

# The FAST Scan: Are We Improving Care of the Trauma Patient?

## EBEM Commentator Contact

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This is a systematic review abstract, a regular feature of the *Annals' Evidence-Based Emergency Medicine (EBEM)* series. Each features an abstract of a systematic review from the *Cochrane Database of Systematic Reviews* and a commentary by an emergency physician knowledgeable in the subject area.

The source for this systematic review abstract is: Stengel D, Bauwens K, Schouli J, et al. Emergency ultrasound-based algorithms for diagnosing blunt abdominal trauma. *Cochrane Database Syst Rev.* 2005,2:CD004446.

The *Annals EBEM* editors assisted in the preparation of the abstract of this Cochrane systematic review, as well as selection of the "Evidence-Based Medicine Teaching Points."

## OBJECTIVE

To assess the efficiency and effectiveness of trauma algorithms that include ultrasonographic examinations in patients with suspected blunt abdominal trauma.

## DATA SOURCES

The researchers searched MEDLINE, EMBASE, CENTRAL, CCMED, publishers' databases, controlled trial registers, and the Internet. Bibliographies were hand searched. Trials were obtained from the Cochrane Injuries Group's trials register. Authors of articles were contacted for further information.

## STUDY SELECTION

Randomized controlled and quasirandomized trials in patients undergoing diagnostic investigations for blunt torso, abdominal, or multiple trauma were divided into ultrasonography (intervention) versus no ultrasonography (control) groups. Outcome measures were compared with regard to mortality, use of computed tomography (CT) and diagnostic peritoneal lavage, cost-effectiveness, laparotomy and negative laparotomy rates, delayed diagnoses, and quality of life.

## DATA EXTRACTION AND ANALYSIS

Two reviewers independently selected trials for inclusion, assessed methodologic quality, and extracted data. Where possible, data were pooled and relative risks (RRs), risk

differences, and weighted mean differences, each with 95% confidence intervals (CIs), were calculated using fixed- or random-effects models, as appropriate.

## MAIN RESULTS

Two randomized controlled trials (RCTs) and 2 quasirandomized trials were considered. Data were pooled comprising 1,037 patients; the included trials were of moderate methodologic quality. The RR of death was 1.4 (95% CI 0.94 to 2.08) in favor of the no-ultrasonography arm. There was a marginal benefit with ultrasonography-based pathways in reducing CT scans (random-effects risk difference  $-0.46$ ; 95% CI  $-1.00$  to  $0.13$ ), offset by trials of higher methodologic rigor. No differences were observed in diagnostic peritoneal lavage and laparotomy rates.

## CONCLUSIONS

There is insufficient evidence from RCTs to justify promotion of ultrasonography-based clinical pathways in diagnosing patients with suspected blunt abdominal trauma.

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## COMMENTARY: CLINICAL IMPLICATION

The treatment of the trauma patient presents a multitude of diagnostic and therapeutic dilemmas to the emergency physician and trauma team. Moreover, blunt abdominal trauma presents the clinician with the most difficult challenges. The goal of the emergency physician in such cases is simple: identify the patients who will benefit from surgical intervention as quickly and efficiently as possible. Historically, emergency physicians have relied on injury history, vital signs, examination, laboratory testing, and various diagnostic modalities (eg, ultrasonography, CT, and diagnostic peritoneal lavage) to detect intraabdominal injury. In the past decade, however, the availability and resultant popularity of portable ultrasonographic equipment has

provided emergency physicians with a bedside tool to consider in the treatment of patients with abdominal trauma.

The reported sensitivity of ultrasonography for the detection of hemoperitoneum is 85% to 95%. It is widely accepted that the sensitivity for detection of isolated solid organ injury, however, is much lower. Still, proponents of ultrasonography believe that “urgent laparotomy, thoracotomy, or thoracostomy can be expedited, avoiding the morbidity and mortality associated with continued bleeding.”<sup>1</sup> Yet the question remains: Are we truly improving patient outcomes by using ultrasonography for the trauma patient?

This was the focus of the Cochrane review, published in February 2005 by Stengel et al. The strength of this review arises from the authors’ attempts to avoid publication and selection bias and their adherence to methodologic principles consistent with most Cochrane reviews. Despite the apparent widespread use of ultrasonography in emergency departments, only 4 studies were identified as being of sufficient methodologic quality to be included in this review. Two of these included mortality outcome data, which failed to demonstrate a benefit in the ultrasonographic group. There was a small reduction in CT scans ordered in the ultrasonographic group, a testament to what the author describes as “a false sense of security,” given the discussion of the overall sensitivity of ultrasonography for isolated solid organ injury. Two studies examined cost-effectiveness and provided divergent results. No difference was found between the groups in laparotomy rate.

As emergency physicians, should we conclude that we are just wasting our time and gel in performing these scans? Clearly, more comprehensive outcome reporting is needed in all device research because interesting secondary outcome findings were observed in 2 of the included studies. Boulanger et al<sup>2</sup> reported a reduction in mean time from arrival to completion of the diagnostic algorithm from 151 minutes to 53 minutes. This finding was echoed by Arrilaga et al,<sup>3</sup> who demonstrated a reduction in median disposition time from an average of 86 minutes to 20 minutes. Melniker et al<sup>4</sup> also found a dramatic decrease in time to definitive care (operating room/intervention room) from 3 hours to 1 hour and also demonstrated improvements in length of stay and overall cost of hospitalization. Consequently, there are a number of reasons to believe that this review has not resolved the controversy and that more evidence is needed on both sides to resolve the current debate.

**Editor’s Note:** After the completion of this EBEM review, an important article was published in *Annals of Emergency Medicine* on this topic.<sup>5</sup> In short, Melniker et al<sup>5</sup> demonstrated a 64% decrease in time from presentation to operative care (57 versus 166 minutes) in patients with torso trauma. CT use was also decreased (odds ratio 0.16), although much of this decrease was in the operative care group in which CT scanning was obviated by the positive FAST (Focused Assessment with Sonography for Trauma) scan. Complications in the operative group, length of stay, and overall cost of hospitalization were also reduced in the

ultrasonographic group, which the authors hypothesized may be a result of earlier interventions during the “golden hour.” This article is a valuable addition to the ultrasonographic literature and should be included in future revisions of this Cochrane review.

### TAKE HOME MESSAGE

In summary, the review demonstrates no evidence to support improvement in patient-centered outcomes based on the literature included. A stronger argument can now be made, however, that decreasing time to definitive care and disposition is of critical importance to emergency physicians. Further study is necessary in this regard, focusing on time from presentation to diagnosis and definitive therapy while continuing to examine patient morbidity and mortality as long-term outcomes. High-quality studies are required to determine the risks and benefits associated with this device.

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### EBEM TEACHING POINT

*Cluster RCTs.* Sadly, traditional RCTs in the emergency ultrasonographic field are infrequent and clearly difficult to perform for a variety of reasons.<sup>6</sup> First, physicians trained in emergency ultrasonography may believe that randomization to nonuse results in an ethical dilemma. Second, using mortality outcomes may be considered suboptimal because many fatalities in multiple trauma are influenced more by injury severity than by ultrasonography use. Third, for less severe injuries, mortality may be such a rare outcome that very large sample sizes would be required. Finally, traditional RCTs are time consuming and expensive to conduct. Designs such as cluster RCTs offer a feasible alternative; however, they are no less difficult to conduct and remain costly. Cluster RCTs randomize sites to use or not use the intervention in question (in this case, emergency ultrasonography), and the unit of randomization is the site, rather than the patients enrolled (ie, results represent comparisons between sites, not patients). This design is appropriate for many device comparisons and has been applied in emergency medicine for clinical decision rules and clinical practice guidelines.

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The American Board of Emergency Medicine (ABEM), the American Board of Family Medicine, (ABFM), the American Board of Internal Medicine (ABIM), and the American Board of Pediatrics (ABP), will administer the certification examination in Sports Medicine and the recertification examination in Sports Medicine on July 19-21, 26-28, and August 2-4, 2007. The examination will be administered at computer-based testing centers. Candidates will schedule an examination appointment on one of those days.

The eligibility criteria are available from each of the four board offices or on the boards' web sites: [www.theabfm.org](http://www.theabfm.org), [www.abem.org](http://www.abem.org), [www.abim.org](http://www.abim.org), [www.abp.org](http://www.abp.org).

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