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Original Research Article

Analysis of Intra-abdominal Injury Pattern and Frequency in Patients with Blunt Abdominal Trauma: An Observational Study

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Abstract

Background: Trauma is the leading cause of death among people aged 1 to 45, causing greater loss of everyday activities than other well-known illnesses including cardiovascular disease and cancerous tumors. Finding the pattern and frequency of intra-abdominal injuries in patients with blunt abdominal trauma was the aim of this investigation.

Methods: For six months, from July 2025 to December 2025, this observational study was carried out in the Department of Surgery at Government Medical College and Hospital in Bettiah, West Champaran, Bihar. The study comprised 50 cases of blunt abdominal injuries in total. These patients, who were admitted to Emergency Department of GMCH were more than 12 years and of both sexes.

Results: Nine (18%) of the 50 patients involved in the study were female, and 41 (82%), were male. 13 (26%) of the patients had splenic lesions, while 15 (30%) of the patients had liver impairment. The intestinal injury in eleven patients (22%) ranged from the anal canal to the stomach area. Two patients were observed to have damage in the duodenum and stomach, four patients in the large intestine, and five patients in the small intestine. Two (4%) of the patients involved pancreatic damage. Two (4%) patients had a perforated diaphragm, while three (6%) patients had a mesenteric tear. Five (10%) patients had a retroperitoneal hematoma. Three patients (6%) had renal damage, and injury to the bladder was observed in 2 patients.

Conclusion: It is shown that the most frequently injured organs are those located inside the abdomen. The solid organs suffered more damage from the blunt abdominal trauma. The liver was the most frequently affected organ in our investigation of blunt abdominal trauma, followed by the intestine, spleen, and retroperitoneal hematoma.

Keywords: Intra-Abdominal Injuries, Abdominal Trauma.

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Introduction

Traffic flow accidents are on the rise in this fast-paced world. The prevalence of blunt abdominal trauma has increased as a result of modern industrial development and the growth of the car sector, which has led to an increase in the production of explosive chemicals capable of producing enormous compressive forces that impact humans. The WHO predicts that trauma will be the first and second main cause of "loss of productive years" in 2025 for both underdeveloped and developed nations.[1,2] Trauma from RTA is typically the top cause of death for people aged 1 to 45, impacting daily activities more than other well-known illnesses like cardiovascular disease and malignant tumors.[3] In general, solitary abdominal organ injuries account for ten percent of over-all

trauma-related deaths. The leading cause for the rise in morbidity and mortality after blunt trauma to the abdomen due to RTA or any other cause is a postponement in the timely identification of trauma.[4] Blunt abdominal trauma most usual causes are falls, car accidents, industrial accidents, and attacks.[5] In earlier studies, abdominal injuries were usually caused by traffic accidents in 83.6% of cases, including 38.1% were from motorcycle accidents and 45.5% from motor vehicles. Patients with fatal abdominal trauma are higher than penetrating wounds due to a lack of early diagnosis and optimal treatment. Diagnosing a patient with intra-abdominal lesions is much more difficult because examining the abdomen does not consistently categorize all patients with injuries to intra-abdominal organs.[6] Approximately 13 percent is the intra-abdominal injury prevalence in blunt abdominal trauma patients. It was noted that in blunt trauma to the abdomen, the most injured organ is the spleen concurred about fifty percent of cases.[7,8]

In the other hand, a number of analyses have confirmed that the liver and spleen are the most often affected organs in abdominal trauma. However, these differences haven't been settled yet. In order to ascertain the pattern and frequency of intra-abdominal injuries in cases of blunt abdominal trauma, as well as to correlate the results with both domestic and foreign research, this analysis was conducted.

Material and Methods

For six months, from July 2025 to December 2025, this observational study was conducted in the surgical unit of the Government Medical College and Hospital in Bettiah, West Champaran, and Bihar. The study comprised 50 cases of blunt abdominal injuries in total. Both sexes were admitted to the GMCH Surgery Department, and the patients were more than twelve. Many injuries and abdominal penetrations were excluded for individuals younger than 12 years of age.The primary questionnaire quickly questioned each selectee to gauge their physical condition. Two large diameter (16-meter) cannulas are used for intravenous access. The main replacement treatments for blood loss were crystalloid solution and colloids. When required or not contraindicated, nasogastric tubes and urethral catheters were passed. After the patient was stabilized, a second survey was conducted, which included a thorough history and a head-to-toe examination. In the accident and emergency room, tests such as serum electrolytes, serum amylase, complete blood count, blood creatinine and urea level, blood cross-match, abdominal and chest x-rays, and pelvic ultrasound and abdomen were performed.

In some cases, the stable ones underwent diagnostic peritoneal lavage, where other investigations and physical findings were not conclusive. If there was abdominal distention or the patient was in shock, the exploratory laparotomy was done. All findings were recorded on the designed Performa. Using SPSS 22.0, the data were analyzed.

Results

The study comprised a total of 50 individuals with acute abdominal injuries. Nine patients (18%) were female, and 41 patients (82%) were male: Fifteen of the patients were between the ages of 13 and 25; twenty-one were between the ages of 26 and 40; twelve were between the ages of 41 and 55; and two were between the ages of 56 and 70. In traffic accidents, 29 patients (58%) were hurt in falls (10%), 8 patients (16%) were hurt in violent incidents, and 3 patients (6%) were hurt in industrial mishaps. In 15 (30%) of the patients, liver damage was observed. Eleven patients (73.3%) had simple grade I or II lesions, three patients (20%) had grade III lesions, and one patient (6.7%) had liver lesions. Seven patients (53.84%) had grade I injuries, six patients (46.16%) had grade II injuries, and thirteen patients (26%) had splenic trauma. Eleven patients (22%) had intestinal injury ranging from the anal canal to the stomach area. Five patients suffered injuries in the small intestine, two patients in the duodenum and stomach, and four patients in the large intestine. The pancreas was injured in two (4%) of the patients. Two patients (4%) had a perforated diaphragm, while three patients (6%) had a mesenteric tear. Five individuals (10%) had a retroperitoneal hematoma. Two patients suffered bladder impairment, while three patients (6%) had renal damage. Table 1 shows the frequency of organ injuries resulting from gender disparities as well as the frequency of damage to other organs.

Discussion

The majority of trauma survivors in this study were in a productive time of life, between the ages of 20 and 45.[11] Of the 50 patients in our research, 21 (42%) were in the 26–40 age range. In the United States, it was nearly identical to other studies conducted by Saad and Alpar, Ball and Croley in America, and Gupta. The male to female ratio was 5.4: 1. According to data that Kunin collected in France, 58% of instances involved automobile accidents that resulted in blunt abdominal damage. The primary cause is that the passengers are seated on the roof of the buses, putting them at risk of severe harm. In addition, the majority of bus drivers attempt to make more than twenty-four hours a day by driving in a row and frequently use opium and other hallucinogens, which distorts their judgment and contributes to a number of significant traffic accidents.

Table 1: Shows the different organs injuries incidence

Organ Injury	Total No.	Male	Female	P-value
Injury to Spleen	13	10	3	0.580
Injury to Liver	11	9	2	0.987
Kidney Injury + Liver injury	01	01	0	0.635
Injury to GUT	08	06	02	0.574
Gut Injury + Liver injury	03	02	01	0.476
Pancreatic Injury + GUT Injury	01	01	0	0.635
Injury to Kidney	02	02	0	0.498
Injury to Diaphragm	02	02	0	0.498
Injury to Retroperitoneum	05	04	01	0.901
Injury to Pancreas	01	01	0	0.635
Injury to Mesentery	03	03	0	0.403

According to several international surveys, automobile accidents are the leading cause of blunt abdominal injuries (48 percent in the UK, 67 percent in France, and 30 percent in the US).[12] In 20% of cases, falling from a height is the second major.Workers in towering structures were involved in a large number of these falls. While some analyses have shown an incidence of 18.18%, a minimal portion may be attributed to falls on the stairs in the house or occasionally to the fall of large objects in the abdomen area, as in industrial occurrences. In 15 (30%) of the 50 patients in our investigation, the liver was the most frequently damaged organ. Hoyt reported 15% while Hussain et al. reported 22.7% of liver damage. While an Italian study report grade I, II, and III liver injury in 84.75% of instances, our research found grade I and II injuries in 73.3% of patients.[13] The spleen is the second most often injured organ in thirteen (26%) of the cases. A left-sided rib fracture typically suggests the possibility of a splenic injury as well. GUT (anal to the stomach) was the third most often injured organ, occurring in eleven cases (19.6%) along with other organ injuries.[14] Five cases (8.9%) involving kidney, bladder, and retroperitoneal hematomas were observed in fourth place in this investigation. Following that, there were three (5.4%) cases of renal and mesenteric rips, followed by two cases of diaphragmatic injury, bladder, and pancreas. The findings of this study differ slightly from those of previous analyses mentioned in Cuscheri Essentials. The overall mortality rate was 10%.[15] Alpar and Khan reported 20% in the UK, while Gupta et al. claimed 11% in India. The death rate in this study was higher than the 8.6% reported by Croley and Ball in the USA. Hemorrhagic shock, septicemia, and multiple organ failure were the reasons of death.

Conclusion

Traffic accidents are the leading cause of blunt abdominal trauma in India. Because they live outside and provide for their families, men are more likely than women to suffer from stomach damage. Every intra-abdominal organ is vulnerable to harm. The liver was the most frequently affected organ in our investigation of blunt abdominal trauma, followed by the intestine, spleen, and retroperitoneal hematoma. For the majority of injuries, conservative and straightforward surgical techniques are necessary. A proficient surgical team is a clear advantage that has a direct impact on the life expectancy of the patient. The morbidity increases if the patient receives inadequate nutritional support.

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