On ED Patient Follow-up, Early Repolarization, Pulmonary Crackles, Acute Diarrhea, Assessing Dyspneic Patients, and Administering Lidocaine

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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.

It's not Easy for ED Patients to Get Follow-Up Care

Key point: **Only 23% of attempts to schedule an outpatient follow-up appointment were successful in this study of callers posing as ED patients without primary care physicians.**

Citation: Vieth TL, Rhodes KV. Nonprice barriers to ambulatory care after an emergency department visit. *Ann Emerg Med*. 2008;51(5):607-613.

Almost half of emergency department patients are discharged with instructions to follow up with an outpatient clinic or physician, yet many patients do not comply or are not able to obtain an appointment. Often, the ability to safely discharge a patient rests on the success of obtaining outpatient follow-up care.

In this study, research assistants called a random sample of 603 primary care and OB/GYN clinics in nine U.S. cities from a list provided by EDs. The callers posed as ED patients without established primary care, with or without insurance or Medicaid, who were seeking follow-up care for an ED visit that occurred on the previous day, during which they had received a diagnosis of community-acquired pneumonia, asymptomatic accelerated hypertension, or possible ectopic pregnancy.

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Callers posing as patients without insurance or with Medicaid called clinics on the list that were designated for such patients.

Callers made a total of 1,065 calls in attempts to make appointments at each of the 603 clinics. Overall, 23% of calls resulted in an appointment within one week, yielding an overall caller success rate of 40%. Of the 603 initial calls, 43% did not result in an appointment for the following reasons: clinic closed, busy signal, voicemail, or personnel too busy to take the call (27%); wrong number (6%); disconnected call or extended hold (4%); or the medical condition was out of the clinic's practice scope (6%).

When callers contacted clinic personnel during the initial call, 55% were placed on hold (average hold time, 2.4 minutes). The time required to navigate an answering system averaged 1.2 minutes. On average, 1.7 calls were required to reach appointment staff, with 8% of the 603 cases requiring four or more calls. Calls that resulted in an appointment averaged 11 minutes. Results were independent of insurance status.

Appropriate emergency care often requires the integration of timely outpatient follow-up. If follow-up is not available, many patients might require admission or might return to the ED, further contributing to ED and hospital overcrowding. Analysts often point to a combination of hospital and ED factors when evaluating ED crowding. This study suggests that a closer look at ambulatory care also is in order.

[Published in *J Watch Emerg Med*, May 9, 2008—Richard D. Zane, MD, FAAEM.] ■

Early Repolarization: Maybe Not So Benign After All

Key point: **A retrospective evaluation shows that patients with sudden cardiac arrest without demonstrable heart disease often have electrocardiographic findings of early repolarization.**

Citation: Haïssaguerre M, Derval N, Sacher F, et al. Sudden Cardiac Arrest Associated with Early Repolarization. *N Engl J Med*. 2008;358:2016-2023.

Wellens HJ. Early Repolarization Revisited. *N Engl J Med*. 2008;358:2063-2065.

Experimental evidence suggests that early repolarization is associated with ventricular dysrhythmias, but no clinical evidence is available. In a case-control study, researchers reviewed data from 22 dysrhythmia centers in several countries to evaluate the prevalence of early repolarization and its association with dysrhythmia in patients younger than 60 who had idiopathic (no evidence of structural heart disease) sudden cardiac arrest and had received implantable defibrillators.

The researchers identified 206 cases (60% men; median age, 36) and compared them with 412 matched controls who had not had cardiac arrest and did not have evidence of heart disease. Early repolarization (defined as a J-point elevation ≥1 mm) was significantly more frequent in the cardiac-arrest group than in the control group (31% vs. 5%) and, when present, was significantly greater in magnitude in the cardiac-arrest group (2.0 vs. 1.2 mm).

Nearly 30% of patients in the cardiac-arrest group had a history of syncope. Defibrillator interrogation (in 18 patients) showed that dysrhythmias were preceded by an increase in J-point elevation.

In the one third of cardiac-arrest patients who had early repolarization and had pre-arrest electrocardiograms available, the pre-arrest ECGs showed early repolarization.

During a mean follow-up of 61 months, the three patients with the highest J-point elevation (>5 mm) together had more than 50 episodes of ventricular fibrillation (VF), resulting in the death of one patient. Few patients in the cardiac-arrest group were athletes or blacks, groups in which repolarization abnormality is most common.

An editorialist notes that while repolarization abnormality is common, sudden cardiac arrest is not, and that patients with the characteristic ECG findings who are symptomatic (i.e., syncope, palpitations, chest pain) require close monitoring, with particular attention to intermittent increases in J-point elevation.

Although ventricular fibrillation is uncommon in young people, this study suggests that we make two important changes in our approach to "benign" early repolarization. First, an ECG that shows early repolarization should not be considered as normal in patients who have had syncope or symptoms of dysrhythmia. Second, patients undergoing electrocardiography in the emergency department for unrelated reasons who have findings of early repolarization abnormality should be told about the symptoms of dysrhythmia and advised to seek care if these symptoms arise.

[Published in *J Watch Emerg Med*, May 30, 2008—J. Stephen Bohan, MD, MS, FACP, FACEP.] ■

Age-Related Pulmonary Crackles May Interfere with Diagnosis of Heart Failure

Key point: **Clinically unimportant crackles are very common among elderly patients.**

Citation: Kataoka H, Matsuno O. *Ann Fam Med*. 2008;6:239-245.

The authors examined the characteristics of pulmonary crackles among patients with stage A cardiovascular disease (per American College of Cardiology/American Heart Association heart failure staging criteria), stratified by decade, because little is known about these issues in such patients at high risk for congestive heart failure who have no structural heart disease or acute heart failure symptoms.

The investigators analyzed rales in 274 participants without comorbid pulmonary or other critical diseases and who had normal heart structure (based on Doppler echocardiography) and function (B-type natriuretic peptide [BNP] < 80 pg/mL) and normal lung results on chest radiographs.

The prevalence of crackles varied with age, ranging from 11% at ages 45 to 64 years, to 34% at ages 65 to 79 years, to 70% at ages 80 to 95 years. The risk for audible crackles approximately tripled every 10 years after 45 years of age.

Logistic regression analysis showed that age was the only independent predictor of the presence or absence of pulmonary crackles and that leg venous insufficiency, leg edema, serum creatinine levels, and serum BNP levels were not associated with pulmonary crackles.

During follow-up of a mean duration of 11+/-2.3 months, the short-term (≤ 3 months) reproducibility of crackles was 87% in 255 patients studied. Cardiovascular disease developed in five patients and pulmonary disease in six during follow-up.

"Recognition of age-related pulmonary crackles (rales) is important because such clinically unimportant crackles are so common among elderly patients that, without knowledge of this phenomenon, their existence might interfere with the physician's management of cardiopulmonary patients," the study authors write. "Characteristically, crackles in such patients are fine and are almost always restricted to an area localized to the lower quadrant of the lung field." ■

Overuse of Empirical Antibiotics for Acute Diarrhea

Key point: **Antimicrobials were prescribed for more than 10% of diarrhea episodes, usually without a stool culture.**

Citation: Carpenter LR, Pont SF, Cooper WO, et al. Stool Cultures and Antimicrobial Prescriptions Related to Infectious Diarrhea. *J Infect Dis*. 2008;Apr 21;e-pub ahead of print.

Antimicrobial therapy is rarely indicated for acute diarrhea, and current guidelines recommend that a stool culture be performed when such therapy is prescribed. Investigators recently examined Medicaid data from Tennessee for 1995 through 2004 to determine the frequency of antimicrobial use for acute diarrhea and the extent to which stool cultures accompanied such therapy.

Of 315,828 diarrheal episodes identified, 15,820 (5.0%) were evaluated with stool culture, and 32,949 (10.4%) were treated with antimicrobial therapy. Among the episodes for which antimicrobial therapy was prescribed, only 3,504 (10.6%) had a stool culture performed. Multivariable regression revealed that white race, urban residence, antimicrobial prescription, and not receiving a concurrent diagnosis of respiratory tract infection were associated with higher rates of stool culture.

This study reveals a high rate of antimicrobial use for acute diarrhea and a disconcertingly low rate of stool culture evaluation. Antimicrobial use may worsen outcome in some cases of infectious diarrhea (e.g., those caused by *E coli* O157:H7 or *C difficile*) while also raising both cost and antimicrobial-resistance pressure. In addition, failing to perform a stool culture when antimicrobials are prescribed limits its diagnostic information to guide management and increases the likelihood of missing infections or outbreaks that are of public health importance.

[Published in *J Watch Infect Dis*, May 7, 2008—Daniel J. Diekema, MD, MS.] ■

Diagnostic (In)accuracy in Patients with Dyspnea

Key point: **Natriuretic peptide testing adds diagnostic value to physician judgment in determining which dyspneic patients have congestive heart failure in the ED.**

Citation: Green SM, Martinez-Rumayor A, Gregory SA, et al. Clinical Uncertainty, Diagnostic Accuracy, and Outcomes in Emergency Department Patients Presenting with Dyspnea. *Arch Intern Med* 2008 Apr 14; 168:741-748.

Both dyspnea and exacerbations of congestive heart failure are common complaints in emergency medicine practice. Determining which dyspneic patients have congestive heart failure and which do not is a challenge. Researchers reviewed data from the PRIDE (ProBNP Investigation of Dyspnea in the Emergency Department) study to determine the role of natriuretic peptide (NT-proBNP) testing in making this distinction.

After a standard clinical evaluation of a patient with dyspnea, the treating clinician, who had access to all standard diagnostic tests available (but not proBNP level), was asked to estimate from 0% to 100% the likelihood that the patient had acute decompensated heart failure (ADHF).

Estimates of ≥80% or ≤20% were considered to reflect certainty that the patient did or did not have ADHF, and estimates in the intermediate range (21%–79%) were considered to reflect clinical uncertainty.

The final diagnosis was based on the judgment of a panel of cardiologists who were blinded to BNP levels but who had access to all clinical information from presentation through 60 days of follow-up.

Physicians' estimates of the likelihood of ADHF were in the clinical uncertainty range for 31% of the nearly 600 patients enrolled. These patients were older, had lower ejection fractions, and presented with atrial fibrillation more often than patients whose physicians had clinical certainty.

Patients in the clinical uncertainty group also had longer hospital stays and higher one-year mortality rates. In the clinical uncertainty group, 56% of patients had a final diagnosis of ADHF.

Physicians' estimates of clinical certainty that a patient had ADHF (estimate ≥80%) were correct 63% of the time, and estimates of certainty that a patient did not have ADHF (estimate ≤20%) were correct 99% of the time. In a logistic model, the combination of BNP testing and clinical judgment had greater diagnostic accuracy than either approach alone.

This study clearly demonstrates both the inaccuracy and fallibility of clinical diagnosis of acute decompensated heart failure. The findings suggest that BNP levels enhance diagnostic accuracy for all patients except those for whom the clinician is convinced that ADHF is *not* the cause of the presentation.

[Published in *J Watch Emerg Med*, May 2, 2008—J. Stephen Bohan, MD, MS, FACP, FACEP.] ■

Needle-Free Powder Lidocaine Delivery

Key point: **The needle-free system is effective and safe and the device seems perfect for the ED setting.**

Citation: Zempsky WT, Bean-Lijewski J, Kauffman RE, et al. Needle-free powder lidocaine delivery system provides rapid effective analgesia for venipuncture or cannulation pain in children: Randomized, Double-blind Comparison of Venipuncture and Venous Cannulation Pain After Fast-Onset Needle-Free Powder Lidocaine or Placebo Treatment Trial. *Pediatrics* 2008 May; 121:979-987.

ABSTRACTS IN URGENT CARE

Needle insertion can be one of the most painful and distressing procedures for a child and often leaves a traumatic, lasting impression. Topical anesthetic creams that are used to ameliorate the pain of a needlestick often are impractical in an emergency department because of the delay between application and analgesic effect.

In a multicenter, randomized, double-blind, sham–placebo-controlled trial, researchers evaluated the efficacy and safety of a needle-free powder lidocaine delivery device in 597 hospitalized children (age range, 3–18 years) who were undergoing venipuncture or intravenous cannulation on the dorsal hand or antecubital fossa. (The device manufacturer provided the devices and funded the research, and one author was an employee of the manufacturer.)

The device uses helium-generated pressure to deliver 0.5 mg of lidocaine hydrochloride powder to the anticipated needle insertion site, where the particles penetrate the epidermis.

In this study, the device was used to deliver lidocaine powder or no powder approximately one to three minutes before the venous access procedure. Patients rated the pain of the subsequent needlestick using a modified Wong-Baker Faces Pain Rating Scale (0=no pain to 5=worst pain), and patients aged 8 to 18 years also used a 100 mm visual analog scale (VAS). Parents used the VAS to rate their child's pain.

The lidocaine and placebo groups had similar patient and procedural characteristics at baseline. Pain scores were significantly lower in the lidocaine group than in the placebo group, as assessed by patients on both the faces scale (1.8 vs. 2.1) and the VAS (22.6 vs. 32.0) and by parents on the VAS (21.4 vs. 28.7).

Differences in treatment effect across age categories were similar in both groups. Treatment-related adverse events were rare in both groups, and all resolved without sequelae; most adverse events were attributed to minor dermal reactions at the administration site.

Children should receive local anesthesia before venipuncture whenever possible. Existing topical anesthetics can require as long as one hour to achieve a desired effect, and their use often requires multiple clinician assessments to determine patient readiness; this device avoids both drawbacks.

This study shows that the needle-free system is effective and safe, and, although the study was limited to hospitalized children, the device seems perfect for the ED setting. The measured benefit as scored on the faces scale was modest and perhaps of no clinical significance, but the differences on the VAS exceeded 25% and likely were real. Although cost data were not provided by the authors, a higher cost could easily be justified by the benefits.

[Published in *J Watch Emerg Med*, May 23, 2008—Jill M. Baren, MD, MBE, FACEP, FAAP.] ■

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