



ROLE OF EXTENDED FOCUSED ASSESSMENT WITH SONOGRAPHY IN TRAUMA IN ASSESSING VISCERAL INJURIES IN BLUNT ABDOMINAL TRAUMA

General Surgery

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ABSTRACT

Background: Identifying clinically significant abdominal damage is the focus of torso trauma. Abdominal USG is a safe and efficient diagnostic tool that can be used at the bedside in casualty without any delay in patient management. The efficiency of such E-FAST and its comparison with abdominal CT which is the gold standard procedure to assess blunt abdominal injury is done in this study. **Objectives:** To study the role of focused abdominal sonography in trauma in assessing visceral injuries in blunt injury abdomen. To correlate the finding of focused abdominal sonography in trauma and CT and laparotomy findings. **Methods:** This is a prospective cross-sectional study of 75 cases of blunt injury abdomen with suspected intra-abdominal injury admitted in KAPV Govt Medical College, Trichy from Jan 2020 to Jan 2022 **Results:** 75 patients were studied. Age ranged from 18 to 80. There were 83.8% males and 16.3% females. Mode of injury was RTA in 53.3%, self-fall in 17.3%, bull hit 18.7%, and Assault in 10.7%. 29.3% were hemodynamically unstable and 70.7% were hemodynamically stable. X-ray showed air under the diaphragm in 10 patients (13.3%) and Pneumothorax in one patient (1.3%). Dilated small bowel loops in 4 patients (5.3%). E-FAST showed free fluid in 49 patients (72%) and Normal in 26 patients (28%) CT findings – splenic injury in 16 patients (21.3%) liver laceration in 14 patients (18.6%) renal injury in 5 patients (6.6%) bladder injury in 6 patients (8%) mesenteric injury in 12 patients (16%) hemopneumothorax in 13 patients (17.3%) retroperitoneal hematoma in 2 patients (2.6%) diaphragmatic injury in 1 patient (1.3%) pancreatic injury in 1 patient (1.3%). Laparotomy alone was done in 47 patients, laparotomy with tube thoracostomy was done in 2 patients, tube thoracostomy was alone done in 4 patients, and Conservative management in 22 patients. **Conclusion:** The presence of hemoperitoneum was identified as free fluid FAST in most of our cases. But most retroperitoneal hemorrhages and bowel injuries were missed in ultrasonograms. Treatment delay caused by transferring the patient to CT scanning can be avoided if the FAST technique is learned by surgical residents as it is a reliable procedure and can be easily learned. FAST is both sensitive and specific to the presence of intraperitoneal fluid and can be done by surgeons in the resuscitation room while doing the initial assessment.

KEYWORDS

Blunt Abdominal Trauma, Focused Assessment With Ultrasonogram In Trauma, Computed Tomography, Free Fluid Abdomen

INTRODUCTION

Trauma is the leading cause of death among those aged under 40 and the third leading cause of death among those aged 65 and older (1). The “Golden Hour” emphasizes the importance of prompt diagnosis and treatment to the survival of the patient (2). Blunt abdominal trauma is one of the leading causes of morbidity as well as mortality (3). Hence rapid diagnosis and treatment are essential since missed injuries can result in fatalities.

FAST focussed assessment with sonography in trauma coined by Rozycki in 1996 and used in ED rooms was introduced as a prompt method to diagnose free fluid in the peritoneal cavity and if present can be treated accordingly (4). Although, CT is the gold standard to diagnose solid organ injury, in expert hands FAST can detect as little as 30ml of free fluid and can be used as a screening test on unstable patients where time is critical (5).

In rural areas where CT may be out of reach, Ultrasound can be the diagnostic procedure of choice in blunt abdominal trauma. The major motive of this study is to examine whether FAST involving Ultrasonography is beneficial in reducing early, late and overall mortality among patients who have blunt abdominal trauma.

OBJECTIVES:

1. To study the role of Focused Abdominal Sonography in Trauma in assessing visceral injuries in blunt abdominal trauma
2. To correlate the findings of FAST with Computed Tomography and laparotomy findings.

MATERIALS AND METHODS

Study place:

Mahatma Gandhi Memorial Govt. Hospital and KAPV Govt. Medical College, Trichy.

Duration of study:

2 years (From Jan 2020 to Jan 2022).

Study Design:

Cross-sectional study.

Inclusion Criteria

1. All patients with blunt abdominal trauma both hemodynamically stable and unstable patients (RTA, Assault, Traffic accidents)

2. Both sexes
3. Age above 12 years

Exclusion Criteria

Wounds caused by gunshots and stabs are excluded from the study

METHODS:

Ethical approval to conduct the study was obtained. Rapid initial assessment looking for head injuries, fractured ribs, and fractured long bones is made. Patients were immediately resuscitated. Plain X-ray abdomen done in all cases. FAST is done in all patients and a CT scan is taken for selected stable patients. Based on USG and CT patients are either taken for surgery or put on conservative management. During laparotomy, the degree of abdominal injury was noted, and post-op complications were monitored. Data analysis was done using SSP software

OBSERVATION AND RESULTS

A total of 75 patients were enrolled in the study. Age ranged from 18 to 80 years. Most of them were Male (82.7%). A road traffic accident was the common mode of injury (53.3%). Most of the patients were hemodynamically stable (70.7%) The plain X-ray was normal (70.7%). FAST was reliable in most of the cases (72%)

Table No.1 Mode Of Injury

MODE	PATIENTS	PERCENTAGE
RTA	40	53.3
ASSAULT	8	10.6
SELF FALL	14	18.6
BULL HIT INJURY	13	17.3

Table No. 2: Plain X-Ray Abdomen with finding

Findings	No. of Patients	Percentage
Hazy	3	4%
Dilated small bowel loops	4	5.3%
Lt pneumothorax	1	1.33%
Dilated large bowel loops	1	1.33%
Hazy with hemopneumothorax	1	1.33%
Air under the diaphragm	10	13.3%

Bowel injuries were diagnosed with X-ray. Plain X-ray was normal in 55 patients.

Table 3: e-FAST done in 75 Patients

e-FAST Findings	No. of Patients	Percentage
FREE FLUID SPLENORENAL	4	5.33%
FF Pelvis	21	28%
FREE FLUID HEPATORENAL	8	10.66%
FREE FLUID PELVIS AND SPLENORENAL	8	10.66%
FREE FLUID SPLENORENAL & LT CHEST	2	2.66%
FREE FLUID LT & CHEST	2	2.66%
FREE FLUID PELVIS AND HEPATORENAL	2	2.66%
FREE FLUID PELVIS AND RT CHEST	2	2.66%

49 patients had free fluid

Table 4: CT abdomen findings done in 70 patients

Findings	No. of patients	Percentage
Splenic Injury	16	22.8%
Liver Laceration	14	20%
Diaphragm Injury	1	1.4%
Pancreatic Injury	1	1.4%
Renal Injury	5	7.14%
Bladder Injury	6	8.5%
Retroperitoneal hematoma	2	2.8%
Mesenteric injury	12	17.14%
Hemo/pneumothorax	13	18.5%

Table 5: MANAGEMENT

Laparotomy alone – 47 Laparotomy & tube thoracostomy - 2 Tube Thoracostomy alone – 4	Conservative – 22
Splenectomy – 12 Gastric Perforation – 6 Resection Anastomoses - 10 Liver Laceration Packing – 1 Bladder Repair - 6 R.P.H -1 Mesenteric Tear Suturing - 10 Diaphragmatic Hernia Repair -1 Pancreatectomy – 1 Nephrectomy/renography –1 Tube thoracostomy – 6	Splenic Contusion – 4 Liver Injury – 10 Renal injury – 2 RPH – 1 Mesenteric injury – 1 Hemothorax – 7

Laparotomy alone done in 47 patients (62.66%)

Laparotomy and tube thoracostomy done in 2 patients (2.66%)

Tube thoracostomy alone in 4 patients (5.33%)

conservative management in 22 patients (29.33%)

OBSERVATIONS

- Most patients admitted with shock were found to have active intra or retroperitoneal hemorrhage during laparotomy. Most of the patients with intestinal injuries were stable on admission. Abdominal signs were positive in all patients with bowel injury even if only serosal or mesenteric contusion was present. But only in 50% of patients with hemoperitoneum, abdominal signs were positive and in rest of the patients, abdomen was clinically normal. In most of the patients with bladder injury also, abdomen was clinically normal. Presence of Air under diaphragm in plain X-ray is specific in diagnosing Bowel perforation. But in solid organ injuries it is least contributory. Air under diaphragm was seen in 4 patients. Presence of hemoperitoneum was identified as free fluid FAST in most of our cases. But most of the Retroperitoneal Hemorrhages and bowel injuries were missed in Ultrasonogram. Of the 75 patients, 2 patients had no FF in the initial scan. CT was done in 70 patients

DISCUSSION:

- Up to 20% of patients with acute hemoperitoneum have abenignphysical examination (i.e., nontender, non-distended abdomen). Blood is a relatively weak peritoneal irritant and the abdominal examination is often normal. In addition, abdominal injury can be masked by other painful injuries (i.e.,) CNS injury or intoxication.

FAST examination is rapid, simple and performed in the resuscitation area. USG has a high sensitivity (83 - 99%) specificity (98 - 100%) and

accuracy (97%) for detecting hemoperitoneum (6). It is used as a screening procedure in detecting hemoperitoneum. Patients with a significant amount of intra peritoneal fluid >2mm stripe of fluid in Morrison's pouch or pelvis require laparotomy. FAST is less sensitive than CT for detecting solid organ injury.

In the hemodynamically stable patient with a suspected abdominal injury, abdomino-pelvic CT is the preferred imaging procedure to evaluate injury to solid organs (7).

CT has a high sensitivity and specificity for intra-abdominal injury and allows non-operative treatment of stable patients with splenic or hepatic injury. It also provides excellent visualization of the kidneys, pelvis and retro peritoneum. The treatment delay caused by CT scanning of abdomen is dangerous in an unstable patient. FAST may replace DPL in the emergent evaluation of Blunt Injury Abdomen (8).

CONCLUSION

A high rate of true negatives suggests that limited training is sufficient for relatively young members of the trauma team to perform FAST.

In rural areas where there is a lack of professional radiologists, including short courses on trauma sonography may be extremely useful.

With regard to the worldwide trend of higher casualties, especially in lower-income countries, and the limited availability of qualified radiologists in rural areas, we suggest short-term trauma ultrasound courses for surgical residents, medical residents, and nurses associated with trauma response teams.

The technique is easily learnt and has been demonstrated, in the right hands, to be both sensitive and specific for the presence of intraperitoneal free fluid and can be done by the surgeons in the resuscitation room while doing the initial assessment.

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