Case Report

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Surgery Section

Isolated Mesenteric Vascular Injury Following Blunt Abdominal Trauma Leading to Massive Segmental Gangrene of Small Gut: A Case Report

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ABSTRACT

Isolated mesenteric vascular injury following blunt abdominal trauma as a result of road traffic accidents is rare. Delay in reaching hospital, delay in diagnosis, or late operative intervention could lead to increased morbidity, prolonged hospital stay and even mortality. We herein report a case of such injury with subsequent massive segmental small bowel infarction. The patient was referred to our institute ten hours after the alleged accident. Resection of the infarcted bowel segment with end-to-end anastomosis was done. We highlight the various techniques for timely diagnosis and management of isolated mesenteric injuries. A high index of suspicion, early detection and prompt surgical intervention is required when there are minimal symptoms and signs, which might avert adverse outcome.

Keywords: Haemoperitoneum, Ileal infarction, Isolated mesenteric injuries

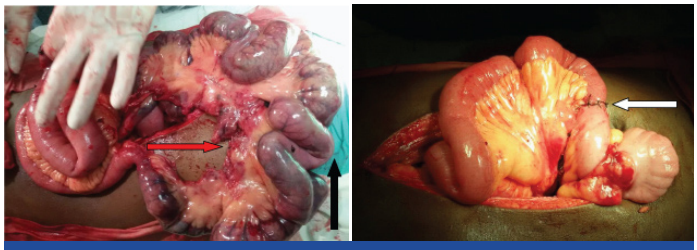
CASE REPORT

A 40-year-old male presented to the trauma and emergency department of our institute with history of road traffic accident. He was driving a truck which met with a head on collision with a stationary object; he was wearing a seat belt and sustained injuries to the abdomen. The patient was admitted and treated at a local hospital by a general practitioner with analgesics for complaint of pain abdomen and was referred out when the general condition deteriorated.

He was received at our institute ten hours after the alleged accident in an unstable condition. The patient was conscious and well oriented. On physical examination, pulse rate was 128/minute, low in volume and blood pressure was 80/40 mm of Hg. He was tachypnoeic. Airway was patent with an oxygen saturation of 99% through an oxygen mask. Abdomen was tense and tender with guarding and rigidity. Bowel sounds were absent. There was no associated external injury on the abdomen. Rest of the systemic examination revealed no abnormality. Focused Abdominal Sonography for Trauma (FAST) showed gross free fluid in the peritoneal cavity with dilated bowel loops suspicious of haemoperitoneum.

Patient underwent emergency exploratory laparotomy two hours after admission following initial resuscitation. Abdomen was entered through midline incision. At laparotomy, around 2 litres of altered blood with clots was found inside peritoneal cavity. There was a single transverse small bowel mesenteric tear with no active bleeding. Almost whole of the ileum was gangrenous sparing approximately 5 inches of distal ileum [Table/Fig-1]. Bowel perforation or other intra-abdominal visceral injury was absent. Resection of the infarcted segment with primary jejuno-ileal double layer anastomosis was done using 3/0 polyglactin and 3/0 silk [Table/Fig-2]. Protective stoma could not be done due to lack of adequate length of ileum. Two large bore intra-peritoneal drains were given and kept in situ for seven days.

Two units of whole blood and two units of packed red blood cells were transfused during intra-operative and post-operative period. Patient was kept on parenteral nutrition for one week. Post-operative recovery was uneventful. He was discharged on the 12th post-operative day with an advice for high carbohydrate low fat diet. Histopathology showed infarcted ileum with viable tissue at the resected ends. Patient is now on follow-up and doing well-one year post surgery with no complaints.



[Table/Fig-1]: A single transverse tear in small bowel mesentery (red arrow) with massive segmental gangrene of ileum (black arrow). **[Table/Fig-2]:** Primary double-layered jejuno-ileal anastomosis done (white arrow).

DISCUSSION

Abdominal vascular injuries following blunt trauma are uncommon as compared to penetrating wounds of the abdomen. Isolated mesenteric injury with subsequent small bowel infarction after Blunt Abdominal Trauma (BAT) in road traffic accidents has a further rarer incidence [1]. Undiagnosed mesenteric injuries are associated with high morbidity and mortality rates due to life-threatening haemorrhage from disruption of mesenteric vessels, bowel infarction and peritonitis [2]. The mechanism of injury involved is either direct compression forces or shearing and deceleration forces in BAT [3].

Clinical manifestations of patients with isolated mesenteric vascular injury include features of intra-abdominal bleeding and peritoneal irritation. The delayed and late manifestations might be due to sepsis, bowel infarction and bowel stenosis or adhesion formation. Abdominal pain, tenderness, distension, hypotension and shock are non-specific clinical findings in mesenteric blunt trauma injuries. Sometimes retroperitoneal haematoma ensues with minimal abdominal signs and the injury may remain unrevealed until hypovolemic shock sets in [3]. Seat belt sign refers to a mark on the abdominal wall along the strap site which varies from mild bruising or haematoma formation to even fat and muscular disruption [4]. The absence of this sign does not exclude intra-abdominal vascular or visceral injury as illustrated in our case. Furthermore, in patients with concomitant head and spinal cord trauma and in those with a decreased level of consciousness, physical assessment for intra-abdominal injury might not be reliable [5].

The appearance of signs and symptoms in mesenteric injuries might be delayed. Patient may remain asymptomatic with subtle and non-specific clinical signs during initial evaluation [3]. Thus, sole dependence on clinical parameters while evaluating patients with BAT can lead to unacceptable diagnostic delays. Moreover, surgical intervention based entirely on physical examination has a high negative laparotomy rate of 40% [2]. Major trauma patients are still often dealt initially by non-specialist doctors with limited experience in this field; our case too first encountered a general practitioner. Availability of tertiary trauma care facilities and diagnostic procedures are imperative to the management of accident victims.

Jansen et al., suggested a low threshold for investigations in BAT as almost 10% of patients with no clinical signs of injury and radiological evidence of abdominal injury [5,6]. Further investigation in our case was, when the patient was haemodynamically stable that might have resulted in earlier diagnosis. Diagnostic Peritoneal Lavage (DPL) is a highly accurate test for detecting haemoperitoneum [7]. Its drawbacks include risk of visceral injury (0.6%) and high rate (36%) of non-therapeutic laparotomy. Ultrasound is now the investigation of choice in haemodynamically unstable patients and DPL is reserved for resource constraint settings. Ultrasound can be performed concurrently with resuscitative measures and FAST can be carried out by non-radiologists [5]. However, mesenteric injuries might be missed by ultrasound; therefore it is not preferred in haemodynamically stable patients with BAT in comparison to Computed Tomography (CT) scan [8].

CT is both highly sensitive and specific for the diagnosis of mesenteric injury. Multidetector CT can determine the source of haemorrhage by detecting arterial contrast extravasation and may assist in determination of operative intervention [9]. Free peritoneal fluid, infiltration of mesenteric fat, mesenteric haematoma, vascular beading and abrupt termination of mesenteric vessels are the features that can be marked in CT [2]. A careful search for these findings is crucial for early detection of mesenteric injuries. But when the CT findings are non-specific, the decision for surgical intervention largely depends upon clinical assessment. Diagnostic laparoscopy is an emerging option for evaluating haemodynamically stable patients [4].

Laparotomy is indicated in presence of peritonitis, uncontrolled shock or hemorrhage, haemoperitoneum without evidence of solid organ injury, CT signs of significant bowel or mesenteric injury and clinical deterioration during observation. Conservative approach requires close monitoring of vitals, physical signs and a re-evaluation using CT. Treatment of mesenteric vascular injuries includes volume resuscitation, rapid exposure of injuries, arterial anastomosis and resection of infarcted bowel [10]. Patients with a short bowel due to loss of ileum may have gradual under-nutrition. They are advised high carbohydrate low oxalate diet [11]. Resection of more than 100 cm of terminal ileum may occasionally lead to bile salt mal-absorption and diarrhea which may be treated with cholestyramine. Residual length of small bowel less than 70-100 cm results in short bowel syndrome requiring long term parenteral nutrition [10].

CONCLUSION

It is not easy to recognize an isolated traumatic injury to the mesentery after BAT as many injuries may not manifest during the initial assessment and physical examination is neither sensitive nor specific. Furthermore, missed diagnosis is associated with increased morbidity and mortality as seen in our case. Judicious selection of appropriate investigations along with clinical judgment is of immense value in determining prognosis in trauma patients. Early detection and emergency surgical intervention when necessary might avert poor outcome in mesenteric injuries.

REFERENCES

[1] Wani I, Bhat RA, Wani S, Khan N, Wani RA, Parray FQ. Isolated small bowel mesentery injury after steering wheel trauma. *Trauma Mon*. 2012;17(2):279-81.
[2] Brofman N, Atri M, Hanson JM, Grinblat L, Chughtai T, Brenneman F. Evaluation of bowel and mesenteric blunt trauma with multidetector CT. *Radiographics*. 2006;26(4):1119-31.
[3] Praveen S, Jayanth SH, Girish Chandra YP, Harish S. Death due to Isolated mesenteric vascular injury following blunt abdominal trauma: A case report. *J Indian Acad Forensic Med*. 2010;32(3):251-53.
[4] Vailas MG, Moris D, Orfanos S, Vergadis C, Papalampros A. Seatbelt sign in a case of blunt abdominal trauma; what lies beneath it? *BMC Surgery.* 2015;15:121.
[5] Jansen J O, Yule S R, Loudon M A. Investigation of blunt abdominal trauma. *BMJ*. 2008;336:938-42.
[6] Salim A, Sangthong B, Martin M, Brown C, Plurad D, Demetriades D. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury. *Arch Surg*. 2006;141:468-75.
[7] Nagy KK, Roberts RR, Joseph KT, Smith RF, An GC, Bokhari F, et al. Experience with over 2500 diagnostic peritoneal lavages. *Injury*. 2000;31:479-82.
[8] Stengel D, Bauwens K, Sehouli J, Rademacher G, Mutze S, Ekkernkamp A, et al. Emergency-ultrasound-based algorithms for diagnosing blunt abdominal trauma. *Cochrane Database Syst Rev*. 2005;(2):CD004446.
[9] Genovese EA, Fonio P, Floridi C, Macchi M, Maccaferri A, Ianora AAS, et al. Abdominal vascular emergencies: US and CT assessment. *Critical Ultrasound Journal*. 2013;5(1):S10.
[10] Aydin U, Unalp OV, Yazici V, Guler A. Success of microvascular surgery; repair mesenteric injury and prevent short bowel syndrome: a case report. *BMC Emergency Medicine*. 2007;7:11.
[11] Nightingale J, Woodward JM. Guidelines for management of patients with a short bowel. *Gut*. 2006;55:iv1-iv12.

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