,425 available for analysis. Median age 24 years, 44% were female. Three months after mTBI, 53% had PCS and the median RCPQ score was 4. Multivariate analysis found females to be more likely to have PCS (OR 1.29, 95% CI = 1.01 to 1.65) and higher RCPQ scores (parameter estimate 2.9, $p < 0.0001$) compared to males.

Conclusions: Female gender is associated with a significantly higher risk of poor outcome after mild TBI, after control for appropriate confounders. Understanding the factors contributing to this observation may shed light on mechanisms of injury and putative therapeutic interventions.

359 **Transfer of Medication Administration Information from Critical Care Transport Teams to Trauma Teams**

Michael Frakes, Wendy Lord, Sue Verrengia, Susan Gaeta, Kenneth Robinson, Jacqueline McQuay, Aaron Harman.

Hartford Hospital

Introduction: Poor "hand-off" causes up to half of medication errors, and optimized medication reconciliation is a JCAHO Patient Safety Goal. Patients arriving by critical care transport (CCT) teams are frequently medicated in transport. We evaluate transfer of medication administration information from CCT to ED trauma teams.

Methods: A retrospective review of 144 consecutive CCT records and matched ED trauma records. ED records were abstracted for documentation of in-transport administration of neuromuscular blocking agents (NMBA), etomidate, opioids, benzodiazepines, or ACLS medications, then compared with the matched CCT record. The medication: 26 patients received short-acting NMBA, with drug name documentation on the ED record for 10 (38.5%) and dose documentation for 1 (3.8%); long-acting NMBA for 29 patients, with name documentation for 21 (53.8%) and dose documentation for 3 (7.7%); opioid for 86 patients, 56 (65.1%) with name documentation and dose for 26 (30.2%); benzodiazepine for 33 patients, 21 (63.6%) with name documentation, and 6 (18.2%) with dose information; etomidate for 27 patients, name documentation for 9 (33.3%) and none with dose documented; ACLS medication for 15 patients, name documented on ED record for 9 (60%) and dose for 2 (13.3%).