

SHORT REPORT

Implementation of an eFAST guideline and teaching to improve documentation practices and saving of ultrasound images

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Abstract

Objectives: To investigate whether implementation of a hospital-based Extended Focused Assessment with Sonography in Trauma (eFAST) guideline and teaching improved documentation and saving of images.

Methods: A retrospective cohort study was conducted on trauma patients aged ≥ 16 years presenting to St Vincent's Hospital Sydney Emergency Department over two, three-month periods in 2023.

Results: Guideline and teaching implementation resulted in statistically significant improvement in documentation on the Trauma Response Form, 85% (113/133) to 93% (120/129), odds ratio (OR) 2.4 (95% confidence interval [CI] = 1.03–5.40), $P = 0.04$, and images saved, 4% (5/133) to 21% (27/129), OR 6.7 (95% CI = 2.5–18.2), $P < 0.001$.

Conclusions: Developing an eFAST Standard of Care Guideline and education was associated with improvements in documentation and saving of images to ultrasound machines.

Key words: *critical care, eFAST, emergency, quality improvement, trauma.*

Introduction

Extended Focused Assessment with Sonography in Trauma (eFAST) has been incorporated by many

institutions into their trauma algorithms as it is particularly useful in ruling in haemo/pneumothorax, pericardial effusion and intra-abdominal free-fluid, allowing for immediate changes to management.¹

eFAST documentation and image acquisition are integral to optimising patient care and allowing for quality assurance and education.² Australasian College of Emergency Medicine (ACEM) guidelines recommend eFASTs be documented in medical records, images stored safely and doctors be credentialed or otherwise seek prompt review of images.³ Time pressures, lack of supervision and multiple recording systems have been implicated in poor documentation in the trauma setting.⁴

Given the importance of eFAST documentation and saving of images, and recent developments in ACEM guidelines, the authors deemed it prudent to investigate whether implementing an eFAST guideline and teaching improved practice.

Methods

A retrospective cohort study was conducted of trauma patients presenting to St Vincent's Hospital Sydney (SVHS) Emergency Department (ED) following the implementation of a hospital-based eFAST guideline (Supplementary document 1) and teaching session in early July 2023 which highlighted that documenting

on the Trauma Response Form (TRF) and saving of images to ultrasound (US) is the standard of care. Two, three-month periods, 1 February 2023 to 30 April 2023, and 1 September 2023 to 30 November 2023, were used as a pre-implementation and post-implementation cohort, respectively. Patients aged ≥ 16 years triaged 'Major Trauma' or 'Trauma Alert' were included and excluded via inter-hospital transfer as these patients may already have had an eFAST.

The TRF includes sections for documenting eFAST time, clinician, tick-boxes of Positive/Negative/Inadequate for the six standard eFAST views and a comment box. Other documentation methods at SVHS include a patient's paper file and Emergency Department Information System (EDIS), a SVHS ED-specific electronic documentation system.

The project was approved by SVHS Human Research Ethics Committee, identifier 2023/ETH01212.

Results

Table 1 delineates the baseline patient characteristics of 280 and 289 patients satisfying the criteria.

Table 2 displays 133 (48%) and 129 (45%) patients had eFASTs in respective periods. Near three-quarters of Major Traumas had an eFAST in both periods. Approximately a quarter of doctors were credentialed across both periods. Registrars most commonly performed eFASTs. In September–November, there was a lesser proportion, 4% compared to 11%, of eFASTs documented where the performing-clinician was unclear, $P = 0.024$. 27/129 (21%) eFASTs

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TABLE 1. Baseline characteristics

	February–April	September–November
Patients identified	286	295
Patients satisfying inclusion/exclusion criteria	280	289
Age in years†	45 (20)	45 (20)
Gender		
Male	184 (66%)	209 (72%)
Female	96 (34%)	80 (28%)
Triage Category		
Major Trauma	152 (54%)	156 (54%)
Trauma Alert	128 (46%)	133 (46%)
Patient disposition		
Discharged	121 (43%)	135 (47%)
Admitted Trauma	72 (26%)	91 (31%)
Admitted Surgical	50 (18%)	32 (11%)
Admitted Medical	27 (10%)	22 (8%)
Other	10 (4%)	9 (3%)

†Results are presented as *n* or *n/N* (%) for categorical and mean (standard deviation) for continuous data.

TABLE 2. Outcomes

	February–April	September–November	<i>P</i> *
eFAST performed	133/280 (48%)	129/289 (45%)	
Major Trauma with eFAST	112/152 (74%)	114/156 (73%)	
Trauma Alert with eFAST	21/128 (16%)	15/133 (11%)	
eFAST performed by registrar	72/133 (54%)	73/129 (57%)	
eFAST performed by consultant	46/133 (35%)	51/129 (40%)	
Unclear who performed eFAST	15/133 (11%)	5/129 (4%)	0.024
US experience of clinician			
Credentialed (CCPU, DDU or equivalent)	27/118 (23%)	32/124 (26%)	
Course or Term	73/118 (62%)	82/124 (66%)	
Other	18/118 (15%)	9/124 (7%)	
eFAST images saved to US machine	8/133 (6%)	31/129 (24%)	<0.001
eFAST images saved and complete	5/133 (4%)	27/129 (21%)	<0.001
Patient's with a TRF completed	174/280 (62%)	174/289 (60%)	
Results of eFAST documented on TRF‡	113/133 (85%)	120/129 (93%)	0.038
Results of eFAST documented on Paper Notes	72/133 (54%)	46/129 (36%)	0.003
Results of eFAST documented on EDIS	18/133 (14%)	6/129 (5%)	0.013

*An online chi-square calculator was used to calculate two-sided *P* values, *P* < 0.05 considered statistically significant, displayed to three decimals. An online odds ratio (OR) calculator was used to quantify association in analysis. †Minimum documentation on TRF included recording the eFAST result, positive or negative, and ticking all views. Minimum documentation on Paper Notes and EDIS included recording the eFAST result, positive or negative. If a plan for eFAST was recorded on Paper Notes or EDIS, but there was no result of the eFAST exam, this was not recorded as having been documented. In both periods, Paper Notes and EDIS documentation were lacking in recording detail, rarely recording all views, adequacy of views, date/time and performing clinician, often just recording a positive/negative result. CCPU, Certificate in Clinician Performed Ultrasound; DDU, Diploma of Diagnostic Ultrasound; EDIS, Emergency Department Information System; eFAST, Extended Focused Assessment with Sonography in Trauma; TRF, Trauma Response Form; US, Ultrasound.

were saved under patient MRN on ED US machines with all views, compared to 5/133 (4%) initially, odds ratio (OR) 6.7 (95% confidence interval [CI] = 2.5–18.2), $P < 0.001$. In September–November, 120/129 (93%) patients had results of eFAST documented on TRF, from 113/133 (85%), OR 2.4 (95% CI = 1.03–5.4), $P = 0.04$. Fewer results were documented in paper notes 46/129 (36%) compared to 72/133 (54%), $P = 0.003$, and EDIS, 6/129 (5%) compared to 18/133 (14%), $P = 0.013$.

Discussion

Implementation of an eFAST guideline and teaching has resulted in a channelled standardised approach for eFAST documentation at SVHS, with statistically significant improvement in documentation on the TRF, from 85% to 93% (OR 2.4, $P = 0.038$), and a corresponding decline in paper notes documentation, 54% to 36% ($P = 0.003$), and EDIS, 14% to 5% ($P = 0.013$). eFAST images saved correctly and completely to US machines also improved from 4% to 21%, with strong association, OR 6.7, and statistical significance, $P < 0.001$.

Overall rates of saving images, although substantially improved, remained low post-implementation. Scope exists for qualitative research exploring barriers clinicians face in image storing and archiving, and documentation in general, such as time pressures of trauma resuscitation and clinician views on the importance of saving eFAST images.

Future TRF may benefit from having sections dedicated to whether an eFAST is indicated, whether the user saved images and their US experience, as this is not always available retrospectively. This may be another implementation strategy to further improve documentation and image saving, and could be the foundation of a future study.

The baseline characteristics between the two patient groups are similar, as well as proportion of patients having an eFAST and proportion of patients with a TRF completed,

supporting applicability to the wider trauma population. The greater proportion of male: female in both periods reflects a large study of near 50 000 patients which found 2.7:1.0 the ratio of male: female trauma patients.⁵

Limitations

To minimise bias attributable to immediate education, the post-implementation cohort was analysed 2 months after guideline and teaching implementation. However, sustained change beyond 3 months cannot be concluded. Follow-up audits would be required to demonstrate long-term trends and if ongoing education and guideline usage leads to sustained change. Other limitations include external validity being a single-centre retrospective study.

Conclusions

Implementing a hospital-based eFAST Standard of Care Guideline with teaching improved documentation and saving of images to ED US machines.

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Competing interests

None declared.

Author contributions

Joseph Rossi: Conceptualisation; methodology; data curation; formal analysis; writing—original draft; writing—review and editing. **Anthony Van Assche:** Conceptualisation; methodology;

data curation; writing—review and editing; supervision.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

1. Netherton S, Milenkovic V, Taylor M, Davis PJ. Diagnostic accuracy of eFAST in the trauma patient: a systematic review and meta-analysis. *CJEM* 2019; **21**: 727–38.
2. Aspler A, Wu A, Chiu S, Mohindra R, Hannam P. Towards quality assurance: implementation of a POCUS image archiving system in a high-volume community emergency department. *CJEM* 2022; **24**: 219–23.
3. Australasian College for Emergency Medicine. Provision of Focused Ultrasound Training and Governance Guidelines; 2023. Available from URL: https://acem.org.au/gemedia/0702004f-c669-4646-b5fc-4fa577117ba3/Guideline_for_the_Provision_of_ED_Focused_Ultrasound_Training_and_Governance.
4. Shwe S, Witchey L, Lahham S, Kunstadt E, Shniter I, Fox JC. Retrospective analysis of eFAST ultrasounds performed on trauma activations at an academic level-1 trauma center. *World J. Emerg. Med.* 2020; **11**: 12–7.
5. Bolandparvaz S, Yadollahi M, Abbasi HR, Anvar M. Injury patterns among various age and gender groups of trauma patients in southern Iran: a cross-sectional study. *Medicine (Baltimore)* 2017; **96**: e7812.

Supporting information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Data S1. Supporting Information.