

Research Article

Pattern and Outcome of Abdominal Injury Management in Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia

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Abstract

Background: Abdominal injury is one of the major causes of trauma admissions. Evidence based information about causes of trauma related deaths is relevant for health policy making about prevention and control. The aim of the study was to identify the mechanism of trauma, commonly injured organs, patterns and outcome of abdominal trauma in Yekatit 12 Hospital Medical College. **Method:** A Longitudinal study design was conducted from April 2022 to May 2023 G.C **Results:** During the study, 42 patients were observed, with males comprising 83.3%. Most patients fell within the 20-29 age groups. Penetrating trauma was the most common mechanism (54.8%), with stabs (38.1%), RTAs (31.0%), and gunshots (14.3%) leading the causes. Negative laparotomy rate was 4.8%. Laparotomy was performed in 88.1% of cases, with the small bowel (33.3%) being the most commonly injured organ. Postoperative complication rate was 21.6%, mainly surgical site infections (10.8%). Complication rate was higher in penetrating injuries (62.5%) compared to blunt trauma (37.5%). Mortality rate for abdominal injury was 4.78%. **Conclusion:** Abdominal trauma predominantly impacts younger males. Stab wounds and road traffic accidents (RTAs) are the primary causes, emphasizing the importance of public awareness for preventing RTAs and similar injuries.

Keywords

Abdominal Injury, Pattern, Outcome

1. Introduction

Trauma is the top cause of illness and death among young people globally, leading to significant workforce losses. In the US in 2013, about \$671 billion was spent on trauma victims, with fatal injuries costing \$214 billion [1-3]. In 2013, the WHO African Region had the highest road traffic injury fatality rate worldwide, at 26.6 per 100,000 people. Low- and middle-income countries, home to just 47% of the world's registered vehicles, accounted for over 85% of road

traffic deaths and 90% of disability-adjusted life years lost [4-6].

Trauma management in developing countries faces numerous challenges, particularly in Africa, where increasing injury rates are associated with poor infrastructure and urbanization. The lack of adequate emergency systems exacerbates the issue, as many places lack well-established response teams. Consequently, the outcome for abdominal

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trauma victims can be catastrophic [7].

Around one-third of trauma patients suffer from abdominal injuries, necessitating careful triage for proper intervention, as about 25% of these cases require surgery. Blunt and penetrating injuries are the most common, affecting organs like the spleen, bowels, stomach, and liver, while the diaphragm and kidneys are less frequently injured [2, 8].

Managing abdominal trauma requires an organized approach and presents a public health challenge globally, irrespective of socioeconomic status. Missed or delayed diagnoses are the most critical pitfalls in managing such injuries, often leading to urgent deaths [9, 10].

Despite trauma being a leading cause of morbidity, mortality, and Emergency Department visits, there's insufficient data on interventions to prevent and manage trauma and its aftermath. This study will examine the patterns and outcomes of abdominal injuries and associated factors at Y12HMC in Addis Ababa, Ethiopia.

2. Methods and Materials

2.1. Study Area and Period

The study was conducted in Y12HMC which is an academic institution found in Addis Ababa, Ethiopia under Addis Ababa City Administration. The study was from April 2022 to May 2023 G.C.

2.2. Study Design

An Institution based longitudinal study design used using primary data sources.

2.3. Source and Study Population

All abdominal injury patients seen in Department of surgery in Yekatit 12 Hospital Medical College while all Patients with diagnosis of abdominal injuries who were admitted and managed in Surgical Ward.

2.4. Inclusion and Exclusion Criteria

All adult abdominal injury patients who were eligible and gave consent whereas Pediatric patients and Patients who were not admitted to surgical ward and managed as outpatient department.

2.5. Study Variable

Independent variables: age, sex, type of organ injured in each mechanism, residence, educational status, occupation, mechanism of Abdominal injury; Dependent variables:- pattern and outcome of abdominal injury management.

2.6. Data Collection and Quality Control

The data collection tool was adopted from previous researches and it had sociodemographic, identification of signs and symptoms of acute pancreatitis, and identification of the etiologies sections. The data was collected by individuals trained by the principal investigator after pretest was done. The data were collected by structured and pretested data abstracting checklist. The data collectors were given adequate training with practical demonstrations before they have started the collection. The principal investigator was supervising the quality of data.

2.7. Data Analysis and Presentation

Once data completeness was ensured, it was inputted into SPSS Version 27 for analysis. Descriptive statistical methods were employed to ascertain frequencies, means, and standard deviations of both dependent and independent variables.

3. Results

Forty two patients were seen during the study period. Among them 35 (83.3%) of patients were males making male to female ratio of 5:1. The minimum and maximum age of the study participants were 17 and 78 years old respectively with the mean of 31.19 ± 12.114 years. Majority of the patients were within the age range of 20-29 (40.5%). Fifty percent ($n=21$) of patients were single and 45.2% ($n=19$) were married. 76.2% ($n=32$) were living in urban and 23.8% ($n=10$) in Rural areas. Most of the patients (95.2%, $n=40$) were Litrate. Regarding occupational status, 35.7% ($n=15$) were unemployed and 21.4% ($n=9$) were students.

Table 1. Sociodemographic data of abdominal injury patients in Y12HMC, Addis Ababa, Ethiopia, 2023.

Variables	Category	Frequency (n)	Percentage (%)
Age (in years)	<20	7	16.7
	20-29	17	40.5
	30-39	11	26.2
	40-49	4	9.5
	>50	3	7.1
Sex	Male	35	83.3
	Female	7	16.7
Marital status	Single	21	50.0
	Married	19	45.2
	Divorced	2	4.8
Residence	Urban	32	76.2

Variables	Category	Frequency (n)	Percentage (%)
Educational status	Rural	10	23.8
	Literate	40	95.2
	Illiterate	2	4.8
Occupation	Government Employee	4	9.5
	Student	9	21.4
	Merchant	4	9.5
	Driver	5	11.9
	Unemployed	15	35.7
	Farmer	1	2.4

Variables	Category	Frequency (n)	Percentage (%)
	Housewife	4	9.5

3.1. Mechanism and Cause of Abdominal Injury

The mechanism of abdominal trauma was penetrating in 54.8% (n=23) of patients and blunt in 45.2% (n=19) of patients. In general the commonest cause of Abdominal injury were Stab occurred in 38.1% (n=16) of patients, RTA in 31.0% (n=13) and gunshot in 14.3% (n=6) of patients (Table 2). Majority of the patients 76.2% (n=32) visited the hospital within 6 hours of the trauma, 11.9% (n=5) in 13-18 hours, 7.1% (n=3) in 7-12 hours.

Table 2. Shows Mechanism and cause of abdominal injury in Y12HMC, Addis Ababa, Ethiopia, 2023.

Penetrating			Blunt		
Cause of Injury	Frequency (n)	Percentage (%)	Cause of injury	Frequency	Percentage
Stab	16	38.1	RTA	13	31.0
Gunshot	6	14.3	Assaults	3	7.1
Arrow wound	1	2.4	Fall from height	3	7.1
Total	23	54.8	Total	19	45.2

3.2. Clinical Pictures, Types of Injury and Management Outcome

During presentation to the hospital, 80.95% (n=34) of patients had stable vital signs and 19.05% (n=8) of patients had abnormal vital signs like hypotension, tachycardia and fever. Among patients with deranged vital signs, 25% (n=2) had died. Patients with blunt abdominal injury with abnormal vital sign during the time of admission had 40% (n=2) risk of death (Table 4). Most of the patients 97.3% (36) were operated within 6 hours of admission and 2.7% (1) on his 14th day for a patient diagnosed as Grade IV Liver injury with diaphragmatic rupture. Among study participants who were operated, 94.6% (n=35) of patients had positive findings upon Exploratory laparotomy where as 4.8% (n=2) had no finding 73.8% (n=31) patients had isolated visceral injury where as 9 (21.4%) were having more than one organ injury in a single patient and 11.9% (n=5) patients were on conservative management. The most commonly injured organ was small bowel 33.3% (n=14), followed by Spleen 19.0% (n=8) and colon 14.3% (n=6). Spleen was the commonest solid organ injured 19.0% (n=8). Regarding mechanism of trauma associated with Viscous injury, Small bowel, colon,

stomach and Diaphragm are often injured in penetrating trauma where as Spleen, Liver and bladder had higher risk of injury in blunt abdominal trauma (Table 3).

Table 3. Table showing type of viscous injury and mechanism of abdominal injury in Y12HMC, Addis Ababa, Ethiopia, 2023.

Variables	Mechanism of Abdominal injury		Total	Percentage
	Penetrating	Blunt		
Small Bowel	8	6	14	33.3
Colon	6	0	6	14.3
Spleen	2	6	8	19.0
Stomach	3	0	3	7.1
Bladder Rupture	0	2	2	4.8
RPH	2	1	3	7.1
None	0	2	2	4.8

Variables	Mechanism of Abdominal injury		Total	Percentage
	Penetrating	Blunt		
Liver	0	2	2	4.8
Diaphragmatic Rupture	2	0	2	4.8

Over all Post operative complication rate was 21.6% (n=8). The commonest complication was Surgical site infection 10.8% (n=4) following laparotomy for small bowel and colon injuries. The chance of post operative complication is higher in penetrating injuries 62.5% (n=5) compared to blunt trauma 37.5% (n=3). Irreversible shock observed in blunt trauma (n=2) where as enterocutaneous fistula occurred after penetrating trauma (n=1).

Table 4. Shows post operative complications in patients with abdominal injury in Y12HMC, Addis Ababa, Ethiopia, 2023.

Post op complications	Frequency (n)	Percentage (%)
SSI	4	10.8
Irreversible Shock	2	5.4
HAP	1	2.7
Enterocutaneous fistula	1	2.7
None	29	78.4

4. Discussion

Trauma is the leading cause of morbidity and mortality in younger populations and its estimated that one third of trauma patients had abdominal injury [2]. The Majority of patients in this study were within the age groups of 20 -29 and more common in males than females. This is due to males' involvement in high risk activities and young people are mobile and involved in recreational activities. In African culture, males are the bread-winners for the family and are mobile prone to trauma [2, 7, 11, 12]. Most of the study participants (57.1%) were unemployed and students which is comparable with other studies in Ethiopia, Tanzania, Nigeria and Uganda [2, 7, 11-13].

In this study, Penetrating trauma (54.8%) is the leading mechanism of abdominal injury which is consistent with other studies done in Ethiopia, Kenya, Nigeria, Mauritania [12, 14, 15]. In contrary to this, prospective study done in Tanzania and others showed Blunt injury was the commonest mechanism of abdominal injury [13]. This is related to the difference in political situation, prevalence of social conflict, countries level of growth. Stab, RTA and Gunshot are the

leading cause of abdominal injuries as shown in studies from Kenya, Nigeria, Ethiopia and Uganda [11, 12, 14, 15] which is similar with our study.

In this Study, RTA (68.4%) was the commonest cause of blunt abdominal trauma comparable to other studies [11, 12, 16]. RTA was common in urban areas and Gunshot injuries were prevalent in rural areas. This could be due to illegal owns of guns in rural areas. RTA prevalence in urban can be explained by the increased traffic jam, increased vehicles, crowded roads and substance abuse like alcohol and decreased awareness of traffic rules [17].

Most of our patients (76.2%) visited the hospital within the first 6 hours of the trauma like other studies done in Ethiopia, Kenya, Uganda showed the same result [11, 12, 14, 18]. Patients with penetrating injuries visited the hospital earlier than blunt injuries. This can be explained by visible bleeding is seen more in penetrating trauma which worries the patient to come earlier than blunt injuries. Our study showed 80.95% of patients had stable vital signs and 19.05% of patients had abnormal vital signs. Patients with deranged vital signs had higher chance of death which is consistent with studies done Kenya and Ethiopia [12, 14, 18].

In this study, 88.1% of patients had Exploratory laparotomy while others were on conservative management which is comparable with Ethiopian and Ugandan studies [14, 18]. Conservative management were effective in patients with normal vital signs, in blunt traumas, stab wounds compared to high velocity gunshot wounds.

The most commonly injured organs were small bowel (33.3%), Spleen (19.0%) and colon (14.3%). With regard to Mechanism of trauma, small bowel and spleen were commonly injured organs in penetrating and blunt abdominal injuries respectively similar to other studies done in Kenya, Nigeria and Ethiopia [12, 14, 15]. Various literatures stated different reasons for small bowel to be commonly injured organ, but most agreed on anatomic reasons. Small bowel occupies largest surface area and mobile which predisposes for risk of injury.

In contrast to studies done in Uganda and Kashmir [11, 16], this study revealed hollow viscous (small bowel) is commonly injured than solid organs. This is because of the higher incidence of penetrating injury over blunt trauma as a mechanism of abdominal injury. Negative laparotomy rate reported in a range of 7-16.1% in Ethiopia, Kenya and Tanzania [12-14] where as in our study it is 4.7%.

Studies showed mortality rate from abdominal trauma ranges from 7.9-16.5% and in Ethiopia is 8.5% [12, 14, 16]. Another study in Ethiopia revealed Mortality rate of 3.6% [18] which is comparable to this study 4.78%. Patients with deranged vital signs and blunt abdominal traumas had increased risk of death.

In the current study, over all Post operative complication rate was 21.6%. The commonest complication was Surgical site infection 10.8%, Irreversible shock and HAP in descending order which is similar with other studies in Kenya, Tanzania and Ethiopia [12, 14, 17]. The chance of post Irreversible

shock is higher in blunt injuries and Enterocutaneous fistula in penetrating trauma due to missed injuries during laparotomy.

5. Conclusion

Abdominal trauma mainly affects young males, often due to stabbings or road accidents. Penetrating injuries are common, with most patients seeking medical help within six hours. Exploratory laparotomy is frequently performed, and surgical site infections are a common complication. It's crucial to increase public awareness to prevent these accidents.

Abbreviations

AT	Abdominal Trauma
AA	Addis Ababa
BAT	Blunt Abdominal Trauma
DALYS	Disability Adjusted Life Years
PAT	Penetrating Abdominal Injury
WHO	World Health Organization
Y12HMC	Yekatit 12 Hospital Medical College

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Author Contributions

Yismaw Melese: Conceptualization, Data curation, Software, Formal Analysis, Supervision, Validation, Investigation, Writing - original draft, Methodology, Writing - review & editing

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Ethical Approval and Consent to Participants

Ethical clearance was obtained from the Institutional Review Board of Y12HMC. Permission and written consent

was taken from the college management. The information gained from the patients upon data collection was kept confidential by using codes for each card throughout the study. The procedures followed were by the ethical standards of the Helsinki Declaration.

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Data Availability Statement

All data supporting the case report is available with the crosspondance.

Conflicts of Interest

The authors declare no conflicts of interest.

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