



## Resident Journal Review: September – October 2010

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*This is a continuing column providing a review of journal articles pertinent to emergency medicine (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. This edition will include articles published in September and October 2010.*

### **Emergency Department Visits For Concussion in Young Child Athletes. Bakhos L, Lockhart G, Myers R, Linakis J. *Pediatrics* 2010; 126:e550-e556.**

The topic of sports related concussion (SRC) has received increasing attention in the media and in clinical practice. Pre-high school-aged children (8-13 years old) are an understudied group who are likely more vulnerable to the sequelae of concussions. These young athletes are at a different developmental stage than older athletes, which has led to a demand for more research and raises a question whether there should be age-specific guidelines on the management of concussion.

In this retrospective review, the authors focused on emergency department (ED) visits for SRC in pre-high school versus high school-aged athletes. The National Electronic Injury Surveillance System (NEISS), the NEISS All Injury Program (NEISS-AIP), and the National Sporting Goods Association (NSGA) were the sources of information gathered for the review. All emergency department (ED) visits for concussion were included in the data analysis. These visits were subdivided into all causes, all sports-related, individual and leisure sport-related and organized team sport (OTS)-related. The OTS included the five most common concussion-generating sports: football, basketball, baseball, ice hockey and soccer.

The authors found that between 2001-2005, children aged 8-19 years, had an estimated 502,000 ED visits for all cause concussion and of those, 50% were SRC. Of the SRC, 40% were seen in the 8-13 age group. These percentages correlate to an estimated incidence of ED visits for SRC of roughly 4 in 1,000 U.S. children aged 8-13 and roughly 6 in 1,000 U.S. children aged 14-19 during 2001 to 2005. The authors also examined the trend of ED visits for concussion over time and found that over a 10-year period from 1997 to 2007, ED visits for OTS related concussion in 8-13 year olds doubled. In the older aged group (14-19 years old) the visits increased by more than 200%. These dramatic increases over time were found despite an approximate 13% decrease in overall team sport participation in the same 10 years.

The high incidence of SRC virtually guarantees that any practicing EM physician will need to be up to date on the signs, symptoms, management and appropriate follow up for these patients. This study highlighted the large number of young child athletes that visit the ED with concussion. The source of the data is a limitation. The NEISS included only ED visits; therefore, visits to other health care facilities (urgent care centers or doctor's offices) are not accounted for, as well as concussions that are managed at home or at school. Therefore, the method of data collection likely resulted in an underestimation of the incidence of SRC in these age groups. As clinicians, we must have a heightened awareness when managing these young patients and be cognizant of the fact that this population is likely more vulnerable to the sequelae of concussion. The ED also gives us the opportunity

to educate the patient and family about preventive measures which should be taken when participating in sports.

### **Bedside Ocular Ultrasound for the Detection of Retinal Detachment in the Emergency Department. Yoonessi R, Hussain A, Jang T. *Acad Emerg Med*. 2010; 17:913-917.**

The incorporation of ultrasound into daily EM practice continues to increase. The benefits of this imaging modality include its noninvasive nature and accessibility. Ophthalmologists use ultrasound to diagnose various ocular pathologies, and it is a modality that can be utilized by ED physicians to identify potential ocular emergencies.

The authors looked at the use of bedside ocular ultrasound to identify retinal detachment in ED patients presenting with acute visual changes. The study was a prospective, observational study using a convenience sample in an urban academic ED. The providers that performed the bedside ultrasounds included both attending and resident-level physicians with adequate ultrasound training. Patients were enrolled in the study if they had less than 48 hours of visual changes, an ophthalmology consult was to be obtained, and if the bedside ocular ultrasound could be done prior to the ophthalmology evaluation. The standard for the diagnosis of retinal detachment was that given by the ophthalmologist after their examination.

A total of 48 patients were enrolled in the study, of which 18 had a confirmed diagnosis of retinal detachment. The authors found that bedside ocular ultrasound for detection of retinal detachment was 100% sensitive (95% confidence interval (CI) = 78% to 100%) and 83% specific (CI 65% to 94%). There were five patients with vitreous hemorrhage that were misidentified as having retinal detachment. Ultrasound results obtained by more experienced ultrasonographers (physicians with more than 50 prior ultrasounds) were analyzed in a separate subgroup analysis, and the results were similar.

Despite the limitations of this study, which include small sample size and high prevalence of retinal detachment found in the population, these results support using ultrasound as a possible screening tool for retinal detachment. In the current ED environment, which is busy and fast-paced, the use of an accessible, non-invasive imaging modality to evaluate emergent diagnoses is welcome. Given that retinal detachment is an ocular emergency, this study supports that even with minimal training, bedside ocular ultrasound may aid in triaging patients with acute visual changes.

### **Six Years of Epinephrine Digital Injections: Absence of Significant Local or Systemic Effects. Muck A, Bebartha V, Borys D, Morgan D. *Ann Emerg Med*. 2010; 56:270-274.**

The outpatient treatment of choice for severe allergic reactions and anaphylaxis is epinephrine administered via an autoinjector. One of

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the inherent risks of the autoinjector is an accidental digital injection and the associated concern for digital ischemia.

In this retrospective review, the authors reviewed cases that were reported to six poison centers in Texas and sought to determine the frequency of digit ischemia after accidental epinephrine injections. Both adult (0.3mg) and junior (0.15mg) autoinjector accidents were included in this study. Secondary outcomes included frequency of digital injections, treatments used, adverse local effects and systemic effects. The chart review identified 365 patients with hand epinephrine injection exposure that had been reported to the six poison centers over six years. Of those patients, 213 had finger injuries. The final analysis consisted of 127 patients with finger injuries who received complete follow up.

The patients ranged in age from 8 months to 69 years. Fifty-four percent of the cases were managed outside the hospital. A majority of the patients (77%) had a minor effect from the digital injection including symptoms such as pain, blanching and discoloration at the injection site. Ten percent of the patients reported no effect from the injection. There were four patients (3.1%) that had a report of an ischemic finger. All patients, including those with ischemia, had complete resolution of their symptoms, most in less than two hours. Regarding medical treatment, 77% received no drug therapy. Of those patients who did receive treatment, the regimens consisted of nitroglycerine paste alone, phentolamine alone, both nitroglycerine paste and phentolamine, or terbutaline alone. All of the patients with reports of an ischemic finger received drug therapy. None of the patients had significant systemic effects, none were admitted, nor had a surgical consult or received surgical care.

This study suggests that digital ischemia after an epinephrine digital injection is a rare event, and if symptoms do occur, they usually resolve in less than two hours. This study does have limitations. It is a retrospective review, and the data set is limited to only those cases reported to the poison centers. Data from the poison center is not based on first hand observation of the clinical picture but relies on physician reporting. In addition, many of the patients with finger injuries had no follow up (86/213) after the initial contact with the poison center.

Despite the limitations, the findings of the current study could be used as a foundation to guide a reasonable observation time in the emergency department before discharge of such patients. This evidence supports previous literature stating that complications associated with local anesthetic digital blocks with lidocaine containing epinephrine are extremely rare. In clinical practice though, there still remains a certain degree of unnecessary hesitancy in utilizing lidocaine with epinephrine when repairing finger injuries that should no longer exist.

**Randomized Controlled Trial of Trimethoprim-Sulfamethoxazole for Uncomplicated Skin Abscesses in Patients at Risk for Community-Associated Methicillin-Resistant *Staphylococcus Aureus* Infections. Schmitz G, Bruner D, Pitotti R, et al. *Ann Emerg Med*. 2010;56:283-287.**

With the increasing prevalence of community-associated Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA) as a cause of skin and soft tissue infections, the question of whether antibiotics are necessary after incision and drainage (I&D) of simple abscesses

continues to linger. If the decision is made to prescribe antibiotics, trimethoprim-sulfamethoxazole is commonly used when CA-MRSA coverage is needed.

In this multi-centered, randomized, double-blinded, placebo-controlled trial, the authors evaluated whether a seven-day course of trimethoprim-sulfamethoxazole taken after I&D of a simple abscess reduced treatment failure at seven days. Treatment failure was defined as no improvement after two days, development of a new lesion within seven days, or worsening infection within seven days that prompted more aggressive treatment. Secondary outcome was the development of new lesions at 30 days. A convenience sample of 212 adults were enrolled and randomized to receive either trimethoprim-sulfamethoxazole (160mg/800mg) two pills by mouth twice a day for seven days or placebo after I&D of an abscess performed in the ED. The study had a number of exclusion criteria; most notable was the exclusion of immunocompromised patients (HIV, diabetes and cancer patients). After the initial ED visit and I&D of the abscess, the enrolled patients were asked to return on days two and seven for re-evaluation and appropriate wound care. Telephone calls, return ED visits within 30 days, and review of medical records were used to obtain 30 day follow up for the secondary outcome.

Ninety-six patients were randomized to the trimethoprim-sulfamethoxazole group and 116 patients to the placebo group. Follow up at seven days was obtained for 190/212 (90%) of the patients. The authors found no statistically significant difference in treatment failure at seven days; 17% (15/88) in the trimethoprim-sulfamethoxazole group versus 26% (27/102) in the placebo group ( $p = 0.12$ ). At 30 days, 69% of patients were available for follow up. Nineteen percent fewer lesions were seen in the treatment group 9% (4/46) versus placebo 28% (14/50) which was statistically significant (95% CI 4% to 34%,  $p = 0.02$ ).

In the current era of antibiotic overuse and increasing antibiotic resistance, these findings are important. This study does not support routine use of antibiotics to cover against CA-MRSA after I&D of a simple abscess in an immunocompetent patient. However, the results must be interpreted with some caution given the limitations of the study design. A significant number of patients were lost to follow up, especially at 30 days, which may have affected the secondary outcome analysis. Furthermore, the convenience sample may limit the generalizability of these results.

**Accuracy and Quality of Clinical Decision Rules for Syncope in the Emergency Department: A Systematic Review and Meta-Analysis. Serrano LA, Hess EP, Bellolio F, Murad MH, Montori VM, Erwin PJ, Decker WW. *Annals of Emerg Med* 2010; 56(4):362-373.**

The focus of the ED evaluation of an adult with syncope has shifted from diagnosis to risk stratification. Several clinical decision rules that predict adverse outcomes in these patients have been created to aid with clinical decision-making and patient disposition. The goal of this meta-analysis was to evaluate the methodological quality and prognostic accuracy of currently available clinical decision rules.

The authors conducted a comprehensive search of six databases and recent abstracts to identify all relevant studies that derived or

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validated clinical decision rules or risk scores to predict subsequent adverse outcomes. The quality of the decision rules as well as the quality of the individual studies was assessed by two independent reviewers. Data from studies that used the same clinical decision rule was pooled for the final meta-analysis, and between-study heterogeneity was assessed. Eighteen studies, representing nine clinical decision rules, were identified in the initial search. Of those, only 12 studies, representing five clinical decision rules, had enough quantitative data to undergo full quantitative analysis. Of the five clinical decision rules, only two were validated - the San Francisco Syncope Rule (SFSR) and the Osservatorio Epidemiologico sulla Sincope nel Lazio risk score (OESIL), the others were derived but lacked further validation.

Of the clinical rules, the most studied is the San Francisco Syncope Rule, which was evaluated by nine of the 12 studies included in this meta-analysis. It is the only clinical decision rule that evaluates adverse outcomes within seven days of the initial ED visit. In this meta-analysis, the pooled sensitivity and specificity for the SFSR was lower than in the original study (sensitivity 86% vs 96%; specificity 49% vs 62%, respectively).

The findings of the initial OESIL derivation study showed that abnormal electrocardiogram (ECG), history of cardiovascular disease, lack of prodrome, and age greater than 65 predicted deaths at one year. The results were replicated in the initial validation cohort, but subsequent validation studies did not reproduce this result. Again, sensitivities and specificities differed markedly between the original study and the pooled data (sensitivity 100% versus 95%, specificity 22% versus 33%, respectively).

After evaluating multiple clinical decision rules for syncope, the authors of this meta-analysis concluded that all clinical decision rules need further development prior to being routinely incorporated into clinical practice. Most of these rules have not been validated, and the ones that have show a high degree of variability between the individual studies. In an attempt to explain this variability, the subgroup analysis suggested that differences in study design and differences in ECG interpretation may account for the differences between the studies' outcomes. This is important to note because it bares consequences on how to correctly apply these rules in a wide variety of ED settings.

Clinical decision rules are desirable to assist complex decision-making such as that required in evaluation of patients with syncope. However, the current data warns that they should be applied with caution and should not be substituted for clinical experience and judgment. The methodological quality analysis in the current study suggested that, in order to increase their utility, clinical decision rules must contain clear definitions in order to be interpreted and applied correctly.

Resident Journal Review articles are now being translated to Spanish! AAEM would like to thank Fernando Soto, MD; Roberto Portela, MD FACEP; Cesar Andino, MD; Manuel Colón García de la Noceda, MD FACEP; Vanesa Torres Navarro, MD; Edgardo Torres, MD; and Dorcas Ruiz, MD, for their work on translating the article. To see the full translated Resident Journal Review article, please go to <http://www.aem.org/international/>.

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part of your responsibility is to serve as a role model for others. You can always model professionalism and teach by example to those around you.

As one of my mentors says, the ED is the modern home of diagnosis. We see the entire breadth of patient problems across the entire range of acuity. The ED is THE place for medical students to hone their history and physical skills and to learn to develop their differential and plans. It is a challenging, but fulfilling, place for residents to learn how to teach. We should all strive to become better teachers—a skill that will serve our students, our profession and ourselves.

I welcome comments to my articles. Please email: [wen.leana@gmail.com](mailto:wen.leana@gmail.com).

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