

Assessment of the Forensic Autopsies due to Blunt Injury Abdomen among the Patients Admitted to the Hospital - A Retrospective Study

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ABSTRACT

Introduction: Blunt injury in the abdomen is seen more commonly because of rapid industrialization and increased number of vehicles ultimately leading to more number of accidents. It can occur as a result of fall from height, assault with blunt objects, sports injuries, and bomb blasts. In majority of the cases, blunt injury was the cause of death. In criminal violence, blunt injuries lead to death and more of forensic importance. The aim of the present study was to make a pattern of blunt abdominal injuries, which were fatal and resulted in death.

Material and methods: A total of 160 cases of deaths from blunt abdominal trauma from 1st July 2011 to 30th June 2013 were included in the study. Demographic details about age, gender, occupation brief facts of the cases collected from the inquest report were entered. Patterns of death and types of injuries were studied and the data was collected through a pre-designed format.

Results: The most common age group affected with blunt abdominal injuries was 20-40 years followed by above 40 years and below 20 years. The main cause of injury was found to be due to road accidents. The most common organ involved in blunt injury of abdomen was liver followed by intestine and spleen. The mechanism of death was found to be due to hemorrhage.

Conclusion: Injury to abdomen is considered to be the most common reason for morbidity and mortality among the general population.

Keywords: Blunt Injury Abdomen, Death, Inquest, Spleen

INTRODUCTION

Trauma or injury has been defined as damage to the body caused by an exchange with environmental energy that is beyond the body's resilience.¹ It is the most common cause of death for all individuals between the ages of 1 and 44 years. Globally, injury is the seventh leading cause of death, with 5.8 million deaths attributable to trauma. According to the World Health Organisation by the year 2020, trauma will become the first or second leading cause of death over all ages.²

Abdominal trauma has been traditionally classified as either blunt or penetrating. Penetrating abdominal trauma can usually be diagnosed easily and reliably, whereas blunt abdominal trauma is often missed because clinical signs are less obvious. Blunt abdominal injuries predominate in rural areas, while penetrating ones are more frequent in urban settings. Penetrating abdominal trauma is often subdivided into stab wounds and gunshot wounds, which require different methods of treatment.^{3,4}

It is a major contributor to global mortality and morbidity with a notable difference between Low Income Countries (LIC) and High to Moderate Income Countries (HMIC). The modality of trauma differs globally however the most notable cause is pedestrian vs. vehicle and road traffic collision respectively. It is imperative that patients who have sustained a traumatic injury are managed in an appropriate and timely manner.⁵

Abdominal injury is a significant cause of morbidity and mortality; expedient diagnosis and treatment of intra-abdominal injuries are essential to prevent morbidity and death. In this era of modern technology, the rate of road accidents has increased rapidly due to high speed engines in automobiles. The reason of these injuries is due to the evolution of mass production of automobiles which leads to the creation of explosive compounds capable of producing sufficient compression forces resulting into the highest impact on human body leading to severe bleeding from the major organs.⁶

The other causes include assaults, industrial accidents and falls from height. Mortality rates are quite higher among patients with blunt abdominal trauma than in those with penetrating wounds, because of the lack of early diagnostic facilities and optimal management. Consequently, it becomes dangerous because it is difficult to assess pathologies in poly-trauma victims.⁷

From the previous literature, a study done by Naghavi et al stated that trauma leads to more deaths than HIV/AIDS, tuberculosis and malaria combined, even when intentional self-harm is not considered. An estimated 1.5 million people died in traffic collisions and road related accidents during 2013 and when Years Life Lost (YLL) was calculated according to 15% increase since 1990, and death by trauma has moved up the ranking scale from 9th to 5th place globally. The most common causes of death in Road Traffic Accidents

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(RTAs) were attributed to accidents that takes place among pedestrians which are struck by a vehicle (n=36%), motor vehicle road injuries (n=33%) and motorcycle accidents (n=17%).⁸

In contrast to penetrating injury, the decision to perform laparotomy for blunt abdominal trauma is more complex and difficult, because of structural injury being less obvious and associated other injuries may necessitate more urgent action. When laparotomy is performed, the surgeon should keep a careful record of the injuries, which he observes, for many of these are due to criminal violence and such cases are important from forensic point of view. It may be difficult to interpret the anatomic abnormalities to understand the mechanism of death, and may require a lengthy explanation.⁹ Hence, the aim of the present study was to analyse the deaths due to blunt injury abdomen, brought to the mortuary which was both dead on arrival and dead after hospitalisation and also to identify the commonest complications leading to death in abdominal trauma with the mechanism involved.

MATERIAL AND METHODS

The present study was a retrospective which was conducted from 1st July 2011 to 30th June 2013 among patients admitted in an Osmania General, Hospital. Total 160 patients were admitted with the blunt abdominal trauma in two years. Clinical history like time of admission, and deaths and other relevant data was collected from the hospital case sheets and death summaries. Detailed description was also taken for pattern, nature of injuries, complications, cause of death and mechanism of death from a detailed follow-up and study of the autopsy cases and reports.

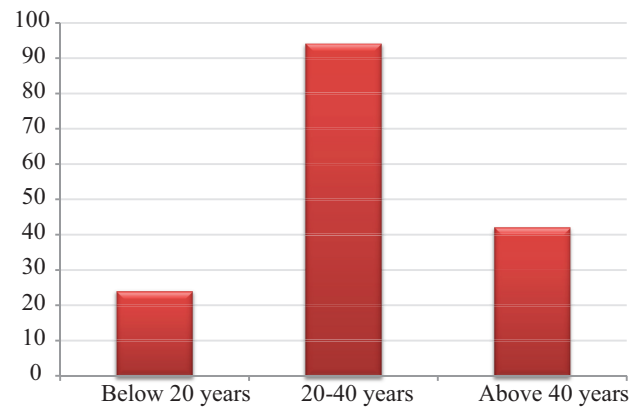
The deaths analyzed in this study were those whose cause directly involved AT. Also, cases with trauma in other body regions were included such as the head, limbs and thorax, as long as associated with AT in the mechanism of death. Cases presented with technical problems in the completion of the reports, the duplicates, and the cases with types of trauma could not be precisely defined, and those in which the death was due to trauma occurring exclusively in other body regions other than the abdomen were completely excluded from the study.

STATISTICAL ANALYSIS

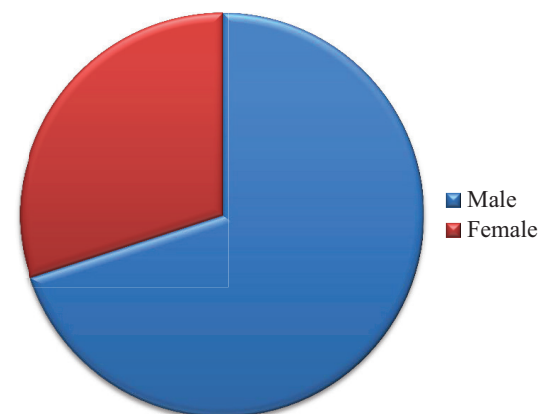
The data was entered in the Microsoft excel sheet and the statistical analysis was done by using SPSS software version 21. Descriptive statistics was performed using frequency and percentages which was presented in the form of tables and graphs.

RESULTS

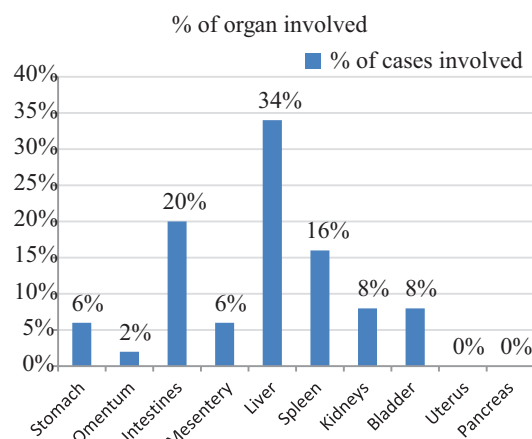
In the present study, the most common age group affected with blunt abdominal injuries was in the age group of 20-40 years and there were only 24 cases below 20 years followed by 42 cases above 40 years (Graph-1). Graph no. 2 depicts distribution of gender; it was found that out of 160 cases, 72.5% were males and 27.5% were females. Graph no. 3 depicts the percentage of organ involved in blunt injury



Graph-1: Shows the distribution of age group among the study subjects



Graph-2: Shows the distribution of gender among the study subjects



Graph-3: Shows the common organ involved in blunt injury of abdomen

abdomen. It was found that liver (34%) was most common organ followed by intestine (20%) and spleen (16%). Table no. 1 shows the associated injuries of abdomen and was found that head injury (35%) was most commonly involved with chest (32.5%) followed by pelvis (10.6%) and spine injuries (10%). Also, there were cases that died due to the involvement of multiple injuries (11.8%).

Table no.2 shows the mechanism due to which the patient's death takes place. Around 66.5% death occurs due to haemorrhage followed by infection (27.5%) and neurogenic

Associated injuries	No. of cases	Percentage
Head injury	56	35%
Chest injury	52	32.5%
Pelvis	17	10.6%
Spine injury	16	10%
Multiple injuries	19	11.8%
Total	160	100%

Table-1: Shows the injuries of abdomen associated with head injury and chest injury

S. No.	Type of mechanism	Male	Female	Total	Percentage
1.	Shock Neurogenic (or) Visceral	08	02	10	6.25%
2.	Hemorrhage	78	28	106	66.25%
3.	Infection	26	18	44	27.5%
4.	Total	112	48	160	100%

Table-2: Shows the mechanism of death among the study subjects

Period of survival	Male	Female	Total	Percentage
0 – 1 hour	56	18	74	46.25%
1 – 6 hours	24	14	38	23.75%
6 – 12 hours	14	8	22	13.75%
12 – 24 hours	8	3	11	6.85%
1 – 2 days	6	4	10	6.25%
2 – 7 days	2	1	3	1.8%
1 – 2 weeks	1	0	1	1.6%
More than 1 month	1	0	1	0.6%
Total	112	48	160	100%

Table-3: Shows the period of survival among the study subjects

shock (6.25%). Table no. 3 shows the period of survival among the cases and it was found that maximum number (46.25%) of cases died within the time period of 0-1 hour followed by 1-6 hour. Least number of cases died after 1-2 (1.6%) weeks and 2-7 days (1.8%).

DISCUSSION

Due to rapid development of cities and development and construction of new factories, the incidence of cases of blunt abdominal trauma has increased. Injuries in blunt abdominal trauma have a wide variety of spectrum. It can range from no any organ injury to multi-organ injury. In some cases, there may be associated head or chest or any other injuries, in such circumstances it is difficult to perform abdominal examination. So, each poly-trauma patient has to be thoroughly investigated in addition to clinical examination. In the present study, 70% cases were males and 30% were females and this increased incidence of trauma in male is attributed to their work outside house, frequent travelling, more social activities and influence of alcohol sometimes. This finding is in concordance with studies conducted by Kamawat JL, Panchal HA and Aziz A. In the present study, blunt abdominal trauma due to road traffic accidents were seen in 68% (most common), assault in 17%, fall down in 12%, hit by animals in 2% and by blunt object in 1%.^{10,11,12} The major concern for surgeon is control of haemorrhage in blunt trauma but how it can be best done with safety and less morbidity, depends on grade, severity and site of injury. In a study done by Bordoni PHC et al revealed that the most

damaged organs in cases of penetrating AT necropsied was liver, followed by the intestines both in gunshot and stabbing victims. Although there are regional variations, the reverse is epidemiologically observed, with intestines more damaged than the liver in this type of trauma.¹³

Also, 4478 patients operated on due to penetrating AT indicated that the intestines (duodenum, jejunum, ileum and colon) were the most commonly affected abdominal organs, followed by the liver, stomach and kidneys. The same finding was observed in a study done by Florianópolis et al. Liver lesions by penetrating AT show higher mortality rates than intestinal lesions, reaching 22% in gunshot wound cases and 8% in stabbing ones, which explains their high prevalence in IML-BH penetrating necropsies.¹³

Although the liver was the most commonly injured abdominal organ in penetrating AT in the present study, there were predominantly more lesions in the intestines, stomach and large abdominal vessels of individuals who were victims of penetrating trauma compared with victims of blunt trauma.

It is noteworthy that isolated hepatic lesions due to gunshots are not common, these being usually associated with other lesions, particularly the right lung, diaphragm, right kidney and small intestine. Early deaths take place due to severe blood loss from the head, respiratory system, and abdominal organs but these deaths are largely treatable and therefore possibly preventable. Furthermore, the late death occurs due to infection and multi organ failure. Decreasing these numbers of injury-related deaths during each period depends

upon the expedient and optimal medical care.

In order to minimize mortality in cases of abdominal trauma, risk factors for mortality need to be systematically identified and studied. In recent years, studies have identified a number of such risk factors, including sex, the length of the interval between abdominal injury and surgery, shock at the time of admission, and cranial injury. Injuries in blunt abdominal trauma have a wide variety of spectrum. It can range from no any organ injury to multi-organ injury. In some cases, there may be associated head or chest or any other injuries, in such circumstances it is difficult to perform abdominal examination. So, each poly-trauma patient has to be thoroughly investigated in addition to clinical examination.^{14,15}

CONCLUSION

Majority of the victims were males. The age group of 20-30 years accounts for total deaths due to blunt trauma of abdomen. The most frequently noted cause of blunt injury abdomen was road traffic accidents followed by falls. The incidence of death was high within 1-6 hours after sustaining trauma. The liver was commonly injured organ followed by intestine and spleen. The mechanism involved was found to be haemorrhage due to which most of the death occurs.

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