

## AN ANALYSIS ON HOLLOW VISCERAL INJURY AND ITS MANAGEMENT FOLLOWING BLUNT TRAUMA ABDOMEN AT A TERTIARY HEALTHCARE CENTRE

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### ABSTRACT

#### BACKGROUND

Trauma is "the neglected disease of modern developing nations." Hollow viscous injury following blunt trauma to abdomen is not common. The incidence of hollow viscous injuries following abdominal trauma varies from 2 to 15%. The following study was conducted at Department of General Surgery, MKCG Medical College and Hospital, Berhampur, a tertiary care hospital.

#### MATERIALS AND METHODS

All the patients admitted to MKCG Medical College and Hospital, Berhampur, with history of blunt trauma to abdomen were examined carefully. Those patients with symptoms and signs suggestive of visceral injury were identified and subjected to x-ray chest and abdomen erect view and ultrasound abdomen/CT scan. Those with features of pneumoperitoneum are subjected to laparotomy and treated according to location of perforation. Duration of study was from January 2016 to July 2017.

#### RESULTS

This study included people of different age groups from 13 to 65 years. Majority of the patients were men (83.5%) and most common mode was found to be road traffic accident (69.6%). Most of the patients injured were young and belonged to earning group (81.44%). Most common viscera injured was ileum (37.85%) Most common type of injury encountered in our study was isolated perforation and the common surgical procedure was primary closure.

#### CONCLUSION

In cases of polytrauma, blunt abdominal trauma contributes significantly to morbidity and mortality. Both the sexes were affected with a male preponderance. The most common mode of blunt trauma was found to be Road Traffic Accident (RTA). Adequate knowledge regarding suspecting intra-abdominal injuries and timely management at tertiary care centre can definitely bring a marked difference in the prognosis of polytrauma patients with history of blunt trauma to abdomen.

#### KEYWORDS

Blunt trauma, Pneumoperitoneum, Ileum, Perforation, Primary Closure.

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#### BACKGROUND

Trauma is the neglected disease of modern developing nations. All trauma is not road traffic injuries. 22.8% of all trauma is transport-related injuries. Majority (77.2%) is other modes trauma like falls, assaults, fall of objects, injuries due to burns, drowning, fire arms and intentional self-harm.

A trauma-related death occurs for every 1.9 minutes in India. Trauma is the leading cause of death and disability in developing countries and the most common cause of death under 45 years of age.<sup>1</sup> Trauma causes more loss than cancer and heart disease together.<sup>2</sup> In Indians younger than 40 yrs, the third most common cause of mortality seemed to be trauma.<sup>3</sup> Trauma to abdomen can occur following both penetrating and blunt injuries. Majority of abdominal traumas are of blunt character. Hollow viscous injury following blunt trauma to abdomen is not common. The incidence of hollow viscous injuries following abdominal trauma varies from 2 to 15%. Intestine is the third most commonly injured organ in blunt trauma abdomen following spleen and liver.<sup>4</sup> Injuries to the bowel and mesenteries occur in 3-5% of blunt abdominal traumas.<sup>5-7</sup> These polymorphic injuries (haematoma, tear, perforation, ischaemia) affect preferentially the small bowel and maybe

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responsible for bleeding and peritonitis. Most of the patients following hollow viscous injury due to blunt abdomen trauma presented to emergency department in shock due to peritonitis and haemorrhage due to polytrauma.<sup>8</sup> These patients are resuscitated immediately and investigated after stabilising their general condition. The early diagnosis and treatment remains the most important part of the management. Management of visceral injury due to blunt abdominal trauma is a major challenge for surgeons. Surgical intervention should be initiated as early as possible once the diagnosis of hollow viscera is made. A delay in diagnosis and hence treatment increases morbidity and mortality.<sup>8</sup> There is lack of large data sets and epidemiological data about the incidence, prevalence, diagnosis and outcomes of these injuries. The following study was carried at MKCG Medical College and Hospital, a tertiary health care centre in Southern Odisha with the aim to locate the site of injury and how it is managed.

**MATERIALS AND METHODS**

This is a prospective study on 103 patients who presented with features of visceral injury following blunt trauma abdomen and were treated in different surgical units of M.K.C.G. Medical College and Hospital, Berhampur. It was conducted during the time period of one and a half year from January 2016 to July 2017. The provisional diagnosis was established based on signs and symptoms supported by radiological evidences. The final diagnosis was made on laparotomy.

Ethical approval to conduct the study was granted by the Institutional Ethics Committee of M.K.C.G. Medical College and Hospital.

**Inclusion Criteria**

All patients with history of blunt trauma to abdomen.

**Exclusion Criteria**

1. Patients with penetrating trauma to abdomen.
2. Children with age less than 12 years.
3. Patients with positive findings in CT scan brain.

**Mode of Evaluation**

1. Detailed history about the mode of trauma and complete physical examination of all the trauma patients.
2. Blood investigations, blood grouping and Rh typing.
3. Chest x-ray PA view and x-ray abdomen erect.
4. USG abdomen and pelvis.
5. CT scan abdomen and pelvis.

The cases were followed from the time of admission till the time of discharge or death of the patient. After admission, history was taken, clinical examination was done. Patient were resuscitated and stabilised. All routine blood investigations were done. Electrolyte imbalances and renal function assessed and correction done if required. X-ray abdomen erect was done in suspected cases of peritonitis following trauma. In patients whom x-ray reports were

inconclusive, USG of abdomen and pelvis or CT scan was done. Cases were adequately prepared for emergency laparotomy. Patients were operated under anaesthesia.

The main procedures were primary closure, segmental resection and end-to-end anastomosis, closure of rents in mesentery and colostomy/ileostomy with or without resection of pathological bowel. The operative findings, surgical procedure done and operative diagnosis were noted. Patients were monitored in the postoperative period carefully. The patients were followed up till discharge or death and any complications were also recorded.

**OBSERVATION AND RESULTS**

Mode of Trauma	No. of Patients	Percentage
Road traffic accident	72	69.90%
Assault	15	14.56%
Fall from height	10	9.78%
Others	6	5.82%

**Table 1. Mode of Trauma**

Sex	Total Number of Patients	Percentage
Male	86	83.5%
Female	17	16.5%

**Table 2. Sex Distribution of Patients (n=103)**

Age	Total No. of Patients	Percentage
13-19	5	4.86%
20-29	30	29.12%
30-39	35	33.98%
40-49	19	18.44%
50-59	9	8.73%
60-69	5	4.85%

**Table 3. Age Wise Distribution of the Patients**

In my study, the age of the patients ranged between 18 to 65. The youngest being 18 years and oldest being 65 years. The mean age of presentation of patients is 32.36.

Symptoms	No. of Patients	Percentage
Pain abdomen	103	100%
Vomiting	52	50.48%
Constipation	34	33.09%

**Table 4. Symptom Wise Distribution of the Patients**

Vital Sign	No. of Patients	Percentage
Hypotension	34	33%
Tachycardia	56	54.36%
Hyperpyrexia	20	19.41%

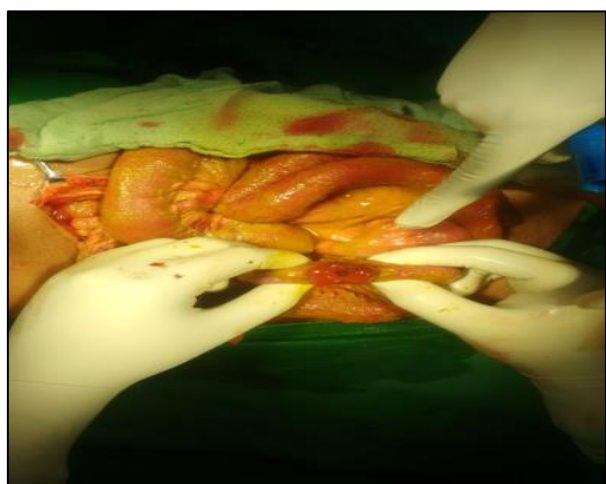
**Table 5. Signs of the Patients**

Organ Injured	No. of Patients	Percentage
Stomach	11	10.67%
Jejunum	Single perforation – 9	8.73%
	Multiple perforations - 3	2.91%
Ileum	Single perforation – 33	32.03%
	Multiple perforations – 6	5.82%
Mesentery	30	29.12%
Ascending colon	4	3.88%
Descending colon	4	3.88%
Rectum	3	2.91%

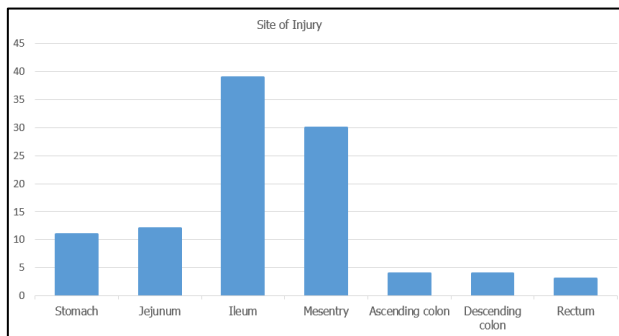
**Table 6. Anatomical Location of Perforation**



**Figure 1. X-Ray Abdomen Erect with Free Gas under Right Hemidiaphragm**



**Figure 2. Single Perforation on Proximal Ileum**



**Figure 3. Bar Charts Showing the Frequency of Organ Injured**

Bowel Injury	No. of Patients	%
With mesenteric tear	35	33.98%
Without mesenteric tear	68	66.01%

**Table 7. Association of Mesenteric Tears With Bowel Injury**

Surgical Procedure	No. of Patients	Percentage
Primary closure	70	67.96%
Resection and anastomosis	27	26.21%
Ostomies	6	5.82%

**Table 8. Various Surgical Procedures Done**

Complications	No. of Patients	Percentage
Wound infection	40	38.83%
Respiratory infection	35	33.98%
Enterocutaneous fistula	10	9.70%
Burst abdomen	6	5.82%
Death	23	22.33%

**Table 9. Complications in the Postoperative Period**

**DISCUSSION**

Majority of patients in my study belonged to the age group of 30-39 years. Therefore, it can be concluded that the young and the productive age group people are the usual victims of traumatic hollow viscous injuries. Around 83.5% of the patients are male and 16.5% of patients are female. The male population is more affected because in a country like ours males are engaged in outdoor activities and sole income earners in the family. All the patients in my study complained of pain abdomen and 50.48% of patients had vomiting. Around 56% of patients had tachycardia, 34% of patients were hypotensive and 20% of patients were febrile. Most common mode of trauma in my study was road traffic accident, followed by assault. Patients with signs of peritonitis like abdominal tenderness, localised guarding and rigidity, absent bowel sounds and obliteration of liver dullness were subjected to chest x-ray and x-ray abdomen erect to look for free air under diaphragm. Most of the patients had pneumoperitoneum, but in some cases where clinical and x-ray findings were not conclusive were subjected to ultrasonogram abdomen or computed tomography abdomen to look for free air depending on availability and taken up for surgery. Ileum (37.89%) was most commonly injured organ and rectum (2.91%) was the least injured organ in my study. Most common type of injury encountered in our study was isolated perforation and hence a simple refreshing of the edge of the wound, followed by primary wound closure of the wound was done in 67.96% of cases (in accordance with concept of damage control surgery thereby considerably reducing the duration of the surgery comparing to resection and anastomosis of bowel). There is clear evidence supporting primary repair in colorectal injuries.<sup>9</sup> Bowel injury was associated with tears in mesentery in about 33.98% of the patients. Most common complication in the postoperative period was wound infection (38.83%) followed by respiratory infections (33.98%). Wound infection in our study was higher than other studies. Long-term morbidity could not be exactly studied in our study.

Overall, mortality rate was 22.33% of this, majority of deaths occurred in polytrauma cases.<sup>10</sup> Mortality rates quoted from blunt intestinal trauma range from 10-30%.<sup>11</sup>

**CONCLUSION**

In cases of polytrauma, blunt abdominal trauma contributes significantly to morbidity and mortality. The most commonly affected group are the economically productive age group people. Both the sexes were affected with a male preponderance. The most common mode of blunt trauma was found to be Road Traffic Accident (RTA). Solid organs were injured more commonly than hollow visceral organs.

Small intestine particularly the ileum is the most common hollow viscus to be injured. Most common encountered lesion seemed to be isolated ileal perforation and these isolated perforations were treated by simple refreshing of edges of wound followed by primary closure of the perforation. Bowel with multiple perforations were treated by segmental resection of the injury bowel and end-to-end anastomosis. Mortality was more or less equal to other studies. Adequate knowledge regarding suspecting intra-abdominal injuries and timely management at tertiary care centre can definitely bring a marked difference in the prognosis of polytrauma patients with history of trauma to abdomen.

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