Section: Radiodiagnosis

Original Research Article

ROLE OF FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA (FAST) IN PREDICTING SURGICAL INTERVENTION IN BLUNT ABDOMINAL TRAUMA

Saraswata Das[1], Sabuj Pal[2]

[1]*Assistant Professor, Department of Radiodiagnosis, College of Medicine & JNM Hospital, Kalyani, West Bengal, India*
[2]*Assistant Professor, Department of General Surgery, College of Medicine & JNM Hospital, Kalyani, West Bengal, India*

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Corresponding Author:
Dr. Saraswata Das,
Assistant Professor, Department of Radiodiagnosis, College of Medicine & JNM Hospital, Kalyani, West Bengal, India
Email: saraswatastar@yahoo.com

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ABSTRACT

Background: Blunt abdominal trauma is a significant cause of morbidity and mortality throughout the world. Rapid identification of intra-abdominal injuries is critical for timely surgical intervention. Focused Assessment with Sonography for Trauma (FAST) is a rapid, bedside, non-invasive tool used to detect free fluid in trauma patients. This study evaluates the role of FAST in predicting the need for surgical intervention in patients with blunt abdominal trauma.

Materials and Methods: A prospective observational study was conducted on 200 patients presenting with blunt abdominal trauma. All patients underwent initial clinical assessment and FAST scan in the emergency department. The FAST results were compared with surgical findings or clinical outcomes, including CT scans and operative reports.

Results: Of 200 patients, 65 (32.5%) had a positive finding on FAST. Among these, 52 required surgical intervention. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of FAST in predicting surgical need were 88.1%, 90.8%, 80.0% and 94.8% respectively.

Conclusion: FAST is a valuable initial tool in evaluating blunt abdominal trauma. A positive FAST is strongly associated with the need for surgical intervention, whereas a negative FAST can help to avoid unnecessary surgeries.

Keywords: FAST, Blunt abdominal trauma, Sonography, Surgery.

INTRODUCTION

One of the most common conditions encountered in any emergency department is blunt abdominal trauma. Most common causes of blunt abdominal trauma include road traffic accidents, physical assaults and falls. Failure to detect intra-abdominal injury in time leads to increase in mortality and morbidity.[1]

The gold standard for evaluation of abdominal trauma is computed tomography (CT) scan. However, CT scan is not available in all settings thus limiting its usefulness. Moreover, patients need to be stable for undergoing CT scan. On the other hand, ultrasound evaluation of abdominal trauma using FAST (Focused Assessment with Sonography for Trauma) protocol is an easily available bedside technique which can detect intra-abdominal, pericardial and pleural fluid collection in trauma patients.[2-4]

The aim of this study is to evaluate the utility of FAST to predict the need for surgery in patients with blunt abdominal trauma, especially in resource-limited settings.

MATERIALS AND METHODS

Study Design and Setting: This prospective observational study was performed at a tertiary care teaching hospital in India. The study duration was one year.

Patient Selection: Patients aged more than 18 years with blunt abdominal trauma were included in the study. Both hemodynamically stable and unstable patients were included. Informed consent was obtained prior to enrolling in the study. Exclusion

criteria included patients with penetrating abdominal injuries, pregnancy and those with prior abdominal surgeries.

Procedure: Patients arriving to the emergency department with blunt abdominal trauma first underwent primary trauma survey, followed by a FAST scan performed by radiologists. The standard views of FAST scan taken included the hepatorenal, splenorenal, pelvic and pericardial views. Clinical decisions about management of the patient and surgery were taken independent of the FAST results. However, these findings were documented for analysis and evaluation.

Outcome Measures: The outcome measures included need for surgical intervention, final diagnosis by surgery or CT scan and hemodynamic instability prompting surgery.

Statistical Analysis: The statistical analyses were performed using SPSS version 25. Sensitivity, specificity, PPV, NPV, and accuracy of FAST in predicting surgery were calculated.

RESULTS

Demographic Profile: Out of the 200 patients enrolled, 142 (71%) were male and 58 (29%) were female. The study population had a mean age of 36.5 years.

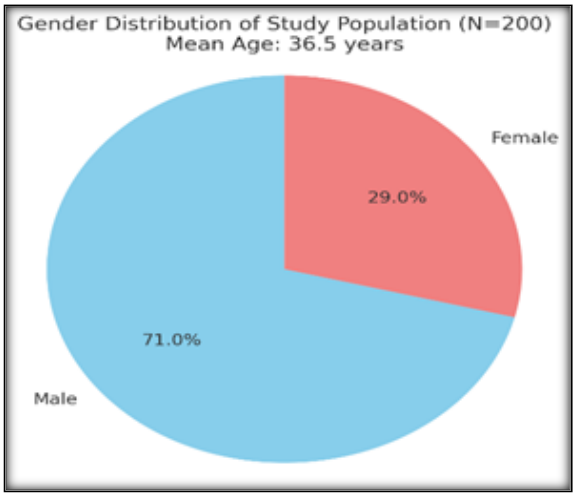

Figure 1: Gender distribution of study population

FAST Results and Surgical Intervention: Out of the 200 patients enrolled in our study, 65 (32.5%) were FAST positive and 135 (67.5%) were FAST negative. Surgical intervention was required in 59 patients (29.5%). Of these, 52 were FAST positive (true positives) and 7 were FAST negative but required surgery (false negatives). 141 patients did not require surgery; 128 of them were FAST negative (true negatives), and 13 were FAST positive (false positives) [Table 1].

Table 1: FAST Results and Surgical Intervention

	Surgery Needed	No Surgery	Total
FAST Positive	52	13	65
FAST Negative	7	128	135
Total	59	141	200

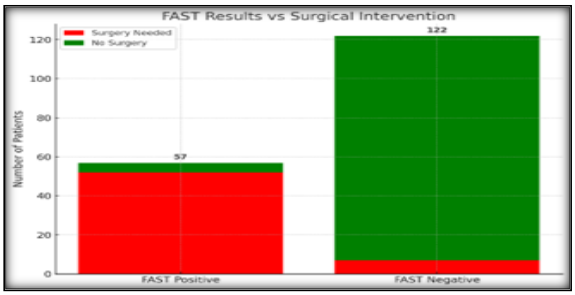

Figure 2: Stacked bar graph showing the relationship between FAST results and surgical intervention. The red portion represents patients who required surgery, and the green portion represents those who did not.

Diagnostic Performance: Statistical analyses showed FAST to have sensitivity of 88.1%, specificity of 90.8%, PPV of 80.0%, NPV of 94.8% and accuracy of 90.0% in blunt abdominal trauma.

DISCUSSION

Focused abdominal sonography for trauma (FAST) has been adopted widely due to its significant advantages in terms of quick diagnosis, portability and applicability in unstable patients.[5,6] Unavailability of CT scan machines at peripheral centres and the low cost of portable ultrasound machines make it a suitable choice in resource-limited settings.[7] Our study confirms the high sensitivity and specificity of FAST in predicting the need of surgical intervention in patients with blunt abdominal trauma.

Limitations of FAST include missing retroperitoneal hemorrhage or small solid organ injuries without significant fluid collection. Diagnostic accuracy of FAST also depends on the skills of the operator as well the patient habitus. The few false-negative results seen in our study reinforce the importance of clinical observation as well as additional imaging studies, e.g. CT scan in cases of high clinical suspicion.[8-10]

There were some limitations of our study. Our study was performed in a single-centre and not a multi-centre study. As the FAST was done by different personnel, hence some variation due to operator dependency crept in. Our study was limited to adult patients and pediatric patients were not included. All patients included in our study did not undergo CT scan for confirmation.

CONCLUSION

Focused abdominal sonography for trauma (FAST) has proved to be of great benefit in emergency rooms

due to its speed of diagnosis, portability, easy availability and easy learning curve. A positive FAST result correlates strongly with the need for surgery, thus helping in operative decision-making. On the other hand, a negative FAST, though reassuring, those not rule out solid organ injury and hence additional imaging should be performed in cases with high clinical suspicion.

Future studies should aim to validate these findings in multicentre trials. Incorporation of extended FAST (eFAST) that builds upon the FAST findings by adding thoracic views to identify pneumothorax and hemothorax would help in making it even more useful in trauma patients. Continued education and training programs to improve operator proficiency would go a long way to ensure that the benefits of FAST are realized universally in varied clinical settings.

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