On Wheezing Children, ECG and ACS, and Resuscitation Protocols

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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.

Clinical Predictors of Pneumonia Among Children with Wheezing

Key point: The routine use of chest radiography for children with wheezing but without fever should be discouraged.

Citation: Mathews B, Shah S, Cleveland RH, et al. Clinical predictors of pneumonia among children with wheezing. *Pediatrics*. 2009;124(1):e29-e36.

A prospective cohort study was performed with children <21 years of age who were evaluated in the ED, were found to have wheezing on examination, and had chest radiography performed because of possible pneumonia. Historical features and examination findings were collected by treating physicians before knowledge of the chest radiograph results. Chest radiographs were read independently by two blinded radiologists.

A total of 526 patients (median age: 1.9 years) met the inclusion criteria; 36% were hospitalized. A history of wheezing was present in 247 patients (47%). Twenty-six patients (4.9%) had radiographic pneumonia. History of fever at home, triage temperature of 38°C, maximal temperature in the ED of 38°C, and triage oxygen saturation of <92% were associated with increased risk of pneumonia. Among afebrile children (temperature of <38°C) with wheezing, the rate of pneumonia was very low (2.2%).

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Radiographic pneumonia among children with wheezing is uncommon. Historical and clinical factors may be used to determine the need for chest radiography. The routine use of chest radiography for children with wheezing but without fever should be discouraged. ■

Normal ECG During Chest Pain Does Not Rule Out ACS

Key point: Among chest pain patients with normal initial ECGs, a similar percentage had acute coronary syndrome whether the ECG was performed when chest pain was present or absent.

Citation: Turnipseed SD, Trythall WS, Diercks DB, et al. Frequency of acute coronary syndrome in patients with normal electrocardiogram performed during presence or absence of chest pain. *Acad Emerg Med*. 2009;16:495-499.

A normal electrocardiogram does not exclude acute coronary syndrome (ACS) in patients who present with chest pain, but many clinicians believe that ACS is unlikely to be the cause of the chest pain if the normal ECG was obtained during a pain episode. To clarify this issue, these authors conducted a prospective, observational study of 387 patients who presented to an emergency department with chest pain, had normal initial ECGs, and were admitted for evaluation for ACS.

Patients were divided into two groups, based on whether they had active chest pain during acquisition of the normal initial ECG: 126 had chest pain and 261 did not. ACS was defined as non–ST-segment-elevation myocardial infarction, >70% stenosis on coronary angiography, or positive noninvasive cardiac stress test. The prevalence of ACS did not differ significantly between the groups

that did and did not have chest pain when the normal initial ECG was obtained (16% and 20%, respectively).

Lack of changes on an ECG performed during chest pain often is thought to reduce the likelihood of ACS. However, this and other research has shown that this assumption is erroneous and that the likelihood of serious cardiac disease in patients with chest pain and an initial normal ECG is the same whether or not chest pain was present when the ECG was obtained.

[Published in *J Watch Emerg Med*, June 12, 2009—Diane M. Birnbaumer, MD, FACEP.] ■

A Resuscitation Protocol That Minimizes Hands-off Time Improves Survival

Key point: A pre-hospital protocol emphasizing minimal interruption of chest compressions was associated with improved survival to hospital discharge.

Citations: Garza AG, Gratton MC, Salamone JA. Improved patient survival using a modified resuscitation protocol for out-of-hospital cardiac arrest. *Circulation*. 2009;119:2597-2605. Ewy GA. Do modifications of the American Heart Association guidelines improve survival of patients with out-of-hospital cardiac arrest? *Circulation*. 2009;119:2542-2544.

Recent research suggests that minimizing interruptions during cardiopulmonary resuscitation improves coronary perfusion pressure and increases the likelihood of return of spontaneous circulation (ROSC).

The Kansas City, MO, emergency medical services system changed its cardiac arrest protocol to emphasize early chest compressions and de-emphasize airway management for resuscitation of adult patients with primary cardiac arrest (ventricular fibrillation [VF] or pulseless ventricular tachycardia).

In a retrospective study, researchers compared ROSC, survival to discharge, and cognitive function in 1,097 patients with primary cardiac arrest during the 36 months before the change and 339 patients during the 12 months after.

Overall, survival to discharge increased significantly from 7% before the change to 14% after. In the subset of adult patients with witnessed arrest and an initial rhythm of VF (143 before the change and 57 after), survival to discharge increased significantly from 22% to 44%, and rates of ROSC increased significantly from 38% to 60%. In this subset, cerebral performance category scores at discharge (assessed only in the after group) were favorable (scores of 1 or 2) in 88% of 25 survivors.

The concept of minimally interrupted cardiac resuscitation is important for revising how we think about CPR. Our focus should be to provide sufficient and sustained perfusion to the ailing myocardium. Prolonged or repeated interruptions significantly undermine the process.

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Neurologic findings (e.g., decreased muscle strength or reflexes) may be present; blood cultures, typically, are sterile.

White blood cell count usually is normal, and the erythrocyte sedimentation rate is elevated in most patients.

The etiology of discitis is controversial. For our patient, the cause was never found.

Sixty percent of biopsied discs grow bacteria, usually *Staphylococcus aureus*.

Differential diagnosis should include consideration of the following:

- Spondylolysis is a unilateral or bilateral defect (separation) in the vertebral pars interarticularis, usually in the lower lumbar vertebrae, particularly L5. Spondylolisthesis occurs when bilateral defects permit anterior slippage of the vertebral body. These may be congenital, but more typically are acquired as the bone "fatigues" from recurrent microtrauma during excessive lumbar hyperextension, a common problem in gymnasts, dancers, divers, weightlifters, and football linemen.
- Scoliosis.
- Degenerative disc disease. Herniation of the nucleus pulposus is less common in children than in adults. Some risk factors include acute trauma and Scheuermann kyphosis.
- Osteoid osteoma, the most common neoplasm that presents with back pain in children. This is a benign bone tumor characterized by nocturnal pain and prompt relief with NSAIDs.

Treatment

Children often recover from discitis without antibiotic therapy, and many cases probably go undiagnosed. The current consensus is that discitis in children is a low-grade infection. Host defense systems usually are capable of overcoming the infection without assistance because the disc is richly vascularized up to 7 years of age. Occasionally, host defenses are overwhelmed, and complications such as abscess formation may result.

Treatment for discitis is not standardized. Aspiration of the affected disc for culture usually is not performed. Empiric antibiotic therapy should be directed against *S aureus*. Limited retrospective data suggest that initial treatment with IV antibiotics followed by oral antibiotics is associated with more rapid response and fewer relapses than is treatment with oral antibiotics or analgesia alone.■