

# Evisceration of the intestine following blunt force impact: Highlighting management

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## ABSTRACT

**Aims and objectives:** Evisceration of the abdominal parts following traumatic injury with high velocity impact is a rare entity. We are reporting five cases of high velocity injury with different findings. Our objectives are to present the potential clinical impact of injury and requirement of early management.

**Materials and Methods:** The present study was conducted in the Department of Surgery at Maharishi Markandeshwar Institute of Medical Sciences and Research, Maharishi Markandeshwar University, Mullana, from March 2010 to March 2013. A total of 150 cases were admitted, diagnosed with blunt and penetrating abdominal wall injury. We are presenting five cases diagnosed as eviscerated abdominal injury. Ultrasonography (USG) and computed tomography was done which helped us in their management.

**Results:** A total of five cases were admitted with evisceration of the abdominal parts. One case presented with a rare finding as the stomach and intestine were lying outside and on surgery, multiple perforations of the small intestine were seen. Ultrasonography and computed tomography (CT) helped in the management of the patient.

**Conclusion:** High velocity impact due to road side accidents can lead to severe abdominal organ injury or evisceration of the abdominal parts. It can cause morbidity and mortality, if not treated on time. USG and CT scans are the important diagnostic tools for diagnosing and preventing further complications. We came out with better prognosis as cases were operated on time. We treated the patients successfully without any mortality.

**Keywords:** Abdomen, blunt trauma, management, perforation, stomach, transverse colon

## INTRODUCTION

Traumatic evisceration of intra-abdominal organs through the abdominal wall can occur with penetrating or blunt trauma or a combination of these two. High velocity impact by a bicycle or motorcycle handlebar is a rare cause of traumatic abdominal wall hernia (TAWH).<sup>[1]</sup> Abdominal evisceration (AE) associated with TAWH is even less common, with one study reporting an incidence of approximately 1 in 40,000 trauma admissions.<sup>[2]</sup> Handlebar injuries to the abdomen from

bicycle accidents are commonly seen in Emergency Departments (EDs), but uncommonly result in rupture of the abdominal wall, as most sole bicycle accidents occur at low speed. When rupture of the abdominal muscles occurs, the skin remains intact most of the time, with only a resultant hernia. A report and review of 21 reported cases of closed abdominal herniation from handlebar injuries was published in 2004.<sup>[3]</sup> Rikki *et al.* reported three cases of TAWH along with one case of intestinal perforation diagnosed on laparotomy, though patient vitals were stable. They concluded that a patient with TAWH should be explored immediately so as not to miss other injuries.<sup>[4]</sup> The aim of the study was to determine the early outcome of the patients with abdominal wounds managed with either mandatory or selective laparotomy.

## MATERIALS AND METHODS

### Case 1

A 65-year-old female was brought to the ED after falling on the road, suffering an evisceration injury. She was hit by an auto-rickshaw, which lost control, travelling at a high speed. She was brought to the hospital

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in a collapsed state. On arrival at the Department of Accident and Emergency, she was unconscious. The patient was resuscitated and her blood pressure came to 90/60 mmHg and pulse at 120/min. On local examination, a large wound of 6 cm × 8 cm was present over the right side of the abdomen, and the skin around the injured area had bluish discoloration. The injury was obvious with small intestinal loops and a necrotized part of the omentum obscuring the wound beneath.

After excluding cervical and chest injuries, the resuscitated patient was taken to the theatre. The skin and subcutaneous tissues had been degloved into a 10 cm inferiorly based flap. The abdomen was opened through the midline. There was oozing from the wound site. The anterior rectus fascia was ruptured at its lateral margin in the right iliac fossa. The insertions of the external oblique, internal oblique and transversus abdominis muscles to the right rectus sheath were disrupted, leaving a ragged defect 9 cm in diameter. The small intestinal loops and a small extent of the greater omentum were herniated through the defect. There was a large tear in the ascending colon showing fecal material [Figure 1]. The small bowel was not injured, nor was any other intra-abdominal organ.

After thorough abdominal wash, the bowel was inspected, cleaned and kept inside. The muscles and sheaths were repaired utilizing mass closure technique with a PDS loop number - 1. The skin flap was irrigated and closed with an Ethilon suture over a small suction drain. The postoperative recovery was uneventful and the patient was discharged after 16 days.

### Case 2

A 37-year-old male reported in ED in shock with an alleged history of roadside accident. He was on a motorcycle and got hit by a car, both travelling at

high speeds. Abdominal contents were lying outside and bleeding was also present. His blood pressure was 70/40 mmHg and pulse was 146/min. On local examination, a dirty lacerated wound was present over the left ilioinguinal region from which stomach and small bowel loops were protruding outside. Bleeding was also present from the wound site.

The patient was immediately shifted to the operation theatre. Abdomen was opened through a midline incision and blood was present in the abdomen. Stomach and small loops were lying outside on the left side of the abdomen. The contents were returned to the abdominal cavity [Figure 2]. Multiple tears were seen in the mesentery and repaired. There were multiple perforations seen in the small intestine, both jejunum and ileum. After a thorough wash was given to the abdomen with normal saline, resection of the perforated area was done and ileo-jejunal anastomosis performed. Abdomen was closed in a single layer with polydioxanone loop and the injury site was repaired separately. The patient was kept on ventilatory support for 2 days. On the 7<sup>th</sup> postoperative day, liquids were started and on the 9<sup>th</sup> day, the patient was on a normal diet. The patient recovered well, but on the 6-month followup, the patient developed incisional hernia which was repaired.

### Case 3

A 26-year-old young male admitted in ED with polytrauma. He was in a car and got hit by a high velocity vehicle. He sustained injuries over the abdomen and thigh. The patient was semi-conscious and bleeding was present from the abdominal wall. Tenderness was present over the left side of the chest. Chest X-ray showed multiple rib fractures from 3<sup>rd</sup> to 6<sup>th</sup> ribs. Intercostal chest tube was placed. The patient was resuscitated, and intravenous fluids and third generation antibiotics were started.

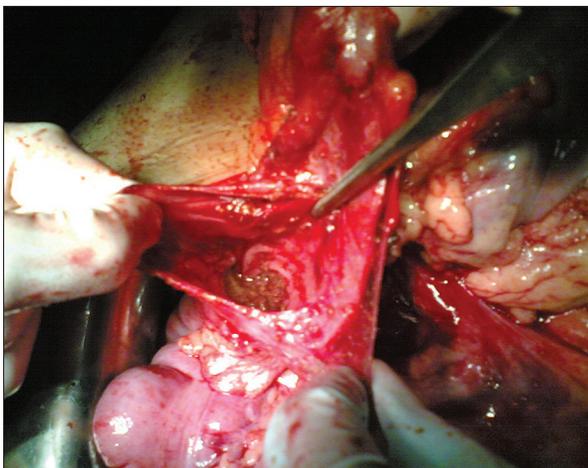


Figure 1: Operative picture showing injury in the large colon



Figure 2: Gross injured area showing contaminated wound, bowel loops



**Figure 3:** Gross photograph revealed small loops lying outside

Local examination revealed small bowel loops and mesentery lying over the skin on the right side of the abdomen in the iliac region [Figure 3]. Dirt was present over the wound. Exploratory laparotomy revealed gangrenous ileal loop including perforation of the ileal loop with mesenteric tear. Resection of the gangrenous loop was done and loop ileostomy was performed through the perforated loop in view of the critical condition of the patient and septicemia. The patient was discharged in satisfactory condition after 15 days.

#### Case 4

A 57-year-old farmer, while working in his fields, slipped on the mud and sustained an abdominal trauma. He reported to the ED with a complaint of abdominal pain. On admission, vital signs revealed blood pressure 120/80 mmHg, pulse 120/min, respiratory rate 26/min and temperature 98.7°F. Physical examination revealed no superficial injury. On abdominal examination, diffuse tenderness, guarding and rigidity were present. Diagnosis was in favour of peritonitis. Ultrasonography (USG) abdomen revealed 100 ml of fluid in the pelvis and X-ray chest showed gas under the diaphragm. On operation, fecal matter was present in the peritoneal cavity. A 3 cm × 3 cm perforation in the proximal transverse colon was appreciated in the antimesenteric border [Figure 4]. Rest of the gut was normal and there were no signs of any other injury. Primary repair of the perforation was done and thorough wash was performed. The patient was put on third generation intravenous antibiotic for 7 days. He was allowed liquids orally from the 5<sup>th</sup> day and normal diet from the 7<sup>th</sup> day. Postoperative period remained uneventful and patient was discharged after 7 days postoperative.

#### Case 5

A 31-year-old female reported in the ED with abdominal trauma 2 days ago. She complained of abdominal pain



**Figure 4:** Operative picture showing injury in transverse colon

and vomiting. There was no history of fever. The patient had injury over the abdomen with a knife penetrated into the abdomen. On examination, her vitals were stable. Abdomen examination revealed distention and tenderness along with guarding. There was injury seen just 1 cm lateral to the midline in the left lower costal space. Wound was seen deep into the abdomen, penetrating the peritoneum, as a finger could be moved into the abdomen. In view of peritonitis, surgery was planned. A midline incision was made and abdomen opened in layers. Operative findings were negative except for approximately 50 ml of serous fluid. Hence, abdomen was closed in layers and drain was kept in the pelvis, which was removed after 3 days. Patient was stable on the 1-month followup.

## DISCUSSION

Evisceration of abdominal organs through the abdominal wall is a relatively common event in adults after a penetrating injury. Evisceration due to blunt trauma is far less common and has been reported through the abdominal wall, vagina, anus and diaphragm.<sup>[4]</sup> TAWH associated with blunt injury mechanism is very rare, with an approximate prevalence of 0.2 - 1% in major reported series. TAWHs have been linked to both high energy (i.e., traffic/pedestrian accidents, falls from heights) and low energy (i.e., "handlebar hernia") mechanisms.<sup>[5,6]</sup> TAWHs are thought to result from a simultaneous surge in abdominal pressure and the presence of shearing forces that synergistically disrupt the abdominal wall musculature and fascial layers.<sup>[7]</sup> TAWHs are generally categorized into three major types: (a) A small abdominal wall defect caused by low-energy trauma with small instruments, e.g., bicycle handlebars, (b) a larger abdominal wall defect caused by high-energy injuries, and (c) rarely, intra-abdominal herniation of the bowel caused by deceleration injuries.<sup>[8]</sup> Consistent with the mechanism reported in the current case, many TAWHs have been associated with the victim

impacting on angled or curved surfaces/objects.<sup>[5]</sup> Most instances of eviscerations encountered in trauma are caused by abdominal stab wound injuries, which generally require laparotomy.<sup>[4]</sup> There have been reports of blunt evisceration following motor vehicle accidents.<sup>[9]</sup> Evisceration can occur through natural orifices, trans-anally as a result of high suction at a pool or from an abdominal crush injury or perianally.<sup>[10-13]</sup> Bâ *et al.*<sup>[14]</sup> reported a 7-year-old girl, who had a haemorrhagic shock with transanal evisceration of the small intestine following a blunt trauma to the abdomen. This clinical presentation occurred at the waning of a traffic accident.

Sometimes, associated hollow visceral injuries and vascularization of the herniated bowel loops can be overlooked on a computed tomography (CT) scan. Nowadays, multidetector CT (MDCT) is the new imaging technique employed in blunt trauma patients of abdomen and pelvis. It easily detects the solid organ injuries with associated bowel or mesenteric injuries and decreases the morbidity and mortality. However, challenges still continue in abdominal and pelvic CT images of trauma cases. Moreover, with the help of the advanced technology such as MDCT, new CT features of bowel or mesenteric injuries have been identified.<sup>[15,16]</sup> The presence of extraluminal air or fluid on MDCT is significantly correlated with blunt hollow viscus injury. Extraluminal air had the highest specificity (98.1%), but low sensitivity (62.5%) while extraluminal fluid had the highest sensitivity (95.8%), but low specificity (36.2%). By comparison, unexplained fluid in the absence of solid organ injury had a higher specificity than the unspecified extraluminal fluid (73.3% vs. 36.2%).<sup>[17]</sup> To diagnose an overall abdominal wall injury, severity graded on a scale from I to VI was described on CT scan by Dennis *et al.*<sup>[18]</sup> Of note, among the 140 patients with CT-diagnosed abdominal wall injuries in that study, only three had TAWH (grade V injury) and none of the patients had grade VI injury (i.e., complete abdominal wall disruption with evisceration). This report describes a case of grade VI injury - an exceedingly rare finding.

A penetrating or blunt trauma or a combination of both can cause evisceration of intra-abdominal organs through the abdominal wall. Immediate resuscitation is the first line of management. Immediately thereafter, it is essential to establish if the eviscerated organs are viable. In the presence of vascular compromise, it is crucial to extend the wound in the abdominal wall to secure adequate perfusion of the eviscerated organs. This can be performed in the emergency room as a temporizing procedure while waiting for theatre. However, if there is herniation of strangulated necrotic bowel, the patient should be transferred to the theatre as a matter of emergency. The eviscerated

part should be clamped and resected at the neck of the hernia to prevent systemic spread of toxic products like potassium, hydrogen, and lactate, together with endotoxins and bowel flora, which might cause cardiac arrest and/or renal failure.<sup>[8]</sup>

In their results, they found evisceration of organ and omentum in 35 (53%) and 31 (47%) patients, respectively. The evisceration of organs was as follows (number of patients): Small bowel in 27 (40.9%), stomach in 2 (3%), colon in 1 (1.5%), small bowel and stomach in 2 (3%), and small bowel and colon in 3 (4.5%). A negative laparotomy occurred only in 2 (5.7%) patients with organ evisceration. In total, 23 patients with omental evisceration (21 with peritonitis, 1 with a head injury, 1 who failed abdominal observation) underwent therapeutic laparotomy.<sup>[19]</sup> There has been controversy about performing a full laparotomy or just reduction of the herniated organs and closure of the abdominal wall defect under local anaesthesia. Emergency laparotomy should be done in evisceration of both omentum and organ, and in suspected cases of peritonitis with TAWH.<sup>[16,19]</sup> Singal *et al.* in their study recommended that patients with blunt or penetrated/evisceration injury should undergo laparotomy.<sup>[8,16]</sup>

The rate of organ injuries has been reported to be as high as 70 - 80%. Delaying laparoscopy for 24 h allows the patient to undergo serial abdominal observations, thereby defining the patients with significant enteric injury and obviating the need for nontherapeutic laparotomy in the presence of minor haemoperitoneum. Early diagnostic laparoscopy was performed 6 h after admission, to assist in excluding injury to the hollow viscera.<sup>[19]</sup> An 88% conversion rate to laparotomy was recorded in their series because of the presence of haemoperitoneum and the concern for missing enteric injuries; however, no enteric injuries were detected at laparotomy. Only two patients in the current series presenting with organ evisceration underwent a negative laparotomy. Both had a hole in the abdominal wall, large enough for the bowel to come out, which when shoved back would simply pop back out. Both of these patients underwent repair of abdominal wall defects or "acute traumatic hernias."<sup>[19]</sup>

Regardless of the presence of any associated injuries, prompt surgical repair of the TAWH and/or AE is still required.<sup>[18,20]</sup> At the time of surgical repair, the surgeon should perform a standard trauma laparotomy via separate midline abdominal incision, followed by either a mesh and/or primary repair of the traumatic abdominal wall defect. At times, immediate abdominal wall reconstruction may not be possible; instead, a staged abdominal wall closure might be required.<sup>[21]</sup>

## CONCLUSIONS

- Prompt and an aggressive search for other associated injury should be done in TAWH and evisceration injured cases
- USG and contrast-enhanced CT should be done in all cases
- Exploratory laparotomy and surgical repair of the abdominal wall defect is necessary
- Long-term follow-up is required to assess the cosmetic outcomes and any recurrence of the hernia at the operated site.

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