



ABSTRACTS IN URGENT CARE

On Blood Cultures in the ED, Scald Burns and the Microwave Oven, Pre-hospital Notification for Stroke Patients, Atrial Fibrillation in Observation Units, Venous Access Pain in Children, and Coronary CT

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Each month, Dr. Nahum Kovalski reviews a handful of abstracts from, or relevant to, urgent care practices and practitioners. For the full reports, go to the source cited under each title.

Who Needs a Blood Culture in the ED?

Key point: Use of a prediction rule might reduce use of cultures in low-risk patients.

Citation: Shapiro NI, Wolfe RE, Wright SB, et al. Who needs a blood culture? A prospectively derived and validated prediction rule. *J Emerg Med.* 2008;35(3):255-264.

Although blood cultures often are obtained for patients in the emergency department, little evidence is available to guide patient selection for such testing. Currently, general indications for testing are poorly defined, and only 4% to 8% of blood cultures yield growth.

Such low yield suggests that opportunity exists to save both ED and laboratory resources and considerable costs.

In a prospective, observational cohort study of adult patients who had blood cultures obtained at a single academic ED (annual census: 50,000) over the course of one year, researchers developed a decision rule to assess risk for bacteremia. Of 3,730 patients, 8.2% had true bacteremia. Two thirds of the 3,730 patients were randomly selected as the derivation group and the remaining one third as the validation group.

In multiple logistic regression analysis, the researchers identified 13 independent predictors of bacteremia, categorizing them as major or minor criteria based on the strength of the association:

■ Major criteria

- Temperature $>39.5^{\circ}\text{C}$
- Indwelling vascular catheter
- Clinical suspicion of endocarditis

■ Minor criteria

- Temperature 38.3°C – 39.4°C
- Age >65
- Chills
- Vomiting
- Hypotension (systolic blood pressure <90 mm Hg)
- Neutrophil percent $>80\%$
- White blood cell count $>18,000$ cells/ mm^3
- Bands $>5\%$
- Platelets $<150,000$ cells/ mm^3
- Creatinine >2.0 mg/dL

According to the decision rule, blood cultures are indicated if at least one major criterion or two minor criteria are present. Less than 1% of patients who did not meet any of the criteria had positive blood cultures. In the validation group, the rule had a sensitivity of 97%, a specificity of 29%, a positive predictive value of 11%, and a negative predictive value of 99%. The authors estimate that use of the rule could reduce use of blood cultures by 27%.

This clinical decision rule for predicting bacteremia may be a reasonable starting point for further research, but the authors' inability to prospectively control which patients had blood cultures casts doubt on many of the criteria. ■



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[Published in *J Watch Emerg Med*, November 21, 2008—Aaron E. Bair, MD, MSc, FAAEM, FACEP.]

Scald Burns—Beware the Microwave Oven!

Key point: *Nine percent of unintentional scald burns in young children were related to use of microwave ovens.*

Citation: Lowell G, Quinlan K, Gottlieb LJ. Preventing unintentional scald burns: Moving beyond tap water. *Pediatrics*. 2008;122(4):799-804.

Scald burns are the most common type of serious burn in young children. Reminding parents to lower hot-water heater temperatures to ≤120°F to prevent scald burns has been a key preventive measure; now, most scalds in children do not involve hot tap water. To determine the leading causes of scald burns among young children, investigators examined data from 104 patients <5-years-old who were admitted to a Chicago hospital for scald burns in 2002 through 2004. Nineteen children with intentional burns and 14 with tap-water burns were excluded.

The most common mechanisms of injury by non-tap-water scalds were children pulling containers on themselves (39%), someone else spilling a hot substance on the child (15%), children climbing to reach a hot substance (11%), children opening a microwave oven and removing the heated substance (9%), and children being scalded while being carried by another person (5%).

The mechanisms of injury paralleled developmental stages predictably: Infants often were burned while being carried, while most toddlers were burned when they pulled a container on themselves. Children as young as 18 months were burned while they were removing a heated substance from a microwave oven. Older children (age range, 7–14 years) were involved or cooking during 16% of scald burns to younger children.

Most scald burn accidents involved hot foods or liquids that were heated on the stove, but the microwave oven also deserves mention when providing anticipatory guidance about home safety and burn prevention in young children. ■

[Published in *J Watch Pediatr Adolesc Med*, November 5, 2008—Cornelius W. Van Niel, MD.]

Benefits of Pre-hospital Notification for Stroke Patients

Key point: *Pre-hospital ED notification decreased door-to-CT time by 23% and doubled use of thrombolytic therapy.*

Citation: Abdullah AR, Smith EE, Biddinger PD, et al. Advance hospital notification by EMS in acute stroke is associated with shorter door-to-computed tomography time and increased likelihood of administration of tissue-plasminogen activator. *Prehosp Emerg Care*. 2008;12(4):426-431.

To examine the effects of advance notification of the arrival of stroke patients, researchers retrospectively analyzed data for 118 patients with acute stroke who were transported by emergency medical services directly from the scene to a single tertiary care emergency department within six hours of symptom onset during a 16-month period.

EMS staff provided advance notification to ED staff for 44 patients. No significant differences in age, sex, stroke history, or median National Institutes of Health Stroke Scale scores were noted between patients for whom pre-hospital notification was and was not given. Pre-hospital notification was associated with significantly shorter door-to-computed tomography time than no pre-hospital notification (median time, 40 vs. 47 minutes).

In multivariable linear regression modeling, pre-hospital notification reduced door-to-CT time by 23%. Nine patients for whom pre-hospital notification was given and none for whom notification was not given had prolonged door-to-CT times (two to five hours).

All patients were evaluated by a vascular neurologist.

Overall, 29% of patients received thrombolytic therapy (intravenous tissue plasminogen activator [TPA] in 20; IV TPA followed by intra-arterial thrombolysis in 12; and intra-arterial thrombolysis alone in two). Patients who arrived at the ED after pre-hospital notification were twice as likely as those who arrived without advance notice to receive thrombolytic therapy (42% vs. 21%).

As expected, pre-hospital notification of the ED allows mobilization of hospital resources for incoming stroke patients. Pre-hospital notification for stroke already is a class I recommendation of the American Heart Association. Why advance notification was not given for 63% of patients in this study is not known.

Most disturbing is that even when advance notification was provided, patients did not get CT scans within the recommended 30 minutes. Although it has been reported elsewhere that the window of time for stroke treatment is widening to 4.5 hours, that is not a license for delay. ■

[Published in *J Watch Emerg Med*, November 7, 2008—Kristi L. Koenig, MD, FACEP.]

Treatment of AF in an ED Observation Unit: Faster and Better?

Key point: *Compared with patients who received traditional inpatient care, patients managed in an ED observation unit had comparable outcomes and significantly shorter stays.*

Citation: Decker WW, Smars PA, Vaidyanathan L, et al. A prospective, randomized trial of an emergency department observation unit for acute onset atrial fibrillation. *Ann Emerg Med*. 2008;52(4):322-328.

The management of uncomplicated acute atrial fibrillation (AF) has evolved during the last few years, with early rate control and cardioversion gaining favor.

Here, researchers compared traditional inpatient care with management in an emergency department observation unit in a prospective, randomized trial of 153 adult patients who presented to an academic ED with acute (<48 hours' duration) uncomplicated AF.

Patients in both groups underwent initial pharmacologic rate control followed by electrical cardioversion, if needed. Patients were followed up after 30 days and six months.

Rates of conversion to sinus rhythm did not differ significantly between patients managed in the ED observation unit and those who received traditional inpatient care (85% vs. 73%; $P=0.06$), but patients managed in the ED observation unit had significantly shorter mean lengths of stay (12.6 vs. 50.1 hours). Recurrence rates, adverse events, and use of healthcare services during the six months after treatment were similar in the two groups.

The finding that comparable outcomes were achieved with shorter lengths of stay is a compelling argument for management of uncomplicated acute AF in an ED observation unit. ■

[Published in *J Watch Emerg Med*, October 30, 2008—Richard D. Zane, MD, FAAEM.]

Pharmacologic Approaches for Reducing Venous Access Pain in Children

Key point: Multiple approaches for topical local anesthesia, some of which are effective within minutes.

Citation: Zempsky WT. Pharmacologic approaches for reducing venous access pain in children. *Pediatrics*. 2008;122 Suppl 3:S140-S153.

A variety of pharmacologic options are available to clinicians who want to provide effective and safe topical local anesthesia to children undergoing venous access procedures. These options can be distinguished on the basis of how they deliver active drug through the impermeable outer layer of skin, the stratum corneum, to pain receptors located in the dermis and epidermis.

Three general methodologies are typically used to bypass the stratum corneum:

- direct injection of local anesthetics, usually via a small-gauge hypodermic syringe
- passive diffusion from topical creams or gels
- active needle-free drug strategies that enhance the rate of drug passage into the dermis and epidermis

Examples of the latter mechanisms include heat-enhanced diffusion, iontophoresis, sonophoresis, laser-assisted transdermal passage, and pressurized gas delivery of powdered drug particles.

Pharmacologic options in this setting can also be distin-

guished on the basis of the time to onset of full anesthetic effect. Several available agents induce significant local anesthesia within one to three minutes of administration or faster, allowing easy integration into the skin preparation and subsequent venous access procedure. In combination with nonpharmacologic approaches, these agents can be used to dramatically lessen this significant source of pediatric pain.

Coronary Computed Tomography: Still Searching for a Reason to Believe

Key point: In a multicenter study, 64-row coronary CT performed well, but not well enough to justify its use as a first-line diagnostic tool.

Citation: Miller JM, Rochitte CE, Dewey M, et al. Diagnostic performance of coronary angiography by 64-Row CT. *N Engl J Med*. 2008;359:2324-2336.

Coronary computed tomography with 64 detectors has been heralded in some quarters as a noninvasive diagnostic tool that could replace conventional coronary angiography.

To evaluate the accuracy of this technique, investigators compared results of 64-row coronary CT with those of conventional coronary angiography in 291 patients with Agatston calcium scores ≤ 600 who were evaluated for symptoms of coronary artery disease at nine centers.

Fifty-six percent of the participants had at least one obstructive stenosis ($\geq 50\%$); 27% had single-vessel disease. The median time between the two tests was 10 hours. The sensitivity of coronary CT for the detection of an obstructive stenosis of $\geq 50\%$ was 85%, and its specificity was 90%. Coronary CT had a positive predictive value of 91% and a negative predictive value of 83%.

In a vessel-based analysis, coronary CT had a sensitivity of 75%, a specificity of 93%, a positive predictive value of 82%, and a negative predictive value of 89%. The mean radiation dose for CT was 13.8 mSv for men and 15.2 mSv for women.

Multidetector CTs' performance was reasonably close to that of the gold standard, coronary angiography, in patients with suspected CAD. The authors conclude, however, that the positive and negative predictive values of CT in this population are insufficient to recommend that the new technique replace conventional coronary angiography.

In an accompanying perspective piece, Redberg and Walsh note that the study "does not advance our knowledge of the appropriate use and possible benefits of the technology." Until we have solid evidence of such benefits—and clarity about how best to incorporate the evidence into decision making—we should avoid the routine use of coronary CT to assess patients for CAD. ■

[Published in *J Watch Cardiol*, November 26, 2008—Harlan M. Krumholz, MD, SM.]