

## SHORT REPORT

# Prospective evaluation of non-radiologist performed emergency abdominal ultrasound for haemoperitoneum

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**F**ocused assessment with sonography for trauma (FAST) is a technique developed principally for non-radiologists<sup>1,2</sup> for the ultrasound assessment of abdominal trauma. FAST is based on the principle that haemoperitoneum collects primarily in three dependent regions: perihepatic, perisplenic, and pelvis. These regions are sequentially assessed for blood together with a pericardial view to detect cardiac tamponade. Positive findings augment the clinical assessment and may expedite the appropriate management of the trauma patient. Previous studies have predominately been undertaken in busy American trauma centres and data on the value of non-radiologist performed FAST in a British accident and emergency (A&E) department are limited to date.<sup>3</sup>

The aim of this study was to evaluate non-radiologist performed emergency torso ultrasound against established investigations for the detection of intra-abdominal blood in patients with abdominal trauma in a British A&E department.

### METHODS

Adult patients triaged to the resuscitation room with multiple trauma over a 12 month period underwent ultrasound investigation using the FAST technique by one of three trained non-radiologists (consultant, specialist registrar, staff grade). The ultrasound findings were declared to the trauma team as required by the ethics committee (reference GS040102).

The FAST results were compared against the investigation of choice of the attending surgeon—computed tomography, diagnostic peritoneal lavage, laparotomy, or clinical observation. All clinical decisions were taken based on information collected from these investigations. The patients were followed up until hospital discharge or death for significant events related to potential abdominal injuries.

### RESULTS

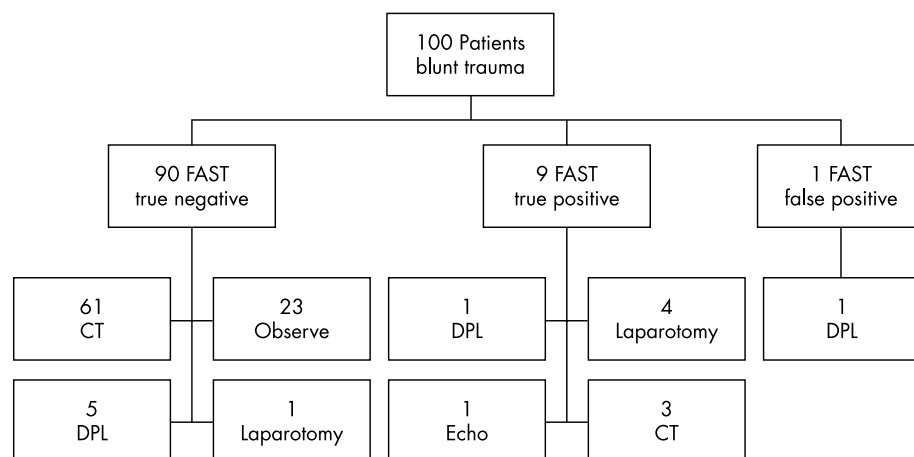
One hundred blunt and 10 penetrating abdominal trauma patients were evaluated by FAST and analysed separately. Five scans were technically incomplete, three as a result of surgical emphysema. Figure 1 gives details of the FAST findings in the blunt trauma patients and subsequent investigations. Twenty three patients were observed until hospital discharge after a negative FAST (median 5 days, range 1–21 days), none developed abdominal complications. The sensitivity of FAST for the evaluation of blunt abdominal trauma was 100% and specificity 99%, with a positive predictive value of 90%.

In the penetrating trauma group (fig 2) one positive FAST and two false negative scans were reported leading to a sensitivity of 33%, specificity 86%.

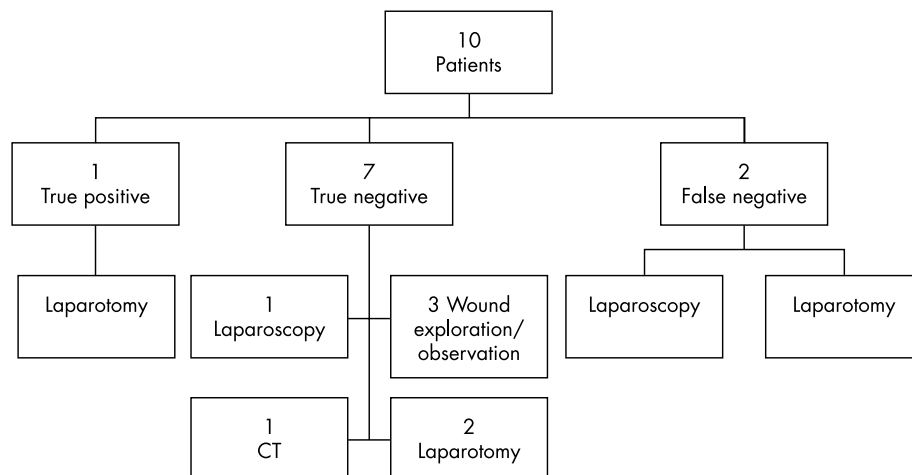
### DISCUSSION

FAST has been shown to be a valuable investigation for the assessment of blunt abdominal trauma in large series from North America reporting sensitivities of 80%–88% and specificities 90%–99%.<sup>1–5</sup> Other papers have shown that FAST is equally accurate in the hands of non-radiologists and radiologists.<sup>6</sup>

This study evaluated FAST against established investigations in a cohort of British trauma patients and has demonstrated the ability of trained non-radiologists to perform FAST with acceptable accuracy in this environment. The results show that FAST is accurate in blunt trauma compared with evaluation with computed tomography, diagnostic peritoneal lavage, or clinical observation. The small number of patients with haemoperitoneum in the series may account for the high sensitivity reported. The results also compare favourably with international work evaluating radiologists and non-radiologists in detecting haemoperitoneum in blunt trauma.<sup>6</sup>



**Figure 1** FAST results and investigations to confirm the FAST findings for blunt trauma.



**Figure 2** FAST results and investigations for penetrating trauma.

The limited number of patients with penetrating injuries in our study precludes conclusions being drawn from the data, however the sensitivity in the series is similar to previously published work.<sup>7</sup> Caution must be used evaluating penetrating injury with FAST, although positive studies are strong predictors of injury, negative scans must be augmented by additional investigations.

We recommend that FAST should be adopted as the initial investigation to augment the clinical assessment of abdominal trauma. However, the limitations of a negative FAST must be recognised and the results should be interpreted with caution in penetrating injury.



A longer version of this paper is available on line (<http://www.emjonline.com/supplemental>)

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#### REFERENCES

- 1 **Rozycki GS Ochsner MG**, Jaffin JH, *et al.* Prospective evaluation of surgeons' use of ultrasound in the evaluation of trauma patients. *J Trauma* 1993;**34**:516–26.
- 2 **Rozycki GS Ochsner MG**, Schmidt JA, *et al.* A prospective study of surgeon-performed ultrasound as the primary adjuvant modality for injured patient assessment. *J Trauma* 1995;**39**:492–500.
- 3 **Sloan JP**, Lalanda M, Brenchley J, *et al.* Developing the role of emergency medicine ultrasonography. The Leeds experience. *Emerg Med J* 2002;**19**:A63.
- 4 **Dolich MO**, McKenney MG, Varela JE, *et al.* 2576 ultrasounds for blunt abdominal trauma. *J Trauma* 2001;**50**:108–12.
- 5 **McKenney MG**, Martin L, Lentz K, *et al.* 1000 consecutive ultrasounds for blunt abdominal trauma. *J Trauma* 1996;**40**:607–12.
- 6 **Buzzas GR**, Kern SJ, Smith SR, *et al.* A comparison of sonographic examinations for trauma performed by surgeons and radiologists. *J Trauma* 1998;**44**:604–8.
- 7 **Udobi KF**, Rodriguez, Chiu WC, *et al.* Role of ultrasonography in penetrating abdominal trauma: a prospective clinical study. *J Trauma* 2001;**50**:475–9.