

out our niche. Until the “time is muscle” concept was accepted, thrombolytics were restricted to the cardiac care unit. Emergency physicians’ use of paralyzing agents still causes spasms in some of our anesthesia colleagues. In recent years, the boundaries of radiology have been threatened by orthopedic surgeons who read their own radiographs, cardiologists who interpret coronary angiograms, and now by EPs who develop diagnostic imaging protocols and demand to perform ultrasounds. Where will it end?

There are many issues to resolve: training, maintenance of skills, availability, indications, “turf,” the need for a “gold standard,” and the critical question: Will ED ultrasound actually improve patient outcomes? In preparing this article, we invited several emergency physicians and one radiologist to comment on the role of U/S in the ED. Their opinions follow.

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## Ultrasound in emergency medicine

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Although diagnostic imaging is, for the most part, the domain of radiologists, exceptions to this rule have developed. Cardiologists perform cardiac catheterization and echocardiography. Obstetricians have developed expertise in transvaginal ultrasound and fetal assessment. Why have some specialties embraced areas of imaging as theirs, while others — such as orthopedics and medicine — continue to rely on radiology? One reason is that radiologic expertise in these latter specialities is rarely required on a 24-hour basis and it can be provided without taking on an overwhelming workload. ED bedside ultrasonography, on the other hand, must be available 24 hours a day. Conditions requiring immediate (within 15 to 20 minutes) ultrasound (U/S) include expanding or leaking abdominal aneurysm, suspected ectopic pregnancy, and traumatic hemoperitoneum. When patients with these conditions are unstable they require even more rapid imaging — “real imaging” in the operating room.

Emergency physicians (EPs) in many emergency depart-

ments state that they lack rapid access to U/S because of resistance from their radiologists, in effect using the same arguments that other specialists have used. But unlike other specialties, to remedy this situation and make 24-hour U/S immediately available, *all* EPs in *every* department would have to master the technique. Anything less than this would establish a double standard of care in each department, eliminating the argument that immediate U/S is essential for optimal patient management. The appearance would be that EPs want to perform U/S for financial or turf reasons.

What has rapidly available U/S given us? Many US trauma centres are equipped with ED U/S. Despite this, few if any studies demonstrate that trauma outcomes have improved as a result. While U/S rapidly identifies intraperitoneal blood and perhaps decreases invasive peritoneal lavages, it does not identify hollow viscus injuries. A normal U/S does not allow patient discharge; nor does it rule out significant intra-abdominal injury. To date, therefore,

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U/S in trauma resuscitation remains in the “Mikey likes it” category: an expensive tool that everyone likes, but hardly a gold standard and not yet justified by proper trials.

If we insist on U/S training and accept radiology recommendations for a 3-month minimum training period, what should we then remove from our 5-year Royal College program and our 1-year CCFP(EM) training? Remember that all EPs will have to be trained if this technology is to be properly utilized, and the largest group of Canadian-trained EPs comes from CCFP(EM) programs. This is clearly not a viable solution; neither is it reasonable to require all trainees to take a (nonexistent) fellowship to learn the technique adequately.

Since we cannot achieve proper training or universal expertise, how can we justify this venture? Should we not at least have conclusive evidence that bedside U/S improves outcomes prior to embarking down the path? If we do not, then are we not imitating those specialties we have decried (e.g., anesthesia and their attempts to control certain medications) in claiming a “turf” issue?

In our hospital, a trauma centre, we receive 250 major trauma victims each year. Operative intervention is most often required for orthopedic, plastics and neurosurgical injuries; only 10% of our patients have intra-abdominal pathology requiring urgent laparotomy. This is typical in Canada, where

we have relatively little penetrating trauma. If we assume that 4 to 6 trauma team leaders share call, then each will have fewer than 10 abnormal abdominal U/S exams annually. How, exactly, will this produce experts in ED U/S?

It seems better in the long run to work out our difficulties with radiology than to train all EPs to perform U/S. In this era of digitalization and cable modems, it is no longer necessary for radiologists to be on-site. Technicians can perform the study and transmit images to *any* radiologist — not just those associated with a specific hospital. By keeping a trained technician in-hospital, this compromise would be cost-effective and provide the necessary 24-hour service without requiring EPs to learn the new skill.

As discouraging as this may seem to those who support claiming abdominal U/S as an emergency medicine skill, the arguments raised above suggest it is not. Instead of trying to gain new expertise, we should negotiate an equitable agreement with those who already possess it: the radiologists. What matters is patient outcome, and this is better served by interdepartmental cooperation and a multidisciplinary approach than by having partially trained EP ultrasonographers available in a haphazard fashion.

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## Ultrasound in the ED: a different point of view

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Many published papers report excellent sensitivity, specificity and accuracy when non-radiologists employ ultrasound (U/S) to detect free intraperitoneal fluid in cases of blunt abdominal trauma (BAT). In this setting, it is best to view the FAST (focused abdominal sonogram in trauma) as a noninvasive diagnostic peritoneal lavage (DPL): It tells us whether there is free intraperitoneal fluid but does not determine the specific parenchymal injury. In other words *it is a screening tool*.

Why is this important? In abdominal trauma, the single most important criterion for laparotomy is the rapid demonstration of hemoperitoneum.<sup>1</sup> But unanswered questions remain. What is the role of FAST in patients with less severe trauma who will be discharged from the ED, and in what situations should we be doing serial studies? If emer-

gency physicians (EPs) perform FAST, does this improve patient care and outcomes? While there is evidence that 2-dimensional echocardiography in the hands of emergency physicians improves time-to-diagnosis, survival rate and neurological outcome in patients with penetrating cardiac injuries,<sup>2</sup> I am unaware of studies showing improved patient outcomes when FAST is added to the blunt abdominal trauma algorithm. Nevertheless, it is clear that in many trauma centres, FAST decreases the use of DPL, which is invasive, nonspecific, and is associated with a high rate of non-therapeutic laparotomy and the attached morbidity. In addition, in centres using FAST as a screening modality, the number of abdominal CT scans has decreased significantly, reducing costs.<sup>3</sup> Non-radiologists who perform FAST rarely bill for the procedure, which leads to additional savings.

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