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RESEARCH ARTICLE

A COMPARATIVE STUDY OF BLUNT AND PENETRATING ABDOMINAL TRAUMA AMONG PATIENTS ADMITTED IN RIMS, RANCHI

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ABSTRACT

Aims & Objectives: To compare the outcome of penetrating trauma versus blunt abdominal trauma patients coming to emergency ward in RIMS, Ranchi.
Methods: A total 50 cases of abdominal trauma were studied out of which 32 were of blunt trauma and 18 were of penetrating abdominal trauma. All underwent exploratory laparotomy and outcome of the cases were studied.
Results: Penetrating injuries mostly led to early rush for hospital, early exploratory laparotomy and hence better prognosis. Patients who died in both groups had reached to the emergency department with much delay and had comorbid injuries much more than the surviving cases. 75% cases of blunt trauma had comorbid injuries leading to increased mortality whereas patients with no comorbid injuries had better prognosis. The strongest risk factor for mortality in all abdominal injury cases was delay in treatment followed by severity of injury. Presence of comorbid injuries, Revised Trauma Score (RTS) and haemoglobin level were other risk factors.
Conclusion: Improved motor vehicle safety, rapid emergency transport, and rapid intervention will definitely help to reduce the mortality and morbidity associated with this public health problem of abdominal trauma mostly caused by Road Traffic Accidents.

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INTRODUCTION

Trauma is a leading cause of hospitalization, long-term disabilities and mortality worldwide. (Naumann *et al*., 2010) It is still the most frequent cause of death in the first four decades of life, and remains a major public health problem in every country, regardless of the level of socioeconomic development. (Aldemir *et al*., 2004) Abdomen is one of the most common and important regions in respect to trauma. Early diagnosis and treatment of abdominal injuries affects the prognosis of patients significantly. In respect to the mechanism of injury, Motor Vehicle Crash (MVC) is a common cause of admission to the emergency department, accounts for 50-75% of abdominal injury cases. (Naumann *et al*., 2010; Burgut *et al*., 2010; Mamtani *et al*., 2012) Abdominal trauma is traditionally classified as either blunt or penetrating. Traumatic abdominal injury (TAI), whether blunt or penetrating trauma is the third common type of injury (10%) after head (30%) and chest (20%). (Bonatti and Calland, 2008) Penetrating abdominal trauma can usually be diagnosed easily and reliably, whereas blunt abdominal trauma is often missed because clinical signs are less obvious. (Aldemir *et al*., 2004)

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Penetrating abdominal trauma is often subdivided into stab wounds and gunshot wounds, which require different methods of treatment. (Jansen *et al*., 2008) Blunt abdominal trauma is a common surgical emergency which can cause injury to solid and hollow viscera. (Sivit, 2008) It challenges the diagnostic skill and efficiency of emergency surgeons since negative laparotomy as well as missed visceral injuries are associated with significant morbidity and mortality. (Pathan, 2005) 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. (Aldemir *et al*., 2004) The Revised Trauma Score is a physiological scoring system, with high inter-rater reliability and demonstrated accurracy in predictng death. It is scored from the first set of data obtained on the patient, and consists of Glasgow Coma Scale (GCS), Systolic Blood Pressure (SBP) and Respiratory Rate (RR).

RTS = 0.9368 GCS + 0.7326 SBP + 0.2908 RR

Values for the RTS are in the range 0 to 7.8408. The RTS is heavily weighted towards the Glasgow Coma Scale to

compensate for major head injury without multisystem injury or major physiological changes.

MATERIALS AND METHODS

This hospital based study was conducted on patients with abdominal trauma coming to the emergency department of RIMS, Ranchi over a period of six months from January 2016 to June 2016. Patients underwent emergency laparotomy for their abdominal injuries. The information such as name, registration number, age, sex, mode and time of injury, presence of comorbid injuries, haemoglobin levels, Revised Trauma Score and later clinical outcome were noted.

Inclusion Criteria

All cases of abdominal trauma with or without association with other injuries undergoing emergency laparotomy.

Exclusion Criteria

Trauma patients managed conservatively.

RESULTS

Table -1 shows that out of 50 cases, 32 were of blunt trauma and 18 were of penetrating abdominal trauma. Male patients were higher among both the groups. Mode of injury in blunt trauma was mainly due to Road Traffic Accidents [RTA] (59.4%) and fall from height (40.6%) whereas it was stab injury and gun shot among penetrating trauma. Patients having comorbid injuries had injury to extremities and chest injury in both the groups whereas patients of blunt trauma also had injury to head and neck regions and genitals.

Table 1. Details of Trauma patients

	Blunt trauma n=32	Penetrating Trauma n=18
Males	29 (90.6%)	17 (94.4%)
Females	3 (9.4%)	1 (5.6%)
Mode of injury	RTA (59.4%) Fall from height (40.6%)	Stab injury (61.1%) Gun shot cases (27.8%) Fall from height (11.1%)
Comorbid injuries	Injury of extremities (54.2%) Chest injuries (33.3%) Head and neck injury (8.33%) Injury to genitals (4.17%)	Injury of the chest (54.54%) Injury of extremities (45.45%)

Table 2. Comparison between all patients of abdominal trauma

	Blunt trauma n=32	Penetrating Trauma n=18	P value
Mean age	36.6+/-9.28 yrs	27.22+/-6.08 yrs	0.0003*
Mortality	9 (28.13%)	1 (5.55%)	0.0731
Comorbid injuries	24 (75%)	7 (38.89%)	0.0165*
Mean arrival time in ED	14.25+/-12.7 hrs	4.11+/-1.37 hrs	0.0016*
Mean Hb level (mg/dl)	9.55+/-1.526	11.42+/-1.332	<0.0001*
Mean RTS	6.7383+/-1.02	7.156+/-0.63	0.1227

Above Table shows that mean age among blunt trauma patients was more than the penetrating trauma group having a significant p value of 0.0003. Mortality was also more in the blunt trauma group though p value was not significant. Mean arrival time i.e. time between actual injury and patient presenting into the emergency department was also more in blunt trauma patients with a significant p value of 0.0016. Mean haemoglobin levels were also compared which was significantly higher in penetrating trauma group (p value <0.0001). Revised Trauma Score (RTS) was also calculated among all patients which was also better in the penetrating trauma group though p value was not significant.

DISCUSSION

Patients with abdominal trauma were mostly young. Mean age in blunt trauma group was 36.6+/-9.28 years whereas it was 27.22+/-6.08 years in patients with penetrating trauma. Similar findings were also reported by earlier studies. (Musau *et al*., 2006; Gad *et al*., 2012) Ayman El-Menyar *et al* in 2014 found mean age of 30.6 ± 13 years among patients of abdominal trauma. (El-Menyar Ayman *et al*., 2014) Most of the patients were male in this study. Among all the blunt trauma cases, 90.6% patients were male and 94.4% were male among penetrating trauma cases, similar to earlier studies having 93% of male patients. (El-Menyar Ayman *et al*., 2014) Most cases were of blunt trauma (64%) with the commonest mode of injury being Road Traffic Accidents (RTA) similar to earlier studies. (Gad *et al*., 2012; El-Menyar Ayman *et al*., 2014) Others have found that the main causes of blunt abdominal trauma were road accidents, interpersonal violence, and falls. (Smith *et al*., 2005) Comorbid injuries were present in 75% of blunt trauma cases which were Injury of extremities (54.2%), Chest injuries (33.3%), Head and neck injury (8.33%) and Injury to genitals (4.17%) whereas 38.89% of penetrating trauma cases had associated injuries being injury of the chest (54.54%) and of extremities (45.45%) *P=0.0165*. Mohammad A Gad found that abdominal trauma was associated with additional comorbid injuries in 66.1% of cases, and more so for blunt cases (76.7%) than for penetration cases 42.1%, $P<0.05$. The most common associated injuries in blunt cases were injury of extremities (51.2%), chest injuries (34.1%), and head and neck injury (14.6%) (Gad *et al*., 2012) similar to this study. The RTS was significantly lower among fatal cases of abdominal trauma in both groups (5.416+/-0.89 vs 7.256+/-0.43 in blunt trauma group (p<0.0001) and 5.148+/-0.0 vs 7.27+/-0.3938 in penetrating trauma group).Patients who died in both groups had reached to the emergency department with much delay. Mean hemoglobin was significantly lower among fatal abdominal trauma cases (7.378+/-0.8997 mg/dl vs 10.4+/-0.5494 mg/dl in blunt trauma group (p<0.0001) and 7.2+/-0.0 mg/dl vs 11.67+/-0.84 mg/dl in penetrating trauma group) similar to other studies. (Gad *et al*., 2012; El-Menyar Ayman *et al*., 2014)

Conclusion

The strongest risk factor for mortality in all abdominal injury cases was delay in treatment followed by severity of injury. Presence of comorbid injuries, RTS and haemoglobin level were other risk factors. Improved motor vehicle safety, rapid emergency transport, and rapid intervention should help to reduce the mortality and morbidity associated with this public health problem.

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Conflict of interest – None

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