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Original Research Article

Role of e-FAST in patients presenting with blunt injury abdomen and thorax and their correlation with operative or conservative management

Rathindra Tripura, Gyanendra S. Mittal, Rajdeep Singh*, Mrunal B. Kshirsagar

Department of Surgery, Rama Medical College, Hapur, Uttar Pradesh, India

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***Correspondence:**
Dr. Rajdeep Singh,
E-mail: drrajdeepsingh254@gmail.com

ABSTRACT

Background: This study aims to explore the role of e-FAST in patients with blunt abdominal and thoracic trauma, evaluating its accuracy in guiding management decisions and its correlation with operative versus conservative treatment approaches, ultimately seeking to improve triage efficiency, reduce delays in treatment and enhance patient outcomes in trauma care.

Methods: Prospective study was conducted in General Surgery Emergency Department, Rama Medical College Hospital and Research centre, Hapur, U.P from June 2022–June 2024**.** E-FAST in blunt trauma abdomen patients. Patients above the age of 12 years. All patients with blunt abdominal trauma and blunt chest trauma. Pregnant patients were included. Patients with penetrating injuries. Psychiatric patients and Paediatric patients (below 12 years of age) were excluded. Number of groups were 3**.** Blunt abdominal trauma patients (above 12 years). blunt chest trauma patients (above 12 years). pregnant patients (with blunt abdominal or chest trauma).

Results: The prospective observational study was conducted at Emergency Department, Rama Medical College, Hospital and Research centre, Hapur, U.P. Sixty patients above the age of twelve were taken as study sample. The main goal of this study is to offer valuable insights into the efficacy of e-FAST ultrasound as a crucial imaging tool. This is vital for supporting clinical practice with empirical evidence and determining the optimal significance to attribute to these scans in guiding the management of acutely injured patients.

Conclusions: In conclusion, the study reaffirms the role of e-FAST as a frontline diagnostic tool in blunt trauma management.

Keywords: Abdomen, Accuracy, Blunt injury, e-FAST, Specificity, Sensitivity, Thorax

INTRODUCTION

Blunt trauma, particularly involving the abdomen and chest, remains a leading cause of morbidity and mortality worldwide. Early and accurate diagnosis is crucial in managing such cases effectively, as delayed intervention can result in worsened outcomes. In this context, the focused assessment with sonography for trauma (e-FAST) has emerged as a vital diagnostic tool. The e-FAST technique allows for rapid, non-invasive evaluation, enabling clinicians to make timely decisions in the management of trauma patients. This study aims to assess the role and effectiveness of e-FAST in blunt trauma situations, emphasizing its utility in both the initial assessment and ongoing patient management.

Blunt abdominal trauma is a significant cause of morbidity and mortality, with rapid and accurate diagnosis being crucial for timely intervention and improved patient outcomes. Ultrasonography, specifically the focused assessment with sonography for trauma (FAST), has been recognized as a valuable tool for

diagnosing trauma, offering a rapid, non-invasive assessment.[1] This approach has gained further traction in emergency departments, where point-of-care ultrasonography plays a pivotal role in early trauma evaluation, as demonstrated in the randomized controlled trial by Melniker et al which highlighted its utility in trauma care settings.[2]

The accuracy of FAST in detecting blunt abdominal trauma has been well-documented, with Kim et al confirming its high sensitivity and specificity in identifying abdominal injuries, thereby aiding in decision-making in emergency scenarios.[3] Research by Gul et al found that e-FAST demonstrated strong diagnostic accuracy when compared with contrast-enhanced CT, confirming its effectiveness in detecting both abdominal and thoracic injuries in trauma patients. These studies emphasize the growing importance of ultrasonography, particularly e-FAST, in trauma management, highlighting its advantages in terms of rapid diagnosis, accessibility and non-invasiveness by Gul et al. As trauma care continues to evolve, these imaging techniques are becoming indispensable in improving patient care and outcomes, reducing the need for more invasive diagnostic procedures.[4]

This study aims to explore the role of e-FAST in patients with blunt abdominal and thoracic trauma, evaluating its accuracy in guiding management decisions and its correlation with operative versus conservative treatment approaches, ultimately seeking to improve triage efficiency, reduce delays in treatment and enhance patient outcomes in trauma care.

METHODS

Study design

This was a prospective study.

Study place

General Surgery Emergency Department, Rama Medical College Hospital and Research centre, Hapur, U.P.

Study period

The study duration was from June 2022-June 2024.

Intervention

E-FAST in blunt trauma abdomen patients.

Inclusion criteria

Patients above the age of 12 years. All patients with blunt abdominal trauma and blunt chest trauma and pregnant patients.

Exclusion criteria

Patients with penetrating injuries. Psychiatric patients and Pediatric patients (below 12 years of age).

Number of groups

Blunt abdominal trauma patients (above 12 years). Blunt chest trauma patients (above 12 years) pregnant patients (with blunt abdominal or chest trauma)

The study included patients admitted with blunt trauma at Rama Medical College Hospital and Research Centre, Hapur, from July 2022 to June 2024. A total of 52 patients underwent e-FAST examination, with findings compared to chest radiography and CT scans where applicable.

In hemodynamically unstable patients where CT was not feasible, e-FAST played a crucial role in early diagnosis and intervention. False-negative cases were primarily identified through serial follow-ups or subsequent CT scans. Overall, the study highlights e-FAST as a rapid and reliable tool for detecting pneumothorax in trauma patients, demonstrating its utility in both stable and unstable cases.

RESULTS

Most blunt trauma patients in this study were young adults, with the highest number (35%) falling within the 18-26 age range. Males made up a majority (56.67%), while females accounted for 43.33%, showing a gender imbalance. In terms of occupation, housewives (30%) were the largest group, followed by students (21.67%) and farmers (15%).

Regarding medical history, most patients had no significant past conditions (86.66%), with a small percentage reporting hypertension and diabetes (10%) or hypertension alone (3.33%). Blunt injuries were mostly abdominal (50%), with some patients experiencing both abdominal and chest trauma (33.33%).

The main cause of injuries was road traffic accidents (88.33%), followed by physical assaults (8.33%) and falls (3.33%). Abdominal tenderness was the most common symptom (33.33%), with some patients also showing tenderness in the chest. Most patients had a moderate body build (76.67%), while dehydration was common, with 70% showing moderate dehydration.

Vital signs showed an average pulse rate of 110.77 bpm, normal body temperature and a respiratory rate of 22.23 breaths per minute. However, low blood pressure was noted, indicating possible circulatory issues. Physical examination revealed tenderness and guarding in most patients and Ryle's tube aspirate showed varying results, indicating possible digestive or gastrointestinal complications.

Thoracic injuries were present in 16.67% of patients, while abdominal injuries were found in 50%. e-FAST exams detected pneumothorax (20.83%), hemothorax (26.39%), pneumoperitoneum (23.61%) and hemoperitoneum (29.17%), with X-ray findings corroborating these results. CT scans confirmed the presence of both thoracic and abdominal injuries, highlighting the value of imaging for trauma diagnosis.

The results also showed that e-FAST is more reliable than X-ray for detecting pneumothorax, hemothorax, pneumoperitoneum and hemoperitoneum. It has higher sensitivity, specificity and accuracy, making it a valuable tool in trauma care. The study underscores the importance of early diagnosis, especially in cases of internal bleeding and the need to incorporate e-FAST into trauma protocols for faster and more accurate patient assessments.

Table 1: Age-wise distribution of patients.

Age (in years)	Number	%
18-26	21	35.00
27-36	15	25.00
47-56	13	21.67
57-67	11	18.33
Grand total	60	100.00

Table 2: Gender-wise distribution of patients.

Gender	Number	%
Female	26	43.33
Male	34	56.67
Grand total	60	100.00

Table 3: Distribution of patients according to drug history.

Drug history	Number	%
HTN	2	3.33
HTN and diabetic	6	10.00
No significant history	52	86.66
Grand total	60	100.00

Table 4: Distribution of patients according to type of injury.

Injury	Number	%
Blunt injury abdomen	30	50.00
Blunt injury thorax	10	16.67
Blunt injury abdomen and thorax	20	33.33
Grand total	60	100.00

Table 5: Distribution of patients according to mode of injury.

Mode of injury	Number	%
Fall from height	2	3.33
Physical assault	5	8.33
RTA	53	88.33
Grand total	60	100.00

DISCUSSION

The role of repeated extended focused assessment with sonography for trauma (e-FAST) has been explored in several studies, demonstrating its value in monitoring patients with blunt thoracoabdominal trauma. Yazıcı et al examined the effectiveness of repeated e-FAST in stable trauma patients, emphasizing its role in early detection and continuous monitoring of injuries. Their findings suggest that repeated e-FAST can provide ongoing assessment of patients' conditions, ensuring timely intervention and improving the management of stable trauma patients. This highlights the utility of e-FAST not only as an initial diagnostic tool but also in follow-up care to track injury progression.[5] In terms of detecting blunt chest injuries in polytrauma patients, Attia et al compared the National Emergency X-radiography Utilization Study (NEXUS) chest algorithm with e-

FAST, concluding that e-FAST was more effective in the early detection of such injuries. Their study demonstrates that e-FAST is particularly valuable in trauma scenarios where rapid assessment is crucial and its superiority over X-ray in certain situations supports its adoption as a primary diagnostic tool for chest trauma. This study contributes to the growing body of evidence suggesting that e-FAST can significantly improve early diagnosis in polytrauma patients, particularly when chest injuries are suspected.[6] The diagnostic accuracy of e-FAST has been the subject of systematic reviews and meta-analyses, with Netherton et al providing comprehensive insights into its performance. Their review found that e-FAST demonstrates high sensitivity and specificity for detecting thoracoabdominal injuries, confirming its reliability as a diagnostic tool in trauma care. The authors emphasized that e-FAST outperforms other diagnostic methods in many cases, further solidifying its role in trauma management. This systematic analysis of multiple studies underlines e-FAST's diagnostic capabilities and its effectiveness in trauma settings.[7]

Further supporting the accuracy of e-FAST, Bagheri-Hariri et al explored its impact on the clinical judgment of physicians managing blunt thoracoabdominal trauma. Their study concluded that e-FAST significantly improved the accuracy of physicians' clinical decisions, aiding in the detection of critical injuries and guiding appropriate interventions. This suggests that the integration of e-FAST into clinical practice enhances not only the speed of diagnosis but also the decision-making process, leading to better patient outcomes.[8]

In more remote settings, Sabatino et al examined the impact of point-of-care ultrasound (POCUS) on patient management and training in Sierra Leone. Their study demonstrated that POCUS, including e-FAST, had a positive impact on patient outcomes by allowing for immediate diagnosis and facilitating treatment in resource-limited environments. This research highlights the versatility of e-FAST in global trauma care, particularly in areas where access to advanced imaging technologies is limited, showing its potential for widespread application in diverse healthcare settings.[9]

Limitations

Small sample size

A limited number of subjects may reduce the statistical power of the study, making it difficult to generalize the findings to a larger population. A more extensive dataset is needed to validate the effectiveness of double antibiotic prophylaxis.

Lack of multi-centre data

Conducting the study at a single institution or region may introduce selection bias and limit the generalizability of results. A multi-centre approach with diverse patient populations would provide stronger evidence.

CONCLUSION

In conclusion, the study reaffirms the role of e-FAST as a frontline diagnostic tool in blunt trauma management. Its ability to provide rapid, non-invasive and accurate assessments makes it a valuable addition to trauma care. Future studies should focus on expanding e-FAST applications and refining its diagnostic parameters to further improve patient outcomes.

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