

# URGENT CARE ALERT

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## Cardiac Risk Factor Burden in Diagnosing ACS in the ED Setting

ABSTRACT & COMMENTARY

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**Synopsis:** *Cardiac risk factor burden has limited clinical value in diagnosing acute coronary syndromes in the ED setting, especially in patients older than 40 years.*

**Source:** Jan JH, et al. The role of cardiac risk factor burden in diagnosing acute coronary syndromes in the emergency department setting.  
*Ann Emerg Med.* 2007;49:145-152.

THE OBJECT OF THIS ORIGINAL STUDY WAS TO DETERMINE IF THE burden of cardiac risk factors, defined as the number of conventional cardiac risk factors present, is useful in the diagnosis of acute coronary syndromes (ACS).

The study was a post hoc analysis of acute coronary syndrome patients who were registered on the Internet Tracking Registry of Acute Coronary Syndromes. This was a multi-center, multi-site study of 17,713 patients in the United States and Singapore. (Patients from Singapore were ultimately excluded secondary to a different set of risk factors associated with ACS.) Patients were entered in the study if they were older than 18 years of age, if the physician suspected they had acute coronary syndrome, provided, however, that they were not on cocaine or methamphetamine and they did not leave against medical advice, provided the researchers had complete ECG and demographic data.

Acute coronary syndrome was defined by revascularization within 30 days, diagnostic-related group codes, or death within 30 days, with positive cardiac bio markers at hospitalization. Cardiac risk burden was defined as the number of the following factors

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present at hospitalization: diabetes, hypertension, smoking, hypercholesterolemia, and family history of coronary artery disease. The patient population was broken down into 3 subgroups: < 40-years-old, 40 to 65-years-old, and > 65-years-old.

Ultimately, 10,806 patients were included in the study; 871 had acute coronary syndrome defined by the aforementioned inclusion criteria. In the group of patients younger than 40, having no risk factors had a negative likelihood ratio of 0.17 (95%; CI, 0.04 to 0.06), and having 4 or more risk factors had a positive likelihood ratio of 7.39 (95%; CI, 3.09 to 17.67). In the 40 to 60 age group, having no risk factors had a negative likelihood ratio of 0.53 (95%; CI, 0.40 to 0.71), and having 4 or more risk factors had a positive likelihood ratio of 2.13 (95%; CI, 1.66 to 2.73). In the patient group over 65, having no risk factors had a negative likelihood ratio of 0.96 (95%; CI, 0.74 to 1.23), and having 4 or more risk factors had a positive likelihood ratio of 1.09 (95%; CI, 0.64 to 1.62).

Other studies support the fact that as the number of cardiac risk factors increased, the odds of ACS increased incrementally.<sup>1-3</sup> In the population-based Framingham Heart Study, researchers found that individuals with 2 or more cardiac risk factors had a much higher risk of death as compared to patients with one or no risk factors.<sup>4</sup>

Jan and colleagues also found that the risk of ACS was significantly modified by age. For example, in the patients over 65, cardiac risk factor burden was less useful for predicting ACS, reflecting that age itself is a powerful risk factor for the development of acute coronary syndrome.

## ■ COMMENTARY

This study is useful to those of us in urgent care centers who are using point-of-care cardiac enzymes. The data suggest that in patients under 40 years old, providers should use cardiac risk factor burden to augment their clinical decision making. In those patients who are over 40, clinicians should not rely on the absence of cardiac risk factors to predict whether or not a patient is having a cardiac-related condition.

Patients often present to the urgent care center with a chief complaint of chest pain, or other potential anginal equivalents. Oftentimes, one of the major factors used to decide whether or not a transfer to the hospital is necessary is the presence or absence of additional cardiac risk factors.

This study suggests that the presence or absence of those risk factors in patients over 40 should not tip the balance either way. Moreover, the absence of risk factors has limited clinical value in diagnosing acute coronary syndrome, particularly in patients who are older than 40 years of age. For those patients with a normal EKG and a negative troponin, the story still buys the admission. ■

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# When to Use Braces, Splints: An A-Brace-Ive Situation

ABSTRACT & COMMENTARY

**By Matt Shores, MD**

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*Dr. Shore reports no financial relationships relevant to this field of study.*

**Synopsis:** Evidence-based recommendations for the use of braces and splints in various musculoskeletal conditions.

**Source:** Gravlee JR, Van Durme DJ. Braces and splints for musculoskeletal conditions. *Am Fam Physician.* 2007;75:342-348.

THE USE OF VARIOUS BRACES AND SPLINTS IS often implicated in many musculoskeletal conditions, ranging from acute injuries to chronic debilitations. It is a difficult task to differentiate between when the use of a particular brace or splint is warranted, with a strong evidence-based foundation versus their use being perpetuated by anecdotal rigmarole. In a February 2007 review published in the *American Family Physician*, Gravlee and Van Durme lay a solid framework for the appropriate use of various braces and splints in a wide variety of musculoskeletal conditions. Beginning with the knee and following with the ankle and the wrist, they highlight brace and splint use in various conditions.

In patients with medial compartment osteoarthritis, unloader (valgus) braces may reduce pain and improve function. The evidence surrounding unloader braces is not particularly overwhelming (evidence rating B), however, unloader braces ultimately may offer a good option for those patients who are not surgical candidates, or for patients who would like to buy some time prior to undergoing surgery.

Anterior knee pain, more specifically, patellar femoral pain syndrome (PFPS), is a frustrating entity in and of itself. So, it should come as no surprise that the evidence in treating anterior knee pain with braces is not strong. The type of brace utilized in PFPS is typically a neoprene sleeve with added patellar support in the form of a C-shaped, J-shaped, H-shaped, or circular buttress. Given that the evidence is limited and the few studies available produced conflicting

results, patellar bracing is neither recommended nor discouraged in treating anterior knee pain.

Immobilization of the knee is generally not a good idea in treating knee injuries. However, there are a few incidences when a knee immobilizer brace would be recommended. These include quadriceps rupture, patellar tendon rupture, MCL rupture, patellar fracture, patellar dislocation, and other acute traumatic knee injuries. Typically, given the injuries that precipitate its use, the knee immobilizer is part of presurgical treatment.

Ankle braces basically come in 2 varieties: rigid and functional. Rigid braces completely immobilize the ankle and are not recommended in the treatment of ankle sprains. The 2 main types of functional ankle braces are lace-up braces and semi-rigid braces that consist of lateral stirrups lined with foam pads. Evidence supporting the use of functional ankle braces is strong (evidence rating A), including multiple randomized trials. However, evidence does not point to either lace-up or semi-rigid braces as a more appropriate option than the other, although lace-up braces have been shown to reduce short-term swelling more so than semi-rigid braces. In terms of wearing an ankle brace as primary prevention or prophylaxis in patients who have had previous ankle injuries, there is strong evidence that semi-rigid braces help prevent ankle sprains in high-risk sports (evidence rating A).

Carpal tunnel syndrome is a complaint growing in relevance as computer use becomes commonplace. Wrist splints are often used in the treatment of carpal tunnel syndrome. The type of splint, and its use, vary. Splints may be used in the neutral position or in an extended (cock-up) position. Also, splints are often prescribed to be worn either full-time or only at night. The recommendation in regard to wrist splints treating carpal tunnel syndrome is that splints should be worn in the neutral position full-time for at least 4 weeks (evidence rating B).

## ■ COMMENTARY

Musculoskeletal conditions are a mainstay of urgent care centers across the country. Acute injuries, in particular, are the backbone of urgent care musculoskeletal presentations, although at times, the management of more chronic problems arises. The section of Gravlee and Van Durme's article most relevant to the practice of the urgent care medicine touches on the use of ankle braces. Ankle sprains are perhaps the most common musculoskeletal injury

that presents in the urgent care setting. It is important to recognize the difference between a rigid brace and a functional brace. The use of functional braces in ankle sprains has strong evidence-based support. The addition of a functional brace to a treatment plan that already includes rest, ice, compression, and elevation should be a foregone conclusion. In his 2006 article in *American Family Physician*, Ivins details the PRICE approach to treating ankle sprains, including functional treatment and the use of lace-up and semi-rigid ankle braces.<sup>2</sup> It would be prudent for all urgent care centers to have a sufficient quantity of both lace-up braces and semi-rigid ankle braces on hand.

Although carpal tunnel syndrome does not present as commonly in an urgent care setting, it is typically easy to recognize, and it is easy to treat conservatively with an evidence-based approach. Prescribing a neutral position wrist splint to be worn full-time for at least 4 weeks is something that can be easily done by any physician, whether it be a patient's PCP or an urgent care physician the patient is seeing for the first time.

Knee injuries that require bracing are not often seen in urgent care centers. However, it is important to recognize the traumatic injuries that require a knee immobilizer. In addition to traumatic injuries of the knee, there are multiple acute musculoskeletal injuries that occur all over the body in which various braces and splints are indicated. Although Gravlee and Van Durme's article does not touch on many other injuries, *Primary Care: Clinics in Office Practice* has produced 2 great musculoskeletal review articles that touch on a multitude of acute injuries. Patel and Baker produced "Musculoskeletal Injuries in Sports"<sup>3</sup> in June of 2006, and Rooks and Corwell published "Common Urgent Musculoskeletal Injuries in Primary Care."<sup>4</sup> Both are solid reviews, as is this article by Gravlee and Van Durme. ■

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# Pediatric Head Trauma: What's Changed?

ABSTRACT & COMMENTARY

**By John Shufeldt, MD, JD, MBA, FACEP**

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Dr. Shufeldt reports no financial relationship to this field of study.

**Synopsis:** The use of CT has increased substantially in the evaluation of children with head trauma from 1995 to 2003.

**Source:** Blackwell CD, et al. Pediatric head trauma: Changes in use of computed tomography in emergency departments in the United States over time. *Ann Emerg Med*. 2007;49:320-324.

THE OBJECT OF THIS ORIGINAL STUDY WAS TO describe the use of cranial computed tomography (CT) in the evaluation of children with head trauma. Head injury is very common in the pediatric population; however, despite its frequent occurrence, inconsistency exists in the clinical criteria used to determine the need for CT scanning.

The study design was a cross-sectional analysis of data obtained from the National Hospital Ambulatory Medical Care Survey from 1995 to 2003. This data set is from approximately 600 emergency departments across the United States and represents approximately 25,000 patient visits. Patients identified for use in this study were between 0 and 18 years old and had either a chief complaint or discharge diagnosis of head trauma (ICD-9-CM codes of skull fracture, concussion, intracranial hemorrhage, other brain injury, and head injury not otherwise specified). Researchers collected demographic data, discharge diagnosis, use of head CT, and disposition.

Ultimately, 2747 patients were included in the study. The results of this study were that the use of CT imaging for head trauma in children rose from 12.8% in 1995 to 28.6% in 2000 and then decreased slightly to 22.4% from 2001 through 2003. In general, CT scanning was used most often (32%) in the oldest age group, 10 to 18-year-olds. No difference in utilization existed between teaching and non-teaching hospitals; however, CT scanning was used more frequently in general emergency departments as opposed to pediatric-specific emergency departments.

Blackwell and colleagues hypothesize that this

upward trend may be due to lower thresholds for ordering scans and improvements in CT scanning software and hardware. Despite the increased use of CT scanning, there are no data that support widespread utilization in children with head injuries, and Blackwell et al conclude that further study is needed to identify objective criteria for cranial CT in head-injured children, as well as to evaluate the impact of increased CT use on patient outcomes.

#### ■ COMMENTARY

Pediatric head injuries often present to urgent care centers which typically do not have the luxury of cranial CT scanning. The dilemma, of course, is how to manage those individuals with seemingly minor head injuries who have a GCS of 14 or 15. Unfortunately, the jury is still out. In one study of 313 head-injured children, there were no reliable indicators of intracranial injury.<sup>1</sup> In another study on head-injured children, Simon and colleagues concluded that neither loss of consciousness nor decreased GCS was a sensitive indicator of a positive CT scan.<sup>2</sup>

In some respects, the non-uniformity is not all that bad. Since there are no clear guidelines, no bright line standard of care exists for those children with historically trivial head injuries, normal exams, and responsible parents. The take-home point is that the children's guardians should be given informed consent about CT scanning, its efficacy, risks, and costs. If the parents elect to have the child's head scanned, the provider should arrange transport to the appropriate emergency department. On the other hand, if they elect to expectantly observe the child, document that in the chart along with any necessary follow-up and/or instructions on what signs and symptoms the parents should be looking for.

Until proven criteria are in practice to aid in the decision making on whether or not to order a cranial CT, we have to rely on historical information, thorough exam, and informed consent. The following are recommendations from *Rosen's Emergency Medicine*:

##### **Children < 3 months old:**

- Consider CT unless asymptomatic, low-risk history and physical exam, no scalp hematoma, and trivial traumatic mechanism;

##### **Children 3 months to 2 years old:**

- No imaging if normal neurological exam, no symptoms, no scalp hematoma;
- Imaging if abnormal neurological exam, moderate or high-risk injury or physical exam findings;

##### **Children > 2 years old:**

- No imaging if normal neurological exam, no symptoms, no scalp hematoma;

- Consider imaging if normal neurological exam, low- or moderate-risk injury or physical exam findings.
- Imaging if abnormal neurological exam, moderate or high-risk injury or physical exam findings.<sup>3</sup> ■

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## Diagnosis and Treatment of DVT in an Urgent Care Setting

ABSTRACT & COMMENTARY

**By Scott C. Elston, MD**

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*Dr. Elston reports no financial relationship to this field of study*

**Synopsis:** *Venous Thromboembolism is a common condition affecting 7.1 persons per 10,000 person years among community residents. Incidence rates are higher for men and African Americans, and increases substantially with age. It is critical to treat deep venous thrombosis at an early stage to avoid development of further complications such as pulmonary embolism or recurrent deep venous thrombosis.*

**Source:** Snow V, et al. Management of venous thromboembolism: A clinical practice guideline from the American College of Physicians and the American Academy of Family Physicians. *Ann Intern Med*. 2007;146:204-210.

#### Recommendations

**RECOMMENDATION I:** LOW-MOLECULAR-WEIGHT Heparin (LMWH), rather than unfractionated heparin, should be used whenever possible for the initial inpatient treatment of deep venous thrombosis

(DVT). Either unfractionated heparin or LMWH is appropriate for the initial treatment of pulmonary embolism.

**Recommendation 2:** Outpatient treatment of DVT, and possibly pulmonary embolism, with LMWH is safe and cost-effective for carefully selected patients and should be considered if the required support services are in place.

**Recommendation 3:** Compression stockings should be used routinely to prevent post-thrombotic syndrome, beginning within one month of diagnosis of proximal DVT and continuing for a minimum of one year after diagnosis.

**Recommendation 4:** There is insufficient evidence to make specific recommendations for types of anticoagulation management of Venous Thromboembolism (VTE) in pregnant women.

**Recommendation 5:** Anticoagulation should be maintained for 3 to 6 months for VTE secondary to transient risk factors and for more than 12 months for recurrent VTE. While the appropriate duration of anticoagulation for idiopathic or recurrent VTE is not definitively known, there is evidence of substantial benefit for extended-duration therapy.

**Recommendation 6:** LMWH is safe and efficacious for the long-term treatment of VTE in selected patients (and may be preferable for patients with cancer).

#### ■ COMMENTARY

With the availability of more sensitive and sophisticated laboratory testing (ie, d-dimer), as well as refined clinical evaluation tools (ie, Hamilton Criteria), urgent care centers can certainly be of greater assistance in diagnosing DVT. Now with growing evidence regarding the safety and efficacy of LMWH, urgent care centers may be able to further participate in the care of select, low-risk patients presenting with DVT. With careful patient history, skillful examination, and supportive laboratory testing, one can reliably diagnose, and now perhaps initiate, treatment in patients without significant co-morbidities or other risk factors, at least until they can be conveniently referred to the appropriate specialist for continued care.

This approach may further help to spare patients (and their insurers) the time and expense of unnecessary emergency room visits/hospitalizations, thus conserving the resources of all of the above for patients more in need of their specific levels of care. ■

## Opioids for Acute Abdominal Pain

ABSTRACT & COMMENTARY

**By Donna Woods, DO**

*Regional Medical Director, Nextcare Urgent Care*

*Dr. Woods reports no financial relationships relevant to this field of study.*

**Synopsis:** *Opiate administration may alter physical examination findings, but these changes result in no significant increase in management errors.*

**Source:** Ranji SR, et al. Do opiates affect the clinical evaluation of patients with acute abdominal pain? *JAMA*. 2006; 296:1764-1774.

TRADITIONALLY, ANALGESIA HAS BEEN WITHHELD from patients with acute abdominal pain due to concerns that important physical examination findings may be masked by medicines to treat pain, thus resulting in delayed surgical treatment and increased mortality and morbidity. Several studies have been published in the last 2 decades aiming to discern the effects of analgesia in the management of acute abdominal pain.

This meta-analysis performed a review of 12 Randomly-Controlled Trials (RCTs) published from 1986-2005, which investigated the effects of opioid analgesia on physical examination and management of patients with acute abdominal pain. Nine of the 12 studies were performed on adults (n = 1062) and 3 of the studies were performed on children (n = 291). The studies were all placebo-controlled, and changes were reported in history, physical examination, and management errors (defined as either performing unnecessary surgery or failure to perform necessary surgery in a timely manner.) Pooled-risk ratios with confidence intervals were examined between the groups given opioids and the groups given placebo.

When the analysis was restricted to only those studies demonstrating adequate, subjective analgesia in the patients given opioids (8/12 of the studies), a statistically significant difference in relevant physical examination findings (ie, loss of peritoneal signs) was noted.

However, this difference in physical examination findings was not shown to lead to a statistically significant increase in management errors and, in some studies, opioid administration was actually associated with a small decrease in management errors.

No patients in the studies reviewed by Ranji and colleagues were reported to have experienced complications or death secondary to opioid administration.

#### ■ COMMENTARY

The studies reviewed by Ranji et al had several limitations. The studies were not adequately powered to show statistically significant differences in management errors between the opioid-treated group and the placebo-treated group.<sup>1</sup>

There may also be differences in management error rates between opioid and placebo groups when individual, underlying causes of the acute abdomen are examined (ie, appendicitis, cholecystitis, small bowel obstruction, ectopic pregnancy, diverticulitis, etc.)

The use of imaging (ultrasound [U] and computed tomography [CT]) may be performed much more frequently now than when some of the earlier studies used in this meta-analysis were published. The use of U and CT contribute greatly to the accuracy and speed of diagnosis in acute abdominal pain. The standard CT scan is 94% sensitive and 95% specific for the diagnosis of acute appendicitis in adults and adolescents.<sup>2</sup>

The risks of delaying treatment in the patient with acute abdominal pain are not small. In patients younger than 3-years-old and in patients older than 60, diagnosis of appendicitis is often delayed, leading to perforation rates as high as 80%.<sup>3,4</sup> The risk of death from perforation in these studies is approximately 1%.

The most common complication of cholecystitis in older patients, diabetics, and those who delay seeking treatment, is gall bladder gangrene (20%), and 2% of those patients subsequently perforate, which is associated with a high mortality rate.<sup>5</sup>

Once an acute abdomen is recognized in the urgent care setting, referral decisions must be made promptly to transfer the patient to the Emergency Department (ED) where imaging and surgical evaluation can occur.

These trials examined how treatment with opioids in the ED affects a patient's care when he/she presents with acute abdominal pain. Some urgent care centers have the ability to administer parenteral opioid analgesics on site. Decisions about treatment to be administered in the urgent care setting, prior to transfer to the ED, must be weighed heavily against the risks of altering physical examination and management. In the ED, when an opioid is administered for acute abdominal pain, it is assumed that there is a direct verbal communication between the examining ED doctor (pre-analgesic exam) and the surgeon (post-analgesic exam). When an analgesic is administered in an urgent care

center prior to transfer to an ED, not only will the exam be altered for the surgeon, it will be altered for the ED doctor and the ED triage staff (which could result in inappropriate triage and seriously delayed care). Alternatively, the urgent care physician may speak directly to the surgeon and communicate the exam finding prior to the administration of opioids, thereby acting in the same role as the ED physician.

Whether urgent care administration of analgesia would result in management errors remains to be studied. Treatment with other medications in urgent care centers prior to ED transfer, is also controversial. This would include anti-emetics, which would not only relieve the symptom of nausea but could also affect alertness and mental status, which could potentially confuse the clinical picture in the evaluation of both abdominal pain and headaches. Treatment with NSAIDs could remove fever as part of a patient's presentation to an ED doctor or triage nurse. This could have serious consequences in a wide variety of infections. Treatment with an antibiotic prior to referral to an ED can alter the results of blood, urine, sputum, and CSF cultures. All of these treatments prior to referral to the ED have the potential to cause management errors, which can have direct consequences for patients. However, antibiotics should never be delayed while waiting for cultures or other labs to be drawn. The goal is to treat the patient first and then obtain the necessary diagnostic information.

Such pre-hospital treatment decisions should be made on a case-by-case basis and should be made with a clear awareness of the potential to alter important physical exam findings. A verbal report of such treatment should be well-communicated to ED personnel, as well as to the patient and should be documented in the patient's record. A copy of the patient's record should accompany them to the hospital. In urgent care centers, oral medications should not be administered to patients with acute abdominal pain, as they should be considered NPO until surgical evaluation. Injectable NSAIDs (ketorolac) should also be avoided, as they can increase bleeding by inhibiting platelets, should the patient require surgery. ■

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## CME Questions

8. True or False? A 44-year-old patient presents with a complaint of chest pressure, with exertion intermittently, for the last week. His ECG does not reveal evidence of an acute MI, and his initial troponin is negative. At this point, should the provider decide whether or not to transfer the patient to the ED based on the patient's cardiac risk factors?
- True
  - False
9. Which of the following would NOT be an appropriate addition to RICE therapy in the treatment of an acute ankle sprain?
- lace-up brace
  - semi-rigid brace
  - rigid brace
  - None of the above
  - All of the above
10. In which of the following injuries would the use of a knee immobilizer be appropriate?
- an acute patellar fracture
  - a new diagnosis of osteoarthritis
  - an acute quadriceps rupture
  - Both a and c
  - All of the above
11. A 14-year-old patient presents with a complaint head injury while riding his bike. The child was wearing a helmet, had no loss of consciousness, and has a normal exam. He is with both his parents, who you find to be competent. What is the most reasonable course of action?
- A 911 transfer to a pediatric trauma center for emergent cranial CT scanning and neurosurgical evaluation.
  - Give the patient and parents informed consent about the efficacy, risk, and cost of cranial CT scanning versus expectant observation.
  - Observe the patient for 8 hours in the urgent care center, with frequent neuro checks.
  - Discharge the patient and tell the parents that the odds of having an intracranial injury are small and not to worry.

Answers: 8. (b); 9. (c); 10. (d); 11. (b)

## CME Objectives

The objectives of *Urgent Care Alert* are to:

- quickly recognize or increase index of suspicion for specific conditions;
- apply state-of-the art therapeutic techniques to treat patients with particular problems;
- identify both common and rare complications that may occur. ■

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