

## Blunt abdominal trauma and organ damage and its prognosis

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### Abstract

**Introduction:** Trauma is the first cause of death in the young population and imposes large costs on the health system. Due to high rates of trauma and its associated mortality in developing countries, it seems to be necessary to study epidemiological and demographic characteristics of the damage caused by blunt abdominal trauma and common organs involved and the prognosis.

**Methods:** All patients with blunt trauma of the abdomen who referred to Imam Reza Hospital, Tabriz, Iran, from March 2012 up to March 2014 were enrolled, the data were collected by a questionnaire for each patient separately; then all data was analyzed by SPSS.

**Results:** From March 2012 to March 2014, 332 patients with blunt abdominal trauma came to the emergency department, mean age was  $34.15 \pm 1.6$  years and 63.9% of them were men. In 290 cases (83.3%) there was not any damage to any organ. The most common injured organs were spleen and liver, equally 10 cases (3.0%). Kidney (2.4%) bladder (1.8%) and intestine (1.2%) were also involved. In this study, the most common cause of blunt abdominal trauma was a car crash.

**Conclusion:** According to this study, men consisted 63.9% cases of blunt abdominal trauma and the mean age of patients was  $34.15 \pm 1.6$  years. The most common cause of blunt abdominal trauma was car crash. In this study, 87.3% cases did not have any intra-abdominal organ damage. Among patients with intra-abdominal organ damage, spleen and liver were most commonly involved with equal incidence. About 79.5% of all patients with blunt abdominal trauma were discharged without complication and morbidity.

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### Introduction

After cardiovascular and cancer, trauma is the third cause of death in all ages and is the first cause of death in the population 5 to 25 years and impose billions of dollars annually in healthcare systems.<sup>1-7</sup>

The prevalence of blunt abdominal trauma has increased significantly compared with the past.<sup>3,8</sup> In developing countries such as Iran, because of the increased number of vehicles and industrial development, trauma,

especially abdominal trauma, is increased.<sup>3</sup> Trauma frequently affects young people.<sup>9</sup> Most patients with blunt abdominal trauma are in the third decade of their life.<sup>7</sup> Blunt abdominal trauma is more common in men than women.<sup>1,4,7</sup>

The most common mechanism of blunt abdominal trauma is a car crash. Falling from height, direct hit to the abdomen, fight, football, and crushing are other causes of blunt abdominal trauma.<sup>1-4,7,10-12</sup>

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The signs of blunt abdominal trauma include hypotension, tachycardia, abdominal tenderness, and rigidity and the symptom include abdominal pain and bruising. In blunt trauma, emergency physicians take history, do the physical examination and request routine laboratory tests and also X-ray.<sup>8,13</sup> Ultrasound is an early diagnostic method to detect free fluid in the abdomen and pelvic cavity.<sup>6,14-16</sup> Emergency physicians may request CT, DPL, and laparotomy if needed.<sup>11,17</sup>

Surgery or nonsurgical management depends on the patient's condition, the damage pattern and the availability of surgeons. The most important point in choosing non-surgical procedure is the stability of patient's condition.<sup>18</sup> The most important step in trauma patients is ABC [airway, breathing, circulation according to Advanced Trauma Life Support (ATLS) guideline or Primary Trauma Care (PTC) guideline]; most of the trauma patients respond to initial fluid treatment and will not need surgery, and all emergency physicians must have continuous education about trauma guidelines.<sup>19-21</sup>

Due to high rates of trauma and morbidity and mortality caused by it in our country, the aim of this study was to evaluate the epidemiologic and demographic damage of the organs involved in blunt abdominal trauma and the prognosis.

## Methods

This survey was a cross-sectional descriptive study, between March 2012 to March 2014 (24 months). Information extracted from records of patients with blunt abdominal trauma referred to Imam Reza Hospital, Tabriz, Iran, and data such as age, sex, location of trauma, trauma mechanism, outcome (death, recovery, complications) were collected in a questionnaire.

Patients with blunt abdominal trauma referred to the emergency department of Imam Reza Hospital were identified by the emergency specialist. Patients with blunt abdominal trauma with different causes such as car crash, motorcycle accidents, pedestrian accidents, falling, fighting, and

sport blunt abdominal trauma were detected and managed by the Emergency Medicine resident or specialist. Information about them was recorded and the questionnaires were completed.

Inclusion and exclusion criteria: All patients with blunt abdominal trauma referred to Imam Reza Hospital from March 2012 to March 2014. Patients who had incomplete records and patients who died before complete diagnosis were excluded.

Variables of the research: Age, sex, mechanism of injury, damaged organ, management (surgical or non-surgical) and outcome.

## Data collection tools: Questionnaire

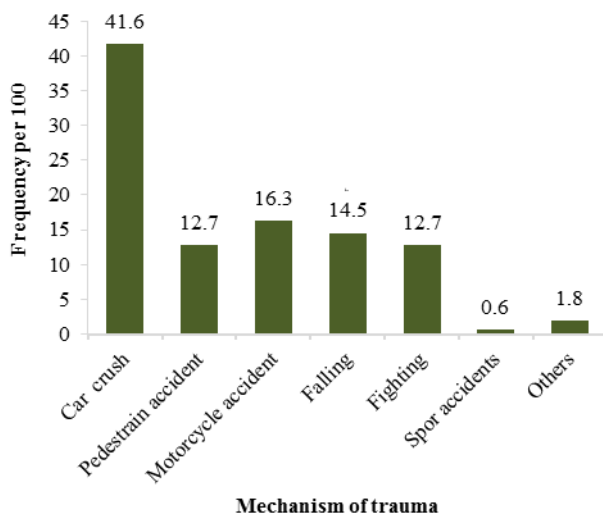
Data was analyzed using SPSS (version 15, SPSS Inc., Chicago, IL, USA). Descriptive statistical methods were used for statistical analysis. To present quantitative data, mean  $\pm$  standard deviation (SD) was used, and frequency and percentage were used to demonstrate qualitative data.

## Results

Age: Among the 332 patients, 16 patients (4.8%) were under 10 years, and 58 patients (17.5%) were between 10-19.9 years. Most of the patients belonged to the age group of 20-30 years old (80 persons, 24.1%), and 30-40 years (76 persons, 22.9%). Forty-six patients (13.9%), aged 40 to 50 years and 22 patients (6.6%) had 50-60 years of age, 14 patients (4.2%) were between 60-70 and 16 patients (4.8%) were 70-80. Patients older than 80 years with blunt abdominal trauma had the lowest percentage (4 people of 332 people equivalent to 1.2%). The mean age of patients in the study was  $34.15 \pm 1.6$  years.

Sex: Among the 332 patients, 212 patients (63.9%) were male and 120 patients (36.1%) were female.

Mechanism of injury: In this study, car crash was the most frequent mechanism of blunt abdominal trauma was with 41.6% (138 out of 332 patients). Sport was the least frequent mechanism of blunt abdominal trauma (2 patients, 0.6%) (Figure 1).



**Figure 1.** Frequency of mechanism of trauma

**Organ involved:** Among 332 patients, in 290 cases (87.3%) there was no damage to the intra-abdominal organs diagnosed by clinical examination and methods such as Focused Abdominal Sonography in Trauma (FAST), computed tomography (CT), diagnostic peritoneal lavage (DPL) performed by emergency and surgery specialists.

Among the 42 remaining patients, the most damaged organs were spleen and liver (equally in 10 patients, 3.0% of all cases). Kidney involvement was in 8 patients (2.4%) and bladder involvement was in 6 patients (1.8%). Intestinal involvement had occurred in 4 cases (1.2%) and the other organs involvement were seen in the 2.1% of patients.

**Surgical or nonsurgical management:** Among the 332 patients of blunt abdominal trauma, 32 cases (9.6%) were managed surgically and 300 patients (90.4%) were managed with nonsurgical procedures.

**Prognosis:** Among the 332 patients, 264 patients (79.5%) were completely cured. In 62 patients (18.7%), blunt abdominal trauma resulted in morbidity and splenectomy. Six patients (1.8%) had liver rupture or rupture of large vessels such as splenic arteries and died with hemorrhagic shock.

## Discussion

The prevalence of blunt abdominal trauma has increased significantly compared with

the past.<sup>3,8</sup> In developing countries such as Iran, because of the increased number of vehicles and industrial development, trauma especially abdominal trauma, has become increasingly important.<sup>3</sup>

The present study was an attempt to assess the epidemiologic and demographic characteristics of blunt abdominal trauma and its outcome in patients referred to Imam Reza Hospital as a trauma center of northwest of Iran.

In the present study, among the 332 patients with blunt abdominal trauma, 212 patients (63.9%) were male. In similar studies, blunt abdominal trauma was reported to be more common in men.<sup>1,4,7,9</sup> This is probably due to the outdoor activity of men.

In our study, the age range was from less than one year to 88 years. The most frequent age range was 20-40 years, mean age was  $34.15 \pm 1.6$  years. In similar studies, the majority of patients with blunt abdominal trauma were in the third decade of their lives.<sup>14</sup> The blunt abdominal trauma occurred more often in younger ages, probably due to being more active in this range of age. Therefore, we can prevent many cases of blunt abdominal trauma by educating and changing culture in this age group.<sup>5</sup>

Financial losses caused by blunt abdominal trauma is not exclusively related to hospital costs, financial losses caused by disability, unemployment, cost of reduction in productivity, damage to vehicles, together with the loss of life and hospital admissions imposes huge costs on society.<sup>5</sup>

The most common mechanism of blunt abdominal trauma evaluated in most studies and the present study were a car crash.<sup>2,3,7,9,19,22-24</sup>

In this study from 332 patients with blunt abdominal trauma, 290 cases (83.7%) had not any damage to any organ. Spleen and liver were equally the most injured organs.

Early management of patients is an important factor in determining prognosis. Closed monitoring and repeating the clinical examination and reassessment are mainstays

decision making for surgical intervention or nonsurgical treatment.<sup>19</sup>

In the present study from 332 patients with blunt abdominal trauma 300 cases (90.4%) were treated with nonsurgical procedures and 32 patients (9.6%) were treated surgically. The increasing use of nonsurgical methods may be due to higher access to imaging methods in the emergency department.<sup>19</sup>

In the present study from 332 patients, 6 patients (1.8%) died, 264 patients (79.5%) were cured completely and 62 patients (18.7%) suffered morbidity.

### Conclusion

According to this study blunt abdominal trauma occurred mostly in men. The average age of patients was  $34.15 \pm 1.6$  years. The most common mechanism of blunt abdominal trauma was car crash. In this study, 87.3 cases had not any intra-abdominal organ damage. Spleen and liver were the most common injured organs and were involved equally. Of all patients with blunt abdominal trauma, 79.5% healed without

complication and morbidity.

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### Authors' Contribution

Babak Abri designed the study. Pouya Paknejad and Sarvin Alizadeh collected the data. Samad Shams-Vahdati performed the analysis and critically revised the article. Pegah Sepehri-Majd drafted the first copy of article.

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### Conflict of Interest

Authors have no conflict of interest.

### Ethic Approval

This study was approved by Tabriz Branch, Islamic Azad University.

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