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An analysis of injury patterns of abdominal trauma in patients attending surgical emergency department of rural hospital, Karnataka, India

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ABSTRACT

Background: Globally, abdominal trauma is a major public health problem irrespective of socioeconomic levels. Severe blood loss and infection are the serious complication of any abdominal trauma. A detailed assessment for early identification and prompt management is required to reduce the mortality and morbidity in any abdominal trauma. Hence this study was designed to assess the incidence and patterns of abdominal injuries in trauma patients.

Methods: It was assorted and identified the incidence and sub type of abdominal injuries and associated trauma, and identified variables related to morbidity and mortality.

Results: A total of 150 abdominal trauma cases were analyzed; 103 patients with blunt abdominal trauma and 47 with penetrating. The most frequent type of abdominal trauma was blunt trauma; its most common cause was motor vehicle accident. Most abdominal trauma patients presented with other injuries, especially patients with blunt abdominal trauma. Mortality was higher among penetrating abdominal trauma patients.

Conclusions: Type of abdominal trauma, associated injuries, and Revised Trauma Score are independent risk factors for mortality in abdominal trauma patients.

Keywords: Abdominal injuries, Mortality, Patterns, Trauma

INTRODUCTION

Adolescents and adults commonly die of trauma. The abdomen is one of the most common injured regions and surgery is required in about one in four cases.¹

Abdominal trauma is conventionally categorized as either blunt type or penetrating type. Penetrating abdominal trauma can be diagnosed with no difficulty, while blunt abdominal trauma is frequently missed because clinical signs are less apparent.² Blunt abdominal injuries are

more common in rural areas, while penetrating ones are more frequently encountered in urban situations¹. Penetrating abdominal trauma is often subdivided into stab wounds and gunshot wounds, which require different methods of treatment.²

The principal causes of blunt trauma abdomen are road traffic accidents followed by fall from height or fall of object over body and assault. In order to reduce mortality in cases of abdominal trauma, risk factors for mortality need to be consistently identified and analyzed. In recent

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years, studies have identified a number of such risk factors, including gender, the period between abdominal injury and surgery, shock at the time of admission, and cranial injury.³

Objectives

- To document the incidence of abdominal trauma among patients presenting consecutively to the surgical emergency department
- To determine the type of abdominal trauma and associated risk factors for mortality

METHODS

This was a descriptive (prospective and retrospective) study of all trauma patients over the age of 18 years admitted to the emergency department of tertiary care hospital attached to medical college. The study was conducted between September 2016 and January 2017. A total of 289 cases visited the emergency department of which 150 cases having abdominal trauma were sequentially recorded.

Exclusion criteria

Referred cases from other health care centers and brought dead patients.

Data collection

The following clinical and demographic data were collected for each patient.

Socio-demographic data: Age, gender and arrival time.

Clinical data⁴

- Early assessment of airway; breathing; circulation; dysfunction of the central nervous system; and exposure.
- Regional examination of head and neck; chest; abdomen; extremities; and back.
- Preliminary determination of abdominal trauma type was made by thorough physical examination.
- Patient condition was next categorized as either stable or unstable. Finally, a plan was developed for supplementary assessment and management.

Stability and hemodynamic status was assessed with the revised trauma score (RTS), one of the most widely used physiological rating systems: The RTS, the Glasgow coma scale (GCS), systolic blood pressure, and respiratory rate (RR). The degree of dysfunction in each parameter was scored from 0-4 and the RTS is determined by adding each of the coded values together; therefore, RTS scores range from 0 to 12.5

Trauma data: The following were recorded in detail:

- Pattern of abdominal damage
- Interval of injury
- Mechanism of trauma and associated injuries.

Emergency department outcome:

Each patient's outcome was coded as one of the following:

- Surgical intervention
- Admitted for observation
- Admitted to the Intensive Care Unit
- Recuperated while under observation
- Died

Statistical analysis

All data were entered and coded using Microsoft Excel and analyzed with Statistical Package for Social Sciences (SPSS) version 10.0 Chi-square and proportions, were used to compare categorical variables; In all cases, we relied on a P value of <0.05.

RESULTS

Abdominal trauma was present in 150 cases; 103 patients presented with blunt abdominal trauma (68.66%) and 47 (31.33%) patients with penetrating abdominal trauma (Table 1). The majority of abdominal trauma cases were male (74%). Motor vehicle accidents were the prompt cause of 59.3% of the abdominal traumas; falls and/or violence accounted together for all of the remaining cases.

Table 1: Association of type of injury with the outcome.

| | Outcome | | Total |
|-------------|---------|------|-------|
| | Alive | Dead | |
| Blunt | 92 | 11 | 103 |
| Penetrating | 26 | 21 | 47 |
| | 118 | 32 | 150 |
| P < 0.001 | | | |

In general, abdominal trauma was related with additional co-morbid injuries in 56.1% of cases, and more so for blunt cases (76.7%) than for penetration cases 43.9%, P<0.05. The most common associated injuries in blunt cases were injury of abdomen (61.2%), chest injuries (21.1%), and head and neck injury (17.7%). Majority of patients were below 40 years (75.1%).

Clinical features

Table 2 and 3 shows a much higher mortality among penetration cases (14%) than among blunt cases (7.3%), which was consistent with the lower RTS scores for penetration cases.

Delay to treatment

The interval between injury and care in the casualty may also be a significant risk factor for fatalities. For example, 70% of blunt cases who experienced a delay of 60 to 90 minutes died, whereas nearly as many blunt cases who waited less than one hour survived (80.3%). Similarly, 68.8% of fatal penetration cases waited 60 to 90 minutes for emergency care, whereas 81% of surviving penetration cases waited less than 60 minutes (P≤0.001).

DISCUSSION

In the present study, significantly more males than females presented with abdominal trauma (74% vs 26%), which is consistent with Atawupe's report of a male to female ratio of 3.4:1 among abdominal trauma patients.⁴ Young males, most of all those aged 20 to 30 years, have been reported to be the most frequent victims.³

Table 2: Association of type of injury with hemodynamic parameters.

| | | Trauma type | | Total | P value |
|-------------------------|---------------|-------------|----------|-------|-------------|
| | | Blunt | Penetrat | ing | |
| Pulse | Less than 100 | 97 | 32 | 129 | 0.0006514 |
| | More than 100 | 6 | 15 | 21 | |
| Systolic blood pressure | Less than 80 | 20 | 20 | 40 | 0.001479 |
| | More than 80 | 83 | 27 | 110 | |
| Respiratory rate | Less than 20 | 90 | 24 | 114 | 0.000000681 |
| | More than 20 | 13 | 23 | 36 | |
| Glasgow coma scale | 13 to 15 | 19 | 3 | 22 | 0.0008829 |
| | 9 to 12 | 48 | 21 | 69 | |
| | 6 to 8 | 25 | 6 | 31 | |
| | 4 to 5 | 6 | 11 | 17 | |
| | 3 | 5 | 6 | 11 | |
| Breathing | assisted | 14 | 23 | 37 | 0.000001597 |
| | self | 89 | 24 | 113 | |
| External bleeding | Not present | 35 | 19 | 54 | 0.01869 |
| | Mild | 34 | 10 | 44 | |
| | Moderate | 29 | 9 | 38 | |
| | Severe | 5 | 9 | 14 | |

Table 3: Association of outcome with hemodynamic parameters.

| | | Outcome | | Total | P value |
|-------------------------|---------------|---------|------|-------|-------------|
| | | Alive | Dead | | |
| Pulse | Less than 100 | 114 | 15 | 129 | < 0.0000001 |
| | More than 100 | 4 | 17 | 21 | |
| Systolic blood pressure | Less than 80 | 21 | 19 | 40 | 0.000001194 |
| | More than 80 | 97 | 13 | 110 | |
| Respiratory rate | Less than 20 | 114 | 0 | 114 | |
| | More than 20 | 4 | 32 | 36 | |
| Glasgow coma scale | 13 to 15 | 22 | 0 | 22 | |
| | 9 to 12 | 66 | 3 | 69 | |
| | 6 to 8 | 30 | 1 | 31 | |
| | 4 to 5 | 0 | 17 | 17 | |
| | 3 | 0 | 11 | 11 | |
| Breathing | assisted | 5 | 32 | 37 | |
| | self | 113 | 0 | 113 | |
| External bleeding | Not present | 43 | 11 | 54 | 0.00002080 |
| | Mild | 37 | 7 | 44 | |
| | Moderate | 34 | 4 | 38 | |
| | Severe | 4 | 10 | 14 | |

68.66% of the cases were blunt abdominal trauma. In accordance with our results, previous studies found that most abdominal injuries were caused by blunt trauma.² Blunt injuries have been reported to prevail in rural areas, but in our study no such demographic arrangement was noticed.⁶

Vehicle accidents are a common cause of blunt abdominal trauma¹. In our study, they were the most common cause followed by interpersonal violence. Others have found that the main causes of blunt abdominal trauma were road accidents, interpersonal violence, and falls.⁷ Blunt trauma in the present study was strongly related with other co-morbid injuries whereas penetration trauma was less strongly associated with such injuries.

The overall mortality rate among abdominal trauma patients in our series was 21.33%, which is relatively high. Mortality was significantly higher with penetrating trauma patients than with blunt trauma (14% versus 7.33% respectively, P value <0.001). Other authors have reported much lower mortality rates of 9.2% and 8.2% in penetrating and non-penetrating injuries, respectively.⁸

We explored risk factors for fatalities in this sample of penetrating and blunt abdominal injuries. The biggest risk factor for all abdominal cases was deferral before treatment. In all cases, the type of abdominal trauma, RTS, and co-morbid injuries predicted higher mortality. An increased age was an extra risk factor among those with blunt injuries. Penetrating trauma had a much higher rate of fatality in general, and the type and site of penetration injury mattered a great deal.

CONCLUSION

A number of independent risk factors for fatality were identified in this sequential sample of 150 abdominal trauma cases presenting to our hospital. These included type of abdominal trauma (whether blunt or penetrating), presence of co-morbid injuries, presence of chronic disease, RTS, delay before treatment. Better motor vehicle protection; speedy emergency conveyance; and quick intervention would help to reduce the mortality and morbidity associated with this public health problem.

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Ethical approval: The study was approved by the

institutional ethics committee

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