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Original Article

# Predictive value of focused assessment with sonography for trauma (FAST) for laparotomy in unstable polytrauma Egyptians patients

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ABSTRACT

*Purpose:* The emergency physicians face significant clinical uncertainty when multiple trauma patients arrive in the emergency department (ED). The priorities for assessment and treatment of polytrauma patients are established in the primary survey. Focused assessment with sonography for trauma (FAST) is very essential clinical skill during trauma resuscitation. Use of point of care ultrasound among the trauma team working in the primary survey in emergency care settings is lacking in Suez Canal University Hospitals even ultrasound machine not available in ED. This study aims to evaluate the accuracy of FAST in hemodynamically unstable polytraumatized patients and to determine its role as an indication of laparotomy.

*Methods:* This study is a cross-sectional study included 150 polytrauma patients with a blunt mechanism admitted in Suez Canal University Hospital. Firstly primary survey by airway check, cervical spine securing with neck collar, maintenance of breathing/circulation and management of life threading conditions if present were conducted accordingly to ATLS (advanced trauma life support) guidelines. The patients were assessed in the primary survey using the FAST as a tool to determine the presence of intra-abdominal collection.

*Results:* A total of 150 patients, and FAST scans were performed in all cases. The sensitivity and specificity were 92.6% and 100%, respectively. The negative predictive value was 92%, while the positive predictive value of FAST was 100%. The accuracy of FAST was 96%.

*Conclusion:* FAST is an important method to detect intra-abdominal fluid in the initial assessment in hemodynamically unstable polytrauma patients with high accuracy.



## Introduction

Polytrauma is one of the commonest presentations to the emergency department (ED). It is noted that patient history and clinical examination is often low sensitivity and specificity for the accurate diagnosis of acute traumatic abdominal pathology.[1]

Patients are evaluated, and their management priorities are established, based on their types of injuries and its mechanisms with their vital signs. In severely traumatized patients, logical and sequential priorities of treatment must be established. Based on clinical assessment of the patient, the patient's vital signs must be assessed quickly and efficiently. Management consists of a primary survey, resuscitation phase of vital functions, with detailed secondary survey, targeted to initiation of definitive treatment, and care accordingly to the underlying definitive pathology. This process includes the ABCDEs approach of traumatized patients and identifies with treated life-threatening conditions by the following sequence: Airway patency with cervical spine protection, Breathing and oxygenation, ventilation, Circulation with control hemorrhage, Disability for neurological state, Environmental control/Exposure. Completely expose the patient, with prevent hypothermia.[1]

Damage control surgery (DCS) may be is a considered of abbreviated laparotomy, which means to prioritize short-term physiological recovery provided over anatomical reconstruction in the seriously compromised polytraumatized patient. This focuses on initial hypotensive resuscitation and using blood products to prevent the lethal triad of acidosis, hypothermia and coagulopathy. The combination of acidosis, coagulopathy and

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hypothermia, (the lethal triad) may preclude definitive repair of surgery to all injuries in one sitting, which is called 'damage control surgery' (DCS), is advocated. DCS is a treatment strategy prioritizing physiological recovery over anatomical repair. Its use is dramatically increased survival of the most dangerous injured patients.[2]

So ultrasonography's primary role is detecting intraperitoneal blood after blunt multiple trauma. This is named by a FAST as a Bedside Procedure.[3]

Diagnostic peritoneal lavage (DPL) was used in the past to determine which patients needed laparotomy, but DPL is mostly not used nowadays in pregnant patients or in polytrauma which cannot be used for serial assessment but leads to a high negative laparotomy rate.[4]

Abdominal computed tomography (CT) has high specificity than DPL for intra-abdominal injury in BAT (blunt abdominal injury) with difficult to perform in hemodynamically unstable polytraumatized patients, CT is expensive tool and requires shifting patients from the clinical area, which relatively contraindicated in hemodynamically unstable polytraumatized patients.[4]

Focused assessment sonography for trauma (FAST) is an important, available tool in ED and valuable in diagnosis other than DPL and CT that can often facilitate a timely diagnosis for polytraumatic patients.[5]

FAST is noninvasive,[6] safe in mostly all traumatic patients, including pregnant women and children, which requires low level of radiation than CT.[7] In addition, during the primary survey or secondary survey FAST can be done quickly, without shifting the patients from the emergency room to radiology unit,[8] meanwhile FAST can help accurately diagnosis in hemoperitoneum cases,[5] assess the degree of hemoperitoneum in blunt polytraumatic patients,[6] shorten the time to diagnosis for acute blunt polytraumatic patients especially with blunt abdominal injury,[5] even can be repeated for serial assessment and re-exam,[8] and decrease DPL done rates; in the proper ER clinical setting, FAST also can lead to decrease CT scans rates. Therefore it is very useful for the patients admitted to the trauma center to do serial abdominal examinations and reassessment by FAST.[7]

Focused Assessment Sonography for Trauma (FAST) examination is becoming very important part of the initial clinical evaluation in emergency room (ER) for polytrauma patients with the increase availability. However the uses and accuracy of emergency physician's sonography for polytrauma patients, and the significance of FAST positive examination for patient management decisions still unclear in the majority of polytrauma patients.[3]

The study aim to improve management process and outcome of polytrauma patients admitted to emergency department of Suez Canal University Hospital. Within one year from April 2016 to March 2017. The results of FAST in hemodynamically unstable polytraumatized patients and its role as an indication of laparotomy have been evaluated in this study.

## Patients and methods

### *Study design and site*

This is a descriptive prospective study (cross sectional). Unstable polytrauma patients admitted to emergency department in Suez Canal University Hospital which considered tertiary hospital and center of referral to five nearly governorate. And all resources are available in ED and emergency resuscitation. By primary survey through checking airway, secure cervical spine by neck collar, breathing and circulation (ABCDE), the life threading condition had been treated if founded.

### *The study question*

What is the role of FAST in unstable blunt polytrauma patients for laparotomy in emergency department?

The sample size was 150 blunt unstable of polytrauma patients admitted to our hospital during one year of the study from April 2016 to March 2017 and all the polytraumatized patients entered resuscitation room, they were treated according to ATLS guidelines.

Patients selected accordingly to inclusion criteria:

1 -two major system injury + one major limb injury;
2 -one major system injury + two major limb injury;
3 -one major system injury + one open grade3, skeletal injury or
4 -unstable pelvic fracture with associated visceral injury.

All the patients underwent the primary survey by the emergency physician with maintaining a patent. And secured airway with application of high flow oxygen then examination of breathing by inspection, palpation, percussion and auscultation and application of pulse oximetry. In the assessment of the circulation blood pressure, heart rate, capillary refilling and urine output data are collected with clinical examination of the abdomen by inspection, palpation, percussion and auscultation of audible intestinal sounds and using focused assessment sonography of trauma as an adjunct in the primary survey then examination of the pelvis and long bone for instability and fractures.

FAST examination was performed by using a phased array or curvilinear 2.5 to 5-MHz probe.

The FAST exam is performed by using four views:

1. Hepatorenal recess or Morison's pouch
2. Splenorenal view
3. Pelvic view
4. Pericardial or subcostal view.

The starting probe position when looking for Morison's pouch should be the anterior axillary line in the seventh to ninth intercostal space. The probe marker should be pointing to the patient's head. To get a good view of the entire recess, the probe can then be moved toward the head and then back toward the feet along this plane.

The starting probe position when looking for Splenorenal Recess on the left should be in the posterior axillary line in the fifth to seventh intercostal space, the marker should be pointed toward the patient's head.

The starting position when looking for pelvic assessment is transverse position (probe marker to the patient's right) on the symphysis pubis and angle toward the patient's feet. This part of the exam can be done before the bladder is emptied by catheterization and if the patient already catheterized accuracy of the study can be increased by instilling saline into the bladder until it is easily visualized using ultrasound. Examine for fluid posterior to the bladder, posterior to the uterus, and between loops of bowel. Once the bladder is identified transversely, rotate the probe ninety degrees for the longitudinal view with tilting the prop to the right and to the lift to assesses the sides of the bladder.

For the FAST subxiphoid view, position the probe almost flat on the abdomen with the marker to the patient's right and angle the probe to the patient's left shoulder.

The primary survey completed with assessment of the disability by examination of Glasgow coma score, pupil examination and signs of lateralization ending the survey with exposure to detect sites of external bleeding.

*Fate at emergency room*

Fate of the patient recorded "Within 2 days' timeframe outcomes" whether:

1 -Had surgical intervention.
2 -Admitted to inpatient department under observation.
3 -Admitted to intensive care unit.
4 -Transferred and indication of transfer.
5 -Discharged from emergency department.
6 -Died at emergency room.

*Ethical consideration*

All Patients give consent to participate in the study without affecting their course of treatment accordingly permission obtained from ethical committee of faculty of medicine in Suez Canal University.

1) Approval of Research ethics committee.
2) Signature written informed consent from participants.
3) Confidentiality of data.
4) Explanation of our study to the participants.
5) An informed consent was taken from each patient or relatives.

Data collected and compared with the formal ultrasound performed with the radiologist and the results of exploratory laparotomy.

The data collected were tabulated and statistically analyzed by SPSS statistical package (SPSS V17) on IBM compatible computer. In the following sections, continuous variables are expressed as mean and SD after checking for normality of distribution. Differences values between baseline and follow-up results were analyzed by the paired sample *t*-test. A $p$ value <0.05 was considered statistically significant.

## Results

This study was conducted on one hundred fifty patients of both sexes and variable age groups with history of a multiple trauma or a localized trauma with a presentation of hemodynamically unstability.

- The mean age for the study group was 27.98 ± 20.39 years, 28% of them were females & 72% were males, with 78% of road traffic accident, 12% falling from height, 4% falling down, 4% falling a heavy object on torso and 2% a train accident. As shown in Table 1.

**Table 1**
Distribution of the studied cases according to demographic data ($n$ = 150).

| Item | $n$ | % |
|---|---|---|
| Age (years) | | |
| ≤40 | 108 | 72.0 |
| >40 | 42 | 28.0 |
| Sex | | |
| Male | 108 | 72 |
| Female | 42 | 28.0 |
| Mode of trauma | | |
| RTA | 117 | 78.0 |
| FFH | 18 | 12.0 |
| Train accident | 3 | 2.0 |
| FD | 6 | 4.0 |
| FHO | 6 | 4.0 |

The age of patients ranged from 2 months to 70 years, mean 27.98 ± 20.39 and median 26.50.

- All the patient fulfill the criteria of hemodynamic unstability with 52% of patients with unrecorded systolic blood pressure. As shown in Table 2.
- All the patient examined for sites of injury, 26% chest injuries, and 48% injuries to the extremities 32% abdominal injuries. As shown in Table 3.
- All the patients scanned with focused assessment sonography of trauma in the circulatory assessment in the primary survey with 50% +ve and 50% −ve and all the results confirmed with the results of the radiologist at the time of presentation. All the −ve cases were scanned after two hours by the radiologist with 92% −ve and 8% +ve, as shown in Table 3.

**Table 2**
Distribution of the studied cases according to vital signs ($n$ = 150).

| Parameters | $n$ | % |
|---|---|---|
| Systolic (mmHg) | | |
| Unrecorded | 78 | 52.0 |
| Recorded | 72 | 48.0 |
| Min.–Max. | 50.0–90.0 | |
| Mean ± SD | 73.75 ± 11.73 | |
| Median | 80.0 | |
| Diastolic (mmHg) | | |
| Unrecorded | 78 | 52.0 |
| Recorded | 72 | 48.0 |
| Min.–Max. | 30.0–90.0 | |
| Mean ± SD. | 45.42 ± 14.44 | |
| Median | 45.0 | |
| Pulse (beat/min) | | |
| Not felt | 69 | 46.0 |
| Felt | 81 | 54.0 |
| Min.–Max. | 100.0–180.0 | |
| Mean ± SD | 134.07 ± 15.82 | |
| Median | 130.0 | |
| RR (breath/min) | | |
| Min.–Max. | 20.0–50.0 | |
| Mean ± SD | 31.0 ± 7.32 | |
| Median | 30.0 | |
| Conscious level | | |
| Min.–Max. | 5.0–15.0 | |
| Mean ± SD | 11.96 ± 2.86 | |
| Median | 13.0 | |

**Table 3**
Distribution of the studied cases according to site of trauma and cases according to fast and follow-up formal US for negative fast with Symmetry between FAST results and formal US results.

| Item ($n$ = 150) | $n$ | % |
|---|---|---|
| Injury region | | |
| Chest | 39 | 26.0 |
| Abdomen | 48 | 32.0 |
| Extremities | 72 | 48.0 |
| FAST ($n$ = 150) | | |
| Positive | 75 | 50.0 |
| Negative | 75 | 50.0 |
| Follow-up regular US for negative FAST ($n$ = 75) | | |
| Negative | 69 | 92.0 |
| Positive | 6 | 8.0 |

| Regular US for FAST ($n$ = 150) | Positive | | Negative | | Total | | Kappa test | $p$ value |
|---|---|---|---|---|---|---|---|---|
| | $n$ | % | $n$ | % | $n$ | % | | |
| Positive ($n$ = 81) | 75 | 92.6 | 0 | 0.0 | 75 | 50.0 | 0.88 | <0.001 |
| Negative ($n$ = 69) | 6 | 7.4 | 69 | 100 | 75 | 50.0 | | |

US: ultrasound.
1) Kappa agreement
< 0, less than chance agreement.
0.01–0.20, slight agreement.
0.21–0.40, fair agreement.
0.41–0.60, moderate agreement.
0.61–0.80, substantial agreement.

**Table 4**
Relations between management modality and intraperitoneal fluid collection.

| Management modality | | Intraperitoneal fluid | | | | Test of significance |
|---|---|---|---|---|---|---|
| | | Negative | Mild | Moderate | Marked | |
| Conservative | Count | 67 | 1 | 1 | 0 | $X^2 = 150.498$[a] |
| | % within Management Modality | 44.7% | 0.7% | 0.7% | 0% | $p$=0.000* |
| Laparotomy | Count | 2 | 36 | 32 | 11 | |
| | % within Management modality | 1.3% | 24% | 21.3% | 7.3% | |

**Table 5**
Distribution of the studied cases according to US view and cases according to laparotomy ($n = 75$).

| FAST positive cases ($n = 75$) | $n$ | % |
|---|---|---|
| US view | | |
| Hepatorenal view | 54 | 75.0 |
| Splenorenal view | 54 | 75.0 |
| Subxiphoid view | 3 | 4.2 |
| Pelvic view | 60 | 83.3 |
| Laparotomy | | |
| Not done | 69 | 46.0 |
| Done | 81 | 54.0 |
| Laparotomy | | |
| Splenic injury | 42 | 28.0 |
| Rupture uterus | 3 | 2.0 |
| Splenic injury + perforated viscous | 9 | 6.0 |
| Splenic injury + rupture bladder | 3 | 2.0 |
| Liver laceration | 12 | 8.0 |
| Splenic tear + rupture diaphragm + 1 | 3 | 2.0 |
| Thoracotomy | 3 | 2.0 |
| Perinephric hematoma + renal injury | 6 | 4.0 |

- Relations between management modality and intraperitoneal fluid: 46.1% of polytrauma conservative management strategy modality was done while 53.9% of patients exploratory laparotomy was done (Table 4)
- Focused assessment sonography of trauma scan was performed in the four cardinal views. 83.3% of the +ve cases had a pelvic collection, 75% of them had a hepatorenal collection, 75% of them had lienorenal collection and 4.2% had a pericardial collection. As shown in Table 5.

**Table 7**
The final outcome of the patients ($n = 150$).

| Final outcome | $n$ | % |
|---|---|---|
| Therapeutic laparotomy and ICU admission | 11 | 7.3 |
| Therapeutic laparotomy and inpatient admission | 70 | 46.7 |
| Inpatient admission under observation | 8 | 5.3 |
| Discharge after observation | 61 | 40.7 |

**Table 8**
Validity of FAST results in comparison to formal US results.

| Validity parameters | FAST (%) |
|---|---|
| Sensitivity | 92.6 |
| Specificity | 100 |
| PPV | 100 |
| NPV | 92.0 |
| False positive rate | 0.0 |
| False negative rate | 7.4 |
| Accuracy | 96.0 |

- All the cases who had a surgical intervention with laparotomy, the results of organs affected reviled 24% splenic injury, 4% rupture spleen, 6% splenic injury with perforated hollow viscous, 2% splenic injury with bladder injury, 2% splenic injury with rupture diaphragm, 8% hepatic laceration, 2% rupture uterus, 4% per nephric hematoma with kidney injury and one case for thoracotomy. As shown in Table 5.
- A relation between the results of exploratory laparotomy and positive views of the focused sonography of trauma scan shown in Table 5.
- All positive cases of FAST scan had exploratory laparotomy while two false negative cases also had exploratory laparotomy and 23 cases with true negative managed with other maneuvers for other causes of hemorrhagic shock. As in Tables 5 and 6.
- The final outcomes of the patients: −7.3%, therapeutic laparotomy and ICU admission; 46.6%, therapeutic laparotomy and inpatient admission; 5.3% inpatient admission under observation; and 40.6%, discharge after observation as shown in Table 7.
- The validity of FAST results in comparison to formal US results performed by the radiologist revealed sensitivity 92.6%, specificity of FAST is 100% with positive predictive value 100%, negative predictive value 92% with 0.0% false positive rate and 7.4% false negative rate and accuracy 96%, as shown in Table 8.

**Table 6**
The relation between FAST views and affected organ seen on laparotomy and relation between FAST and laparotomy ($n = 150$).

| Item | Hepatorenal view ($n = 54$) | | Splenorenal view ($n = 54$) | | Subxiphoid view ($n = 3$) | | Pelvic view ($n = 60$) | |
|---|---|---|---|---|---|---|---|---|
| | $n$ | % | $n$ | % | $n$ | % | $n$ | % |
| Laparotomy | | | | | | | | |
| Splenic injury | 21 | 38.9 | 33 | 61.2 | 0 | 0.0 | 27 | 45.0 |
| Rupture uterus | 3 | 5.6 | 3 | 5.6 | 0 | 0.0 | 3 | 5.0 |
| Splenic injury + perforated viscous | 6 | 11.1 | 9 | 16.6 | 0 | 0.0 | 6 | 10.0 |
| Splenic injury + rupture bladder | 3 | 5.6 | 3 | 5.6 | 0 | 0.0 | 3 | 5.0 |
| Liver laceration | 12 | 22.2 | 0 | 0.0 | 0 | 0.0 | 12 | 20.0 |
| Splenic tear + rupture diaphragm | 3 | 5.6 | 3 | 5.6 | 0 | 0.0 | 3 | 5.0 |
| Thoracotomy | 0 | 0.0 | 0 | 0.0 | 3 | 100.0 | 0 | 0.0 |
| Perinephric hematoma + renal injury | 6 | 11.1 | 3 | 5.6 | 0 | 0.0 | 6 | 10.0 |

| Operation | Negative FAST ($n = 75$) | | Positive FAST ($n = 75$) | | $\chi 2$ | $p$ value |
|---|---|---|---|---|---|---|
| | $n$ | % | $n$ | % | | |
| Not done | 69 | 92.0 | 0 | 0.0 | 42.59 | <0.001[a] |
| Done | 6 | 8.0 | 75 | 100.0 | | |

$\chi^2$, $p$: $\chi^2$ and $p$ values for Chi square test for comparing between the two groups.
[a] Statistically significant at $p \leq 0.05$.

## Discussion

Polytrauma is regularly encountered in the emergency room (ER). The lack of clinical data and the presence of distracting trauma injuries or altered mental status, from head trauma injury or intoxication, can make these injuries so difficult to diagnosis and management. Patients of Polytrauma usually have both abdominal and extra-abdominal injuries, so need further complicating care.[9]

The mean age for the study group was 27.98 ± 20.39 years, 28% of them were females & 72% were males, with which is in accordance with Ulutas H et al (2015) who studied 149 patients with polytrauma they were 121 males and 28 females (81.2% vs. 18.8%; male: female = 4:1). This male predominance may be explained by being more mobile, physically active and are more involved in outdoor activities like drivers, industrial workers, construction sites, other hazardous occupations, and laborers etc.[10]

In our study the mode of polytrauma were 78% of road traffic accident, 12% falling from height, 4% falling down, 4% falling a heavy object on torso and 2% a train accident which in accordance with Ustundag et al[11] traffic related injuries (63%) of blunt trauma patients.

Our present study showed that all the patients fulfill the criteria of hemodynamic unstability with 52% of patients with unrecorded systolic blood pressure. Also the patients examined for sites of injury, 26% chest injuries, and 48% injuries to the extremities, 32% abdominal injuries and these results disagree with Elbaih in Ismailia, Egypt[12] reported that from 21 patients, ten patients (47.6%) had limb injuries, six patients (28.6%) had chest injuries, two (9.5%) had facial injuries and three (14.3%) had spinal injuries. In another study in Uganda done by Naddumba,[13] injuries in the head and neck were the most sites of missed injuries in 46.4%. Abdominal missed injuries ranked second in 19.6%.

FAST is a rapid, repeatable noninvasive bedside method that was to answer one question: Whether free fluid is present in the peritoneal and pericardial cavity. It has been essential a valuable tools for the initial assessment of blunt abdominal trauma.[14]

Zieneldin et al[15] reported sensitivity of 91% and specificity of 100% in identifying fluid by radiologist in polytrauma while other studies reported a sensitivity of 100% with a specificity of 97.5% among non-radiologists and 95.8% sensitivity with 97.5% specificity among radiologists positive predictive value among NR and RR were 88.8%, 88.46% respectively and negative predictive value were 97.5% and 99.15%.[13,15] While in our study sensitivity 92.6%, specificity 100%, positive predicted value 100%, negative predictive value 92%, with false positive rate 0.0% and false negative rate 7.4% and accuracy 96%.

Limitations of a negative FAST examination have been recognized[16,17] and a negative FAST should be repeated at an interval of six hours.[18] Patients with a negative scan should follow up clinically and no patients of this group developed abdominal related complications. In our study negative FAST was repeated by radiologist at an interval of two hours with two positive cases.

Different causes of false negative FAST for example, acoustic shadows ribs will obstruct a clear view of Morison's pouch and an empty bladder was limiting the evaluation for free fluid in the pelvis. Patient with subcutaneous air also degrade image quality.[19] Development of hemoperitoneum over time, those some limitation of the study qualities can make it difficult to detect injuries with slower bleeding at US, so timing may be more responsible for the discrepancy in this patient than imaging modality because of ongoing bleeding and active fluid resuscitation in the interval between FAST and follow up ultrasound after two hours.[20]

In the end of our study the trauma is the sixth leading cause of death worldwide, resulting in five million or 10% of all deaths annually. It is the fifth leading cause of significant disability. About half of trauma deaths are in people aged between 15 and 45 years and is the leading cause of death in this age group. The care of the injured patient remains one of the mainstays of emergency medicine practice. Emergency physicians play a vital role in the stabilization and diagnostic phases of trauma care blunt injuries carry a greater risk of mortality than penetrating injuries because they are more difficult to diagnose and are commonly associated with severe trauma to multiple intraperitoneal organs and extra-abdominal systems. The management of polytrauma should be approached in an organized, vigilant, and knowledgeable manner. Reliance on key clinical features and the timely use of diagnostic procedures tremendously alter morbidity and mortality. Advancements in imaging have helped to decrease missed or delayed diagnoses, but they remain the most serious pitfalls in the management of abdominal injuries.

The present study showed that the relations between management modality and intraperitoneal fluid: 46.1% of polytrauma conservative management strategy modality was done while 53.9% of patient's exploratory laparotomy was done. We know that ultrasonography's primary role is detecting free intraperitoneal blood after polytrauma. This is accomplished by a FAST ultrasound examination of Morrison's pouch, the splenorenal recess, and the pouch of Douglas, which are dependent portion of the intraperitoneal cavity where blood is likely to accumulate. Ultrasonography carries a host of advantages. It is a portable instrument that can be brought to the bedside in the trauma resuscitation area. Therefore when time is precious in the patient in critical condition, the FAST can provide a rapid answer to the key question in the decision matrix, which is whether hemoperitoneum is present. Serially performed FAST increases its diagnostic accuracy for organ injury in patients with polytrauma.[3]

Serial FAST examinations may help to determine progressive hemorrhage, however, in hypotensive patients the FAST has excellent sensitivity for hemoperitoneum requiring surgical intervention, and proceeding to exploratory laparotomy in these patients is a must. In addition, in those with a negative FAST, intra-abdominal injury requiring operative repair cannot be excluded because the FAST study does not image solid parenchymal damage, the retroperitoneum, or diaphragmatic defects well and is poor at recognizing bowel injury, so other investigation as CT scan should be performed to patients with negative FAST to rule out other injuries.

In hypotensive patient it is mandatory to rule out other sites of injury that cause hemorrhagic shock as hemothorax, pelvic or long bone fractures, and to rule out other causes of shock as obstructive shock in cases of cardiac tamponade and pneumothorax, neurogenic shock, and cardiogenic shock.

In cases with hemorrhagic shock due to intra-abdominal collection exploratory laparotomy must be performed in hemodynamically unstable patient to control the bleeding with resuscitation with blood products and warmed crystalloids to avoid the lethal triad.

The final outcome of the studied patients: 7.3% therapeutic laparotomy and ICU admission, 46.6% therapeutic laparotomy and inpatient admission, 5.3% inpatient admission under observation and 40.6% discharge after observation. In accordance with Elbaih et al's[3] studied of 75 patients with blunt abdominal trauma and their outcome 5.3% done therapeutic laparotomy and ICU admission, 4% done therapeutic laparotomy and inpatient admission, 4% were inpatient admission under observation and lastly 86.7% were discharged after observation.

## Summary

The care of the injured patient remains one of the mainstays of emergency medicine practice. Emergency physicians play a vital role in the stabilization and diagnostic phases of trauma care.

Seeking to reduce the costs, radiation risks of unnecessary polytrauma patient imaging and transposition of unstable patients, our goal in this study was to improve management process of unstable polytrauma patients by evaluate the accuracy of FAST in detected of blunt injuries in Suez Canal University Hospital. And decreased number missed injuries by improved the assessment of instability polytrauma patients in the emergency setting by used trained FAST physicians.

Trained FAST physicians were improved diagnostic imaging utilization by decreasing unnecessarily exposure of the patients to potentially harmful ionizing radiation especially in case of imaging contraindication (e.g. unstable patients, pregnancy).

## Conclusion

FAST is considered as the initial diagnostic tools for traumatic patients to detect intra-abdominal fluid in hemodynamically unstable patients. FAST performed by clinicians detects intraperitoneal fluid with a high degree of accuracy. All FAST examinations are valuable tests when positive. However, ultrasound examination is operator dependent, and FAST scan has its own limitations. For negative FAST examination patients, we recommend a period of monitoring, serial FAST scans, or further investigations, such as CT scan.

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