

**Laparotomy for Abdominal Injury: Pattern, Indication & Outcome of
patients at Jimma University Hospital, Jimma, Ethiopia.**

By

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**Research report submitted to Jimma University, Institute of Health,
department of Surgery in partial fulfilment of the requirements of
specialty certificate in General surgery**

January, 2022

Jimma Ethiopia

Jimma University

Institute of Health
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SUMMARY

Background: Abdominal injury is among the major causes of trauma admissions. Affect productive age group.

Objective; the aim was to determine etiology, commonly injured organs, indication and outcome of patients with abdominal injuries requiring laparotomy.

Methods: A retrospective study of all adult patients who underwent laparotomy for abdominal injury at Jimma Medical Center was conducted from June 2019 to May 2021..

Results: Laparotomy for abdominal injury was performed for **117** patients. Of these, 87 (75 %) case records were retrieved. Penetrating trauma was the commonest injury, stab (n=35, 42.5%) and Road Traffic Accidents (RTA) (n=15, 17.2 %) being the leading causes in blunt trauma. Extra-abdominal injuries were seen in 57.5 % (n=50) of the cases. Hollow organs were commonly injured than solid organs. Small intestine (37, 49.3%) and Spleen (21, 28%) were the leading injured organs in penetrating and blunt respectively.

The main procedure performed was repair of solid and hollow organs laceration/perforation (34, 39.1 %). The negative laparotomy rate was 14.7% (n=13). Complications were seen in 23(26.4%) patients, the commonest being SSI (n=11, 47.8 %). The mortality rate was 10.5 % (n=9).

Conclusion: Stab and RTA were the commonest indications of laparotomy. The mortality was significantly associated with blunt abdominal injury and hypotension (SBP<90mmHg).

ACKNOWLEDGMENT

First of all, I would like to thank public health department student research program office and department of surgery for giving me the chance to participate in Research Program for postgraduate students. I would like to express my deepest appreciation and heart felt thanks to my adviser Dr.Gemechu for his great support in providing essential materials and relevant guidance from the beginning to the end of this research.

The data collector for their precious time and patience.

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LIST OF ABBREVIATION AND ACRONYMS

ATLS: Advanced trauma life support

BP: Blood pressure

COR: Crude odds ratio

ICU: Intensive care unit

LMIC: Low- and middle-income countries.

LOS: Length of hospital stay

RTA: Road traffic accident

BAT; blunt abdominal trauma

AOR; actual odd ratio

CI; confidence interval

SBP; Systolic blood pressure

DCS; damage control surgery

HAP; hospital acquired pneumonia

SSI; surgical site infection

VS; versus

RPH; Retroperitoneal hematoma

CHAPTER 1: INTRODUCTION

1.1 Background

Trauma is the second largest cause of illness accounting for 16% of global diseases burden, and it is the highest between the ages of 15 and 45 years. According to WHO, more than 90% of injuries occur in low and middle-income countries. Africa, mainly sub-Saharan region, contributes 21% of these(1). The rapid growth of motorized transport and expansion of industrial production without adequate safety precautions is partly blamed for the burden in these areas (2).

The scarce data in Ethiopia on burden of trauma shows increasing rate which accounts for half of surgical emergencies (3-6).

Abdomen is the third commonly injured organ, and 40 to 80% of deaths after trauma are due to exsanguination caused by injuries to the abdominal organs (7-9). There is no agreement mechanism of the injury as etiology to abdominal trauma. Most literatures indicate that blunt is the common (85%) mechanism. Road traffic accidents (RTAs) and stab injuries were the commonest causes of blunt and penetrating injury respectively (7-10). According to an Indian study the commonest (53%) causes of blunt is road traffic accident. Spleen was the commonest (53%) organ injured and the most common surgery performed was splenectomy (30%). This also supported by Turkish study RTA being the leading cause (87.5%) of a blunt abdominal injury followed by a fall from height (9.7%) and blows (2.8%) (12). However Nigeria study and 1, penetrating abdominal trauma A study from Kenyan suggested the majority (62.9%) of patients. Stab (28.1%) and road traffic accidents (30.3%) were the commonest causes. Spleen (29.8%) was the most common isolated injured organ while the small bowel and the colon (40.7%) were the most injured in combined trauma. Surgical site infection (42.9%) was the leading post-operative complication (13.)

In Ethiopia study done SPHMMC indicated that penetrating is common than blunt (62% vs 38%) (2).

Management of patients with abdominal injury can be operative (Laparotomy) or non-operative. Generally, laparotomy is required in about 25% of abdominal injuries (12).

Peritonitis,

hemodynamic instability, evisceration and impalement are most common indications for laparotomy. Non-operative management is a standard protocol for hemodynamically stable solid organ injuries with a failure rate of 2-3%. (8- 10, 15, 17, 18). Scarcity of resources like imaging modalities in developing countries is a major challenge for non-operative management (15).

Conducting this study to determine etiology, commonly injured organs, indication and outcome of patients with abdominal injuries requiring laparotomy will help to evaluate our experience and to analyze the magnitude of the problem.

It also helps to compare the pattern with other figures and to design appropriate management outline as well as preventive measures.

1.2. Statement of the problem

Trauma is the second largest cause of illness accounting for 16% of global diseases burden, and it is the highest between the ages of 15 and 45 years. According to WHO, more than 90% of injuries occur in low and middle-income countries. Africa, mainly sub-Saharan region contributes 21% of these (1). The rapid growth of motorized transport and expansion of industrial production without adequate safety precautions is partly blamed for the burden in these areas (2). The scarce data in Ethiopia on burden of trauma shows increasing rate which accounts for half of surgical emergencies (3-6). On the other hand, lack of sufficient data about its magnitude leads to underestimation of injury burden [13]. Thus, to design effective prevention strategies, there is need of findings about the

magnitude of injury and its associated factors.

The paper we found on abdominal injuries due to missile injuries in Ethiopia showed a mortality rate of 16.5%(17).The reports from different parts of Ethiopia showed blunt injuries as the main mechanisms, assaults and RTA being the leading causes(3,4,5). Scarcity of resources like imaging modalities in developing countries is a major challenge for non-operative management (15). Conducting this study to determine etiology, commonly injured organs, indication and outcome of patients with abdominal injuries requiring laparotomy will help to

1.3. Significance of the study

This study is the first study of its kind in western Ethiopia, it can assist the national government, major institutions, and other stakeholders to understand the pattern and surgical outcome of patients with abdominal injury who underwent surgery in Ethiopia and the challenges facing during management abdominal trauma patients so that, working together, they can plan and budget strategically for creation and expansion of advanced trauma center with trauma surgeons ,necessary emergency drugs , equipment ,and other supplies, and also allocate the necessary human resources to support the establishment, maintenance, and improvement abdominal trauma management throughout the country. Evaluate our experience and to analyze the magnitude of the problem.

CHAPTER 2: LITERATURE REVIEWS

Abdominal trauma is present in 7-10% of all trauma victims with 85% being blunt. According to WHO, more than 90% of injuries occur in low and middle-income countries. The scarce data in Ethiopia on burden of trauma shows increasing rate which accounts for half of surgical emergencies (3-6). Abdomen is the third commonly injured organ, and 40 to 80% of deaths after trauma are due to exsanguination caused by injuries to the abdominal organs (1).

In Ethiopia retrospective study on 776 emergency laparotomy was done at St. Paul's Hospital Millennium Medical College (SPHMMC) from January 2014 to December 2016. Trauma accounted for 15.3% (n=425) of emergency procedures. Laparotomy for abdominal injury contributed 34 % (n=145) of trauma procedures and it was the third (145, 6.5 %) leading cause of emergency laparotomy following appendicitis and large bowel obstruction. Of these, records of 129 patients were analyzed. The most commonly affected age group was 20-29 years (n=48, 37.2%), and the mean was 29 years. Penetrating abdominal injury was the leading indication for trauma laparotomy (n=80, 62%). Overall, the leading cause of abdominal injury was stab (35.7%). RTA was the major (n=27, 55.1%) cause of blunt abdominal injuries. Extra-abdominal injuries were seen in 33.3 % (n=43) of the patients. The commonest was chest injury (n=31, 72%) followed by Fracture (n=9, 20%) and head injury (n=3, 7 %)

Hollow organs were injured two times than solid organs. The leading injured organs were small intestine (n=48), followed by colon (n=38) and liver (n=32) irrespective of the mechanism of injury. Spleen (n=17, 22.7%) and small intestine (n=35, 26%) were the commonly injured organs in blunt and penetrating respectively. Irrespective of the type of injury, the leading injured single (isolated) organ was the small intestine 18.6% (n=24).

The majority of the patients (n= 70, 54.3%) underwent repair of laceration/perforation involving hollow and solid organs. The negative laparotomy (no intra-abdominal organ injury) rate was 4.7 % (n=6).

Overall complication occurred in 17.8% (n=23) of patients and the commonest was

irreversible shock (30.4%). The rate of complication was higher in blunt injuries (22.4%) than penetrating (15%). The rate of irreversible shock was higher in patients with blunt abdominal injuries (10.2% vs. 2.5%).

A descriptive prospective study was conducted in Tanzania on 396 patients. The median age was 28 years. More than three quarter of patients sustained blunt abdominal injuries. Road traffic accidents (RTAs) were the most common cause of injury accounting for 64.9% of cases. None of our patients received any pre-hospital care. The spleen was the most common injured organ in blunt abdominal trauma occurring in 176 (75.9%) patients, while in penetrating injury; gastrointestinal tract was the most common in 24(10.3%) patients.

One hundred twenty-four (31.3%) patients had associated extra-abdominal. injuries of which the head/ neck region (46.8%) was commonly affected. A total of 232 (58.6%) patients were treated surgically with a negative laparotomy rate of 7.8%. Complication and mortality rates were 20.7% and 17.9% respectively.

The retrospective study of 144 patients over period of 2years at Gazzi university medical center (Turkish) shows [98 (68%) males; 46 (32%) females; mean age 36; range 17 to 84 years] .

The commonest cause of the BAT was road traffic accidents in 126 (87.5%) patients, followed by fall from heights in 14 (9.7%) and abdominal blows in 4 (2.8%).The abdominal signs of 29 (20%) patients could not be evaluated. Twenty-one (15%) of the patients were admitted due to isolated BAT and an associated injury was seen in 123 (85%) of 144 patients. Head injury was the most common coincidental injury with BAT and was present in 76 (53%) patients. Other injuries were pelvis-extremity fracture in 59 (41%) patients and rib fracture and/or hemo-pneumothorax in 53 (36%) patients. A total of 22 out of 144 patients were exitus in the study and overall mortality rate was 15.2%. Nine of these patients died due to serious brain injury, 8 due to cardiac causes, 3 due to sepsis, 1 due to acute respiratory distress syndrome, and 1 due to pulmonary embolism. Three of the 21 operated patients due to BAT were exitus postoperatively and the postoperative mortality rate was determined to be 14.3%. Two of these three patients (1

with liver, jejunum and mesentery injury and 1 with liver, common bile duct, and spleen injury and retroperitoneal hematoma) died due to sepsis, and the third died due to associated serious brain injury.

In Nigeria a cross sectional study done in Gombe Federal Teaching Hospital, penetrating abdominal trauma was seen in the majority (62.9%) of patients. Stab (28.1%) and road traffic accidents (30.3%) were the commonest causes. Spleen (29.8%) was the most common isolated injured organ while the small bowel and the colon (40.7%) were the most injured in combined trauma. Surgical site infection (42.9%) was the leading post-operative complication (13).

A study from Kenyatta National Hospital revealed penetrating abdominal injury as the commonest (66.2%) mechanism.

CHAPTER 3: OBJECTIVES

3.1. General objective

To assess the pattern, indication and outcome of patients with abdominal trauma and underwent abdominal laparotomy at JUMC during June 2019 to May 2021

3.2. Specific objectives

1. To describe the commonly injured organs in abdominal injury patients and underwent surgery at JUMC, from, from June 2019 to may2021.
2. To determine the indication of laparotomy for abdominal injury patients who underwent surgery at JUMC from June2019 to May 2021.
3. To determine the clinical outcomes of laparotomy for abdominal injury patients at JUMC from June2019 to May 2021.

CHAPTER 3: METHODS

4.1. Study Area

The study was conducted at Jimma University Medical Center (JUMC), is one of the oldest public hospitals in the country. It was established in 1930 E.C by the Italian Government to serve and care for the Italian forces. Geographically, it is located in Jimma City, 352 km southwest of Addis Ababa. Currently, it is the only teaching and referral hospital in Southwestern Ethiopia, serving a catchment population of 15 million persons that come from three states of the country: mainly Oromia, some parts of South Nation Nationality Population (SNNP), and Gambella (or sometimes from South Sudan via refugee camps in Gambella).

4.2. Study design and period

Retrospective cross-sectional study reviewing the files of patients with abdominal injury and underwent surgery November 15- December 15, 2021.

4.3. Source of population

All adult patient who underwent abdominal surgery at Jimma Medical center during June 1, 2019 until May 1, 2021

4.4. Study population

All adult patient underwent laparotomy for abdominal trauma at Jimma medical center from June 1, 2019 until May 1, 2021.

4.5. Eligibility criteria

4.5.1. Inclusion criteria

All adult patient, age ≥ 15 years underwent laparotomy for abdominal trauma between study period.

4.5.2 Exclusion criteria

Patients who referred after operation from other facility, incomplete charts missing important information (operation note, death summary).

4.6. Sample size and Sampling techniques

All patients presented during period under the study were included in the study.

4.7. Variables

4.7.1. Dependent Variables

- Outcome of patients

4.7.2. Independent Variables

- Age
- Sex
- Address
- VS (SBP), Interval of time from trauma
- Hospital stay
- Type of trauma; penetrating, blunt
- Injured organs and parts of body
- Complication
- Type of procedures
- Perioperative transfusion.

4.8. Data collection tools and procedure

The operating room logbook was used to identify study subjects. Trained third and fourth years surgical residents collected the data from individual patient's medical records with a structured data collection format.

4.9. Data analysis

Data were checked for completeness, cleaned, entered and analyzed with SPSS version 26. Descriptive analysis was done to summarize the findings. Results were shown using charts, tables, graphs and texts.

4.10. Definitions of terms

Negative laparotomy; laparotomy without any intra-abdominal injury and patient deemed to be managed non-operatively.

Penetrating abdominal injury; violation of abdominal cavity by sharp insult or GSW
Isolated organ injury.

4.11. Ethical consideration

Prior to data collection a formal letter of permission was collected from JU, department of surgery and forwarded to JUMC administrative office to get permission for the study.. Patient's record was kept confidential

4.12. Dissemination of the results

After analyzing data, conclusion and recommendation were made and the result will be submitted to Jimma university department of surgery, college of public health and medical science.

CHAPTER 4: RESULTS

Totally around 951 emergency laparotomy were conducted during the study period, among this 117 done for abdominal trauma (n=117, 12.3 %)

Out this 87 were retrieved and analyzed.

4.1. Demographic characteristics

Males were commonly affected with a male-to female ratio of 5.1:1. The most commonly affected age group was 20-29 years (n=35, 40.2%), and the mean was 29 years. Most of the patients, 58.6 % (n=51) lived in rural areas.

Table 1: Socio-demographic data of patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

		Count	Column N %
Sex	MALE	73	83.9%
	FEMALE	14	16.1%
age(yrs.)	15-20	13	14.9%
	20-29	35	40.2%
	30-39	19	21.8%
	40-49	16	18.4%
	50-59	3	3.4%
	>=60	1	1.1%
Address	Urban	36	41.4%
	Rural	51	58.6%

4.2. Patterns of injury

Types and mechanism of injury

Penetrating injury is common than blunt (62.1 vs 37.9 %). (RTA was the major (n=15, 52.1%) of cause of blunt abdominal injuries.

Table 2: Types and mechanism of injury among patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

Type of injury	frequency	%
Causes of injury		
Stab	37	42.5%
Gunshot	16	18.4%
Horn	3	3.4%
RTA	15	17.2%
Fall	10	11.5%
Assaults	6	6.9%
Mechanism of injury		
Penetrating injury	54	62.1%
Blunt injury	33	37.9%

The average duration from injury to presentation was 16.7 hrs and nearly one third of the patients (n=28, 32.2 %) presented within 6 hours after injury.

The majority of presented with in 6 hrs is from urban, (n=26, 78%) (Table 3) and n= 15 (17.2%) had hypotension. The perioperative transfusion was in n=25(28.7) of patients and need for transfusion is higher in in blunt trauma patients than penetrating type (25.9% vs 33%).

Extra-abdominal injuries were seen in 57.5 % (n=50) of the patients. The commonest was chest injury (n=35, 40.2%) followed by Fracture (n=9, 10.3%) and head injury (n=6, 6.7%). They were more common in penetrating injury than blunt (62% vs 38%).

Table 3: Time of arrival, blood pressure and associated injuries at presentation among patients who

Table 3.underwent abdominal laparotomy at JUMC during June 2019 to May 2021

		Frequency	%
Interval of time till arrival in hrs	<6 hrs	28	32.2%
	6-12hrs	33	37.9%
	>12 hrs	26	29.9%
SBP in mmHg	>=90mmhg	72	82.8%
	<90mmhg	15	17.2%
Associated extra-abdominal injury	Head	6	6.9%
	Chest	35	40.2%
	Extremity	9	10.3%
	None	37	42.5%

Intra-abdominal injured organ

The 87 patients had a total of 118 intraabdominal injuries. Most patients (n=40, 54%) had single organ injury, and in 34 (46 %) of the patients, the injury involved more than one organ. The negative laparotomy (no intraabdominal organ injury) rate was 14.7 % (n=13). Hollow organs were injured three times than solid organs. The leading injured organs were small intestine (n=37), followed by colon (n=21) and spleen (n=21) irrespective of the mechanism of injury. Colon, (n=18, 23.6%) and small intestine (n=26, 34.2 %) were the commonly injured organs in penetrating injury. Spleen which is (n=14, 33.3%) and small bowel, n= 11, (26.1%) is commonly injured organs in blunt trauma. Over all, spleen=14, 33.3% and small bowel n=26, is commonly injured organ in bunt and penetrating respectively.

Irrespective of the type of injury, the leading injured single (isolated) organ was the small intestine 27.5 % (n=11).

Table 4: Types of intraabdominal organ injuries among patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

	Frequency	%
Intraabdominal organ injuries (n=117)		
Yes	74	85.1%
No	13	14.9%
Types of organ injuries (n=74)		
Small bowel injury	37	50.0%
Colon injury	21	28.4%
Splenic injury	21	28.4%
Liver injury	11	14.9%
Diaphragmatic injury	16	21.6%
Stomach injury	5	6.8%
Retroperitoneal hematoma	6	8.1%
Genitourinary tract injury	1	1.4%

Reason for laparotomy

Penetrating abdominal injury was the leading indication for trauma laparotomy (n=54, 62.1%). Overall, the leading cause of abdominal injury was stab (n=37, 42.5%).

The majority of the patients (n= 34, 39.1 %) underwent repair of laceration/perforation involving hollow and solid organs

Most of the splenic injuries were managed with splenectomy (n=12, 57.1 %), and the remaining were either repaired or spontaneous stoppage of bleeding. Resection of injured hollow viscus with primary anastomosis was done n=11, 12.6% and the combination of resection and end to end anastomosis with exteriorizations as either ileostomy or colostomy was done for 15, 17.2% and DCS for 2 patients.

Table 5; Procedure applied for patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

Procedure applied	Frequency	Percent
Repair	34	39.1
Resection and anastomosis	11	12.6
Splenectomy	12	13.8
DCS	2	2.3
None	13	14.9
resection ,stoma ,repair	15	17.2
Total	87	100

Outcomes of the patients

Overall complication occurred in 26.4% (n=23) of patients and the commonest was surgical site infection 11 (47.8 %) followed by irreversible shock 6, 26 %.

The average post-operative period was 6.7 days, and most (62.4%) of the cases stayed for one week.

Table 6: Types of post op complications among patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

Types of post-op complication	Frequency	Percent
SSI	11	47.8
Intra-abdominal collection	1	4.3
Irreversible shock	6	26
necrotizing fasciitis	3	13.
HAP	1	4.3.
Others	1	4.3
Total	87	100

Clinical outcomes

Overall mortality rate was 10.3 % (n=9) and most of them had blunt abdominal injury (12.1 % vs 9.5 %). Mortality was higher in patients who had Extra-abdominal injuries (13.2% vs. 5.7%).

Table 7: Clinical outcomes among patients who underwent abdominal laparotomy at JUMC during June 2019 to May 2021

Clinical outcomes	Frequency	Percent
Died	9	10.3
Improved	78	89.7
Total	87	100

Table 8.shows OUTCOME of patients' abdominal trauma and SBP.

mechanism	SBP \geq 90mmh		SBP \leq 90mmh		total
	discharged	died	discharged	Died	
penetrating	43	0	6	5	54
blunt	26	2	3	2	33
total	69	2	9	7	87

CHAPTER 6: DISCUSSION

The burden of trauma at JUTH showed the condition to be among the common indications for emergency surgical admissions and 12.3 % of operated patients as emergency base. The burden is similar to reports in Ethiopia which ranged from 11.5% -70% (4-6).

Studies from Nigeria and Kenya had a higher rate of trauma burden than ours (12, 13). This difference could be due to the hospital setting and risk factors for trauma. The abdomen was the third most frequently injured region, and studies showed that the burden ranges from 1%-14.2 % (12, 15, 16, 19). In agreement with other studies, abdominal injuries were more common in males and affect the younger age group. This might be due to male's engagement in high-risk activities and the young age groups being the mobile population more involved in recreational activities (4,11,13- 16,20,21).

Penetrating trauma was the leading mechanism of abdominal injury in our study which is in agreement with studies from Pakistan, Uganda, Nigeria and Kenya (13, 14, 16, and 23). In contrast to this, Nigerian, Tanzania, Turkish and Australian authors found that blunt injury is more common than penetrating (12, 15, 19, and 22). This might reflect a difference in the political situation, effectiveness of traffic law, prevalence of social conflict, country's level of growth; in our study, only patients who needed laparotomy were included (blunts tend to be managed conservatively than penetrating). Nigerian and Kenya studies reported that stab, gunshot and RTA were the three leading causes of abdominal injury which holds true for our cases (13, 14).

RTA remained the most common cause of blunt abdominal injury which agrees with African and Western authors' findings (11-16,19,21,22). Motorcycle accidents were common in places where motorcycles are used as a major means of transport (16,24).

Our study also identified the majority of penetrating injuries occurred in the rural than urban areas (59.3 % vs. 40.7%) gunshot being the commonest (75%). This can be explained by illegal owning of unlicensed firearms in the household by the farmers.

Among the blunt injury RTA and fall is commonest in rural(34.2% vs 29.9%).Whereas RTA and Assaults is common in Urban(12.5%).this due to the increase traffic jam, increase in the number of motor vehicles, use of mind-altering agents like alcohol decreased awareness of traffic law (15, 24).

Extra-abdominal injuries were quite common in our and other studies. (11, 13-16, 20, 25). The common areas were thorax, head and extremities (11, 14, 16, and 20).Mortality was found to be higher in those with extra-abdominal injury which agrees with other studies (11, 13-15). The reason could be due to overlooked abdominal injuries, delayed physical findings from altered mentation and increased bleeding resulting in early decompensation.

Our study indicated majority of patients presented after 6 hrs of trauma. This finding against the study at reported by Ugandan and Kenyan studies, most of patients presented within the first 6 hrs of injury (14, 16). This difference could be from less asses to health care and in effective referral system.

The study also identified that the mechanism of injury was significantly associated ($p>0.005$) with an early presentation, i.e. patients with penetrating injury present earlier than blunt injuries.

This can be explained by visible bleeding and evisceration seen more in penetrating injury which could urge the patients to seek care early unlike blunt injuries,

The organs involved also seen to be significantly associated ($P <0.05$) and odds of early presentation were two times in patients without small bowel injury than with small bowel injury. This may be explained as patients with small bowel injury may be minimally symptomatic until they develop peritoneal irritation. In our study, residence in rural areas were associated with delayed presentation. This could be due to lack of infrastructures and delayed referral from primary health facilities

In contrast to our study, the Kenyan study found that there was no difference between the type of injury and the time taken prior to presentation (14). Literatures from Tanzania and

Saudi Arabia agreed that early presentation reduces mortality & morbidity due to early intervention (15, 26).

Overall, the leading injured organs were small bowel, colon and spleen. If an isolated injury is considered, small bowel and spleen were the commonly involved organs. With regard to the mechanism, again, the commonly injured organs were small bowel and spleen in penetrating and blunt injury respectively.

Different literatures had a variety of findings but most agreed that small bowel commonly is injured in penetrating trauma due to its anatomy (freely mobile and occupies a large area) (11,13,21).

They are also consistent with this study concerning the commonest injured organ in blunt mechanism i.e. Spleen (11, 16, 15,12,13,14, 23). This finding is similar to our study spleen commonly injured in blunt. Overall, in this study, colonic injury was the second commonly injured viscus which is in line with Australian and USA studies, 31% and 30.2% respectively (22,27). Injuries to other solid organs such as kidney and pancreases were rare as seen in our study and other studies (20)

The majority of patients underwent a single procedure, and the commonly applied procedure was repair of laceration/perforation of hollow or solid organ which is in agreement with other reports (12, 13, 15, and 21). More than half of splenic injuries were managed with splenectomy, and rate tended to be higher in patients with blunt injury. Studies reported the rate of splenectomy to be 30.4%-98 % (11, 13,15). This difference may be due to a high prevalence of blunt injuries, unlike this study. Currently, splenic injury management is shifting toward non-operative treatments due to improvement in patient selection and setup (28).

. Literatures reported that negative laparotomy rate ranged from 7%-16.1 % (14, 15,20 and 25). It also similar to our study. But study at SPHMMC lower 7% (1,2)The difference could be due to improvement in patient selection and availability of staff and facilities .

. In our study, hollow organs are injured more than solid organs which is in contrast to studies in Ugandan, Nigeria and Kashmir (13, 16, 23). This could be explained by the higher prevalence of penetrating injury than blunt.

The overall complication rate was similar with results of studies conducted in Tanzania and Kenya (14, 15). Irreversible shock and surgical site infection were reported as common complications elsewhere (11, 13, 15, and 23). The rate of surgical site infection ranged from 13% to 42.9% (11, 13, 15).

. Our study also identified mortality rate from abdominal injury is 10.2% as supported by Literatures reported mortality rate from abdominal injury ranged from 7.9%-16.5% which is consistent with our study (8.5%) (13, 17, 14, 23, 30).

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

Conclusion

In conclusion, Stab and RTA were the commonest reason for laparotomy in penetrating and blunt trauma respectively. Productive age group is commonly affected. Majority of our patients presented after 6 hrs of trauma and from rural and majority are male.

With regard to intra-abdominal injury small bowel is common organ to be injured in penetrating trauma and followed by colon and spleen whereas spleen leading injured organ in blunt followed by small bowel.

The extra abdominal injury is common and chest is commonest and post- operative complication rate is similar as many literatures.

Mortality rate is 10.3 %.

Recommendations

.This study may not indicate the whole magnitude of problem in the country as the study was done in a single tertiary level hospital. Further multicentric studies need to be conducted for more conclusions. Additionally, it would be better if the mode of arrival was included so as to improve the emergency response system infrastructure such as transportations,

The study provided local data that can indicate the magnitude of the problem and can be input for planning preventive strategies and developing treatment guidelines.

7. QUESTIONNAIRES

A. Socio demographic data

- ✓ ID NO _____
- ✓ Age(yrs.) _____ Sex _____
- ✓ Address ; rural-----
Urban-----
- ✓ Date of admission _____
Date of discharge-----
- ✓

B. Interval of time to arrive hospital since injury?

- 1 . Within 6 hrs.
2. 6 hrs. to 12hrs?
3. If > than 12 hrs. ? -----in hrs. or days

C. Mechanism of injury

- a. Blunt ?1 YES -----
2 NO-----
- .If YES, which type? 1-RTA -----
2. FALL -----
3. ASSAULT -----

- b. Is it Penetrating? 1. Yes---
2. No....

If answer is yes, which type?

1. Stab -----
2. Gun shoot.....
3. Horn injury-----

D. Clinical evaluation

- 1.what is blood pressure at arrival?
 - A) SBP < 90 mmHg-----
 - B).SBP >= 90mmHg-----

E. Is there extra abdominal injury?

1. Yes ---
2. NO-----

IF answer is yes to above question which part is injured? a) Head----

b) Chest-----

C) Extremity fracture

F. Is there perioperative blood transfusion? A) Yes---

B) No---

G. Is there any intraabdominal organs injury?

1. Yes---
2. NO---

IF the answer to above yes which organ/organs injured?

1. ISOLATED ORGAN INJURY?

2. COMBINED

INJURY?

A. Small bowel injury

b.. Coon?

C. Spleen

D. Diaphragm

E. liver

F. Stomach

G. Genitourinary

F. RPH

H. gall bladder

I. mesentery

H. Was any intra operative finding?

1. Yes ----

2. NO injury identified- ----

-

IF answer is yes what was procedure underwent?

1. Repair

2. Resection and anastomosis

3. Splenectomy

4, None

5. Ileostomy?

6. Combined procedure

I. Is there postoperative complication?

1. Yes---

2. No--

IF yes which complication?

1. SSI---

2. Irreversible shock---

3. HAP---

4. Intra-abdominal collection---

5. Combined.

J. Outcome

A. IMPROVED? _____

Dead _____

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