

A Clinical Study of Blunt Injury Abdomen in a Tertiary Care Hospital

J Amuthan¹, A Vijay², C Pradeep², Heber Anandan³

¹Associate Professor, Department of General Surgery, Sivagangai Medical College Hospital, Sivaganga, Tamil Nadu, India, ²Junior Resident, Department of General Surgery, Sivagangai Medical College Hospital, Sivaganga, Tamil Nadu, India, ³Senior Clinical Scientist, Department of Clinical Research, Dr. Agarwal's Healthcare Limited, Tamil Nadu, India

Abstract

Introduction: Abdominal trauma continues to account for a large number of trauma-related injuries and deaths. Motor vehicle accidents and urban violence, respectively, are the leading causes of blunt and penetrating trauma to this area of the body.

Aim: The aim of the study is to evaluate the incidence of blunt injury abdomen, clinical presentation, morbidity, and mortality.

Materials and Methods: This prospective clinical study was carried out on patients admitted in Sivagangai Medical College Hospital. After admission, data for the study were collected by detailed history, thorough clinical examination, and relevant diagnostic investigations performed over the patient.

Results: In our study, road traffic accidents (RTA) were the most common cause of blunt abdominal trauma (68%) with 84% patients being males. Diagnostic aspiration being an accurate investigation with 85% sensitivity. X-ray erect abdomen and ultrasound of the abdomen were the most sensitive investigation for hollow viscous injury and solid organ injuries, respectively, with spleen being the most common organ involved in the latter group. The most common cause of death was septicemia.

Conclusion: RTAs form the most common mode of injury; hence, measures should be taken to prevent these accidents and care of the victims at the accident site. A thorough and repeated clinical examination and appropriate diagnostic investigations lead to successful treatment in these patients.

Key words: Blunt injury abdomen, Mortality, Road traffic accidents

INTRODUCTION

Abdominal trauma continues to account for a large number of trauma-related injuries and deaths. Blunt injury to the abdomen can also occur as a result of fall from height, assault with blunt objects, sports injuries, and bomb blasts.¹ Unnecessary deaths and complications can be minimized by improved resuscitation, evaluation, and treatment. Rapid resuscitation is necessary to save the unstable but salvageable patient with abdominal trauma.² Accurate diagnosis and avoidance of needless surgery is an important goal of evaluation.³ Motor vehicle

accidents account for 75% of cases of blunt abdominal trauma. Explosive increase in population, high-speed vehicles, decivilization of human race, terrorism, and sports are just a few of the predisposing factors of trauma. Unrecognized intra-abdominal injury remains distressingly frequent cause for preventable death in a patient with blunt injury abdomen.⁴ Evaluation of a patient with abdominal trauma can be a most challenging task that a surgeon may be called upon to deal with. Investigative modality can only supplement the clinical evaluation and cannot replace it in the diagnosis of blunt abdominal trauma.⁵ In view of increasing number of vehicles and consequently road traffic accidents (RTAs), this dissertation has been chosen to study the cases of blunt abdominal trauma.

Aim

The aim of the study is to evaluate the incidence of blunt injury abdomen, clinical presentation, morbidity, and mortality.

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Corresponding Author: Dr. J Amuthan, Department of General Surgery, Sivagangai Medical College Hospital, Sivaganga, Tamil Nadu, India. Phone: +91-9994431818. E-mail: amuthanjegadeesan@gmail.com

MATERIALS AND METHODS

This prospective clinical study was carried out on patients admitted at Department of Surgery in Sivagangai Medical College Hospital. Patient admitted with a history of blunt abdominal trauma, undergoing surgical intervention, or treated by non-operative management were included in the study. Patients with penetrating injuries and gunshot injuries were excluded from the study. After admission, data for our study were collected by direct interview with the patient or patient relatives accompanying the patient and obtaining a detailed history. Clinical findings and relevant diagnostic investigations performed over the patient. After initial resuscitation of the patients, thorough assessments for injuries were carried out in all the patients. Documentation of patients, which included, identification, history, clinical findings, diagnostic test, operative findings, operative procedures, and complications during the stay in the hospital and during subsequent follow-up period, were all recorded on a pro forma specially prepared. Demographic data collected included the age, sex, occupation, and nature and time of accident leading to the injury. After initial resuscitation and hemodynamic stability, all patients were subjected to careful examination, depending on the clinical findings; decision was taken for further investigations such as four-quadrant aspiration, diagnostic peritoneal lavage, X-ray abdomen, and focused assessment with sonography for trauma.^{3,6,7,8} The decision for operative or non-operative management depended on the outcome of the clinical examination, hemodynamic stability, and contrast-enhanced computed tomography abdomen. Patients selected for non-operative or conservative management were placed on strict bed rest and were subjected to serial clinical examination which included hourly pulse rate, blood pressure, respiratory rate and repeated examination of abdomen and other systems. Appropriate diagnostic tests, especially ultrasound of abdomen were repeated as and when required. In those who are operated, the operative findings and methods of management are recorded. Cases are followed up till their discharge from the hospital. If patient expired, postmortem findings are noted. Post-operative morbidity and duration of hospital stay were recorded. The above facts are recorded in a pro forma prepared for this study.

RESULTS

The total number of patients who has sustained blunt injuries to abdominal organs was 100. In the present study, maximum of cases were in the 21-30 age group (32%) followed by 11-20 group (22%), mean age was 39 years, range from 15 to 72 years. 84 (84%) patients were male and 22 (22%) were female. Male to female ratio was 4:1.

Common cause of blunt trauma to abdomen was RTA, i.e., 68 (68%) and the second common cause was fall from height (22%). Other causes were hit by blunt objects and assaults (Figure 1).

The most common symptom was pain abdomen (94%). Next symptom was vomiting (30%) followed by distention (16%), urinary retention (8%), and Hematuria (4%) (Figure 2).

Ultrasound abdomen was done in 92 cases. X-ray erect abdomen was done in 90 cases. Four-quadrant aspirations were done in 80 cases (Figure 3).

Spleen was the most common organ involved in 32 (32%) cases and liver was the second most common organ injured in 16 (16%) cases. Small bowel was injured in 14% of cases. Large bowel, mesentery, and stomach were injured in 4% of cases.

Out of 100 cases, 58 (58%) were managed surgically and 42 (42%) were managed conservatively (Figures 4 and 5).

Post-operative complication was present in 20 cases; the most common complication after surgery was wound

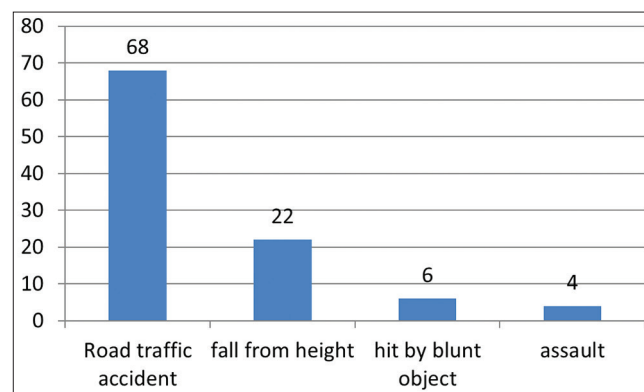


Figure 1: Distribution of mode of injury

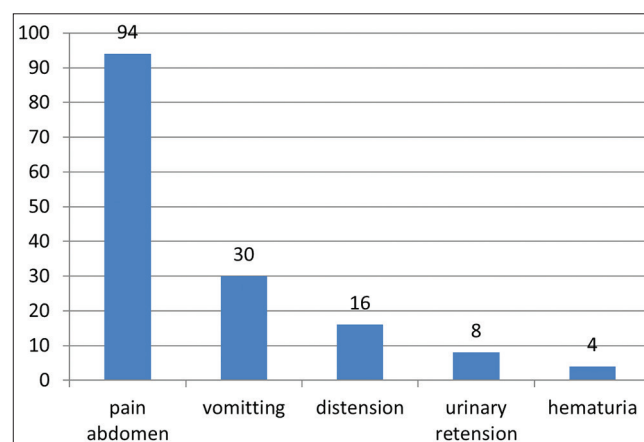


Figure 2: Distribution of clinical symptoms

infection. It was seen in 10 cases (53%). Pelvic abscess developed in four cases (21%). 2 patients (11%) developed pneumonia. Anastomotic leak, intestinal obstruction, wound dehiscence, and abdominal comp. syndrome developed in one case each (5%). In this study, septicemia was the most common cause of death (5 cases). Three died of ARDS and another two died of sudden cardiac arrest (Figure 6).

DISCUSSION

The most common cause of blunt injury abdomen is RTAs (68%) which are comparable to most other studies. Mohapatra *et al.*⁹ also reported 62% cases of blunt injury abdomen were due to RTA. Another study by Curie *et al.*¹⁰ also reported 58.6% cases of blunt injury to abdomen were due to RTAs. In our study, the maximum number of cases was in the third decade of life (20-30). Most of the cases were in the first four decades of life. This indicates trauma is more common in young people. Range was from 15 to 72 years. Average age was 39 years. Our study is comparable to study by Curie *et al.*¹⁰ which showed maximum number of cases in the third decade (35%). Ranging from 15-72 years with a mean age of 39 years. Similar observations were also made by Allen *et al.* which showed 28% cases between 20 and 29 years of age.¹¹ In the present study, 84 (84%) were males and 18 (18%)

were females. In our study, male-to-female ratio was 4:1. Male-to-female ratio was same compared to other studies such as Tripathi *et al.*¹² reported a ratio of 4.4:1. The most common symptom was pain abdomen (94%). Vomiting was the second most common symptom (30%), followed by distention of abdomen (16%), urinary retention (8%), and Hematuria. Another study by Tripathi *et al.*¹² also reported pain abdomen in 91% of their patients. Diagnostic aspiration was done in 74 patients and positive in 52 cases. Out of these 52 cases, 36 cases have undergone laparotomy and the results were found to be positive. True negative in four cases, false negative in six cases, and not even one false positive. Sensitivity was 85% and specificity was 100% in our study. This is comparable to another study (Mohapatra *et al.*) which showed diagnostic aspiration to be accurate in 95% cases.⁹ Another study by Narsing *et al.* showed diagnostic aspiration to be 100% accurate.¹³ In our study, X-ray erect abdomen was done in 88 cases. It detected 16 cases of hollow viscus perforation with an accuracy of 100%. Rest of the cases had gangrenous bowel. X-ray erect abdomen was not done in two cases. There

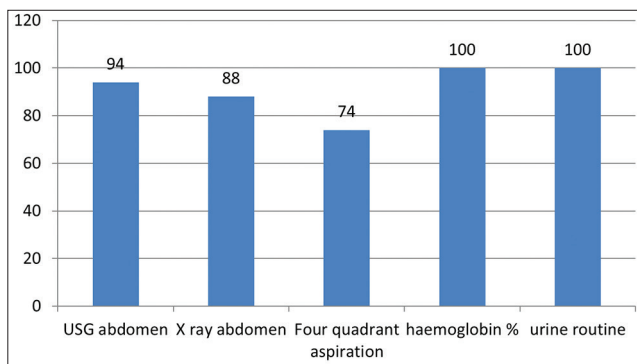


Figure 3: Distribution of investigations done

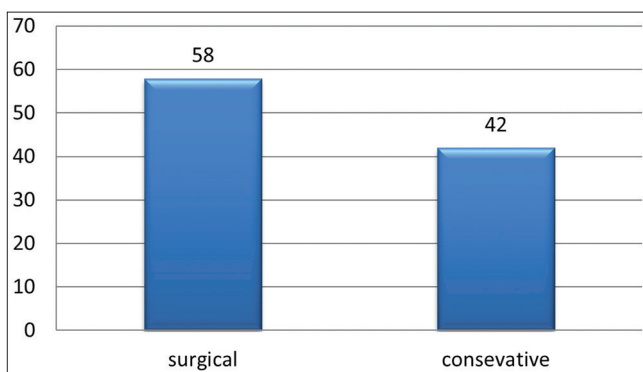


Figure 4: Distribution of management

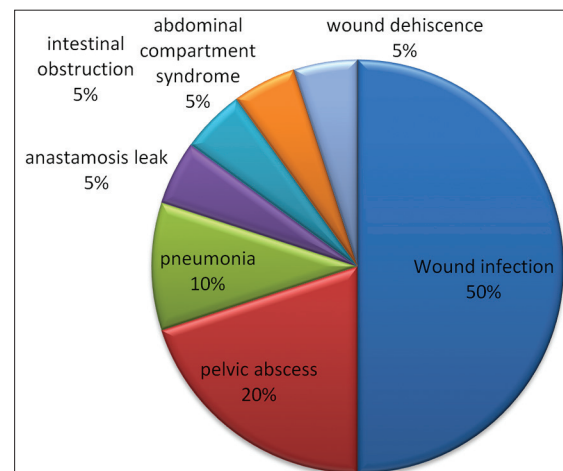


Figure 5: Post-operative complications

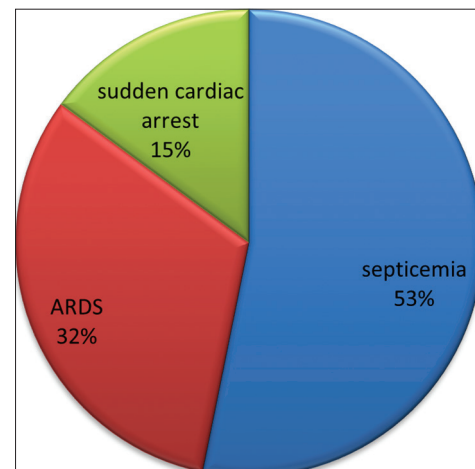


Figure 6: Distribution of cause of death

was gastric tear in two cases. Another study (Mohapatra *et al.*) reported accuracy of X-ray erect abdomen to be 100% in detecting hollow viscous injuries.⁹ In our study, ultrasonography (USG) abdomen was done in 92 cases out of 100 cases. 26 cases were found to have solid organ injuries on laparotomy. Out of these 26 cases, USG was not done in two cases preoperatively. In our study, USG was 81% sensitive in detecting solid organ injuries with the specificity of 100%. This is comparable to other studies such as Soffer *et al.* (2006) which showed USG to have 89% accuracy, 77% sensitivity, and 97% specificity. However, it was not very helpful in detecting hollow viscous injuries. In our study, spleen was the most common organ (32) injured in 32% of cases. Out of these 32 cases, 18 were managed conservatively and 14 were operated. Splenectomy was done in 12 cases; our study is comparable to study done by Davis *et al.* which reported 24.7% of cases had splenic injuries, out of which 10.7% were operated and 14% were managed conservatively.⁶ All the operated cases underwent splenorrhaphy. Another study by Curie *et al.* reported 27.5% of cases had splenic injuries, out of which 15% were operated and splenorrhaphy was done in all cases.¹⁰ Liver is the next most commonly involved solid organ in 16 cases, Of which 10 were operated and 6 managed conservatively. Out of 10 cases that were operated, the laceration in the liver was sutured in two cases and gelatin sponge applied to prevent further bleeding in four cases. In other 4 cases, bleeding was already stopped and hemoperitoneum was drained. This is comparable to study by Davis *et al.*⁶ which showed 16.47% of liver injuries, of which 14% underwent laparotomy and suturing was done in all cases. Another study by Curie *et al.* showed 20.6% of liver injuries.¹⁰ A study by Rutledge *et al.* found spleen to be most commonly injured organ than liver.¹⁴ Small bowel was third most commonly injured organ, i.e., 14 (14%) in our study. Duodenum was injured in four cases. In all the four cases, a small perforation was present, so a simple repair with omental patch was done. Jejunum was injured in eight cases. In two cases, resection anastomosis was done, and in rest six cases, simple closure was done. Ileum was injured in four cases. In all the cases, simple closure was done. All cases of small bowel injury were operated, of which about six patients expired indicating 40% mortality. In our study, injury to small intestine was less compared to a study done by Allen *et al.*¹¹ which showed 35.3% cases. Out of 100 cases in our study, 44 (44%) were managed surgically and 56 (56%) were managed conservatively. Our reports are comparable to Mohapatra *et al.*⁹ who reported 39% laparotomy rates in their series. Non-operative management consisted of nasogastric aspiration, urine output measurement, I.V fluids, analgesics, and antibiotics. In our study, a total of 46 cases were found to be having solid organ injury, of which 24 (52%) were managed conservatively and

22 cases (48%) were managed surgically. All patients in non-operative group recovered uneventfully. There were two mortalities in operative group. Our study shows that 52% of solid organ injuries can be managed nonoperatively. A study by Rutledge *et al.*¹⁴ also showed that incidence of non-operative management in 48% of both hepatic and splenic injuries. Wound infection was the most common complication in 10 (17.24%) cases after undergoing surgery followed by pelvic abscess in four (6.89%) cases, followed by two cases (3.44%) of pneumonia, anastomotic leakage, and intestinal obstruction each. This is comparable to a study by Jolly *et al.*¹⁵ which showed wound infection in 14% of the cases. Another study by Davis *et al.* showed wound infection as a complication in 15% of the cases.⁶ Among 100 cases, 10 (10%) cases ended in mortality and septicemia was the most common cause of death (5 cases). Sudden cardiac arrest was cause of death in two cases and ARDS was cause of death in three cases. These results are comparable to another study by Jolly *et al.*¹⁵ which showed 10% mortality in their study with septicemic shock the most common cause of death. Another study by Davis *et al.*⁶ showed 15% mortality with septicemia the most common cause of death.

CONCLUSION

Blunt trauma to abdomen is on rise due to excessive use of motor vehicles. It poses a therapeutic and diagnostic dilemma for the attending surgeon due to wide range of clinical manifestations ranging from no early physical findings to progression to shock. Hence, the trauma surgeon should rely on his physical findings in association with the use of modalities such as X-ray abdomen, USG abdomen, and abdominal paracentesis. Hollow viscus perforations are relatively easy to pick on X-ray. However, solid organ injuries are sometimes difficult to diagnose due to restricted use of modern amenities such as CT scan in India. From our study, we conclude that in hemodynamically stable patients with solid organ injury, conservative management can be tried and non-operative management is associated with less complication and morbidity.

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