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Original Research Article

Conservative management of penetrating abdominal trauma (stab wound)

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ABSTRACT

Background: The aim of the study is to study the reliability of selective conservative management of the penetrating stab abdominal wounds. Trauma is one of the most important reasons of mortality. The mechanism that underlies the penetrating trauma relates to the mode of injury. The early diagnosis of hollow viscus injuries is difficult and a delay in the diagnosis of such injuries may be associated with increased morbidity and mortality. Focused assessment with sonography for trauma (FAST) is an effective for screening and initial classification of stable patients and confirmed by CT scan. The management of stable patients was either surgical exploration or selective non-operative interference with the optimal management of patients is yet to be fully elucidated for abdominal stab wounds (ASW).
Methods: A prospective study of 40 patients with penetrating abdominal stab wounds between June 2017 and February 2018, at Damanhour Medical National Institute.
Results: The mean age of our patients was 51.9±13.3 years with predominance of males and without predominance of any side to be affected and non-significant deviation from the normal values of hemodynamic signs. The presence of air under diaphragm in X-ray films signify abdominal penetration and ultrasonographic examination (FAST) document the diagnosis and help in following up of cases. Most of hemodynamically stable patients passed conservatively with a little rate of laparotomy.
Conclusions: We concluded that there is still a role for conservative management in managing stable cases of penetrating stab abdominal wound.

Keywords: FAST, ASW, Computed tomography

INTRODUCTION

Trauma is defined as a physical injury due to a sudden or short contact of human with different levels of energy. It is one of the most important reasons of mortality during the first four decades of life that leads to serious functional limitations in this age group.[1]

The mechanism that underlies the penetrating trauma (e.g.; gunshot wound, stab wound, impalement) relates to the mode of injury (e.g.; accidental or intentional injury, homicide, suicide.[2]

The early diagnosis of hollow viscus injuries in patients with blunt abdominal trauma (BAT) is difficult. Furthermore, a delay in the diagnosis of such injuries may be associated with increased morbidity and mortality. Detection of intra-abdominal free fluid without solid organ injury also leads to diagnostic dilemma. The presence of free fluid further indicates the possibility of a

mesenteric tear, a missed solid organ injury, hollow viscus injury, or fluid leaking from retroperitoneal hematoma associated with a pelvic fracture.[3]

Focused assessment with sonography for trauma (FAST) is a highly effective first screening tool for initial classification of abdominal trauma patients.[4] Based on the results of the study of Behboodi and his colleagues, (2016), only 68.9% of the positive FAST findings in patients with blunt abdominal trauma and stable hemodynamics was confirmed by abdominopelvic CT scan.[5]

The management of hemodynamically stable patients who present following a penetrating abdominal injury (PAI) remains variable between mandatory surgical exploration and more selective non-operative approaches.[6]

The optimum management of patients with abdominal stab wounds (ASWs) is yet to be fully elucidated.[7] Immediate laparotomy is the established treatment in approximately 60% of patients with ASWs, who present in hospital with shock, generalised peritonitis and evisceration. Recommendation for the management of the remaining patients (40%) who are mostly asymptomatic with minimal or equivocal abdominal signs at the initial clinical examination is still controversial.[8,9,1]

METHODS

Study type: A prospective cross sectional study.

Study population: Patients with penetrating abdominal stab wounds.

Study groups

Single group of 40 patients with penetrating stab abdominal wounds.

Study design

Between June 2017 and February 2018, patients with penetrating stab abdominal wounds in General Surgery Department at Damanhour Medical National Institute (DMNI).

Informed consents were obtained from all patients included in the study which were approved by the Local Ethics Committee of General Surgery Department of Faculty of Medicine Monoufia University and Damanhour National Medical Institute.

Inclusion criteria

All the patients with penetrating abdominal trauma who were hemodynamically stable with no signs of peritonitis were included in this study and underwent conservative treatment for 3-5 days.

Exclusion criteria

- Acute abdomen "peritoneal irritation" signs of acute abdomen included "guarding, rigidity, tenderness or absent bowel sounds".
- Intra-abdominal structures evisceration as omentum or bowel.
- Shock or hemodynamic instability.
- GIT bleeding.
- Frank hematuria.

All patients will be subjected to history talking (age, sex, etc.), complete physical examination (general, local examination)

General

- Vital signs (blood pressure, pulse, respiratory rate, level of consciousness).
- General signs of associated injuries

Local examination

- Abdominal examination for any sign of associated injuries
- Local examination of the wound for penetrating.

Investigations

- *Laboratory:* CBC, coagulation profile, Htc value, kidney function tests.
- *Radiologic investigation:* X-ray, chest X-ray, erect plain X-ray.
- FAST ultrasonographic examination of the abdomen,
- CT for confirming diagnosis.

Exploration of the wound was done under local anesthesia if needed.

Criteria of delayed laparotomy during conservation

- Hemodynamic instability "↑ pulse, ↑ temperature, etc.".
- Sings of peritonitis "grading, rigidity, tenderness, etc.".
- Lab findings "leucocytosis, progressing anemia, etc.".
- Imaging findings "presence of air under diaphragm, presence of intra-abdominal collection).

RESULTS

The patients will be subjected to conservative management and were evaluated for the efficiency of this type of management.

The age of our patients ranged between 25-70 years with a mean age of 51.9±13.3 years (Table 1). Twenty-nine of our patients were males (29/40, 72.5%) and eleven were

females (11/40, 27.5%) with a male to female ratio about 2.6:1 and the statistical analysis revealed a significant predominance of males in our group (p=0.021) (Table 1).

Table 1: Demographic data of patients of the study.

Variable	Range	Mean±SD	P value
Age (years)	25-70	51.9±13.3	
Sex	No	%	
Male	29	72.5	0.021
Female	11	27.5	S
Total	40	100	

Table 2: Side of affection in patients of the study.

Side of affection	No	%	P value
Right side	23	57.5	0.312
Left side	17	42.5	NS
Total	40	100	

All patients of the study were complaining of penetrating abdominal wound of stab type (40/40, 100%. Twenty-three of our patients have the wound in right side of the anterior abdominal wall (23/40 57.5%) and 17 cases had the penetrating wound in the left aide of the anterior abdominal wall (17/40, 42.5%) and the statistical analysis revealed non-significant predominance of any side of the anterior abdominal wall to be affected (p=0.312) (Table 2).

The hematocrite value of the patients in our study ranged between 27-45% with a mean value of 37.9±4.2% and statistical analysis revealed non-significant deviation from the normal values (p=0.231).

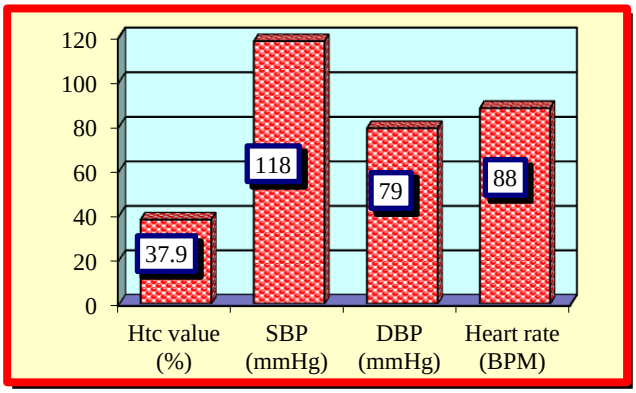

Figure 1: Hemodynamic variable in patients of the study.

Systolic blood pressure of patients of our study ranged between 100-135 mmHg with a mean systolic blood pressure of 118±8 mmHg. The diastolic blood pressure of patients of our study ranged between 70-100 mmHg with a mean diastolic blood pressure of 79±7 mmHg. The statistical analysis revealed that there was no significant change in the systolic or diastolic blood pressure in patients of our study (p=0.231 and 0.354 respectively) (Figure 1).

The heart rate of patients in our study ranged between 70-104 beat per minute with a mean heart rate of 88±9 beat per minute with no significant deviation of heart rate from the normal values (p=0.235) (Figure 1).

Table 3: Radiological investigations in patients of the study.

Examination	No	%
X-ray		
Air under diaphragm	26	65
No signs	14	35
FAST		
No collection	23	57.5
Positive for collection	17	42.5
Mild collection	10	25.0
Moderate collection	7	17.5

X-ray examination of the patients in erect position revealed that Twenty-six of our patients have air under the diaphragm (26/40 65%) and 14 cases had no significant X-ray sign (14/40, 35%) and the statistical analysis revealed the presence of air under diaphragm as a diagnostic sign for penetrating abdominal wounds (p=0.013) (Table 3).

Ultrasonographic abdominal examination (FAST) of our patients revealed that ten patients had mid intra-abdominal collection (10/40, 25%); seven patients (7/40, 17.5%) had moderate intra-abdominal fluid collection while the remaining 23 patients didn't show significant lesion at the time of examination (23/40, 57.5%), (Table 3).

Table 4: Management outcome in patients of the study.

Examination	No	%
Conservative management	36	90
Complicated cases	4	10
Passed free	2	25
Operated upon	2	75

All patients of our study underwent conservative measures in the form of observation of vital signs and repeated ultrasonographic examination of the abdomen; 36 of them passed without surgical intervention (36/40, 90%) while four cases only deteriorated and underwent abdominal exploration (4/40, 10%) which revealed superficial small intestinal injury in one passed with primary repair; another one of colonic injury treated by primary repair with diverting ileostomy, while two were negative upon exploration (Table 4). Three of operated cases had superficial wound infection which were treated by antibiotic (3/4, 75%) while only passed without complications (1/4, 25%), (Table 4).

DISCUSSION

Trauma is a major health problem in every country irrespective of the level of socio-economic advancement. Mortality rate was very high in abdominal penetrating injuries. Among various modes of trauma, penetrating trauma requires an immediate surgical intervention in most of the cases. Most commonly penetrating injuries in civilian group involves younger healthy population, who are very much responsible for the development of the society. Since most of the deaths in penetrating injuries occur within minutes to hours, hence form an important part of surgical emergencies.[11,12]

The optimum management of patients with abdominal stab wounds (ASWs) is yet to be fully elucidated. Immediate laparotomy is the established treatment in approximately 60% of patients with ASWs, who present in hospital with shock, generalized peritonitis and evisceration. Recommendation for the management of the remaining patients (40%) who are mostly asymptomatic with minimal or equivocal abdominal signs at the initial clinical examination is still controversial. In the past, mandatory laparotomy in this group of patients resulted in unacceptably high rates of non-therapeutic and negative aparotomies.[7,10]

Selective non-operative management (SNOM) of abdominal stab wounds is well established. SNOM arose as a result of a massive imbalance between the burden of trauma encountered by surgeons and the limited resources available. The outcomes of SNOM have been extensively published. It has been shown to reduce the morbidity associated with negative laparotomy while being extremely safe.[13]

Bennett and his colleagues, (2016), found in their study that the mean age of their patients was 30.1±14.3 years which disagree with our results but found nearly all of their patients were males (only one was female) and this was in agreement with our results.[14]

Ramya and Jayasree, found in their study that the most age affected by abdominal injuries was the 3rd decade of life which disagree with our results but the predominant gender was males (86.4%) and this was in agreement with our results.[12]

Dayananda and his colleagues, found in their study that the age of patients ranged between 6-68 years with a mean age of 28±6.2 years with a significant male predominance which run in lines with our results.[13]

Osinowo and his colleagues, found in their study that the age of patients was 27±10 years with no specific age group affected with a male predominance (88%) which was in agreement with our results.[10]

Al-Ozaibi and his coworkers, found in their study that the mean age of the patients was 28 years; with a male predominance 94% and 6% were women which was in agreement with our results.[15]

Shashakala and his colleagues, in their study included 64 patients of penetrating abdominal trauma of which 51 (79.7%) were males and 13 (20.3%) were females. And the age range in their study was 17-67 years with a median age of 35 years which was in agreement with our results.[16]

Osinowo and his colleagues, found in their study that the most common affected site of the abdomen was the anterior abdominal wall (90%) which was in agreement with our results.[10]

Al-Ozaibi and his coworkers, found in their study that the most common site of injury was the left upper quadrant. Stab wounds associated with the least injury were in the back, followed by the right upper quadrant (RUQ) which was in agreement with our results.[15]

Üstüner and his colleagues found in their study that the most common affected site was the anterior abdominal wall (80% of cases) especially around umbilicus (25.8% of these cases) which was in agreement with our results.[17]

Üstüner and his colleagues found in their study that the anemia was present in 11.1% of patients of penetrating abdominal wound which was disagree with our results.[17]

Osinowo and his colleagues, found in their study that vital signs were affected in only 1% of cases while the remaining cases hemodynamically stable which was in agreement with our results.[10]

Üstüner and his colleagues found in their study that the hypotension, tachycardia, and tachypnea were seen in 11.1%, 6.7% and 4.4% patients which was in agreement with our results.[17]

Ramya and Jayasree, found in their study that Erect films was not a reliable method for operative interference and give false results in 55.2% of cases and because of this they didn't take it as a sure method for intervention and this was in agreement with our results.[12]

Al-Ozaibi and his colleagues documented in their study that a positive FAST (focused assessment with sonography for trauma) scan was helpful in the diagnosis of penetration but was poor in identifying injuries that required intervention. On the other hand, a negative FAST scan did not exclude significant injuries. Abdominal CT was highly sensitive in the evaluation of the injuries; it was helpful in diagnosing peritoneal violation and bowel, intra-abdominal organ and diaphragm injury which was in agreement with our results.[15]

Üstüner and his colleagues found in their study that ultrasonography have positive findings were found in

12.1% of the patients with penetrating abdominal wounds with a rate of positivity as 4.5% in patients in which abdominal tomography was performed which run in line with our results.[17]

Ramya and Jayasree, found in their study that the incidence of laparotomy was 84.3% of their cases of penetrating abdominal injuries with average hospital stay 1-29 days with a mean of 8 days and a mortality rate of 5.2% which was disagree with our results.[12]

Bennett and his colleagues, (2016), concluded in their study that conservative management in penetrating abdominal trauma in selected patients is a safe strategy results in reduction in the length of stay in ICU/trauma unit with no mortality reported in their cases which was inagreement with our results.[14] Also, Dayananda and coworkers, demonstrates that the SNOM approach to the management of abdominal stab wounds is both safe and effective.[13]

Osinowo and his colleagues, found in their study that laparotomy was needed in 84% of cases with negative results in 12% of the opened cases hospital stay was 12±10.7 days with a mortality rate of about 8% which disagree of our results.[10]

Also, Herfatkar and his colleagues, reviewed 100 patients with stab wounds to the anterior abdominal wall who were selected for non-operative management, and were followed up with selective clinical assessment "SCAs" at admission and at 4, 8, 12 and 24 hours post admission. A total of 8% of patients needed laparotomy only after 12 hours. They concluded that SCAs are safe and decrease the cost and duration of hospitalization in stable patients which run in line with our results.[18]

Another study by Paydar and his colleagues, compared the conservative and surgical management of stable patients with penetrating abdominal stab wounds showed that conservative management with physical examination can decrease the rate of laparotomies performed and the length of hospital stay, and help to start oral feeding earlier that accepying our results.[19]

Al-Ozaibi and his colleagues, found in their study that laparotomy was needed in penetrating stab abdominal wound in a rate if 37% of their cases which disagree with our study results.[15]

Shashikala and his colleagues concluded in their study that conservative management in carefully selected patients with penetrating abdominal trauma is an established standard of care, which minimizes surgical morbidity and improves the quality of life. Careful initial examination complemented by other diagnostic methods to select the patients help in non-operative management.[16]

Üstüner and his colleagues concluded in their study that the patients in which by wound exploration injury was demonstrated to be a penetrating abdominal stab wound should be treated conservatively if the patient with stable vital signs without any evidence of anemia, chest trauma or any pathology requiring a thorax tube, and hollow organ perforation on abdominal tomography and left thoraco-abdominal trauma.[17]

CONCLUSION

From our study we concluded that there is still a role for conservative management for cases of penetrating stab abdominal wound especially in hemodynamically stable patients.

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