

## Original Research Article

# A clinical study of hollow viscus injury due to blunt trauma abdomen

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### ABSTRACT

**Background:** Blunt trauma abdomen is one of the most common causes of morbidity and mortality among younger age group. Hollow viscus injury is one of the most common cause of mortality following blunt trauma abdomen. The Objective of this research was to study clinical presentation, diagnostic methods, treatment modalities and outcome of hollow viscus injury following blunt trauma abdomen.

**Methods:** All patients with hollow viscus injury were included in this study, All the clinical, operative and postoperative parameters were recorded. It was a retrospective observational study.

**Results:** Total number of patients with hollow viscus injury following blunt trauma abdomen were 15%. Amongst them 88.88% were males and remaining were females. The mean age of patients was 32 years. Road traffic accident was the most common cause of blunt trauma abdomen, seen in 72 % of patients. In 81.25% patients free gas under diaphragm was seen and remaining patients were diagnosed by ultrasonography. Ileum is most commonly site of perforation, and postoperative complications were seen in 66% of patients. Mortality was seen in 22.22% of patients.

**Conclusions:** Hollow viscus injury following blunt trauma abdomen commonly seen in younger age group, and involves small bowel. Repeated clinical examination with appropriate imaging with multidisciplinary teamwork is the key for timely intervention for successful outcomes.

**Keywords:** Blunt trauma abdomen, Complication, Diagnostic methods, Hollow viscus injury, Mortality

### INTRODUCTION

Blunt Abdominal trauma is one of the most common causes among injuries caused mainly due to road traffic accidents.<sup>1</sup> The rapid increase in number of motor vehicles and its aftermath has caused rapid increase in number of victims to blunt abdominal trauma. Road traffic accidents being most common cause for blunt trauma abdomen, it accounts for 75 to 80 % of blunt abdominal trauma. Blunt injury of abdomen is also a result of fall from height, assault with blunt objects, industrial mishaps, sport injuries, bomb blast and fall from riding bicycle.<sup>2</sup> Hollow viscus injury (HVI) following blunt abdominal trauma is an infrequent

diagnosis.<sup>3</sup> The incidence of hollow viscus injuries following blunt abdominal trauma varies from 4 to 15%.<sup>4</sup>

Early diagnosis and effective management of hollow viscus injury following blunt trauma abdomen help in decreasing morbidity and mortality.

Hollow viscus injury following blunt trauma abdomen represent a real diagnostic and therapeutic challenge to surgeon, thereby representing importance of this study.

### METHODS

This is a retrospective study conducted in our department for a period of two years. We reviewed the medical

records of the patients who had blunt trauma abdomen and above 11 years of age. As this was a retrospective study, no informed written consent was required for inclusion in the study.

The patients who were diagnosed to have hollow viscus injury were included in the study, irrespective of the outcome of the treatment. The patients presenting with associated major injuries and with penetrating trauma were excluded.

The data collection included identification; history, clinical findings, diagnostic test, operative findings, operative procedures and complications during the stay in the hospital were all recorded on a proforma specially prepared. Demographic data collected included the age, sex, occupation and nature and time of accident leading to the injury.

Indications for surgical intervention in our study were haemodynamic instability from suspected intra-abdominal injury, clinical features of peritonitis, clinical deterioration while on conservative therapy.

#### Statistical analysis

Data are presented as mean and proportions as appropriate. Descriptive analysis was used for the study.

## RESULTS

Total numbers of blunt trauma patients presented to our hospital were 120, out of which 18 (15%) patients had hollow viscus injury. Out of 18 patients, males were 16 (88.88%) and remaining were females 2 (11.11%). The mean age of the patient was 32.44, youngest was 15 years and oldest was 52 years, as shown in Figure 1.

**Table 1: Time of presentation to hospital after trauma.**

Time of presentation (hours)	No of patients	%
0-6	5	27.77
7-12	6	33.33
13-18	3	16.66
19-24	2	11.11
> 24	2	11.11

Most common cause of blunt trauma abdomen was Road traffic accident (RTA) almost 72%, remaining causes were fall from height and assault, Figure 2.

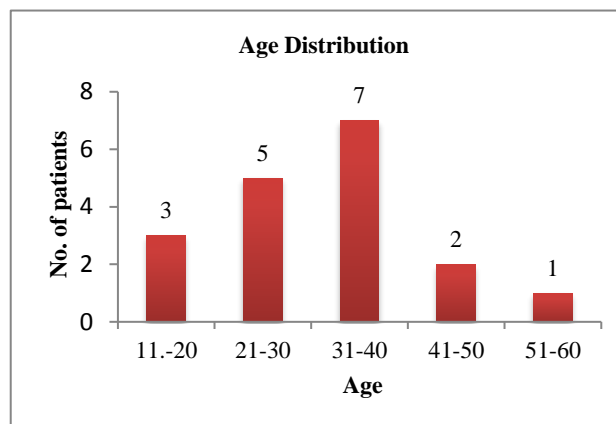
Majority of patients (76%) presented to hospital within 12-18 hours, but few delayed beyond 24 hours (Table 1).

Erect abdominal X-ray was possible in 16 patients; in 2 patients due to fracture pelvis it was not possible. Gas under diaphragm was demonstrated in 13 (81.25%)

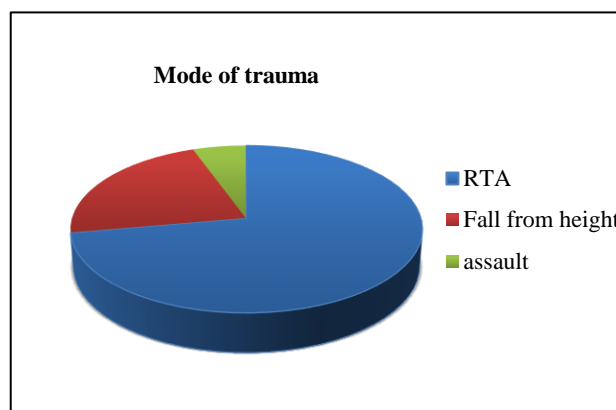
patients, 2 patients had ground glass appearance and in 1 patient it was normal. All patients underwent Ultrasonography and most common finding was free fluid in abdomen.

**Table 2: Site of perforation.**

Site of perforation	No of patients	%
Duodenum	2	11.11
Jejunum	5	27.78
Ileum	8	44.44
Colon	3	16.67



**Figure 1: Age distribution.**



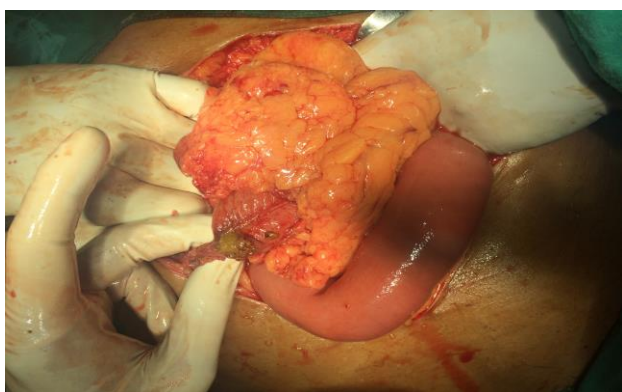
**Figure 2: Mode of trauma.**

All patients underwent exploratory laparotomy, Ileum being the most common site of perforation followed by jejunum, colon and duodenum. (Table 2, figure 3,4). Out of 2 duodenal perforation patients one of them had retroperitoneal perforation.

Primary closure of perforation with distal feeding jejunotomy was performed patients did well. In 12 patients primary closure of perforation was performed. 3 patients required resection and anastomosis and in 3 patients primary closure with proximal colostomy were done. The mortality in our study was 22.22% (4 patients). The causes of mortality were septicemia, delayed presentation and associated injuries.



**Figure 3: Post trauma ileal perforation.**



**Figure 4: Colonic perforation.**

## DISCUSSION

The incidence of bowel injury following blunt trauma abdomen ranges from 3-18%.<sup>5</sup> The frequency of hollow viscus injury post blunt abdominal trauma in our study is 15%, which is comparable to studies in literature. Most common age group affected is the younger age group and the usual cause being road traffic accident.<sup>6</sup> Other causes of bowel injury are fall from height and assault over abdomen. It's being reported that bowel injury is 3<sup>rd</sup> most commonly injured organ in blunt trauma abdomen.<sup>7</sup> There are two primary mechanisms by which intra-abdominal organs gets injured, these are 1) compression forces 2) deceleration forces. There is compression of abdominal organs and bowel between abdominal wall and vertebral column. Raised intra-abdominal pressure results in bursting of bowel.<sup>8</sup>

The time interval between the trauma and admission to hospital varies, and its detrimental factor in prognosis. In our study almost 60% patients presented within 12 hours and there was delay in presentation of remaining patients. The reasons for delay being transportation from distant places, delay in referral of patients from peripheral centers and relatively feeble peritoneal irritation by perforation.<sup>9</sup> It has clearly been demonstrated that delay in presentation as little as 8 hours adversely affects the outcome of small bowel perforation.<sup>3</sup>

All patients with blunt trauma abdomen present with severe pain in abdomen, guarding. In such situation to diagnose perforation solely on clinical basis is difficult. And hence Gastrointestinal perforation should be suspected in all cases of blunt trauma abdomen.<sup>10</sup> Various diagnostic tests are used to evaluate suspected patients of GI perforation following blunt trauma abdomen; these include X-ray erect abdomen, ultrasonography (USG), diagnostic peritoneal lavage (DPL), CT scan abdomen, and diagnostic laparoscopy. X-ray erect abdomen being cheap, readily available and easy test to interpret. Free gas under diaphragm is diagnostic finding in cases of GI perforation. In our study gas under diaphragm was seen in 81.25% of patients, which is similar to other studies. In case of negative X-Ray finding USG finding of free fluid in abdomen without solid organ injury is diagnostic of bowel injury, which was present in 3 patients.<sup>6</sup> CT scan is the best investigation for blunt trauma abdomen, but the disadvantages being availability of sources, require IV contrast agent to inject, costly and requires expert radiologist.

The most common site of perforation was ileum followed by jejunum, colon, and duodenum in our study, similar results are observed in other studies.<sup>11</sup> Majority of small bowel injury are frequently associated with mesenteric injury. It has been seen that colonic injury were less compared to small bowel injury, it has also been reported in literature.<sup>12</sup> All patients underwent exploratory laparotomy with drainage of collection, peritoneal lavage and repair. The type of repair depends upon local factors like vascularity, extent, whether single or multiple, time of presentation, peritoneal contamination, general condition of patient. For hollow viscus perforation the procedure of choice is simple closure. This was most commonly performed repair in present study consistent with other studies.<sup>13,14</sup> In case of multiple perforation or segmental avulsion of bowel, resection and anastomosis was considered. And for colonic perforation primary closure with covering proximal colostomy was done.

Postoperative complications were seen in 55.55% of patients, of which wound infection was most common due to peritonitis. Other complication seen were wound dehiscence in 2 patients, entero-cutaneous fistula and anastomotic leak in each patient. The patient with anastomotic leak second look laparotomy and patient with fistula were managed conservatively. In literature the mortality rate for blunt intestinal trauma quoted ranges from 10-30% in our study it was 22%, which were comparable. The most common cause for mortality was septicemia.<sup>15</sup>

## CONCLUSION

Hollow viscus injury following blunt trauma abdomen require high level of suspicion, careful clinical examination and imaging. Early diagnosis and treatment are of utmost importance. Small bowel is most commonly

injured than large bowel. Type of repair depends upon various local and generalized factors.

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