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COMPARATIVE STUDY OF EFFICACY OF E FAST WITH CT CHEST IN CHEST TRAUMA PATIENTS

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ABSTRACT:

INTRODUCTION: Blunt chest trauma presents a significant challenge in the emergency setting, often requiring rapid and accurate diagnostic assessment to guide management. This prospective study aimed to evaluate the diagnostic efficacy of E-FAST (extended Focused Assessment with Sonography in Trauma) compared to CT chest in blunt chest trauma patients and also clinical correlation with imaging findings.

METHODS: Retrospective observational study conducted saveetha medical college in during the period of November 2022 to march 2024. The inclusion criteria were: all blunt trauma patients and incidental findings in other associated injuries . exclusion criteria included age less than 18 years and associated with other injuries only .Various parameters considered were based on the history, clinical signs ,radiological findings , vitals and alive or death . The software used for statistical purposes were IBM SPSS software .

RESULTS: Total of 100 patients were reported to the trauma centre during the period of the study. The male-to-female ratio was 7:1 .14% E fast negative, but CT chest positive , 38% signs and symptoms related to chest, 24% EFAST negative but haemothorax and pneumothorax seen ; vitals were stable in 87% of the patients ; 28% no associated injuries , death was found to be in the age groups mostly involving the >60 and < 20 years , involving only 3 % of the people .

CONCLUSION: E Fast and CT CHEST can be used to as a triaging tool in blunt chest trauma . Even though E FAST cannot detect positive findings in chest trauma patients, number is very negligible , Thus can be concluded that E FAST can be used as an effective tool in diagnosing chest trauma patients . Thus there is no significant difference between NCCT CHEST and EFAST in the evaluation of chest trauma patients affirming the utility of both in the clinical practice .

INTRODUCTION

Blunt chest trauma presents a significant challenge in the emergency setting, often requiring rapid and accurate diagnostic assessment to guide management. This prospective study aimed to evaluate the diagnostic efficacy of e-FAST (extended Focused Assessment with Sonography in Trauma) compared to CT chest in blunt chest trauma patients and also clinical correlation with imaging findings.

PATIENTS AND METHODS

CT chest is a the gold standard technique for chest trauma patients . (1) e-FAST is a new technique , and thus sensitive and specificity are being checked .(2). This is a Retrospective observational study conducted Saveetha medical college in during the period of November 2022 to March 2024. The inclusion criteria were: all blunt trauma patients and incidental findings in other associated injuries . Exclusion criteria included age less than 18 years and associated with other injuries only . Surveys done were primary , secondary and brief relevant history were done by the trauma team. Duty surgeon did a e-FAST. Ultrasound probe of 2-5 MHz used . Patients were placed in supine position . On both sides midclavicular lines were evaluated at 3-6 intercostal space approximately. Normal lung sliding was observed . If not seen , barcode sign and stratosphere sign looked for M code . If positive , it is suggestive of pneumothorax. If comet tail and B lines present , they indicate that of absence of pneumothorax . The probe is then placed at the 5th to 8th intercostal space on both sides. Haemothorax is considered positive if free fluid is seen above the diaphragm. After documenting the injuries, patients were separated into stable and unstable groups based on their hemodynamic status. An NCCT chest scan was performed after basic resuscitation. Abnormal CT chest findings were provided in a written report by the radiologist. The data were analysed using IBM SPSS version 24.

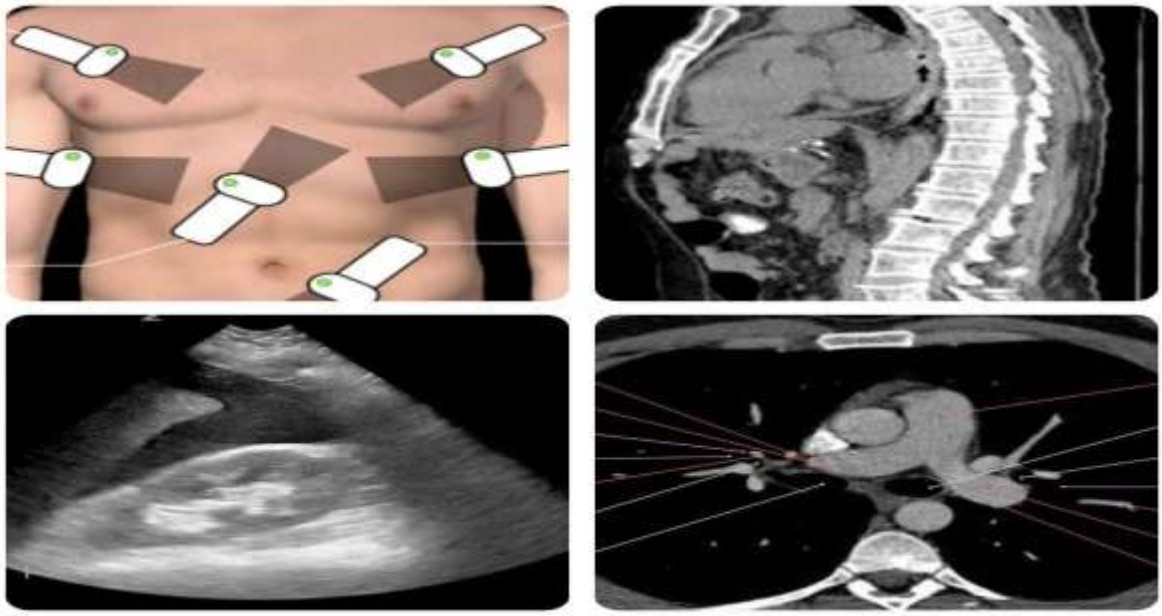

FIGURE 1: COMPARISON OF E FAST AND NCCT CHEST

BACKGROUND OF THE ARTICLE

Chest related clinical symptoms play a vital role in chest trauma patients. Symptoms often plays key role in workup , which includes both e fast and CT chest . Dyspnoea, chest pain, cough, haemoptysis , localised chest pain, and stridor are the main clues for chest trauma. While imaging is used to confirm and characterisation for injuries, symptoms play importance in making appropriate decisions clinically . Therefore an approach considering both symptoms and imaging is essential for management of chest trauma. E FAST plays a vital role in detecting potentially threatening conditions like pneumothorax, haemothorax and pericardial effusion . It can also be used to assess hemopericardium (4) e-FAST provides information which helps to guide further in the diagnostic and therapeutic interventions of chest trauma cases, within the time-sensitive environment . Serial FAST can show negative outcome.(5) .Non contrast computed tomography of the chest is considered as the gold standard in chest trauma evaluation. It is because it is able to recognise and pick up anatomical information details accurately to a certain extent and quickly too. That is why it is very important; it helps in not missing any subtle pathology (6). Easy detection of injures , accuracy and guidance for invention , risk stratification and easy follow up . Even though E FAST is used for assessment in a faster manner , CT chest still remains as important as it particularly identifies subtle injuries and also guides towards further management. The need for comparing efficacy between E FAST and CT chest evolves owing to optimize trauma care by taking care of speed , accuracy and resource utilisation in a proper manner. In short , comparative efficacy of studies between E Fast and CT chest along with correlating clinically , are essential for paving way to diagnostic approach to chest trauma and assurance of timely and accurate assessment and thus reducing the utilisation of the resources and exposure of radiation.

RESULTS

A total of 100 patients were reported to the trauma centre during the period of the study. The male-to-female ratio was 7:1 . The majority of the patients 28% (*n* = 28) were in the age-group of 21–30 and 22% (*n*= 22) were in the age-group of 30–40. And 12% (N=12) n the age group of 41-50. And 20% (n=20) were in the age group 51-60 and 8% (N=8) were in the age group 61-70. And 2% (n=2) were in the age group from 71-80. On arrival to the emergency department, majority of the patients 87% vitals were found to be stable. And 13% Were found to be unstable. All patients were maintaining percutaneous oxygen saturation above 95% on room air. On clinical correlation , majority of the patients (31%) had no symptoms and signs related to chest but had findings in either in CT chest or E FAST or both . 38% found to have signs and symptoms related to chest ; out of which 86% (n=33) found to have symptoms and signs related to chest such as breathlessness , chest pain, difficulty in breathing but imaging found to have no positive findings .On E fast - 87% most of the patients were found to be negative, and 12% only were found to be positive and 1% could not be assessed . In CT chest the majority of patients(*n* = 30) 30% had rib fractures and 11% of patients (*n* = 11) had rib fractures associated with pneumothorax and (n=8) 8% Of patients had rib fractures with haemothorax 3 (3%) had PTX, and 5 (5%) had

hemopneumothorax (HPTX) 2% (n=2) had hemopneumothorax , 6% (n=6) other findings such as atelectasis , bronchiectasis, and other lung changes and none were found to have fast to be positive too .14% e fast negative but CT thorax found to have pneumothorax and haemothorax . Out of 29 people whose CT findings were found to be positive for haemothorax and pneumothorax 24% (n=7) of the people were found to be negative for e fast. 38% (n=38) of the people found to have head injuries , 6% (n-=6) abdominal injuries , 8% (n=8) spinal and other injuries .10% (n=10) polytrauma , 28% (n=28) no associated injuries .97% were alive and 3% people found to be death , in age groups belonging to less than 20 and more than 60 respectively, all associated with polytrauma and unstable vitals. It was found that there was statistical significance in the comparative data with "*p*" values less than 0.005 This accepts the null hypothesis is greater than 0.005 and establishes the fact that there is no significant difference between NCCT chest and e-FAST for chest trauma

	SENSITIVITY	SPECIFICITY
CLINICAL SIGNS AND SYMPTOMS	100%	99.2%
E FAST	100%	99.9%
CT CHEST	100%	99.9%

TABLE : COMPARISON OF SENSITIVTY AND SPECIFICITY IN CHEST TRAUMA PATIENTS

LEVENE'S TEST FOR EQUALITY OF VARIANCES		
	EQUAL VARIANCES ASSUMED	EQUAL VARIANCES NOT ASSUMED
F	19.642	-
SIGNIFICANCE P-VALUE	0.000	-

TABLE : SHOWING LEVENE 'S TEST FOR EQUALITY OF VARIANCES

T-TEST : GROUP STATISTICS		
	CLINICAL SYMPTOMS	CLINICAL SIGNS
OUTCOME	2.0	1.0
N	3	97
MEAN	2.000	1.680
STD DEVIATION	0.000	0.4687
STD MEAN ERROR	0.000	0.476

TABLE SHOWING T TEST AND STATISTICAL DATA

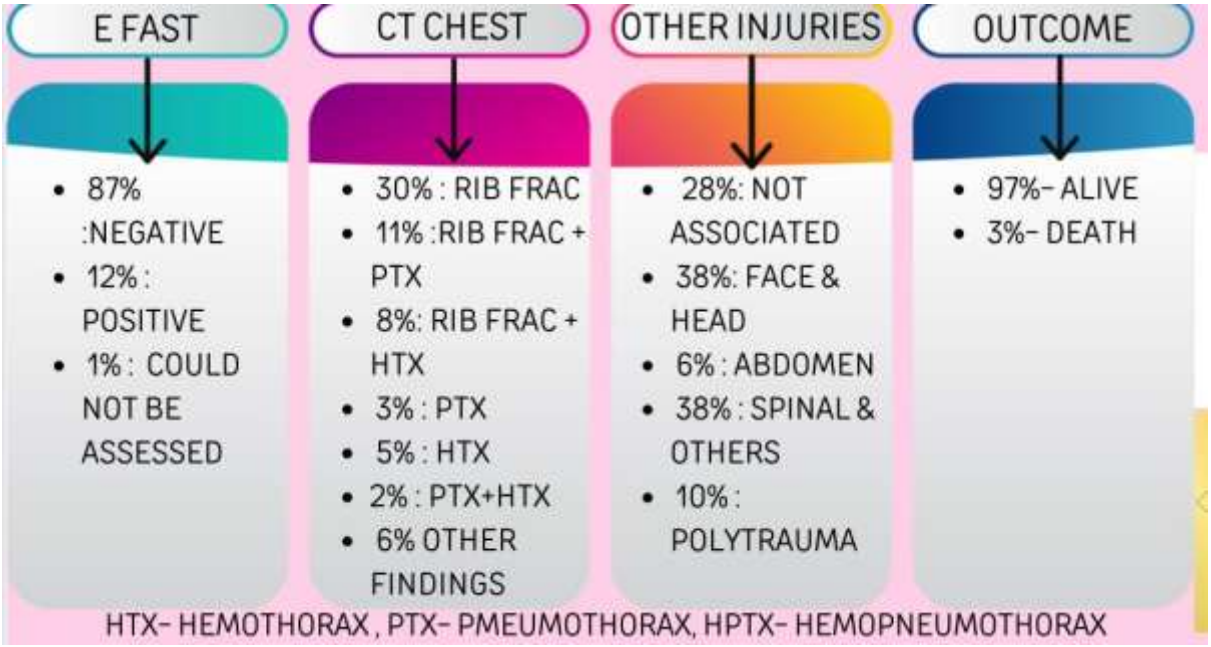

TABLE SHOWING COMPARISON OF PERCENTAGES OF DATA IN E FAST, CT CHEST, OTHER INJURIES AND OUTCOME .

DISCUSSION

Chest trauma-related injuries are a significant global health concern, contributing to morbidity and mortality across diverse populations and settings. These injuries can result from various mechanisms, including motor vehicle accidents, falls, assaults, sports-related incidents, and industrial accidents. Chest trauma can result in a wide range of injuries, including rib fractures, pneumothorax, haemothorax, pulmonary contusions, flail chest, sternal fractures, tracheobronchial injuries, cardiac contusions, and aortic injuries may present with symptoms such as chest pain, dyspnoea, cough, haemoptysis, tachypnoea, hypoxia, and signs of respiratory distress. The severity of symptoms depends on the nature and extent of the underlying injuries. Diagnostic evaluation of chest trauma often includes a combination of clinical assessment, imaging studies (such as chest X-ray, CT chest, and ultrasound), and sometimes invasive procedures (such as thoracentesis or chest tube placement) to identify and manage specific injuries. Management of chest trauma-related injuries aims to stabilize the patient, and to relieve symptoms, prevent complications .

The reproducibility and accuracy of diagnosis both in emergency rooms and in prehospital settings made FAST an important tool in trauma management

FAST protocol is aimed at diagnosing PTX, HTX, and HPTX in a simple bedside procedure. This helps the victim get early surgical management without the need for radiation exposure from NCCT or invasive diagnostic intraperitoneal lavage Desai et al concluded that E FAST examination which is negative should not be regarded as conclusive and clinicians should consider further imaging with CT mild abdominal and severe head injuries are associated with false negative FAST.(7)

Brooks et al. demonstrated the FASTis a very useful technique for haemorrhage in chest and abdominal trauma in casualty..Thus he demonstrated the effectiveness of handheld FAST as a valuable technique for investigations of chest and abdomen in single or multiple casuality events . (8)

Devadoss et al demonstrated that the accuracy of E FAST IS 99.99% with a sensitivity of 100% and a specificity of 99.07% when compared with CT CHEST. (9)

CONCLUSION

Chest trauma is the third most common cause of death after abdominal injury and head trauma patients with polytrauma .(10)

E Fast and CT CHEST can be used to as a triaging tool in blunt chest trauma . Even though E FAST cannot detect positive findings in chest trauma patients, number is very negligible , Thus can be concluded that E FAST can be used as an effective tool in diagnosing chest trauma patients . Thus there is no significant difference between NCCT CHEST and EFAST in the evaluation of chest trauma patients affirming the utility of both in the clinical practice .

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1.Al - Salamah SM, Mirza SM, Ahmad SN, Khalid K. Role of ultrasonography, computed tomography and diagnostic peritoneal lavage in abdominal blunt trauma. Saudi Med J 2002;23:1350–
2. Governatori NJ, Saul T, Siadecki SD, Lewiss RE. Ultrasound in the evaluation of penetrating thoraco-abdominal trauma: a review of the literature. Med Ultrason 2015;17:528–34.doi:10.11152/mu.2013.2066.174.evp
3. 1.Bendinelli C, Easton R, Parr M. Focused assessment with sonography for trauma (FAST) after successful cardiopulmonary resuscitation. Resuscitation. 2012 Jan;83(1):e17.
4. Bahner D, Blaivas M, Cohen HL, Fox JC, Hoffenberg S, Kendall J, Langer J, McGahan JP, Sierzenski P, Tayal VS., American Institute of Ultrasound in Medicine. AIUM practice guideline for the performance of the focused assessment with sonography for trauma (FAST) examination. J Ultrasound Med. 2008 Feb;27(2):313-8.
5. Helsloot D, Fitzgerald MC, Lefering R, Verelst S, Missant C., TraumaRegister DGU® The first hour of trauma reception is critical for patients with major thoracic trauma: A retrospective analysis from the TraumaRegister DGU. Eur J Anaesthesiol. 2023 Nov
01;40(11):865-873.
6. JH Rosset , FRCA FFICM , Computed Tomography of the chest -II Clinical applications. P15-20, JANUARY 2016
DOI :https://doi.org/10.1093/bjaceaccp/mkv007
7. Desai N, Harris T. Extended focused assessment with sonography in trauma. BJA Education. 2018 Feb;18(2):57–62.
8.Brooks AJ, Price V, Simms M. FAST on operational military deployment. Emergency Medicine Journal. 2005 Mar 23;22(4):263-9.Devadoss H, Sharma P, Nair VV, Rehsi SS, Roy N, Rao PP. Diagnostic Accuracy of e-FAST in Stable Blunt Trauma Chest: A Prospective Analysis of 110 Cases at a Tertiary Care Center. Indian Journal of Critical Care Medicine 2022 Jun 21 [cited 2023 May 13]
10. Bendinelli C, Easton R, Parr M. Focussed assessment with sonography for trauma (FAST) after successful cardiopulmonary resuscitation .Resuscitation . 2012 Jan ; 83 (1) :e17.