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Reference: Prospective Evaluation of Prehospital Trauma Ultrasound During Aeromedical Transport. Press GM, Miller SK, Hassan IA, Alade KH, Camp E, Junco DD, Holcomb JB.

J Emerg Med. 2014 Dec;47(6):638-45. doi: 10.1016/j.jemermed.2014.07.056. Epub 2014 Oct 1.

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Clinical question: In prehospital trauma patients what utility does ultrasound have during transport?

Introduction: Ultrasound has been used by ED physicians and surgeons for more than 30 years in trauma patients. The focused assessment with sonography in trauma and more recently the eFAST has been used in the ED setting to evaluate for potential abnormality in the intraperitoneal, pericardial, and pleural spaces. US has been shown to decrease time to operative care and to reduce ionizing radiation in some studies. In some studies the lung views have been shown to be more sensitive than chest x-ray for the diagnosis of pneumothorax. These authors based in Texas wanted to determine if US could be used accurately by helicopter emergency medical service providers in trauma patients.

Methods: This study was a prospective observational study done to evaluate the accuracy of eFAST performed in flight for trauma patients. The study was funded by Sono-Site, Inc. The HEMS providers participated in the study voluntarily. Most had no prior US experience. Their training included a 1-day course, 6 weeks of online modules, a review session and pre/post testing. Portable US machines with phased-array probes were used in the choppers. The providers were instructed to perform an eFAST on trauma patients who were over 18 and flown directly from the scene. The US was to be performed after the patient's standard treatment/stabilization, if time allowed and was not meant to change management. Results were documented prior to ED arrival.

Results: The study was performed over a 7 month period. During that time 293 patients had an US performed and 211 of those had a complete eFAST. The providers interpreted 11% of studies as indeterminate. Sensitivity and specificity for hemoperitoneum was 46% (95% confidence interval [CI] 27.1%–94.1%) and 94.1% (95% CI 89.2%–97%), and for laparotomy 64.7% (95% CI 38.6%–84.7%) and 94% (95% CI 89.2%–96.8%), respectively. Sensitivity and specificity for pneumothorax were 18.7% (95% CI 8.9%–33.9%) and 99.5% (95% CI 98.2%–99.9%), and for thoracostomy. 3 of the 240 patients that were evaluated in flight for pericardial effusion had a possible or minimal pericardial effusion on CT, none required treatment. None were picked up by US, and there was one false positive interpretation of pericardial effusion.

Limitations: There are multiple limitations to this study. This was performed within one system, so generalizability to other systems could come into question. There was also a wide variation in how often individual providers utilized US. In the 7 month study period one provider scanned 42 patients; conversely another scanned only 1.

Discussion: This study shows that prehospital US can be relatively accurate in trauma patients. Future studies are needed to determine in which patients would be appropriate for prehospital US. It would also be interesting to know how prehospital US could change management and/or mortality.
