Research Article

Traumatic abdominal injuries: our experience at rural tertiary care center

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ABSTRACT

Background: The mechanism of injury of abdominal trauma varies in different parts of the world and within same country. Aim of this study was to determine the aetiology of abdominal trauma, evaluate the factors affecting morbidity and mortality in our region.

Methods: This prospective descriptive study was conducted in department of surgery at a tertiary care teaching hospital at Solapur from June 2013 to June 2015. All the patients, regardless of age & gender, admitted with diagnosis of abdominal trauma were included in the study. Depending upon the type of injury, either conservative or operative treatment was carried out. Postoperatively patients were followed up for detection of complications and treatment.

Results: Total 50 patients of abdominal trauma were studied. Blunt trauma was more common than penetrating trauma. Mean age was 29.3 years with male to female ratio 2.6:1. 21 to 30 years was the commonest age group involved. Spleen was the most commonly injured solid organ while small bowel was the most commonly injured hollow viscous. RTA and stab injury were the commonest cause for blunt & penetrating abdominal trauma respectively. Wound infection was the commonest postoperative complication. Mortality was more in blunt trauma

Conclusions: RTA (Road traffic accident) and stab injury were the commonest cause for blunt & penetrating abdominal trauma respectively. Spleen was the most commonly injured solid organ while small bowel was the most commonly injured hollow viscous in our study. Delayed presentation, associated co-morbidities, increases the morbidity and mortality in these patients.

Keywords: Abdominal trauma, Blunt, Penetrating, Etiology, Injury pattern

INTRODUCTION

Abdominal trauma is increasing day by day due to increase in the number of vehicles, on the road which are responsible for increase in the road side accidents. It is leading cause of death, hospitalization, and long-term disabilities in the first four decades of life. In developing country like India abdominal trauma is on the rise due to increased urbanization, industrialization, civil violence and criminal activities. Abdominal trauma is traditionally classified as either blunt or penetrating.¹

As compared to penetrating abdominal trauma diagnosis of blunt trauma is a real challenge even for experienced surgeon as clinical findings are usually not reliable. Fractures of lumbar vertebrae, lower ribs, decreased level of consciousness may not manifest during the initial assessment and treatment period. Mechanism of injury which causes abdominal trauma often causes other associated injuries which may divert the surgeon's attention (distracting injuries) from potentially life-threatening intra-abdominal pathology.

Regional as well as worldwide variations in the etiological spectrum of abdominal trauma are well

documented in the literature.² Present study was undertaken to determine the etiology of abdominal trauma in our region, clinical presentation of patients, different organs injured when person sustains abdominal trauma, postoperative complications, mortality, factors affecting final surgical outcome in these patients.

METHODS

After obtaining the institutional ethics committee approval, present prospective descriptive study was carried out in the department of surgery at a tertiary care teaching hospital at Solapur (Maharashtra). Ours is a rural tertiary care centre surrounded by many villages. Present study was carried out for a period of 2 years (July 2013 to July 2015) on 50 patients.

Inclusion criteria

All patients of blunt as well as penetrating abdominal trauma, irrespective of age and sex, requiring admission and treatment were included in the study included.

Exclusion criteria

Patients with abdominal trauma treated in outpatient department (OPD), pregnant patients with abdominal trauma and those not willing to participate in the study were excluded.

On admission detailed history and thorough clinical examination was performed as per proforma. History regarding exact site of trauma, nature of trauma, the direction and force with which the object assaulted the patient, age, sex, education, occupation, residence, socioeconomic status, injury-arrival interval, associated diseases were documented after direct interview with patient. When patient was not in a condition to give history, it was obtained from the relatives or from accompanying persons. On admission, if patients were found in shock then adequate resuscitation was carried out and once they became haemodynamically stable then shifted for necessary radiological investigations (Radiograph of chest and abdomen, abdominal ultrasound and CT scan etc.).

Laboratory investigations like complete blood count, blood sugar, serum creatinine, serum electrolytes, HIV and Hepatitis B status and urine analysis were carried out. Depending on the type of injury, patients were treated either conservatively or surgically. Conservative treatment included, close monitoring of vital parameters of patient in surgical intensive care unit, administration of adequate IV fluids, blood transfusion when needed. Failure to respond to conservative treatment and deterioration in spite of adequate resuscitation, presence of air under diaphragm on erect abdominal radiograph, sings of continuing intra-abdominal hemorrhage were the indications for laparotomy in our patients. Rest of the patients were treated conservatively. Surgical exploration

was carried out after taking due informed written consent of the patient and relatives. Operative details like organ injured, operative procedure performed were recorded. Whenever required specimen was sent for histopathological examination. Opinions of other specialties were taken for the treatment of associated extra-abdominal injuries. Postoperatively all the patients were followed up for first 3 months for detection of early as well as late complications. The data collected were entered into MS-Excel sheets and analysis was carried out using statistical package for social sciences (SPSS-version 16). On the basis of analysis and observation, results were drawn and discussed and compared with other relevant literatures.

RESULTS

During the study period, consecutive 50 patients of abdominal trauma admitted and treated either conservatively or surgically were included.

Table 1: Age incidence.

Age group (years)	No. of cases	Percentage
Upto 10	2	4%
11-20	4	8%
21-30	27	54%
31-40	9	18%
41-50	5	10%
51-60	2	4%
61-70	1	2%

The most vulnerable age group in this study was 21 to 30 years (54%) followed by 31 to 40 years (18%).

Table 2: Sex incidence.

Sex	No. of cases	Percentage
Males	36	72%
Females	14	14%

Out of 50 cases studied, 36 were male and 14 were females. Thus males outnumbered the females in our study.

Table 3: Clinical presentation of patient.

Signs and symptoms	No. of cases	Percentage
Abdominal pain	47	94%
Vomiting	30	60%
Distension	25	50%
Haematuria	7	14%
Retention of urine	6	12%

Abdominal pain and vomiting were the predominant symptoms of presentation in our study.

Table 4: Mechanism of injury.

Blunt trauma	No. of cases (%)	Penetrating trauma	No. of cases (%)
Road traffic accident	17 (34%)	Stab injury	8 (16%)
Fall from height	11 (22%)	Bull horn injury	4 (8%)
Assault	6 (12%)	Gunshot injury	2 (4%)
Object fallen from height	2 (4%)		

Road traffic accident (34%) and Stab injury (16%) were the commonest causes of blunt and penetrating trauma respectively.

Table 5: Time of presentation to hospital after injury.

Time of presentation (hours)	No. of cases	Percentage
1 to 8 hours	14	28%
9 to 16 hours	5	10%
17 to 24 hours	4	8%
25 to 32 hours	7	14%
33 to 40 hours	10	20%
41 to 48 hours	6	12%
>48 hours	4	8%

In our study, overall 23 patients (46%) presented within 24 hours after trauma while 27 patients (56%) presented after 24 hours following trauma.

Table 6: Abdominal organs injured.

Hollow viscous injured	Total cases (%)	Solid organs injured	Total cases (%)	Soft tissue injured	Total cases (%)
Stomach	2 (4%)	Spleen	14 (28%)	Mesentery	6 (12%)
Duodenum	1(2%)	Liver	9 (18%)	Mesocolon	2 (4%)
Small bowel	14 (28%)	Kidney	5 (10%)	Diaphragm	1 (2%)
Large bowel	4 (8%)	Pancreas	3 (6%)	Omentum	1 (2%)
Rectum	1 (2%)				
Urinary bladder	3 (6%)				

Table 7: Mode of treatment.

Mode of treatment	No. of cases	Percentage
Non operative	12	24%
Operative	38	76%

Table 8: Various operative procedures performed.

Operative procedures	No. of cases	Percentage
Splenectomy	11	22%
Perforation closure	9	18%
Suturing of liver laceration (Hepatorraphy)	3	6%
Splenorrhaphy	2	4%
Repair of urinary bladder rupture	2	4%
Drainage procedure for pancreatic injury	1	2%
Repair of diaphragmatic tear	1	2%
Rectal injury repair with diverting loop colostomy	1	2%
Resection of small bowel with primary anastomosis	1	2%

Small bowel (28%) was the most commonly injured hollow viscous, while spleen (28%) was the most

commonly injured solid organ in our study. The commonest soft tissue injured was mesentery (12%).

Majority of patients (76%) required surgical intervention.

Splenectomy (22%) followed by closure of perforation (18%) were the commonest surgical procedures performed in our study. Some patients required more than one surgical procedure due to multiple intra-abdominal organ injuries.

Table 9: Extra abdominal injuries.

Extra abdominal injuries	No. of cases	Percentage
Head injury	6	12%
Chest injury (Haemothorax, rib fractures, pneumothorax, etc)	17	34%
Extremity injury (Long bone fractures)	11	22%
Pelvis fracture	2	4%
Spine injury	1	2%

Chest injury (34%) was the commonest extra abdominal injury noted in our study.

Table 10: Postoperative complications.

Postoperative complications	No. of cases	Percentage
Wound infection (surgical site infection)	11	22%
Wound dehiscence / Burst abdomen	3	6%
Paralytic ileus	5	10%
Disseminated intravascular coagulopathy	3	6%
Septicaemia	4	8%
Pneumonia	2	4%

Wound infection (22%) was the commonest postoperative complication observed.

Table 11: Abdominal trauma and mortality.

Abdominal trauma	No. of patients	No. of deaths	Percentage
Blunt	36	5	13.88%
Penetrating	14	1	7.14%

Mortality was high in blunt trauma than penetrating trauma in our study.

Figure 1: Evisceration of small bowel following abdominal bull horn injury. (Note the mud on serosal surface)

Figure 2: Mesenteric tear.

Figure 3: Ruptured spleen.

Figure 4: Evisceration and perforation of small bowel following abdominal stab injury.

Figure 5: Traumatic small bowel perforation (Note the pouting mucosa)

Figure 6: Evisceration of small bowel following perianal bull horn injury.

Figure 7A: Multiple small bowel perforations following bullet injury to abdomen.

Figure 7B: Bullet being removed.

Figure 8: Evisceration of stomach & omentum following stab injury.

DISCUSSION

Trauma continues to be a major public health problem worldwide. It can affect all age groups and is associated with high morbidity and mortality in every country. Most affected age group in this study was 21 to 30 years (54% cases) followed by 31 to 40 years (18%). Similar observations are also reported in the various studies.³⁻⁶ This is economically productive age-group and trauma in these patients leads to economic loss to both family and the nation. In the studies conducted by Mukhopadhyay M et al⁷ most commonly affected age group was 31 to 40

years. While in the studies by Haque MA et al⁸ the commonest age group affected was 11 to 20 years. The mean age of the patient in this study was 29.3 years which is comparable with various other studies.⁶⁻¹²

Male to female ratio in the present study was 2.6:1. This observation (male predominance) was in accordance with other reported studies.¹³⁻¹⁵ Male predominance seen in this study may be because mostly males are the earning members of the family and are most exposed to outdoor activities while the females are mostly engaged in household activities. Also males are more commonly involved in acts of violence.

Ratio of penetrating to blunt trauma was 2.5:1. These findings are in accordance with Musau P et al study⁶ and Gad MA et al study.¹³ These findings are in contrast with the study conducted by Manohar K et al¹⁵ where ratio of penetrating to blunt trauma reported was 1.63:1. Abdominal pain (94%), vomiting (60%) and distension (50%) were the predominant symptoms of presentation in our study. These findings are almost consistent with the other studies.^{3,9,14,16}

Majority of patients (54%) in our study presented late i.e. 24 hours after injury. This may be because in our study out of 50 patients 28 (56%) were from rural area. 38 patients (76%) were from low socioeconomic status. Poverty, illiteracy, and poor transportation facilities might be the contributing factors for this. Socioeconomic status of the patient in this study was determined by modified BG Prasad socioeconomic classification. The advantage of this classification is that it is applicable to both rural and urban area. It utilizes per capita monthly income of individual.¹⁷ Late presentation of patient to the hospital was also reported by the authors from other developing countries.^{18,19}

Road traffic accident (RTA), involving both vehicular and pedestrian's accidents accounted for majority of the cases (34%) in blunt trauma. Stab injury (18%) was the commonest etiology for penetrating trauma. Similar findings were also reported in the various other national studies^{3,4,7,9,14,18-20} and international studies.^{6,11-13} Bull horn injury to the abdomen was also seen in our region as it is surrounded by many villages. Among the extra-abdominal injuries, chest injury (34%) was the commonest injury in our patients with abdominal trauma. This finding is in accordance with the study conducted by Mehta N et al.¹³

Conservative treatment was carried out in 12 patients (24%) having solid organ injury with haemodynamic stability. Renal injury was the commonest injury treated conservatively, followed by liver and splenic injury. 38 patients (76%) required surgical intervention and splenectomy was the commonest procedure performed in our study followed by closure of perforation. Similar findings were observed in the study conducted by Mehta N et al.¹³

Spleen was the commonest solid organ injured in blunt abdominal trauma. Similar findings are also reported by various national and international studies.^{3,9,14,15,21} Small bowel was the commonest hollow viscous injured in penetrating abdominal trauma in our study. These findings are in accordance with various national and international studies.^{12,15}

Wound infection was the commonest post-operative complication noted in our study. Similar observation was also reported by other studies.^{11,15,16,21} The overall mortality rate in our study was 12%. This figure is comparable with the studies reported by Kumawat JL et al¹⁹ and Musau P et al study.⁶

CONCLUSION

Blunt trauma is more common than penetrating trauma. RTA and stab injury were the leading causes of blunt and penetrating abdominal trauma respectively in our region. Strict adherence to the traffic rules, improving the road conditions, pedestrian lights, pedestrian overpasses etc may reduce the chance of RTA and therefore abdominal trauma. Delayed presentation, involvement of more than one intra-abdominal organ, presence of extra-abdominal injuries and associated co-morbid diseases increases the morbidity and mortality in these patients. Prehospital treatment, better transportation facilities like well-equipped ambulance services, early diagnosis, aggressive resuscitation and timely surgical intervention may improve the outcome in trauma patients.

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