

**Hollow Viscus Injuries in Abdominal Trauma: A Clinical Study****Jyotirmaya Nayak<sup>1</sup>, Nagendra Kumar Rajsamant<sup>2</sup>, Sridhar Panda<sup>3</sup>,  
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**Abstract:****Background and goals:** To investigate the incidence of abdominal trauma. The incidence of blunt and penetrating abdominal trauma-induced hollow viscus lesions is investigated in this study. Demographics such as age and gender will also assist us understand stomach injury symptoms. Determine the duration between injury and surgery, as well as the effectiveness of treatment approaches.**Methods:** Between October 2021 and September 2022, 65 patients sought emergency care at the Department of General Surgery, SCB Medical college, cuttack for blunt or penetrating abdominal trauma caused by automobile accidents, attacks with various objects, acts of interpersonal violence, or unintentional falls. Those who had significant abdominal pain but exhibited no evidence of hollow viscus injury on imaging or after surgery were eliminated.**Results:** The starting factor declined with age, with 18 individuals aged 31 to 40 and 12 aged 41 to 50. 56 of the 65 patients were males, showing that men are more likely to be injured as a result of violence. 78 percent of the 65 patients with hollow viscus injuries had blunt trauma, whereas 13 had penetration. 25 of 42 patients had blunt hollow viscus injuries in car accidents, 9 from falls, and 8 from assaults. Of the 55 patients, 27 had primary perforation closure. Resection and anastomosis were necessary in 12 instances. Seven serosal tears mended without surgery.**Conclusion:** This research demonstrates that blunt abdominal trauma induces hollow viscus damage. As a result, patients with acute abdominal trauma should be assessed for hollow viscus damage. In dubious cases, extensive clinical testing, close observation, and further imaging are required to confirm the diagnosis and expedite surgery. The best restoration procedure is determined by age, intestinal pollution, underlying illnesses, and health. The most essential factors are surgeon skill and trauma center facilities.**Keywords:** Abdominal Trauma, Blunt Trauma, Gastrointestinal Injuries, Hollow Viscous Injuries.

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**Introduction**

According to studies, trauma is the leading cause of sickness and death in today's mobile population. Injuries to the abdominal organs are the third most frequent form of injury encountered in emergency departments, behind head and chest trauma. In hospital emergency departments, both blunt and penetrating injuries are prevalent [1, 2, 3].

Several analytical investigations on solid viscera have been undertaken since they are the most often affected organs in trauma. While solid visceral injuries are more common, the blood loss and bowel contamination associated with hollow viscus injuries make them as, if not more, deadly. Damage to the organs between the cervical region of the oesophagus and the anus, liver and biliary tract, and lower genitourinary system is referred to as

"hollow viscus injuries" when addressing abdominal trauma. The pattern of damage might range from a simple serosal tear to a full transection of the bowel or tracts [4, 5, 6].

Despite the latest techniques and newer technologies like Ultrasound scan, CT scan, MRI scan, and Endoscopy, a large number of patients with hollow visceral injuries can be diagnosed with reasonable accuracy using only the nature of the injury, a clear clinical history, a thorough clinical examination, and simple radiographs. Even a brief delay in diagnosis increases the severity of the disease and the chance of mortality [7, 8, 9].

Because abdominal hollow visceral injuries are so frequent nowadays, a general surgeon should be

able to diagnose and treat them clinically. The goal of this study was to learn more about the prevalence of abdominal trauma, the organs affected by penetrating and blunt abdominal injuries, and the consequences associated with these injuries [9, 10].

### Methods and Materials

Researchers observed 65 patients who sought care at the Department of General Surgery, SCB medical college and Hospital, cuttack, from October 2021 to September 2022 after suffering blunt or penetrating abdominal trauma as a result of car accidents, attacks with various objects, acts of interpersonal violence, or unintentional falls. Those who reported severe abdominal discomfort but no indication of hollow viscus injury on imaging examinations or after surgery were excluded from the study.

In the complete history, the patient's age, gender, kind of injury (blunt or penetrating), symptoms, and time from injury to admission were all documented.

All patients' haemoglobin, platelet count, blood urea, blood sugar, serum electrolytes, and blood grouping were all tested at the commencement of therapy. Because of the brief window in which symptoms develop, haemoglobin readings after hollow viscus may not properly indicate abrupt acute shock. A drop in haemoglobin levels is critical to the development of chronic shock. Glucose, urea, and creatinine levels are all measured. In senior people with diabetes and renal impairment, acute hollow viscus injuries might cause abnormalities. Urinalysis, blood nitrogen and oxygen levels, and abdominal x-rays were performed on healthy individuals.

An upright video makes it easier to see air beneath the diaphragm than a supine one, which is a typical symptom of hollow viscus injuries. Look for lower rib fractures on both the left and right sides; these might indicate spleen or liver injury.

Even a small buildup of 10 ml of air may be detected between the diaphragm and the liver fog. Consider various layers of flowing air. The usage of 700 cc of free blood is required due to the ground glass look of extensive haemoperitoneum. Retroperitoneal hematomas are suspected in the lack of opacities in the psoas and rectal regions, but air shadows in the belly and large intestine may indicate splenic injury. Those who are unable to stand owing to pain or sleepiness may still be assessed in depth utilising left lateral decubitus views. A four-quadrant aspiration with a 10 cc

syringe may detect blood or fluid deposits in the peritoneal cavity. In all instances, abdominal ultrasonography and computed tomography were not routinely done.

Following a complete clinical examination and early diagnostic workup, patients in hypotension or shock were given intravenous fluids, whole blood, and blood products. Gastric decompression and bowel rest were delivered to all patients via nasogastric tubes. The amount of urine generated by patients in shock was measured via bladder catheterization.

Keep a watch out for signs of genitourinary trauma, such as hematuria and urine retention. Broad-spectrum antibiotics prevented the development of intestinal septicemia in individuals with multiorgan failure and hollow viscus rupture [11, 12].

Patients were stabilised before undergoing laparotomy under epidural, spinal, or general anaesthesia, depending on the suspected location of damage and the patient's overall condition, followed by basic and specific radiological exams as required. Every single individual with a hollow viscus had surgery. The gastrointestinal tract (GIT) was inspected, which included the stomach, duodenum, small intestines, and colon. The smaller sac was often opened by suspects to view the retroperitoneum. It was established that bladder ruptures in the intraperitoneum and extraperitoneum were not included.

During the surgery, physicians assessed the patient's health and if they had a single or many perforations, as well as additional injuries such contusions and mesenteric rips. Each procedure was well thought out. Along with resection and anastomosis, omental patch closure was one of numerous alternatives.

A nasogastric aspiration, intravenous fluids, and antibiotics were administered postoperatively. Every day, the patients were treated and observed. Patients were discharged after surgery if they had fully recovered and then followed up with as required.

### Result

The following was found during an observational study of hollow viscus injuries in abdominal trauma, which included 65 patients admitted to the hospital with abdominal trauma. The research included a broad variety of characteristics, including age, gender, kind of injury (blunt vs. penetrating), location of damage (including impacted organs), radiological findings, and intervention approaches.

**Table 1: Age distribution**

Age (years)	No. of patients
<20	3
21-30	32
31-40	18
41-50	12

Only three of the 65 people studied were under the age of 20. Patients aged 21-30, who account for 32 of the total patients, had a higher incidence of RTAs and assaults, as well as greater abdominal damage. There were 18 cases between the ages of 31 and 40, but only 12 between the ages of 41 and 50, demonstrating that the initiating factor becomes less common with age.

**Table 2: Sex distribution**

Male	Female
56	9

Out of a total of 65 patients, 56 were male and 9 were female, suggesting a higher rate of injury among males due to the prevalence of violence against them.

**Table 3: Mode of injury**

Blunt injury	Penetrating injury
42	23

Seventy-eight percent of the 65 patients with hollow viscus injuries had their injuries caused by blunt trauma, whereas the other 13 patients had their injuries caused by penetration.

**Table 4: Type of blunt trauma**

Type of blunt trauma	No. of patients
RTA	25
Assault [knife, sharp objects]	8
Fall [free fall, fall from moving vehicle, fall following hit]	9

Road traffic accidents were shown to be the primary cause of blunt abdominal injuries. The bulk of the patients (25 of 42) had blunt hollow viscus injuries from car accidents, whereas the remaining patients (9 of 42) had similar injuries from falls and 8 from assaults.

**Table 5: Organs injured in blunt injury**

Organs injured	No. of patients
Jejunum [proximal, distal]	18
Ileum	14
Gall bladder [fundus]	5
Urinary bladder	3
Colon [transverse]	2

In individuals with traumatic abdominal injuries, the jejunum and ileum were shown to be the most commonly injured organs. We discovered that the intestines (jejunum and ileum) were affected in 18 of the 42 cases of physical trauma. Five individuals had their gallbladders perforated, and three had their urinary bladders ruptured. In two individuals, the transverse colon perforated.

**Table 6: Organs injured in penetrating trauma**

Organ injured	No. of patients
Ileum	9
Jejunum	6
Stomach	5
Colon [transverse]	3

**Table 7: Bowel injury and abdominal trauma**

Bowel injury	No. of patients
Jejunum	25
Ileum	22
Colon	3

The number of patients with little and major intestinal injuries due to trauma is depicted in this pie chart (50 out of 65 total). The big bowel was only injured in three cases.

**Table 8: Radiological findings based on x ray abdomen erect**

X ray abdomen erect	No. of patients
Air under diaphragm	35
Dilated bowel loops	7
Ground glass appearance	6
No abnormalities detected	10
Not taken	7

Air under the diaphragm was the most common abnormality discovered in 35 patients who underwent an erect x-ray. There were no significant findings for 10 patients. Due to their hemodynamic instability, 7 individuals did not have an X-ray taken.

**Table 9: Modes of management**

Mode of management	No. of patients
Primary closure of perforation	26
Omental patch closure of perforation	9
Resection and anastomosis	13
Repair of serosal tear	7
Open cholecystectomy	6
Urinary bladder repair	4

**Table 10: Gastrointestinal injury and management**

	Primary closure of perforation	Omental patch closure of perforation	Repair of serosal tear	Resection and anastomosis
Jejunum	15	5	3	2
Ileum	9	0	4	10
Stomach	0	4	0	0
Colon	3	0	0	0

The most prevalent kinds of repair for gastrointestinal injuries include primary closure of perforation, omental patch closure of perforation, repair of serosal rips, resection with anastomosis, and resection alone. Twenty-seven of the 55 patients with similar injuries had primary perforation closure. In 12 cases, resection and anastomosis were done. Serosal rips were healed with little surgery in seven instances.

### Discussion

In this prospective analysis of abdominal trauma from car accidents, falls from great heights, object attacks, and interpersonal aggression, 65 patients with hollow viscus injuries were included. One patient was under the age of 22, while 54% of the patients, or 29 persons, were between the ages of 21 and 30. The bulk of the instances (44, or 88%) involve men, with just seven involving women. Men are overrepresented in both automobile accidents and acts of interpersonal aggressiveness.

Researchers investigated the impact of both blunt and penetrating injuries separately. The most prevalent initial injury that led to a rupture of the hollow viscus was found to be blunt trauma. In 72% of patients, hollow viscus injuries were caused by blunt trauma, whereas 30% were caused by penetrating trauma. RTAs, assaults, and falls were all possible causes of blunt force trauma, with RTAs accounting for 65% of all blunt injuries. A fall caused 9 patients to get traumatic injuries, while six

patients were attacked by objects or other individuals. Penetrating wounds may be produced by anything such as a knife or a pistol, however gunshot wounds are unusual in our area. In 15 individuals, an abdominal stab trauma induced hollow viscus injury [13, 14].

Individuals with acute abdominal injuries often displayed symptoms such as pain, discomfort, guarding, external abdominal wall damage, hypovolemia, and shock. The most often reported symptom was abdominal ache. It was present in 55 patients. Hypovolemia and shock symptoms were seen in 17 of the patients. Despite the predominance of stomach pain, only 28 of 33 patients exhibited indications of guarding and stiffness. Outside the abdominal cavity, 13 people had bruises and contusions.

Individual organs impacted by blunt and penetrating trauma were noted. For both types, the small intestine was the predominant site of infection. Because of its retroperitoneal location, the duodenum is unlikely to have been injured. The most prevalent kind of intestinal bleed was damage to the jejunum or ileum. In 22 of the 42 patients with blunt abdominal trauma, the jejunum was affected, whereas the ileum was wounded in 15 of them. One patient was found to have intestinal injury. It is uncommon for the gallbladder to be perforated following trauma, however this occurred in 5 cases. Extraperitoneal urinary bladder perforations occurred in two cases [15, 16].

Ten individuals with hollow viscus penetrating lesions also had small intestine damage (6 ileal and 4 jejunal). Three incidences of stomach damage and one case of colonic injury were reported. When both blunt and penetrating trauma were examined, 23 patients (40%) had jejunal injuries and 19 patients (38% had ileal injuries). Two hddcolonic patients were hurt. The gastrointestinal tract (GI) was injured in 42 of the 65 individuals (82% of the total).

Plain abdominal radiographs, which may detect hollow viscus injuries as free air beneath the diaphragm or a ground glass appearance, are one of the most dependable and cost-effective tests accessible at almost any institution. Nonetheless, pneumoperitoneum is a symptom that does not always occur in individuals with hollow viscus injury.

On radiography, the majority of research participants, 35 out of 63, exhibited signs of free air beneath the diaphragm. Four patients, or 8%, had a ground glass appearance, which nearly invariably suggests hemoperitoneum. Eight individuals were judged to be normal despite findings such as serosal rupture or gall bladder perforation. Four people were unable to have X-rays taken because they were too hemodynamically unstable to be transferred for any kind of examination [17, 18].

Because all of the patients had hollow viscus injuries, drastic procedures were done with all of them. Sixty-five individuals were surgically treated. Despite the fact that surgical intervention was the gold standard of care for these patients, the first and most crucial therapy they got was resuscitation with intravenous fluids, blood, and blood products. Treatment included serosal rip repair, primary perforation closure, omental patch perforation closure, resection and anastomosis for gastrointestinal injuries, cholecystectomy for gall bladder perforation, and two-layer closure for urinary bladder injuries.

The most prevalent treatment was primary perforation closure. This procedure was performed on 23 patients (44% of the sample) owing to 14 jejunal injuries, 8 ileal injuries, and 3 colonic injuries. With four jejunal and three stomach patients, the omental patch closure rate was 15%. Two patients with a serosal tear in the jejunum and three patients with an ileal tear were treated with simple tear repair. One in every five cases required resection and anastomosis. The most prevalent form of therapy in ileal injuries was resection and anastomosis, with 9/10 patients having ileal damage and only 1/10 patients having jejunal injury [18, 19].

In summary, most jejunal injuries were treated with primary closure, whereas ileal injuries were treated with resection and anastomosis. Only two patients died in the time immediately after surgery, and the majority of patients recovered without incident. One patient died on the day of surgery after a fall

from a considerable height caused a traumatic damage to his ileum, necessitating resection and anastomosis. Another hospitalized patient died on the third postoperative day after receiving surgery to correct an ileal perforation caused by a severe injury acquired during an attack.

### Conclusion

Hollow viscus injuries in the stomach, small intestine, colon, rectum, gall bladder, and urine bladder are caused by blunt or penetrating abdominal trauma. Blunt-force wounds occur less often than solid viscera wounds. Trauma may result in anything from a little bruise to a potentially fatal loss of blood.

The patient should be checked clinically, radiographically, and otherwise to rule out gastrointestinal damage based on the cause of injury. An intra-abdominal injury may cause abdominal discomfort, distension, and peritoneal irritation. Hollow viscus injuries may be detected by physical examination and abdominal radiography. In hemodynamically stable patients, CT scans are the best non-invasive diagnostic for hollow viscus injuries and hemoperitoneum. In hemodynamically unstable patients, those with pneumoperitoneum on imaging, and those requiring surgery, a midline vertical incision should be utilized for abdominal exploration. Mesenteric and intramural hematomas often heal on their own. Inadequate resuscitation, extra comorbidities, surgical risk factors, and a longer, more difficult operation all raise the likelihood of complications.

The AAST Organ Injury system of the American Society for Trauma assesses gastrointestinal injuries. This finding is supported by CT and surgical evidence. If the patient has significant secondary injuries and unstable hemodynamics, damage control is feasible. Permanent repairs might be postponed for up to 24 hours. The size and location of intestinal damage determine whether primary repair or resection is performed. Grade I, II, and III stomach, small intestine, colon, and rectal injuries may be repaired immediately, while grade IV and V injuries, as well as multiple lesions along the same segment, need resection and anastomosis.

Primary repair - resection and anastomosis without a diversion colostomy - is advised for colonic or intraperitoneal rectal injuries. Extraperitoneal rectal damage could only need a proximal diversion colostomy. To avoid anastomotic leak in patients with ruptured stomachs, an intra-abdominal drain must be implanted at the esophagojejunal anastomosis site. Other gastrointestinal injuries should not be treated with drains. A temporary abdominal wall closure may be required after an exploratory laparotomy for trauma in order to schedule a second surgery.

Traumatic hollow viscus injuries need the use of an experienced physician, prompt decision-making, expert surgery, and proper postoperative care. A skilled surgeon, regardless of technology, is the greatest choice for treating a hollow viscus lesion. Doctors in emergency rooms must treat abdominal injuries, which is a primary cause of mortality. Clinical manifestations of blunt and penetrating injuries may vary. Hypotensive shock may result in a fatal collapse. Solid organ damage might be difficult to treat. When treating a patient with a hollow viscus injury and other significant injuries, life-threatening injuries should be prioritized. Contrary to earlier studies, this study found that blunt abdominal trauma is the leading cause of hollow viscus injuries.

As a result, any blunt abdominal trauma should be investigated for hollow viscus damage. In situations of ambiguity, further clinical tests, careful monitoring, and imaging are required to confirm the diagnosis and expedite surgery. The repair procedure is determined by the patient's age, intestinal pollution, underlying diseases, and overall health. The most important factors are surgeon expertise and trauma center resources.

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