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ORIGINAL ARTICLE

Utility of Fast Scan in Blunt Abdominopelvic Trauma Patients in Lahore District

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ABSTRACT

Background: To evaluate the utility of fast scan in blunt abdominopelvic trauma patients in the emergency department of tertiary care hospitals in Lahore district. Focused assessment with sonography for trauma (FAST) has been used as the first assessment in diagnosing patients with trauma in the last decade, and we have heard people questioning its authenticity and reliability, and many other things.

Methodology: The study design was cross-sectional .This study was conducted at various tertiary care hospitals of Lahore, in the time duration of 3 months from January 2022 to March 2022. One hundred and six (106) patients with blunt abdominopelvic trauma were assessed by Fast scan using 2-5MHz transducer.

Results: Out of 106 patients 59(55.7%) were males and 47(44.3%) were females with ages ranged between 2 to 72 years. Road traffic accidents accounted for 50% cases, 17% were due to fight while 23.6% were due to fall and 9.4% were due to assault. Of the total patients, 69.8% had negative scan while 30.2% had positive scan. Majority (6.6%) of positive scans were of splenic injury. Of all the positive scans 17% of the cases had abdominal pattern of injury while pelvic and abdominopelvic cases were 9.4% and 2.8% respectively.

Practical implication: Our aim of doing this research study was to learn the benefits of performing Fast scan in BAT patients. We were able to look through possible aspects of pathology of abdomen and pelvic of traumatic patients arriving.FAST Scan is the single most valuable imaging modality in the early assessment and diagnosis of blunt abdominopelvic traumas with an aspect of safety &cost-effectiveness.

Conclusion: Fast scan can be used in the initial assessment of blunt abdominopelvic trauma patients and it is verily preferred in hemodynamically stable patients.

Keywords: FAST Scan, Blunt traumatic patients, Emergency department, Hemodynamic stability.

INTRODUCTION

FAST SCAN which can also be called a Focused assessment with sonography for trauma can be defined as an ultrasound exam that we perform on a traumatic patient presented in the emergency department of hospitals[1]. Focused assessment with sonography for trauma (FAST) has been used as the first assessment in diagnosing patients with trauma in the last decade, and we have heard people questioning its authenticity and reliability, and many other things[2]. When a FAST scan comes out normal it indicates abdominal discovery in hemodynamically unstable patient and a CT scan in stable ones[3]. Direct laparotomy is not obvious in a positive fast scan in blunt abdominopelvic traumatic patients. Some studies present that fast shoes low assessment in renal or other organ injuries. Fast in the emergency department has proved to be a good evaluator for free fluid in the abdomen[3]**.** It is usually very tough to look for abnormalities and pathologies. So, the radiologists use fast CT or diagnostic peritoneal lavage for the ideal supervision[4].

Blunt abdominopelvic trauma (BAT) refers to damage to the body by vigorous effect, falls from height, road accidents, or battering. While penetration or piercing of anything into the body is classified as penetrating trauma. It causes an open wound[5]. Intra peritoneal bleeds are 12% in blunt trauma. These deaths are derived from hypovolemic shocks. This shows the importance of diagnosing and curing blunt traumas before further complications. Fast scan provides us with a noninvasive, cheap, on time and initially accurate scan[6].

Progressive use of CT in abdominopelvic Blunt traumas has increased concerns for radiation and expense. We are going to see if fast can replace CT for assessing pathologies in BAT patients or is it useful as an initial assessing tool?[7]. The fast scan is good in trauma patients who have solid organ injuries. The study showed that half of the negative cases had low-grade visceral or other injuries. They concluded as Fast is a good modality for initial assessment, especially in BAT patients, and has a high level of specificity and sensitivity. But if the fast scan does not detect any pathology, it does not mean that pathology doesn't exist[8].

There was another study conducted by D Dammers on 3 January 2017 on whether or not we should perform Fast in stable patients presented with BAT. A total of 421 patients were involved and 9 had unfavorable results. 14 patients had positive fast scans while negative fast was seen in 407 patients. 6 of these patients had peritoneal fluid. Positive scans were more into unfavorable results than injury severity score and clinical variables measured in ED. So, they concluded it as Fast scan should never be skipped for BAT patients[9].

This research was done by Dr. Kevin Hamburg in 2011 on assessing the correctness of Fast in BAT patients at the Kenyatta national hospital. They took 48 patients that were hemodynamically stable with piercing or blunt injury. According to the routine, Fast was performed in those potentiating BAT injuries were 44% in total from the selected patients. Most of the scans showed a buildup of fluid that is 62% and only 25% of these were positive for peri renal and hepatorenal recess. Only 19% of bowel injuries were detected and only 33% of bladder injuries were detected by fast. So this study clearly explains that Fast is good to look for the positive predictive value that helps us decide whether to operate on a patient with an abdominal injury or not. Also, it tells us that Fast has very high specificity[10].

There was another study done by Hooman Bahrami-Motlagh. He researched on the test qualities of Fast. They took a total of 129 of which 74% were male. They presented that if the CT scan is positive, a physical exam and Fast remains independent in their diagnosis. Fast has proved to be the best protocol for intra-abdominal injury with very high specificity (77%) and sensitivity (87%) positive predictive value (70%) negative predictive value (91%) and accuracy (81%). Kids with blunt trauma should have a Fast scan and physical exam before any radiation linked modality,

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especially when handling the abdomen[11]. The research also said that Fast scans should be confirmed with other modalities to not miss any diagnosis. They said that Fast has a specificity of 92% sensitivity of 69% and accuracy of 80.8%[12]. Fast is good for the initial assessment of patients who were thought to have organ injuries like minor abdominal or spleen or bladder. Official studies to develop the risk lamination tools could allow radiologists to combine Fast into the pediatric patient population in the possible secure manner[13].

Many studies are done comparing fast with other modalities for accuracy, reliability and time management especially in the emergency department for blunt trauma patients. But the answers are not sure or in favor of any modality. Lahore has shown a lack of research on this topic. We have designed this report to know the benefits of Fast in the emergency department in blunt abdominopelvic trauma patients presented in Lahore's tertiary care hospitals.

The rationale of our study was to learn the benefits of performing Fast scan in BAT patients. We were able to look through possible aspects of pathology of abdomen and pelvic of traumatic patients arriving in the ER. The ratio of achievable pathologies was also assessed

MATERIALS AND METHODS

Data was collected from Lahore General Hospital, Mayo Hospital Lahore and Government Mian Meer Hospital after approval from ethical committee of the hospital. This was a cross-sectional observational study. Data was collected in three month after the synopsis was approved. We used convenience-sampling method to collect the data. People with blunt abdominopelvic trauma arriving in the Emergency Department. Sample size of **106** patients was calculated by G Power Software. Data was collected in the form of perfoma which includes Patient's demographic profile, history of patient's trauma, vitalassessment, Physical examination of the patient, scan finding by FAST Scan. SPSS was used to analyze the data and calculate the Mean, Median, Mode, Standard Deviation, Frequencies and percentages. Informed consent forms were signed by each patient or his/her guardian present at that moment. Patients were allowed to withdraw from the study at any time. The collected data was kept confidential and was only used for study purpose in order to generate results.

General Protocol: The patients were presented in the Emergency Department. The on duty doctors after evaluating their vitals and performing physical examination requested for FAST Scan of the patients.

The respective patients were then selected for the research study if they fulfilled the inclusive criteria. Consent forms were signed by the patients or his/her guardian.

Equipments used:

- Ultrasound machine
- Curvilinear ultrasound transducer of 2-5 MHz frequency
- Ultrasound gel
- Glove to cover the tip of transducer

Patient position: The patient is laid on the couch in supine position.

Abdominopelvic views and probe positioning:

- Peri-hepatic view : RUQ of abdomen ; 10^{th} -11^{th} intercostal space
- Peri-splenic view: LUQ of abdomen ; 9^{th}-10^{th}intercostals space
- Pubic view : pubic symphysis

Each patient's entire abdomen and pelvic region was scanned to rule out any internal abnormality

RESULTS

One hundred and six (106) patients, who fulfilled the criteria, were involved in the study. Table 1 shows that the ratio of male patients was more than female patients. The frequency of male patients was 59(55.7%) while the females were 47(44.3%). Mean age was 3.33±1.24.

Table 2 shows the frequency of Mode of Injury and Pattern of Injury. Out of 106(23.6%) were received in the Emergency department with Fall being the cause of trauma. The next major cause of with the highest ratio was Road Traffic Accident with 53 patients of 106(50%). Those who suffered trauma due to fight were 18 patients (17%) while patients with assault were 10(9.4%).The pattern of injury frequency depicts 18 patients of n=106 had abdominal pattern of injury, 10 patients had pelvic pattern of injury while only 3 patients had abdominopelvic pattern of injury. 32(30.2%) patients had positive Fast scan findings after a blunt trauma while 74(69.8%) had negative Fast scan finding.

Table 3 depicts the frequency of hemodynamically stable and unstable patients.

Table 1: Demographic data

Gender	59(55.7%)/47(44.3%)
Age	3.33±1.24

Table 2: Frequency of mode of Injury, pattern of Injury

	Frequency	Mean ±SD
Mode of Injury	25(F),53(RTA),18(F),10(A)	2.12± 0.881
Pattern of injury	18(A),3(AP),10(P),75(N)	3.34 ±1.145

Table 3: Frequency of Hemodynamic Stability

	Frequency	%age
Hemodynamically stable patients	84	79.2
Hemodynamically unstable patients	22	20.8
Total	106	100.0

Table 4: Frequency of Fast Scan Findings

	Frequency	%age
Free fluid in Morrison's pouch and splenorenal recess	1	.9
Splenic hematoma with fluid in splenorenal recess	7	6.6
Paracolic gutter with free fluid in Morrison's pouch	2	1.9
Free fluid in splenorenal recess and around UB	1	.9
Liver laceration with hematoma in Morrison's pouch	2	1.9
Placental abruption with IUD	6	5.7
Hepatic hematoma with free fluid in Morrison's pouch and RIF	2	1.9
Renal hematoma with free fluid in Morrison's pouch and LIF	1	.9
Free fluid in Morrison's pouch with hematoma at base of UB	1	.9
Disruption of myometrium	2	1.9
Pancreatic laceration	2	1.9
Free fluid in Morrison's pouch and LIF	1	.9
Hematoma at base of UB with free fluid in RIF	2	1.9
Free fluid in splenorenal recess and hypogastric region	1	.9
Hepatic hematoma with free fluid in Morrison's pouch and splenorenal recess	1	.9
Normal Scan	74	69.8
Total	106	100.0

Table 4 shows the frequency of FAST scan findings. Out of 106 patients who had their fast scan done 74 patients had normal fast scan while one patient had fluid in splenorenal recess and in Morrison's pouch. 7 patients had splenic hematoma with fluid in splenorenal recess. 2 patients had paracolic gutter with free fluid in Morrison's pouch. One patient had free fluid around splenorenal recess and around urinary bladder. 2 patients had liver laceration with hematoma in Morrison's pouch. 2 patients had hepatic hematoma with free fluid in Morrison's pouch and Right iliac fossa. One patient had renal hematoma with free fluid in Morrison's pouch and Left iliac fossa. One patient had free fluid in Morrison's pouch with hematoma at base of urinary bladder. 2 patients had pancreatic laceration. One patient had free fluid in Morrison's pouch and Left iliac fossa. 2 patients had hematoma at base of

urinary bladder with free fluid in left iliac fossa. One patient had free fluid in splenorenal recess and hypogastriic region. One patient had splenic hematoma with free fluid in Morrison's pouch and splenorenal recess. 6 patients reported with placental abruption with IUD while 2 with disruption of myometrium.

Table 5 determines the relationship of hemodynamically patients with fast scan findings.

Table 5: Relationship of Hemodynamic stability with Fast scan findings

Hemodynamic Stability	Positive fast scan findings	Negative fast scan findings
Hemodynamically stable patients	10	74
Hemodynamically unstable patients	22	0
Total	32	74

DISCUSSION

The prognostic precision and diagnostic job of FAST test in children with blunt stomach injury is unsure. This work explores presentation of crises office (emergency department) FAST scan to anticipate timely careful medication and resulting unbound liquid in children with injury.

Children of age zero to fifteen years with first degree of gruff middle injury at solitary ER were reflectively inspected. Following definition by introductory cardiovascular unsteadiness, relationship of certain scan with initial careful intersession, characterized as employable administration (laparotomy) or angiogram in no less than four hours of emergency department appearance and existence of free fluid is not entirely set in stone to during early careful medication.One of the researches was conducted by Mujtaba Charcoal in 2017 and his topic was a review on using ultrasonography for the diagnosis of pediatric BAT patients. Their study showed that they used 3454 patients and the sensitivity was 54% of ultrasound in them meanwhile specificity was 93%. They also said that using the US procedure the sensitivity and specificity can be attained as high as 100%. This needs more studies to prove that it is 100% correct although it may reach its goals in a very short time[14].

This was a study done by Tian Liang in 2021. He took 2135 patients in total and only 13.5% of patients had an intra abdominal injury. The specificity and sensitivity were 96% and 355.

A total of 2135 individuals were included out of which 13.5% had intra abdominal injury. The chances of false diagnosis in intra abdominal injury were 9%. Only kids with GCS 14-15 underwent CT. Mostly had normal physical examination with negative Fast results[15].

Bala Natarajan in October 2010 conducted a study which showed whether Fast scan is worth doing in hemodynamically stable blunt traumatic patients. He used 2980 patients with trauma and read them. The fast scan was done, and 88 patients had a positive scan. All the patients that had positive findings were sent for CT (70/88). The results of Fast and CT were compared and was noted that the sensitivity of the Fast scan was 41% accuracy was calculated as 94% and specificity was 99%[16].

Results showed that from 508 rescued children with injury with deciphered focused assessment usg test, thirty five had cardiovascular insecurity and ninety eight were scanned positive. Sum of forty two of five hundred and eight sufferers required quick and careful intercession, and the responsiveness and explicitness of focused assessment of usg foreseeing initial careful mediation were fifty nine percent and eighty four percent individually. The particularity and definite prescient worth of free fluid at initial careful intercession in positive FAST cardiovascular unsound victims expanded from half and ninety percent at four hours after emergency department appearance to 100% at two hours following emergency department appearance.

Patients with IAIs found by CT scan made up 1.62% of the population, and hematuria was found in 88.9% of them. FAST's specificity was 97.1%, hematuria's was 84.1%, and when both tests were combined, the specificity was 99.3%[17].

Among these huge chain of hurt kids, a true FAST scan enhances the capability to foresee the requirement for initial careful intercession and exactness is more prominent for free fluid in hemodynamically stable unsteady patients two hours after appearance in the ER.

The above research summarized that FAST scan can be used to foresee the requirement of timely surgery[18].

Results of the ultrasonography were confirmed by a CT abdomen with intravenous contrast. Despite being revived, 17(43.9%) individuals were still unstable and required surgery. 41 patients were continued on conservative care[19].

This work summarizes that focused assessment with sonography can be used as an earliest investigation in people with unreliable cardiovascular system, even though its usage is restricted in some situations.

Our study shows that FAST Scan cannot be used as a diagnostic tool for medical management or surgical intervention although it can be accepted as the initial imaging modality in hemodynamic unstable patients.

CONCLUSION

Fast scan is the appropriate imaging modality for the initial assessment of patients arriving in the ER department after a blunt trauma. It is beneficial for detecting hematomas and free fluid in the abdominopelvic cavity. It is a non invasive, user friendly, cost effective modality with no radiation hazards. According to our study Fast scan must be performed on hemodynamically stable patients as 10 patients who were hemodynamically stable had positive scan findings.

Competing interests: There was no competing interest among authors. All results of this study are presented honestly, clearly without any false or in appropriate data manipulation.

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