

Management of abdominal Trauma at Al-Gamhouria General Modern Hospital-Aden-Yemen

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Abstract

Abdominal injury is relatively common in both civilian and military casualties and is a leading cause of morbidity and mortality. The aim of this study is to identify the prevalence of abdominal trauma, to evaluate its impact on the intraperitoneal and Retroperitoneum organs, and to evaluate various modalities of management and its outcome.

This is a prospective study conducted at Al-Gamhouria Modern General Hospital, from 1st January 2013 up to 31st December 2014. This study involved 70 patients who were diagnosed as abdominal trauma and admitted to the hospital during the study period. Data were collected from the patients by their clinical history, examination and appropriate investigations. Male patients were predominantly more than female, 65 (92.9%) vs. 5 (7.1%). Abdominal trauma involved young people with the mean age of 31.3 ± 13.9 years; most of them were from Aden. Penetrating injuries were more prevalent compared to blunt injuries, as the mode of injury was mostly due to gunshots. The most frequently injured abdominal organ was small bowel. Complications occurred in 25 (35.7%) patients. Wound infection was the most common complications. Operative intervention was the treatment option for most patients with abdominal trauma.

Keyword: Abdominal Injury, Clinical Presentation, Post-operative Complication

Introduction

Trauma is a major worldwide public health problem and one of the leading causes of death and disability in both industrialized and developing countries^[9]. Abdominal injury is relatively common in both civilian and military casualties^[12]. The abdomen is the third most commonly injured anatomic region following the head and extremities^[4]. Abdominal trauma affects all age groups, but men tend to be affected slightly more than women^[13, 19, 25]. It is also the number one cause of years of productive life lost^[9].

Historically, blunt abdominal trauma encountered more frequently in the emergency department than penetrating abdominal trauma^[7, 12]. In the last years, penetrating injuries increasing because of the growth of violence in our society. Most surgeons have advocated laparotomy only in selected patients as some of the patients with an abdominal injury could be managed conservatively^[10, 17]. Mortality from abdominal trauma is associated with the number of organs injured, vascular injury, the need for damage control surgery and emergency department thoracotomy^[24].

Although abdomen trauma is one of the major causes of morbidity and mortality seen in our hospitals, there is a limited number of studies focusing on this problem in our society. The aim of this study is to identify the prevalence of abdominal trauma and to evaluate its impact on intraperitoneal solid organs such as liver, spleen and hollow viscus like stomach, small bowel and large bowel, and retroperitoneal organs, like kidneys and urinary bladder. In addition, to

evaluate different modalities of treatment available for solid and hollow organ injuries and its outcome.

Patients and methods

This is a prospective study, was conducted at Al-Gamhouria Modern General Hospital, from 1stJanuary 2013 up to 31stDecember2014, andnumber of patients studied was 70.

Inclusion criteria

All patients admitted to the hospital with diagnosis of abdominal trauma. The clinical diagnosis was done at the time of the admission by clinical history, physical examination, and investigations (laboratory investigation, radiological investigation, and ultrasound), and/or confirmed during operative intervention.

Exclusion criteria

Pediatric patients with abdominal trauma who were less than 13years old, patients with trauma of reproductive system, pregnant women with abdominal trauma, and major abdominal vascular trauma.

Data collection

Data were prospectively collected from patients by their clinical history, examination and appropriate investigations. Documentation of patients that included demographics, mechanism of injury, clinical pattern, laboratory data, imaging studies, associated extra abdominal injuries and type of treatment, operative findings, operative procedures, morbidity, mortality and length of hospital stay. All patients were followed-up until home discharged.

All analyses wereperformed, using IBM SPSS Statistics version 25. A P-value of ≤ 0.05 was considered statistically significant. The *t*-test was used for continuous data with normal distributions, such as Hemoglobin where compared penetrating abdominal injury with blunt abdominal injury. The continuous data were expressed in mean \pm standard deviation (SD) and the categorical data were expressed as percentages.

Result

Seventy patients with abdominal traumawere recorded during the study period. Table (1) described the demographic features; male patients were predominantly more than female, 65 (92.9%) vs.5 (7.1%).The age ranged from 13 to 65 years, with a mean age of 31.3 ± 13.9 years. The peak age for abdominal trauma was in the third decade of life; 24 (34.3%) then the fourth decade; 15 (21.4%).Students and those with private works were more affected 24 (34.3%) and 22 (31.4%) respectively. Most of the abdominal traumas occurred in residents at Aden governorate 50 (71.4%)

Table 1. Demographic characteristics of patients with abdominal trauma		
Variables	(n=70)	
	No	%
Sex		
Male	65	92.9
Female	5	7.1
Age groups		
< 20	13	18.6
20 – 29	24	34.3
30 – 39	15	21.4
40 – 49	8	11.4

≥ 50	10	14.3
Mean \pm SD	31.3 \pm 13.9 (13 – 65)	
Occupation		
Student	24	34.3
Private clerical worker	22	31.4
Farmer	7	10.0
Soldier	6	8.6
Teacher	6	8.6
House wife	5	7.1
Residence		
Aden	50	71.4
Lahj	14	20.0
Abyan	6	8.6

Table 2. Clinical characteristics of the patients with abdominal trauma		
Variables	(n=70)	
	No	%
Type of abdominal trauma		
Penetrating trauma	53	75.7
Blunt trauma	17	24.4
Mechanism of abdominal trauma		
Gun shot	41	58.6
Stab wound	9	12.9
Road traffic accident (RTA)	9	12.9
Boxing	4	5.7
Sharp object	4	5.7
Falling down	3	4.3
Presentation time (hours)		
< 6	61	87.1
6 – 12	2	2.9
>12	7	10
Hemodynamic state		
Stable	50	71.4
Unstable	20	28.6

Table (2) shows, the clinical data at presentation. The prevalence of penetrating abdominal injuries were more than blunt injuries, 53 (75.7%) vs.17 (24.3%) respectively. The common mechanism of abdominal trauma was gunshot abdomen 41(58.6%).

The majority of patients were presented within < 6 hours of abdominal trauma occurrence. Hemodynamically, most of the patients 50 (71.4%) with abdominal trauma were presented in stable state. The common cause for penetrating abdominal trauma was gunshot in 41 patients (77.3%). Whereas the common cause for blunt abdominal trauma was RTA in 9 patients (12.9%).

Table (3) show, the comparison between penetrating and blunt abdominal traumas according laboratory data at presentation. The mean hemoglobin and hematocrit concentrations were slightly higher among patients with penetrating traumas when compared to those with blunt abdominal traumas (12.0 \pm 2.3 vs 11.2 \pm 2.0, $p = 0.237$) and (36.9 \pm 6.7 vs 33.5 \pm 7.4, $p = 0.078$)

respectively, but these differences were not found statistically significant. There was a significant increase in the mean total leucocytes count of patients with blunt abdominal trauma when compared to penetrating trauma (12.8 ± 5.7 vs. $9.4 \pm 3.8 \times 10^9/L$, $p = 0.006$).

Table 3. Comparison between types abdominal trauma according laboratory data

Laboratory data	Penetrating injury (n=53)	Blunt injury (n=17)	p-value
	Mean \pm SD	Mean \pm SD	
Hemoglobin concentration (g/dl)	12.0 ± 2.3	11.2 ± 2.0	0.237
Hematocrit (%)	36.9 ± 6.7	33.5 ± 7.4	0.078
Total leukocytes ($\times 10^9/L$)	9.4 ± 3.8	12.8 ± 5.7	0.006

Ultrasound examination of abdomen was performed in 16 (22.8%) patients. Out of 11 (15.7%) patients had detected free fluid and found to have hollow viscus injury at laparotomy. Five (7.1%) patients had detected solid organ injuries for which they underwent laparotomy and found to have significant injuries in spleen and liver. Table (4) show, involved organs injured. Some injured patient had multiple organs involved. The small bowel was commonly involved hollow viscus organ, whereas; the liver was commonly involved solid organ. Table (5) show, associated extra abdominal injuries. Associated extra abdominal injuries were found in 25 patients (35.7%). The common extra abdominal injuries were chest injuries. Table (6) show, the various operative procedures carried out among 61 patients (87%) who underwent exploratory. Whereas, the remaining 9 (13%) were managed by non-operative methods. Closure perforation was the most performed surgical procedure in injuries of small bowel and colon injuries.

Table 4. The involved organs in patients with abdominal trauma

Organ injured	(n=70)	
	No	%
Small bowel	28	40
Liver	16	22.8
Colon	13	18.6
Stomach	10	14.3
Spleen	8	11.4
Kidney	4	5.7
Urinary bladder	4	5.7
Rectum	2	2.9
Diaphragm	2	2.9
Mesentery	1	1.4

Table 5. Associated extra abdominal injuries

Associated injuries	(n=70)	
	No	%
Chest	13	18.6
Pelvic	7	10
Lower extremity	6	8.6
Head	3	4.3
Upper extremity	2	2.9

Procedure	(n=61)	
	No	%
Closure perforation	35	57.4
Hepatorraphy	14	22.9
Gastric perforation repair	10	16.4
Colostomy	6	9.8
Splenectomy	5	8.2
Small bowel stoma	4	6.6
Bladder repair	4	6.6
Nephrectomy	2	3.3
Nephrorrhaphy	2	3.3
Diaphragmatic repair	2	3.3
Splenorrhaphy	1	1.6
Mesentery repair	1	1.6

Table (7) show, the outcome of patients with abdominal trauma. The complications were found in 25 (35.7%) of the studied patients with abdominal trauma. The common complications were wound infection 10 (14.3%). Five patients (7.1%) died in this present study. Three patients died due to pulmonary embolism, two patients died due to septicemia; one of them due to abdominal abscess and other due to empyema. The hospital stay ranged from less than one week to more than four weeks.

Outcome	(n=70)	
	No	%
Complications		
Wound infection	10	14.3
Urinary tract infection	5	7.1
Deep vein thrombosis	5	7.1
Empyema	3	4.3
Intestinal obstruction	3	4.3
Pulmonary embolism	3	4.3
Paralytic ileus	2	2.9
Seroma	2	2.9
Jaundice	2	2.9
Pneumonia	2	2.9
Abdominal abscess	1	1.4
Mortality	5	7.1
Hospital stay (week)		
<1	21	30
1 – 2	29	41.4
3 – 4	10	14.3
>4	10	14.3

Discussion

The knowledge in the management of abdominal trauma has progressively increasing due to the in-patient data gathered from different parts of the world.

In the present study, the abdominal trauma were more predominant among male compared to their female counterpart, this finding is in agreement with other studies^[20, 22]. In the present study, a mean age is 31.3 ± 13.9 years. This age group is usually the most active group of the community, they were exposed to many types of hazards including traumatic injuries involving abdomen. Our findings in consistent with two studies; in Nigeria by Dodiya-Manuel et al^[11], and the other one in Qatar by Arumugam et al^[3].

In the present study, found that the penetrating injuries were more prevalent than blunt injuries; this finding is in agreement with a study by Idriss et al^[16]. This may related to the mechanism of injury, which, in that study sample, was mostly due to gunshots and stab actions^[16].

In the present study, the admission time was earlier less than 6 hours after abdominal traumas, the time of presentation is an important determinant of the survival rate of these cases, and may explain the lower mortality rate in our study. In our study, stable hemodynamic status of the traumatic patients was lower than in study by Idriss et al^[16].

Hemoglobin and hematocrit concentrations are an important measurement for the cases of abdominal injuries at the Emergency Departments. In the present study, the mean hemoglobin and hematocrit concentrations were slightly higher among patients with penetrating traumas when compared to those with blunt abdominal trauma, but these differences were not found statistically significant. Our results in inconsistency with a study by Gad et al^[14], who reported that the mean hemoglobin was higher in blunt cases than penetrating cases.

Regarding the involved solid organs during the abdominal trauma, several studies have reported liver to be the most common injured solid organs, followed by spleen in abdominal trauma^[8, 21, 27]. However, other studies have reported spleen to be the most common injured abdominal organ^[11, 18]. In our study, the most frequently injured abdominal organ includes small bowel, especially ileum, followed by liver. These disagreements might be due to difference in the sites and types of trauma and its approximations with specific organs.

Operative intervention is the treatment option for most patients with abdominal trauma in the present study; this is similar in the other studies^[6, 16] in England and Mauritania respectively. While in an Egyptian study by Gad's et al^[14] reported much lower percentage of the abdominal trauma cases received surgical intervention. This difference of the percentages of surgical intervened cases between studies is due to the differences in the number of cases with penetrating and blunt traumas. Some surgeons have advocated laparotomy only in selected patients as some of the patients with an abdominal injury could be managed conservatively^[10].

The most common associated injury in our study was chest injury. In a study by Karamercan et al^[18] it was found that, the head injury the most common associated injury. This might be explained by that the most common cause of abdominal trauma in our study is the gunshots that mostly targeted to the chest area.

The complication rate in our study is higher than that reported by Idriss et al^[16], in Mauritania. Wound infection is the most common complication in our patients; this agrees with the finding of a Nigerian study that reported surgical site infection has been found to be the most common postoperative complication^[11]. In study by Hildebrand et al^[15], they reported the sepsis as the most common complication. Many factors can play an important role in the occurrence of sepsis, of which early recognition of the complications, early use of antibiotics and advanced intensive care units in study^[16]. Furthermore, the fact that bowel injuries associated with abdominal traumas led to heavy contamination of the peritoneum^[11, 16, 26].

In the present study, hospital stay is higher when compared to other studies^[1, 3, 16]. Difference in hospital stay between studies might be due to the variety in the procedures performed, complications occurred, organs involved, and time of admission. In study by Navsaria et al^[23], that concluded doing unnecessary laparotomy increases the hospital stay period.

Mortality rate of the present study is similar to mortality rate in an Iranian study by Baradaran et al,^[5]. Whereas, our mortality rate is lower than that in other studies^[2, 18].

Conclusion

Penetrating injuries were more prevalent compared to blunt injuries, as mode of injury was mostly due to gunshots and sharp objects. The most frequently injured abdominal organ includes small bowel, followed by liver. However, conservative management is successful in carefully selected patients; operative management remains the main stay of treatment. Wound infection was the most common complications.

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إدارة إصابات البطن بمستشفى الجمهورية العام الحديث - عدن - اليمن

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الملخص

البطن ثالث أكثر المناطق عرضة للإصابة بعد الرأس والأطراف، وتعد إصابة البطن شائعة نسبيًا في كل من طوارئ المدنيين والعسكريين وقد تؤدي إلى مضاعفات مرضية والوفاة في جميع الفئات العمرية في مختلف أنحاء العالم.

هدف هذه الدراسة تحديد مدى انتشار إصابات البطن وتقييم تأثير تلك الإصابات على أحشاء البطن وتقييم وسائل علاجها المختلفة ونتائجها.

هذه دراسة استشرافية أجريت في مستشفى الجمهورية الحديث العام، عدن-اليمن، خلال الفترة من 1 يناير 2013 حتى 31 ديسمبر 2014. شملت الدراسة سبعين مريضًا الذين تم تشخيص إصابتهم بصدمة في البطن وتم استقبالهم في قسم الطوارئ بالمستشفى خلال فترة الدراسة. تم جمع البيانات من المرضى من خلال تاريخ الإصابة والفحص السريري والفحوصات المختبرية والإشعاعية.

كان معظم المرضى ذكورًا 65 (92.9%) مقابل 5 إناث (7.1%). كان متوسط عمر 31.3 ± 13.9 سنة؛ وكان معظمهم من عدن. تعتبر الطلقات النارية من أكثر الأسباب شيوعًا لاختراق البطن. حدثت المضاعفات في 25 (35.7%) من المرضى المصابين وكانت عدوى الجرح أكثر المضاعفات شيوعًا وعليه يمكننا القول إن الإصابات المخترقة أكثر انتشارًا مقارنة بالإصابات المرضية (غير الحادة)، حيث كانت آلية الإصابة في الغالب بسبب الأسلحة النارية والأدوات الحادة. أكثر أعضاء البطن إصابة هي الأمعاء الدقيقة يليها الكبد.

ويظل العلاج الجراحي أساس علاج إصابات البطن.

الكلمة المفتاحية: إصابة البطن، أعراض سريرية، مضاعفات ما بعد الجراحة.