

## A Retrospective Analysis of Blunt Trauma Abdomen in Patients Attending the Emergency Department in a Tertiary Care Hospital

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### Abstract

Trauma is the leading cause of death and disability in developing countries and also the most common cause of death under 45 years of age. Injury is the 7<sup>th</sup> cause of mortality worldwide and abdomen is the third most common injured organ. The spleen and liver are the most commonly injured abdominal organs as a result of blunt trauma. In the civilian population, blunt injury to the abdomen is commonly caused due to road traffic accidents. *Material and Methods:* A retrospective study of 157 cases of blunt abdominal trauma patients presenting to department of emergency surgery in medical college of Central India from January to June 2019 was done.

*Results:* Amongst the studied cases most common age group involved was 21–30 years (46 cases) and 31–40 years (32 cases) followed by 41–50 years (28 cases). Liver was found to be the most commonly injured organ 60 cases followed by spleen 39 cases and bowel and kidney (21 and 17 cases respectively).

*Conclusion:* Blunt Abdominal Trauma is one of the important causes of morbidity and mortality in relatively young individuals. Most common mode of injury was road traffic accidents and men were affected predominantly. Hospitals and trauma care centers must adopt a multi-pronged approach to

diagnose and promptly treat patients with blunt injury abdomen so that the prognosis can be better in these patients.

**Keywords:** Abdominal trauma; Road traffic accident.

### Introduction

Trauma has been always a neglected disease of modern society, despite its close companionship with man. Trauma is the leading cause of death and disability in developing countries and also the most common cause of death under 45 years of age.<sup>1</sup> Injury is the 7<sup>th</sup> cause of mortality worldwide and abdomen is the third most common injured organ. Around 25% of cases of abdominal injuries requires surgeries. Eighty-five percent of abdominal traumas are of blunt character.<sup>2</sup> the spleen and liver are the most commonly injured abdominal organs as a result of blunt trauma. Clinical examination alone is inadequate because patients may have altered mental status and some other distracting injuries. Initial resuscitation along with focused assessment with sonography in trauma (FAST) and computed tomography (CT) abdomen are very important to detect patients with minimal and clinically untraceable signs of abdominal injury and are the part of recent management guidelines. Approach to trauma should be systemic and prioritized. About 10% of patients have persistent hypovolemic shock as a result of continuous blood loss in spite of aggressive fluid resuscitation and require an urgent surgical intervention. Damage

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control laparotomy is a life-saving procedure for such patients with life-threatening injuries and to control hemorrhage and sepsis. On the other spectrum, there has been increasing trend towards non operative management (NOM) of blunt trauma amounting to 80% of the cases with failure rates of 2-3%.<sup>3</sup>

For hemodynamically stable solid organ injuries NOM is considered as standard protocol.

Pre-hospital transportation, initial assessment, thorough resuscitative measures and correct diagnosis are of utmost importance in trauma management.

In the civilian population, blunt injury to the abdomen is commonly caused due to road traffic accidents. Patients brought to the emergency department require immediate attention and thorough evaluation. Blunt injury to the abdomen can also occur as a result of fall from height, assault with blunt objects, sports injuries, and blasts injuries.<sup>4</sup> Focused assessment with sonography for trauma (FAST) has emerged as a useful tool in the evaluation of blunt injury abdomen.<sup>5-7</sup> The majority of blunt injury abdomen cases are related to motor vehicle collision or automobile versus pedestrian accidents.<sup>8</sup> The spleen and liver are the most commonly injured solid organs in blunt injury abdomen. However, injuries to the pancreas, bowel and mesentery, bladder, and diaphragm, as well as retroperitoneal structures like kidneys, abdominal aorta, are less common but still need to be considered. Injuries to the kidney and urinary bladder may be associated with pelvic fractures and retroperitoneal hemorrhage.<sup>9</sup> In a patient who has been in a road traffic accident, injuries to the head, chest, and fractures of any bones must also be ruled out.

## Materials and Methods

A retrospective study of 157 cases of blunt abdominal trauma patients presenting to Department of emergency surgery in medical college of Central India from January to June 2019 was done. After initial resuscitation, clinical details, physical examination, laboratory tests and X-rays, ultrasonography was done to confirm the diagnosis.

CT scan was usually done in all of the cases. Patients were categorized to stable verses unstable. The progress of patients was closely monitored, decision was taken for conservative management or to undertake laparotomy. Patients who were unresponsive to conservative management,

were unstable hemodynamically and continued deteriorating in spite of sufficient resuscitation or who had signs of bowel involvement were shifted for immediate laparotomy. Inferences were made for various variables like age, sex, cause of blunt abdominal trauma, time of presentation of patient, signs and symptoms, operative findings, various procedures employed, associated extra-abdominal injuries, postoperative complications and mortality.

This study was based on 157 patients. A thorough history was obtained directly either from the patient or from the patient's relatives. Then, only clinical examination and the relevant diagnostic investigations was performed.

After hemodynamic stability and resuscitation, all patients were subjected to careful examination. However, depending on the clinical findings; a decision was taken for further investigations like X-ray abdomen, FAST and CECT abdomen.

The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability of the patient and the results of the investigations done.

Patients selected for conservative management were placed on strict bed rest. They were also subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of the abdomen and other systems. Appropriate investigations, such as the hemoglobin value, and ultrasound of the abdomen were repeated as and when necessary.

## Results

In this retrospective study of 157 patients with blunt abdominal trauma there were 93 males and 64 females with an M:F ratio of 1.4:1 (Fig. 1). Amongst the studied cases most common age group involved was 21-30 years (46 cases) and 31-40 years (32 cases) followed by 41-50 years (28 cases). Only 5 cases were more than 70 years (Fig. 2). In 92 cases road traffic accident was the mode of injury followed by fall from height in 19 patients. Forty three patients had the history of assault (Fig. 3). Most of the patients presents with history of abdominal pain followed by abdominal guarding and rigidity. Only few patients presented with hematuria. Liver was found to be the most commonly injured organ 60 cases followed by spleen 39 cases and bowel and kidney 21 and 17 cases respectively (Fig. 4).

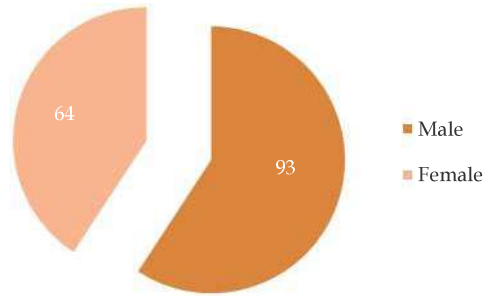


Fig. 1: Sexwise distribution of blunt injury abdomen.

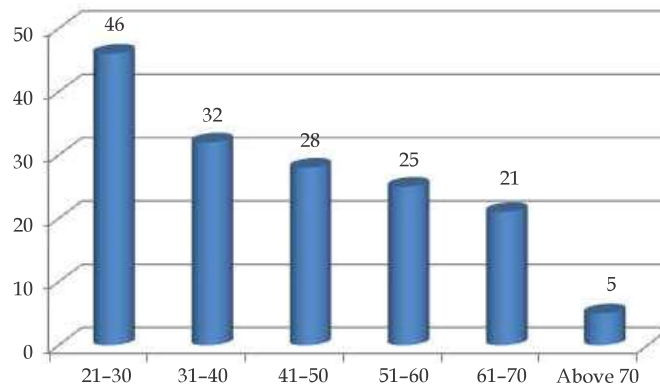


Fig. 2: Agewise distribution of blunt injury abdomen.

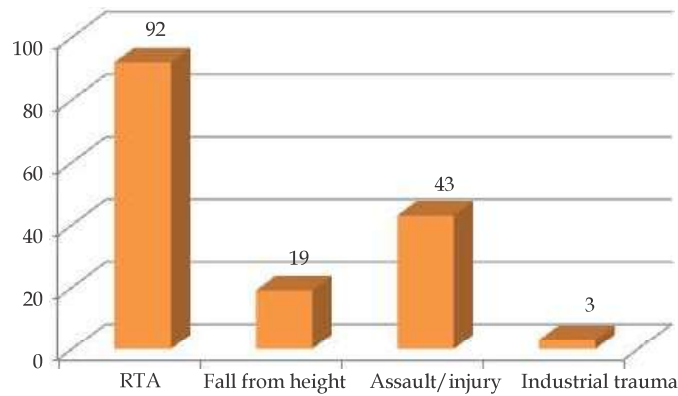


Fig. 3: Mode of injury in patients who sustained blunt injury abdomen.

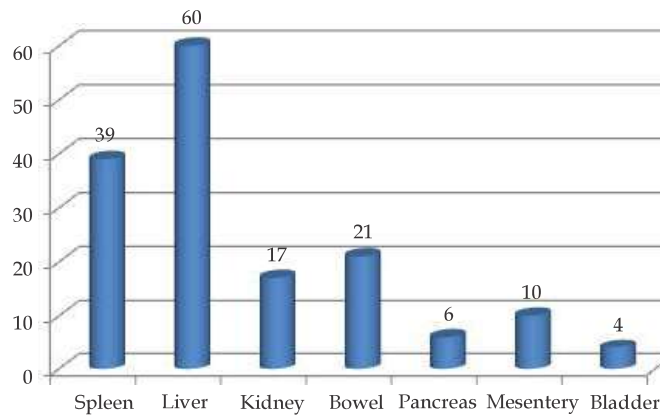


Fig. 4: Organs involved in patients who sustained blunt injury abdomen.

The analysis of the pattern of injuries showed that there were 43 patients with multiple organ injuries. Three patients had hepatic and renal injuries, splenic and renal injuries 6, splenic, kidney

and bladder 4 and hepatic injuries were seen in 21 each. In 9 patient liver and bowel and mesentery were injured (Fig. 5).

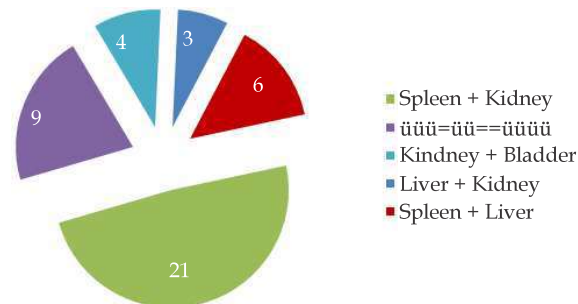


Fig. 5: Multiorgan injuries in study cases.

One hundred eighteen patients were managed non-operatively because they had no signs of peritonitis and they were hemodynamically stable. Whole 39 patients had undergone surgical intervention. During laparotomy the most common operative procedure which was done was resection and anastomosis (17/39) followed by splenectomy

(12/39), by primary closure of perforation, intraperitoneal repair of urinary bladder and nephrectomy was done in 4, 4 and 2 cases respectively (Table 1). Majority of the patients were discharged within 10 days of admission. There was no patient who had to remain in hospital beyond a period of 20 days.

Table 1: Specific operative procedures done in patients who sustained blunt injury abdomen

Procedure done	No. of patients operated
Splenectomy	12
Primary suturing of liver laceration/Hemostatic gel foam	0
Nephrectomy	2
Resection-anastomosis of bowel	17
Perforation closure of bowel	4
Intraperitoneal repair of urinary bladder	4

## Discussion

Blunt abdominal trauma is the challenging work even to the best of grammatologists. Injuries which are ranging from single to multiorgan trauma may be produced by blunt abdominal trauma. Abdominal findings may be absent in 40% of patients with hemoperitoneum. Sometimes, clinical evaluation of blunt abdominal injuries may be masked by other more obvious external injuries.<sup>10</sup> Non therapeutic laparotomies have significantly reduced with proper and timely applications of imaging methods in BAT patients along with physical examination. Unrecognized abdominal injury is a frequent cause of preventable death after trauma.<sup>11</sup>

The patients who had undergone blunt abdominal trauma may have suffered injury simultaneously to other systems and it is mandatory to examine for injuries of head, thorax and extremities. Attention and care of injuries in any of the systems may take priority over the abdominal trauma.

Commonest intra-abdominal injury was liver injury in 60 cases followed by spleen injury. Small bowel perforation was the commonest hollow organ injury.

In blunt trauma surgeon's main concern is control of hemorrhage and/or bleeding, but how it can be best done with safety and less morbidity, depending on grade, sites and severity of injury. Procedures done for splenic trauma in our study were splenectomy in 12. Splenectomy

was done for most of grade 4 and 5 trauma and hemodynamically unstable patients of lesser grades only. Hemodynamically stable patients were followed with series physical examinations; ultrasonography or CT scans thus avoiding unnecessary laparotomy.

Kidney and urinary bladder injuries were frequently associated with pelvic fractures. Nephrectomy through Tran's peritoneal approach was done in 2 cases of extensive renal lacerated Grade 5 injury and the patient recovered uneventfully, otherwise renal injury were treated conservatively.

CT scan was done in each and every patient of renal trauma who were conservatively managed.

In patients with intraperitoneal urinary bladder injury, laparotomy followed by repair of the bladder was carried out in 2 layers and the patients recovered uneventfully.

Perforation closure was done in 4 cases of bowel injury. Resection and anastomosis was done in 17 cases. Bowel injuries is one of the major chunk for failure of non-operative or conservative management

Surgeon should cautiously look for other sites of trauma to rule out extra-abdominal injuries. Abdominal injuries were associated with various extra-abdominal injuries amongst which most common were rib fractures 64 cases and hemothorax 36 cases. The higher incidence of fractures of ribs were probably due to more number of upper abdominal trauma.

Anonymous extra-abdominal injuries can contribute to patient death when a relatively simple procedure might otherwise have saved the patient's life.

The major cause of mortality was delayed presentation of patients and poor general condition of patient.

Commonest postoperative complication in our study was surgical site infection which in most cases were minor infections and were managed conservatively. This was consistent with studies conducted by Beall et al.<sup>12</sup> The cause of sepsis/ infection in these patients were necrotic tissue, mutilating injuries and late presentation in some patients.

## Conclusion

Blunt Abdominal Trauma is one of the important causes of morbidity and mortality in relatively

young individuals. Most common mode of injury was road traffic accidents and men were affected predominantly. Early diagnosis of extent of injury by appropriate imaging (X-ray, Ultrasound or CT abdomen) and appropriate interventions (Aggressive fluid resuscitation, blood transfusion and operative interventions) are crucial in management. Associated injuries like head injury, abdominothoracic injuries and fractures influence the outcome.

From our study it is seen that, blunt injury abdomen mainly affected men and the younger population between the age group of 21 and 30. When the patient is received in the emergency department immediate attention must be provided and a thorough evaluation must be done. The patient must be stabilized quickly and investigations must be done without much delay. FAST and CECT abdomen are very useful tools in diagnosing the severity and extent of blunt injury to the abdomen. Heyn et al. suggested that in patients with multiple injuries, abdominal ultrasound and CT scan of the abdomen have complementary value. Non-operative management can be tried when the patient is hemodynamically stable. Injuries to the liver can sometimes be treated conservatively, due to the firm architecture of the liver. However, careful monitoring is required in such cases. When laparotomy is decided, then a thorough examination of the abdominal organs must be done. In our study the spleen was found to be the most common organ injured in blunt injury abdomen. Thus, hospitals and trauma care centers must adopt a multi-pronged approach to diagnose and promptly treat patients with blunt injury abdomen so that the prognosis can be better in these patients.

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