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Case Series

The study on the role of laparoscopy in the blunt abdominal trauma: a case series

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ABSTRACT

The blunt trauma to the abdomen is the leading cause of mortality and morbidity in India and also worldwide. The young and productive age group are the main victims. The common causes of blunt injury to the abdomen are road traffic accidents, assault, fall from height and work-related injuries. Abdominal trauma is present in 7-10% of all trauma victims and in cases of severe trauma, it is often associated with orthopedic, thoracic or central nervous system injuries. Identification of serious intra-abdominal injuries is often challenging. Thus, a rapid and accurate diagnosis is mandatory. The diagnostic laparoscopy has gained widespread acceptance as a valuable tool for the diagnosis and management of patients with blunt abdominal trauma. When the imaging techniques fail to give the precise diagnosis, diagnostic laparoscopy is a viable alternative for the management of such trauma. This case series consisted of 22 patients admitted to our institute. All the patients underwent diagnostic laparoscopy. The blunt trauma managed by laparoscopy while 12 patients required conversion to exploratory laparotomy. It was observed that the most common organ injured was spleen in 10 patients (45.4%), liver in 9 patients (40.9%), mesenteric injury in 4 patients (18.1%) and small bowel injury in 3 patients (13.6%) respectively. Diagnostic and therapeutic laparoscopy is a preferred in hemodynamically stable patients, it reduces the hospital stay and postoperative complications. This case series underlines the importance of diagnostic and therapeutic application of laparoscopy in the victims of blunt injury abdomen.

Keywords: Blunt injury abdomen, Road traffic accidents, Laparoscopy, Laparotomy

INTRODUCTION

In India, blunt abdominal trauma is the leading cause of morbidity and mortality among all age groups. The majority of fatalities worldwide in people under the age of 35 years are caused by trauma.[1]

Blunt mechanisms account for 78.9 to 95.6% of the injuries.[2-5] The abdomen being affected in 6.0 to 14.9% of all traumatic injuries.[6] The most common cause of blunt abdominal trauma is road traffic accident, assault, fall from height, work-related injuries.[7]

Abdominal trauma is present in 7-10% of all trauma victims and in cases of severe trauma is often found together with orthopaedic, thoracic or central nervous system injuries.[8] Identification of serious intra-abdominal pathology is often challenging. Mechanisms of injury many a time result in other associated injuries that may divert the physician's attention from potentially life-threatening intra-abdominal pathology.

The assessment of patients with blunt abdominal trauma is difficult and the resultant misdiagnosis or delay in diagnosis has contributed to the high mortality and morbidity. The prognosis of blunt abdominal trauma

depends in most cases not only on the extent of existing injuries but also on prompt therapy. Thus, diagnostic measures have to clarify rapidly and accurately for surgical interference or otherwise. Difficulties in the decision for the surgeon become more difficult where diagnostic imaging (ultrasonography, CT scan) does not lead to a clear-cut result. Diagnostic laparoscopy has gained widespread acceptance as a useful tool in the diagnosis and management of patients with blunt abdominal trauma.[8] However, apart from hemodynamic instability, other specific indications call for proactive surgical diagnosis and treatment. While laparotomy has been the standard procedure for these settings, laparoscopy may be considered as an alternative.

The decision in favour of surgery or non-operative conservative treatment in blunt abdominal trauma requires a precise diagnosis but it is not always possible with imaging techniques only. In these patients' diagnostic laparoscopy has become a viable alternative for the management of intra-abdominal injuries. The role of laparoscopy in diagnosis, as well as therapeutic intervention has increased markedly in the few years. Laparoscopy has greatly improved surgical outcomes in abdominal surgery. Laparoscopy can be performed safely and effectively in stable patients with abdominal trauma. The routine use of laparoscopy in blunt abdominal trauma can achieve a sensitivity of 90-100% in abdominal trauma. This can reduce the number of unnecessary laparotomies and related morbidity.[9] The most important advantages of laparoscopy in blunt abdominal trauma are reduced non-therapeutic laparotomies, shortening of hospitalization stay, cost-effectiveness and morbidity. In the future new development of equipment can be expected to increase the use of the minimally invasive technique in abdominal trauma cases.[10] This study aimed to assess the role of laparoscopy in the diagnosis and management of blunt abdominal injury.

CASE SERIES

This study was a prospective observational study. It was conducted in the department of surgery, Pt. J.N.M. medical college, and associated Dr. B. R. A. M. hospital, Raipur, Chattisgarh.

On admission, all the patients underwent detailed history taking, thorough clinical examination and relevant investigation to establish the blunt injury abdomen. Those who were hemodynamically unstable were resuscitated according to the standard hospital protocol. After initial resuscitation, those who were stable, radiological investigation (X-ray chest and abdomen, ultrasonography of abdomen and CT scan of abdomen) were done in every case. The decision for operative management depended on the outcome of the clinical examination, hemodynamic stability, ultrasonography and CT scan abdomen/pelvis. The patients were considered for surgery if conservative management did not improve the patient's condition. For those patients who underwent laparoscopy, detailed operative findings were recorded. A total of 22 patients with blunt abdominal trauma were taken for laparoscopic management. The highest number of cases of blunt abdominal trauma occurred in the age group of 21-30 years in 8 patients (36.3%) followed by 31-40 years in 6 patients (27.2%). The road traffic accident was the most common mode of injury present in 16 patients (72.7%). Accidental fall from height in 3 (13.6%) patients and pedestrian injury in 3 (13.6%) patients were noted.

Table 1: The study design.

S. No.	Parameters	
1.	Place of study	Department of surgery Dr. Bhim Rao Ambedkar memorial hospital and Pt. J. N. M. medical college Raipur
2.	Study duration	17 months from April 2018 to September 2019
3.	Sample size	22 patients (18 Male, 4 female)
4.	Inclusion criteria	Blunt injury abdomen, not responding to conservative treatment
5.	Exclusion criteria	Stable patient, who did not need any surgical intervention; patients with definite major abdominal trauma; patients with local or general contraindication for laparoscopy
6.	Method of data collection	By detail history taking, thorough clinical examination and intraoperative findings

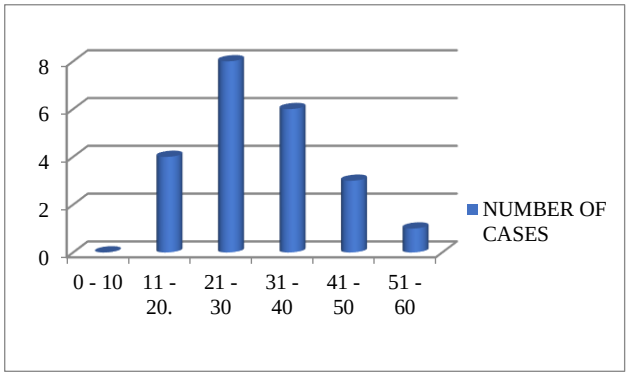

Figure 1: Number of cases in different age groups; the maximum number of accidents occurs in younger age groups, (20 to 40 years).

The most common symptom was abdominal pain, present in all the 22 patients (100%) and the most common sign was abdominal tenderness present in all 22 patients (100%). Abdominal distension was present in 59% (13 cases) of patients. Guarding present in 54% (12 cases), not passing flatus and motion in 18% (4 cases) and vomiting in 13% (3 cases) respectively. In the CT

abdomen and pelvis and we found that mild collection in the peritoneal cavity was noted in 45.4% (10 patients), moderate collection in peritoneal cavity noted in 36.6% (8 patients), gross collection in peritoneal cavity noted in 18.3% (4 patients). Liver injury in 7 patients (31.8%) and splenic injury in 7 patients (31.8%).

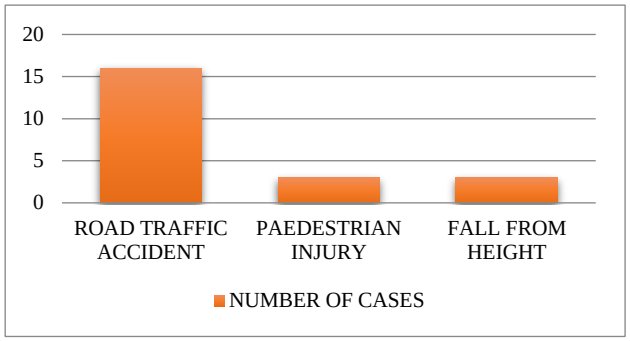

Figure 2: Mode of injury; the most common mode being road traffic accidents.

Figure 3: The commonest mode of presentations and findings on abdominal palpation.

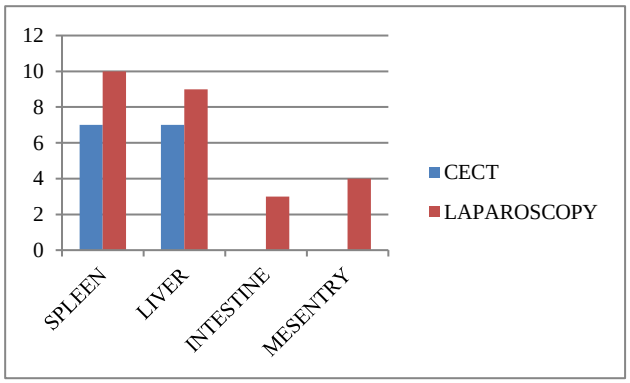

Figure 4: CECT versus laparoscopy.

In this study diagnostic laparoscopy was performed in all 22 patients. It was observed that the most common organ injured was spleen in 10 patients (45.4%), liver in 9 patients (40.9%), mesenteric injury in 4 patients (18.1%) and small bowel injury in 3 patients (13.6%) respectively.

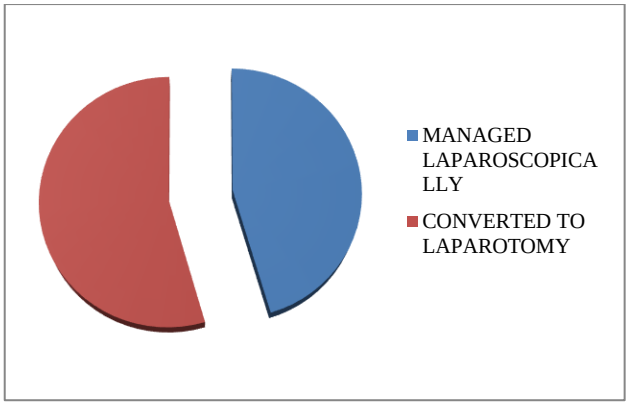

Figure 5: Conversion to laparotomy from laparoscopic procedure.

Figure 6 (a and b): CT findings of liver and splenic injury.

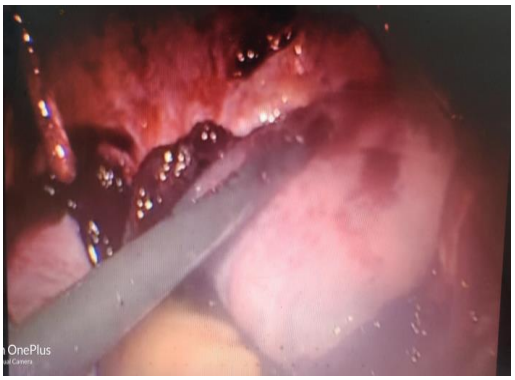

Figure 7: Injury to spleen; laparoscopic finding.

Figure 8: Injury to mesentery; laparoscopic finding.

Among 22 cases, 10 cases (45.5%) were managed laparoscopically. 12 cases (54.5%) require laparotomy after the diagnostic laparoscopy due to various reasons. Among the patients who are converted to laparotomy after diagnostic laparoscopy, splenectomy done in 6 cases (27.2%), 3 cases (13.6%) mesenteric injury repair, 2 cases (9.09%) small bowel perforation repair, and 1 case (4.5%) small bowel perforation and mesenteric injury repair done at laparotomy. The average number of days of hospital stays in patients who were managed only laparoscopically was 9.4 days and those patients who required laparotomy was 17.8 days. Among all 22 patients, 4 patients (18.2%) experienced operative site wound infection, 2 patients (9.1%) postoperative collection in the peritoneal cavity and 1 patient (4.5%) had paralytic ileus.

DISCUSSION

The highest number of cases of blunt injury to the abdomen occurred in the age group of 21-39 years (36.3%) as found in our study; the next vulnerable age group was 31 to 40 years (27.2%). The most vulnerable age group was the young population. The same findings were noted by Singh et al, Gohil et al and Yadav et al,13 and others.[11-13] The male population was predominant as far as blunt abdominal trauma was concerned as noted by Sudarshanbabu et al.[14] In their study 79% of victims were males and 21% were females. As per the study of Bar et al, 72% of males and 28% of females suffered from injury.[15] RTA comprised the most common mode of injury, present in 16 (72.7%) of the total 22 cases included in their study. Accidental fall from height was the mode of injury in 3 (13.6%) patients and pedestrian in 3 (13.6%) patients as found in our study. The study corresponded with the previous studies regarding the mode of injury as mentioned by the other authors like Yehia et al and Kala et al.[16,17] The most common presentation was pain and tenderness in the abdomen. Distension, guarding, obstipation, vomiting was found in the various percentage of patients. On laparoscopy, the most common organ injury was the spleen followed by liver and mesenteric tear. Memon et al found that the injury to the liver was in 53.12% of patients, small bowel and mesenteric bleeding in 18.75% of patients and spleen in 15.6% of patients.[18] In the study by Bar et al, the commonest laparoscopic finding was that of mesenteric tear in 22% (11 patients) followed by liver 14% (7 patients) and splenic injury 10% (5 patients).[15] Thus, the most common organ injured was the spleen as observed by other authors as well as in our study. Compared to CECT, the laparoscopy was superior (to CECT) for the visualization of bowel and mesenteric injuries. Conversion to laparotomy was another observation. In our study 10 cases (45%) were managed laparoscopically. 12 cases (55%) required laparotomy after the diagnostic laparoscopy. These statistics were the same as observed by the various authors like Koto et al and Yehia et al.[16,19] As far as the operative procedure was concerned 45.5% of our cases were managed laparoscopically and the rest of the patients underwent laparotomy. Choi et al was able to manage all the cases laparoscopically and no conversion to laparotomy was required.[20] In our study mean duration of hospital stay in patients that were managed laparoscopically was 9.4 days and in those who underwent laparotomy was 17.8 days. In the study of Taner et al.[21] The mean hospitalization time was 2.75±1.20 days in patients who were managed laparoscopy, whereas it was 7.4±2.20 days in patients who underwent laparotomy. In the study of Po-Chu-Lee at el the mean hospital stays of patients who managed laparoscopically was 11 days and who required laparotomy was 21 days.[22] Koto et al observed that the mean length of hospital stay was 11 days in both patient groups who were managed either laparoscopically or required laparotomy.[19] In our study, the duration of hospital stay was comparable to the other studies. In the postoperative period 4 patients (18.2%) developed wound infection, 2 patients (9.1%) have a postoperative peritoneal collection and 1 patient (4.5%) patients had paralytic ileus postoperatively. The most common complication was wound infection which was similar to other studies.

CONCLUSION

The young population are the common victims of abdominal trauma. They are predominantly male and road traffic accidents are most common mode of injury. The majority of patients present with pain abdomen, distension, obstipation, and vomiting. The ultrasound and CT abdomen remains the invaluable investigation. The commonly injured organ is the spleen followed by the liver. The hospital stay is shortened in patients who are managed laparoscopically. The commonest postoperative complication is wound infection and paralytic ileus. Diagnostic and therapeutic laparoscopy is an advancement in the management of blunt injury abdomen. It helps in significant improvement in the mortality and morbidity and reduces the hospital stay and postoperative complications.

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