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Original research article

Hollow viscus injuries in abdominal trauma: A clinical study

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Abstract

Background and objectives: To study abdominal trauma rates. This research examines the frequency of blunt and penetrating abdominal trauma-induced hollow viscus lesions. age and gender demographics also will help us comprehend stomach injury symptoms. Determine the time between injury and surgery and to evaluate treatment methods.

Methods: Sixty-five patients who sought emergency care at Department of General Surgery, Ayaan Institute of Medical Sciences, Moinabad, Telangana, India between October 2021 to September 2022 for blunt or penetrating abdominal trauma due to automobile accidents, attacks with various objects, acts of interpersonal violence, or unintentional falls were observed. Those who suffered from severe abdominal discomfort but showed no signs of hollow viscus damage on imaging examinations or during surgery were excluded.

Results: The initiating factor decreased with age, with 18 patients between 31 and 40 and 12 between 41 and 50. 56 of 65 patients were men, indicating a higher rate of injury among men owing to violence. Seventy-eight percent of the 65 hollow viscus injury patients had blunt trauma, whereas 13 had penetration. 25 of 42 patients had blunt hollow viscus injuries from motor vehicle accidents, 9 from falls, and 8 from attacks. Twenty-seven of 55 patients had primary perforation closure. 12 cases required resection and anastomosis. 7 serosal rips were healed without surgery.

Conclusion: This study shows that blunt abdominal trauma causes hollow viscus injuries. Hence, acute abdominal trauma should be evaluated for hollow viscus injury. In questionable instances, many clinical testing, vigilant observation, and further imaging must confirm the diagnosis to accelerate surgery. Age, intestinal pollution, underlying disorders, and health define the optimum restoration method. Surgeon expertise and trauma centre facilities are most important.

Keywords: Abdominal trauma, Blunt trauma, gastrointestinal injuries, hollow viscous injuries

Introduction

Studies have shown that among the mobile population of today, trauma is the primary cause of morbidity and mortality. After head and chest trauma, injuries to the abdominal organs are the third most common type of injury seen in emergency rooms. Injuries of both the blunt and penetrating variety are common in hospital emergency rooms [1, 2, 3].

Several analytical studies have been conducted on solid viscera since they are the most usually injured organs in trauma. While solid visceral injuries are more prevalent, the blood loss and bowel contamination associated with injuries to the hollow viscus make them just as dangerous, if not more so. When discussing abdominal trauma, the term "hollow viscus injuries" is used to describe damage to the organs between the cervical section of the oesophagus and the anus, liver and biliary tract, and lower genitourinary system. From a simple serosal rip to a complete transection of the bowel or tracts, the pattern of injuries can be extremely variable [4, 5, 6].

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, despite the latest techniques and newer technologies like Ultrasound scan, CT scan, MRI scan, and Endoscopy. The severity of the illness and the likelihood of death are both increased by even a short delay in diagnosis [7, 8, 9].

Since abdominal hollow visceral injuries are so common today, a general surgeon should be able to clinically suspect and treat them. This research aimed to better understand the frequency of abdominal trauma, the organs damaged by both penetrating and blunt abdominal injuries, and the outcomes associated with these injuries [9, 10].

Material and Methods

From October 2021 to September 2022, researchers observed 65 patients who sought care at an

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emergency room at Department of General Surgery, Ayaan Institute of Medical Sciences, Moinabad, Telangana, India 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 experienced traumatic abdominal pain but had no evidence of hollow viscus damage on imaging studies or during surgery were not included.

The patient's age, gender, type of injury (blunt or penetrating), symptoms, and time from injury to admission were all recorded in the detailed history taken.

Hemoglobin, platelet count, blood urea, blood sugar, serum electrolytes, and blood grouping were all measured at the start of treatment for all patients. Readings of haemoglobin following hollow viscus may not reliably reflect sudden acute shock because of the short window in which symptoms manifest. Vital to the development of chronic shock is a decrease in haemoglobin levels. Measurements of glucose, urea, and creatinine, Acute hollow viscus injuries may exhibit irregularities in elderly patients with diabetes and renal impairment. Urinalysis, Nitrogen and oxygen in the blood, Abdominal x-rays were taken of healthy people.

It is easier to spot air under the diaphragm in an upright video than in a supine one, which is a common sign of hollow viscus injuries. Look for fractures of the lower ribs on both the left and right sides; these can suggest damage to the spleen or liver.

Even 10 ml of air can be seen as a rounded accumulation between the diaphragm and the liver fog. Imagine different tiers of fluid air. The ground glass appearance of gross haemoperitoneum necessitates the use of 700 cc of free blood. In the absence of opacities in the psoas and rectal areas, retroperitoneal hematomas are suspected, while the presence of air shadows in the abdomen and the large intestine may point to splenic damage.

Those who are unable to stand due to discomfort or unconsciousness can still be evaluated with the same level of detail using left lateral decubitus views. Blood or fluid deposits in the peritoneal cavity can be found using a four-quadrant aspiration using a 10 cc syringe. The abdominal ultrasound and computed tomography were not routinely performed in all cases.

Patients in hypotension or shock were given intravenous fluids, whole blood, and blood products following a thorough clinical assessment and initial diagnostic workup. Gastric decompression and bowel rest were administered through nasogastric tubes to all patients. Bladder catheterization was used to track the volume of urine produced by patients in shock.

Keep an eye out for genitourinary trauma symptoms such hematuria and urinary retention. In patients with multiorgan failure and rupture of the hollow viscus, broad-spectrum antibiotics reduced the development of intestinal septicemia [11, 12].

Patients were stabilised, and then underwent laparotomy with epidural, spinal, or general anaesthesia depending on the suspected site of injury and the patient's overall health, after which basic and special radiological examinations were performed as needed. Every single person with a hollow viscus was operated on. The gastrointestinal tract (GIT) including the stomach, duodenum, small intestines, and colon, was examined. Suspects often inspected the retroperitoneum by opening the smaller sac. It was determined that intraperitoneal and extraperitoneal bladder ruptures were not included.

During the procedure, doctors took note of the patient's condition and whether or whether they had sustained a single or many perforations, as well as other injuries such as contusions and mesenteric tears. Each process was carefully considered. Omental patch closure was one of several options, along with resection and anastomosis.

A postoperative nasogastric aspiration, intravenous fluids, and antibiotics were given. Treatment and observation of the patients occurred every day. Patients were released following surgery if they had made a full recovery, and then followed up with as needed.

Result

The following was discovered during an observational research of hollow viscus injuries in abdominal trauma including 65 patients hospitalised with trauma to the abdomen to the casualty. The study took into account a wide range of variables, such as age, gender, kind of injury (blunt vs. penetrating), site of injury (including affected organs), radiological results, and methods of intervention.

1. Age distribution

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

Among the 65 individuals analysed, only 3 were younger than 20. An increased prevalence of RTAs and assaults, and consequently increased abdominal trauma, is seen among patients aged 21–30, who account for 32 of the total patients. There were 18 patients between the ages of 31 and 40, but only 12 between the ages of 41 and 50, indicating a declining incidence of the instigating factor with increasing age.

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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.

3. Mode of injury

Blunt injury	Penetrating injury
42	23

Seventy-eight percent of the 65 patients with hollow viscus injuries had suffered their injuries as a result of blunt trauma, whereas the other 13 patients had suffered their injuries as a result of penetration.

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

It was observed that road traffic accidents were the leading cause of blunt abdominal trauma. The majority (25 of 42) of the patients suffered blunt hollow viscus injuries from motor vehicle accidents, whereas the remaining patients (9 of 42) got these injuries from falls and 8 from attacks.

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

The jejunum and ileum were shown to be the most frequently affected organs in patients with blunt abdominal injuries. We found that 18 of the 42 instances involving blunt trauma involved the intestines (jejunum and ileum). Five patients experienced perforation of the gallbladder, and three patients experienced rupture of the urinary bladder. The transverse colon perforated in 2 patients.

6. Organs injured in penetrating trauma

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

The ileum and jejunum are the two most commonly damaged abdominal organs in cases of blunt force trauma. Twenty-three patients had penetrating abdominal trauma, with nine having ileal and six jejunal injuries, respectively. Five individuals sustained injuries to their stomachs, and three suffered injuries to their colons.

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.

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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.

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

10. Gastro intestinal 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		4	10
Stomach		4		
Colon	3			

Primary closure of perforation, omental patch closure of perforation, repair of serosal tears, resection plus anastomosis, and resection alone are the most common types of repair for gastrointestinal injuries. Twenty-seven patients out of 55 with such injuries underwent primary closure of perforation. Resection and anastomosis were performed in 12 instances. In 7 cases, serosal tears were repaired with little surgery.

Discussion

This prospective study of abdominal trauma from road traffic accidents, falls from heights, object assaults, and interpersonal violence included 65 patients admitted with hollow viscus injuries. One patient was younger than 22, while 54%, or 29 people, were between the ages of 21 and 30. The majority of the cases (44, or 88%) involve males, while only 7 involve females. In both vehicular accidents and acts of interpersonal aggression, men are disproportionately represented.

Researchers looked at the effects of both blunt and penetrating injuries independently. Blunt trauma was shown to be the most common initial damage that progressed to a rupture of the hollow viscus. Hollow viscus injuries occurred as a result of blunt trauma in 72% of patients and penetrating trauma in 30%. Road traffic accidents (RTAs), assaults, and falls were all potential causes of blunt force trauma, with RTAs accounting for 65% of all blunt injuries. 9 patients suffered blunt injury as a result of a fall, and six patients were assaulted by items or other people. Penetrating wounds can be caused by things like a knife or a gun, though shooting wounds are rather uncommon in our region. An abdominal stab wound caused hollow viscus damage in 15 subjects [13, 14].

Individuals with acute abdominal injuries typically exhibited symptoms including pain, soreness, guarding, exterior damage to the abdominal wall, hypovolemia, and shock. Abdominal pain was the most often reported symptom. There were 55 patients that had it. The symptoms of hypovolemia and shock were manifested in 17 cases. In a sample of 33 patients, only 28 showed signs of guarding and rigidity, despite the prevalence of abdominal discomfort. Bruises and contusions outside the abdominal cavity were present in 13 individuals.

Organs affected by blunt and penetrating trauma were recorded individually. The small intestine was the primary site of infection for both kinds. Because to its retroperitoneal placement, the duodenum has likely avoided any injuries. Damage to the jejunum or ileum was the most common type of intestinal bleed. The jejunum was injured in 22 of the 42 patients with blunt abdominal trauma, while the ileum was injured in 15 of the patients.

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One patient was diagnosed with a colon damage. It is quite unusual for the gall bladder to be perforated during trauma, however this happened in 5 patients. Two patients experienced extraperitoneal urinary bladder perforations [15, 16].

Ten patients with penetrating lesions to the hollow viscus also suffered small intestine injuries (6 ileal and 4 jejunal). There were three cases of stomach injury and one case of colonic injury. Briefly, when both blunt and penetrating trauma are considered, 23 patients had jejunal injuries (40%) and 19 patients had ileal injuries (38%). Two hdcolonic patients injuries. Forty-two of the 65 patients (82% of the total) suffered gastrointestinal tract (GI) injuries.

Plain abdominal radiographs, which can reveal hollow viscus injuries as free air under the diaphragm or a ground glass appearance, are one of the most reliable and cost-effective examinations available at practically any institute. Nevertheless, pneumoperitoneum is a symptom that is not always present in patients with damage to the hollow viscus.

The majority of the study's participants, 35 out of 63, had evidence of open air under the diaphragm on radiography. Four patients, or 8%, had a ground glass look, which almost always indicates significant hemoperitoneum. Due to observations like serosal rupture or gall bladder perforation, 8 patients were found to have no abnormalities. X-rays were unable to be taken on 4 individuals because they were too hemodynamically unstable to be moved for any kind of examination [17, 18].

All of the patients had injuries to the hollow viscus, therefore radical measures were taken with all of them. Sixty-five patients underwent surgical treatment. In spite of the fact that surgical intervention was the gold standard of care for these patients, resuscitation with intravenous fluids and blood and blood products was the first and most important treatment they received. Repair of the serosal tear, primary perforation closure, omental patch perforation closure, resection and anastomosis for gastrointestinal injuries, cholecystectomy for gall bladder perforation, and closure in 2 layers for urinary bladder injuries were all methods of treatment.

Primary perforation closure was the most common method used. A total of 23 patients (44% of the sample) underwent this operation due to 14 jejunal injuries, 8 ileal injuries, and 3 colonic injuries. The omental patch closure rate was 15%, with 4 jejunal and 3 stomach patients. Simple repair of the tear was used to treat two patients with a serosal tear in the jejunum and three patients with a tear in the ileum. One in five patients underwent resection and anastomosis. Resection and anastomosis was the most common method of care in ileal injuries, with 9/10 patients having ileal injury and only 1/10 patients having jejunal injury [18, 19].

In summary, primary closure was used for most of the jejunal injuries, while resection and anastomosis was used for the ileal injuries. The majority of patients had a trouble-free recovery after surgery, and only two passed away in the period immediately following the procedure. One patient had a fall from a great height cause a blunt injury to his ileum, requiring resection and anastomosis, however he passed away on the day of surgery. Another hospitalised patient suffered a fatal myocardial infarction on the third postoperative day after undergoing surgery to repair an ileal perforation following a traumatic injury sustained during an assault.

Conclusion

Blunt or penetrating abdominal trauma causes hollow viscus injuries in the stomach, small intestine, colon, rectum, gall bladder, and urine bladder. Blunt-force wounds are rarer than solid viscera wounds. Trauma can produce anything from a little bruise to a life-threatening loss of blood.

Based on the mechanism of injury, the patient should be examined clinically, radiographically, and otherwise to check for gastrointestinal injury. Abdominal pain, distension, and peritoneal irritation can indicate an intra-abdominal injury. Physical examination and abdominal radiography can detect hollow viscus injuries. CT scans are the best non-invasive test for hollow viscus injuries and hemoperitoneum in hemodynamically stable patients. A midline vertical incision should be used for abdominal exploration in hemodynamically unstable patients, those with pneumoperitoneum on imaging, and those who need surgery. Mesenteric and intramural hematomas often recover without surgery. Insufficient resuscitation, additional comorbidities, risk factors for surgery, and a lengthier, more complicated surgery increase the chance of complications.

The American Society for Trauma's AAST Organ Injury system rates gastrointestinal injuries. CT and surgical data support this conclusion. Damage control is possible if the patient has substantial secondary injuries and unstable hemodynamics. Permanent repairs can be delayed for 24 hours. Primary repair or resection relies on the extent and location of bowel injury. Grade I, II, and III stomach, small intestine, colon, and rectal injuries can be repaired initially, however grade IV and V injuries and repeated injuries along the same segment require resection and anastomosis.

For colonic or intraperitoneal rectal injuries, primary repair - resection and anastomosis without a diversion colostomy - is recommended. Extraperitoneal rectal injury may simply require proximal diversion colostomy. In ruptured stomach patients, an intra-abdominal drain must be placed at the esophagojejunal anastomosis site to prevent anastomotic leak. Drains should not be used after other gastrointestinal injuries. An exploratory laparotomy for trauma may require temporary abdominal wall

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closure to schedule a second procedure.

Traumatic hollow viscus injuries require a trained clinician, quick decision-making, skilled surgery, and adequate postoperative care. No matter the technology, a qualified surgeon is the best option for treating a hollow viscus lesion. Emergency department doctors must treat abdominal trauma, a leading cause of death. Blunt and penetrating injuries may have different clinical presentations. Hypotensive shock can induce a sudden collapse and death. Solid organ injuries can be complicated. Treating a patient with a hollow viscus injury and other serious injuries should prioritise life-threatening injuries. This study shows that blunt abdominal trauma is the main cause of hollow viscus injuries, contrary to previous research.

Hence, any blunt abdominal trauma should be assessed for hollow viscus injury. In cases of doubt, repeated clinical examinations, close monitoring, and further imaging are needed to confirm the diagnosis and accelerate surgery. The patient's age, intestinal pollution, underlying ailments, and health decide the repair method. Surgeon skill and trauma centre resources are the most essential determinants.

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Reference

1. Brooks AJ, Rowlands BJ. Blunt abdominal injuries Damage control.
2. Wiewióra M, Sosada K, Piecuch J, Zurawiński W. The role of laparoscopy in abdominal trauma - review of the literature.
3. Wideochirurgia i inne Tech maloinwazyjne = Videosurgery other miniinvasive Tech. 2011 Sep;6(3):121–6.
4. Cassar K. Kevin Cassar Commentary Diagnostic Peritoneal Lavage: an obituary? Vol. 18, Malta Medical Journal. 2006.
5. Feliciano D V, Bitondo-Dyer CG. Vagaries of the lavage white blood cell count in evaluating abdominal stab wounds. Am J Surg. 1994 Dec;168(6):680-3-4.
6. Bruscagin V, Coimbra R, Rasslan S, Abrantes WL, Souza HP, Neto G, *et al*. Blunt gastric injury. A multicentre experience. Injury. 2001 Dec;32(10):761–4.
7. Nance ML, Peden GW, Shapiro MB, Kauder DR, Rotondo MF, Schwab CW. Solid viscus injury predicts major hollow viscus injury in blunt abdominal trauma. J Trauma. 1997 Oct;43(4):618-22-3.
8. Ishikawa K, Ueda Y, Sonoda K, Yamamoto A, Hisadome T. Multiple Gastric Ruptures Caused by Blunt Abdominal Trauma: Report of a Case. Surg Today. 32(11):1000–3.
9. Tejerina Alvarez EE, Holanda MS, López-Espadas F, Dominguez MJ, Ots E, Díaz-Regañón J. Gastric rupture from blunt abdominal trauma. Injury. 2004 Mar;35(3):228–31.
10. Oncel D, Malinoski D, Brown C, Demetriades D, Salim A. Blunt gastric injuries. Am Surg. 2007 Sep;73(9):880–3.
11. Acs0708 Injuries To The Stomach, Small Bowel, Colon, And Rectum.
12. Moore EE, Cogbill TH, Malangoni MA, Jurkovich GJ, Champion HR, Gennarelli TA, *et al*. Organ injury scaling, II: Pancreas, duodenum, small bowel, colon, and rectum. J Trauma. 1990 Nov;30(11):1427–9.
13. Frick EJ, Pasquale MD, Cipolle MD. Small-bowel and mesentery injuries in blunt trauma. J Trauma. 1999 May;46(5):920–6.
14. Williams MD, Watts D, Fakhry S. Colon Injury after Blunt Abdominal Trauma: Results of the EAST Multi-institutional Hollow Viscus Injury Study. J Trauma Inj Infect Crit Care. 2003 Nov;55(5):906–12.
15. Choi WJ. Management of colorectal trauma. J Korean Soc Coloproctol. 2011 Aug;27(4):166–72.
16. Miller PR, Fabian TC, Croce MA, Magnotti LJ, Elizabeth Pritchard F, Minard G, *et al*. Improving outcomes following penetrating colon wounds: application of a clinical pathway. Ann Surg. 2002 Jun;235(6):775–81.
17. Cleary RK, Pomerantz RA, Lampman RM. Colon and Rectal Injuries. Dis Colon Rectum. 2006 Aug;49(8):1203–22.
18. Demetriades D, Murray JA, Chan L, Ordoñez C, Bowley D, Nagy KK, *et al*. Penetrating colon injuries requiring resection: diversion or primary anastomosis? An AAST prospective multicenter study. J Trauma. 2001 May;50(5):765–75.
19. Navsaria PH, Edu S, Nicol AJ. Civilian Extraperitoneal Rectal Gunshot Wounds: Surgical Management Made Simpler. World J Surg. 2007 May;31(6):1347–53.