



Resident Journal Review: July - August 2008

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This is a continuing column providing journal articles pertinent to EM residents. It is not meant to be an extensive review of the articles, nor is it wholly comprehensive of all the literature published. Rather, it is a short list of potentially useful literature that the busy EM resident may have missed. Residents should read the articles themselves to draw their own conclusions. These selections are from papers published in March and April 2008.

Valentino M, Serra C, Pavlica P, et al. Blunt abdominal trauma: diagnostic performance of contrast-enhanced US in children--initial experience. Radiology 2008;246:903-9.

This study prospectively enrolled pediatric trauma patients to evaluate the diagnostic ability of contrast enhanced ultrasound to detect solid organ injury in pediatric patients with abdominal trauma. Both conventional and contrast enhanced ultrasound exams were performed on enrolled patients. Contrast enhanced computed tomography was used as the gold standard.

Twenty-seven patients with moderate to severe injuries were included in the final analysis. Each of these patients sequentially had a conventional ultrasound exam, a contrast enhanced ultrasound exam and a contrast enhanced CT. A separate sonographer was used for contrast-enhanced and conventional studies. The sonographers and CT radiologist were blinded to the results of the other imaging studies.

Contrast-enhanced ultrasound detected 13 of 14 injuries identified on contrast enhanced CT. The sensitivity and specificity of contrast-enhanced ultrasound was 92.9% and 100% respectively.

Contrast CT is a mainstay in the evaluation of blunt abdominal trauma. While there is an established role of ultrasound in the evaluation of blunt trauma, conventional ultrasound is not a reliable method for the detection of parenchymal injuries. Additionally, hemoperitoneum is not always present after a solid organ injury. This preliminary study suggests that contrast-enhanced ultrasound may have a role in the initial evaluation of parenchymal injuries in pediatric patients with blunt trauma. In addition, the authors suggest that this modality may be a radiation sparing alternative for sequential evaluation of injuries identified through other means. The study does not advocate for the replacement of CT scanning in the evaluation of pediatric trauma patients; however, an expanded role of contrast-enhanced ultrasound is supported.

Fasano CJ, O'Malley G, Dominici P, Aguilera E, Latta DR. Comparison of octreotide and standard therapy versus standard therapy alone for the treatment

of sulfonylurea-induced hypoglycemia. Annals of emergency medicine 2008;51:400-6.

This was a randomized, double-blind, controlled trial of octreotide therapy in a group of patients presenting to an emergency department with sulfonylurea-induced hypoglycemia. Study patients were treated with an ampule of 50% dextrose and an oral carbohydrate meal on presentation. They were then randomized to either a placebo arm or single treatment of 75ug of octreotide subcutaneously. In the group of 22 patients randomized to octreotide, serum glucose measurements were higher, and refractory episodes were less frequent. The benefit of the medication extended to the eight hour mark, which is consistent with the duration of action of octreotide.

Octreotide is not FDA approved for the treatment of sulfonylurea-induced hypoglycemia; however, it is often recommended for such use by toxicologists. This study was the first randomized, controlled trial of the somatostatin analog to this clinical end.

Menaker J, Philp A, Boswell S, Scalea TM. Computed tomography alone for cervical spine clearance in the unreliable patient--are we there yet? J Trauma 2008;64:898-903.

Newer generations of computed tomography scanners have called into question the practice getting a magnetic resonance image of the cervical spine in obtunded patients who have a negative CT scan, prior to removing a hard cervical collar. This single-center study was conducted to evaluate the sensitivity of newer generation CT scanners for the detection of significant cervical spine injuries in patients with an unreliable physical exam.

203 patients in the trauma registry had a negative CT scan of the cervical spine and had no obvious neurologic injury, but because their exam was unreliable, were kept in a stabilizing hard collar. 184 (91%) of these patients had no injuries identified on subsequent MRI, and their hard collars were removed. 18 (9%) of the patients had abnormal MRI exams, two of which required operative repair and 14 required prolonged hard collar use.

This study supports the practice of keeping the c-collar on in the emergency department, even in the setting of a negative multi-detector CT study of the cervical spine, if the patient has altered mental status or not cooperative

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with a physical exam. Both stable and unstable cervical spine injuries can be missed by this imaging modality, necessitating later investigation with an MRI prior to removing the collar. Of note, this study was conducted at a high volume trauma center; extrapolation to routine emergency department care may require further validation.

Moore FA, Nelson T, McKinley BA, et al. Massive transfusion in trauma patients: tissue hemoglobin oxygen saturation predicts poor outcome. J Trauma 2008;64:1010-23.

The epidemiology of trauma patients requiring massive transfusion (i.e., requiring more than 10 units of red blood cells in 24 hours) has not been well described. This multicenter cohort study from seven trauma centers enrolled 383 adult patients with hemorrhagic shock. 114 patients from the cohort required massive transfusion (MT).

Near infrared spectrometry derived tissue hemoglobin oxygen saturation (StO₂) monitoring was studied as a potential early predictor of MT and risk factor for poor outcome in the MT subset.

Demographics, injury mechanisms and comorbidities did not differ between those who required MT and those who did not. In the subset of patients who required MT, 41% reached 10 transfused units within the first two hours after arrival at the trauma center. 82% reached that mark by six hours. Patients who required MT had much higher rates of multiorgan dysfunction syndrome (31 vs. 9%) and death (33 vs. 7%). Statistically significant predictors of MT in the first 30 minutes of the clinical encounter included: maximum heart rate, minimum systolic blood pressure, minimum StO₂, maximum base deficit, minimum pH, maximum INR and minimum hemoglobin. In logistic regression modeling, only StO₂ emerged as a significant predictor of poor outcome at both the 30 minute and 60 minute marks of the clinical encounter.

This cohort study of severely injured trauma patients adds to our understanding of the rare subset requiring massive transfusion. The use of StO₂ may play a future role in guiding resuscitation efforts, triaging resources and informing disposition decisions; however, further validation of this technology is needed prior to widespread adoption.

Tallman TA, Peacock WF, Emerman CL, et al. Noninvasive ventilation outcomes in 2,430 acute decompensated heart failure patients: an ADHERE Registry Analysis. Acad Emerg Med 2008;15:355-62.

Questions have been raised about the safety and efficacy of noninvasive ventilation (NIV) in the setting of acutely decompensated heart failure. Specifically, there have been concerns about the risk of myocardial infarction using this modality compared to endotracheal intubation. This

is the largest study of its kind to explore these concerns.

The study investigators analyzed 37,372 admissions for heart failure at 280 hospitals. 2,430 patients required ventilatory assistance, with either NIV (n=1,760; 72%) or endotracheal intubation (n=670; 26%). A small subset required NIV followed by endotracheal intubation (n=72; 4%), but most of the noninvasive cohort were managed only with NIV (n=1,688; 96%). Patients who failed a trial of NIV had similar hospital courses compared to those who were immediately intubated. In-hospital mortality was 7.9% for patients in the NIV cohort, 13.9% in the cohort of failed NIV and 15.4% in the cohort who were initially intubated. There was no significant difference between troponin levels in patients successfully managed with NIV (7%), who failed NIV (7.4%) and who were initially intubated (13.3%).

The results of the study support the use of NIV in patients with ADHF. Their data indicate that NIV can be safely tried in this patient population and that patients who fail a trial of NIV are not placed at greater risk than those who were initially intubated.

Mitchell AM, Kline JA. Systematic bias introduced by the informed consent process in a diagnostic research study. Acad Emerg Med 2008;15:225-30.

The "healthy volunteer effect" is well described in epidemiologic research. This is a source of bias that comes from the observation that participants who volunteer for studies tend to have lower rates of morbidity than the general population. This study's investigators demonstrated a similar systematic bias through the use of the informed consent process. They hypothesized that the rate of venous thromboembolism would be lower among study participants, compared to non-participants in a minimal-risk emergency department (ED) study. The investigators demonstrated not only their primary hypothesis (6% vs. 13%), but also showed that the proportion of African Americans (40% vs. 53%), uninsured (9% vs. 24%) and Medicaid patients (16% vs. 27%) were significantly different between the two groups.

This study identified a systemic source of bias through the use of an informed consent processes in a minimal-risk emergency department investigation. This underscores the difficulty of conducting high-quality research and highlights a source of bias hereto not described in an ED-based study.

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