



Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/20823

DOI URL: <http://dx.doi.org/10.21474/IJAR01/20823>



RESEARCH ARTICLE

JOURNEY THROUGH AN ACUTE ABDOMEN FOLLOWING ROAD TRAFFIC ACCIDENT: A CASE REPORT

Satyajit Kanteshwari Kumathalli, Veda Chigurupati and Ali Reza

Manuscript Info

Manuscript History

Received: 17 February 2025

Final Accepted: 20 March 2025

Published: April 2025

Abstract

Severe blunt abdominal trauma from road traffic accidents (RTA) remains a significant contributor to intra-abdominal hemorrhage and visceral injury. Intraabdominal vascular injuries due to blunt abdominal trauma are very rare but fatal. We present the case of a 37-year-old male truck driver who sustained complex abdominal injuries after a high-impact collision involving a steering wheel. Despite an initial stable airway and neurologic profile, focused assessment with sonography for trauma (FAST) revealed intra-abdominal bleeding. Emergency exploratory laparotomy revealed a rare Superior mesenteric vein (SMV) tear along with catastrophic mesenteric and bowel injuries necessitating staged surgical management. This case highlights the critical importance of prompt surgical intervention in blunt mesenteric trauma as venous injuries often fail to get identified with no obvious active extravasation on preliminary CT findings as was in this case.

"© 2025 by the Author(s). Published by IJAR under CC BY 4.0. Unrestricted use allowed with credit to the author."

Introduction:-

Blunt abdominal trauma (BAT) remains a leading cause of significant internal injury in patients involved in road traffic accidents (RTAs), particularly those involving high-speed impacts. Approximately 13–15% of patients with blunt abdominal trauma require surgical intervention, and among these, small bowel and mesenteric injuries are some of the most serious and often underdiagnosed lesions [1].

Although small bowel injuries occur in less than 1.1% of all trauma admissions, they are associated with high morbidity due to the potential for delayed diagnosis and rapid progression to ischemia, perforation, and sepsis [2]. One of the most common mechanisms for such injuries is direct anterior abdominal compression, such as from a steering wheel during a vehicular collision. This force can cause the bowel to be crushed against the vertebral column, leading to mesenteric tears, vascular injury, or full-thickness bowel rupture, often with minimal external signs [3].

Clinical assessment remains paramount, especially since imaging studies—while valuable—can fail to detect evolving mesenteric injuries or low-volume bleeding. Early signs such as abdominal guarding, rigidity, or unexplained hypotension in the absence of obvious bleeding sources should prompt consideration of exploratory laparotomy. Furthermore, intraoperative findings often reveal more extensive injuries than initially suspected, reinforcing the need for a high index of suspicion [4].

This case report details a rare and severe presentation of multiple mesenteric tears, vascular injury especially a rare Superior mesenteric vein (SMV) and artery (SMA) injury and small bowel ischemia following blunt abdominal trauma from steering wheel impact. It underscores the importance of timely surgical exploration and damage control strategies in managing these life-threatening injuries.

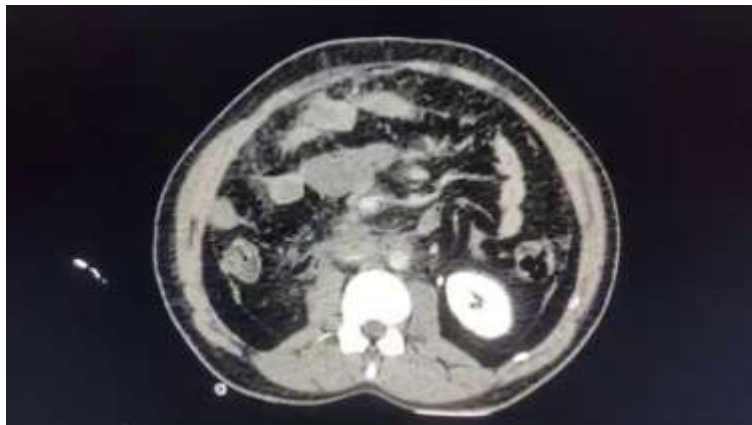
Case Presentation:

A 37-year-old male was brought to the emergency department 30 minutes post-RTA involving a trailer-versus-divider collision. The mechanism of injury involved direct impact from the steering wheel.

Initial Assessment:

The patient was alert with a GCS of E4V5M6, later decreasing to E4V4M6. Vitals showed mild tachycardia, elevated BP, and tachypnea, with normal SpO₂ on supplemental oxygen. The airway was patent, and there were no neurological deficits. Chest examination revealed decreased air entry in the lower zones, and the chest compression test was negative. The abdomen was tender with guarding and no external injuries. FAST was positive in the perihepatic, splenic, and interbowel regions, indicating intra-abdominal injury.

CECT Findings:



A preoperative contrast-enhanced CT scan of the abdomen and pelvis was performed. Key findings included:

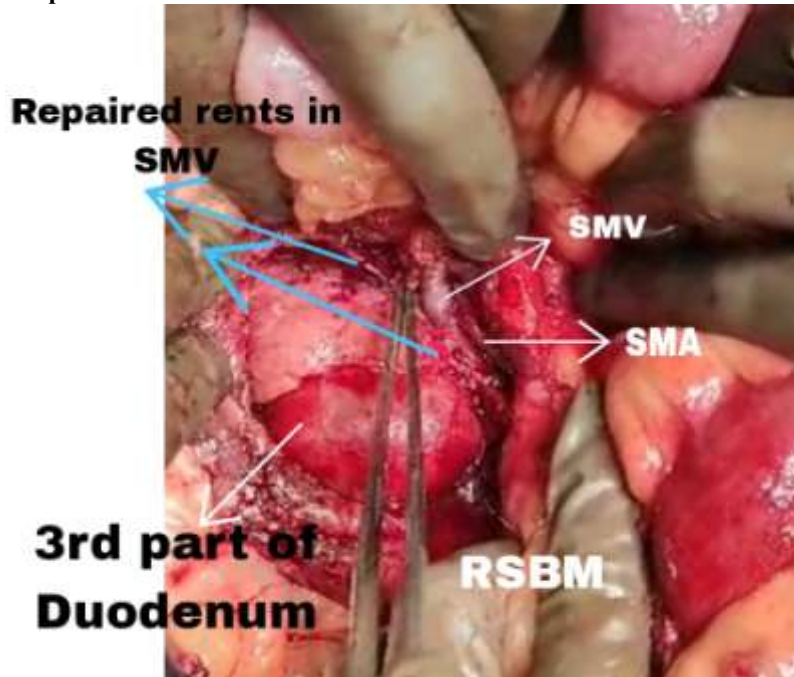
- Mesenteric hematoma and subtle contrast extravasation near the root of the mesentery
- Focal bowel wall thickening and surrounding fat stranding, suggestive of mesenteric vascular injury
- Moderate free fluid in the inter-bowel and pelvic regions without solid organ injury
- Mild pneumoperitoneum visualized in the reviewed sections

These findings were highly suggestive of bowel and mesenteric injury and supported the need for urgent surgical exploration.

Intraoperative Findings (First Surgery):

- 700 mL clotted blood evacuated, 4500 mL frank hemoperitoneum suctioned
- Active mesenteric bleeding near the superior mesenteric artery (SMA) and vein (SMV)
- Large mesenteric root tear (20 × 15 cm) at the DJ flexure
- Jejunal rupture 50 cm distal to DJ flexure
- Multiple vascular tears over SMV and SMA
- Two bucket-handle mesenteric tears:
 - 5 × 3 cm tear with active venous bleeding, 300 cm distal to DJ flexure
 - 200 × 100 cm tear with gangrenous ileal segment, 100 cm proximal to ileocecal junction
- Resection of 50 cm gangrenous ileum and primary end-to-end anastomosis
- Jejunum-jejunal anastomosis performed 5 cm distal to DJ flexure following jejunal rupture and devascularization
- Pancreas, spleen, and duodenum intact
- Skin-only closure performed; patient shifted to ICU on ionotropic support

Intra-operative photos:





Through and through tear in the bowel- jejunal loop transected 50 cm from the DJ flexure with mesentery completely torn. Mesentery torn approximately 200 cm proximal to ICU junction; Active bleeding seen at the root of mesentery from the Superior mesenteric vein seen.



Rent in the superior mesenteric vein visible over the uncinate process of pancreas and 4th part of the duodenum



Transected ends of jejunum cut and Jejunum-jejunal anastomosis done About 50 cm of ileum that was separated from the mesentery and ileo-ileal anastomosis done.

Second Surgery (on POD 2 – Re-look Laparotomy):

- Minimal inter-bowel clots (~10 cc) evacuated
- Mild bowel congestion and edema near previous mesenteric tear
- No leak or new gangrenous changes at anastomotic site
- Peritoneal lavage with 2 L warm saline performed
- Formal abdominal wall closure with two drains placed

Post-operative Course and Complications:

The patient was extubated on post-operative day (POD) 1 following the second laparotomy and shifted to the ward on POD 3. He developed paralytic ileus, which lasted for 3 days and resolved spontaneously with conservative management. Abdominal drains were removed once the patient tolerated a soft diet by POD 8. He showed steady improvement and was discharged on POD 14 in a stable condition.

Outcome and Follow-up:

The patient stabilized hemodynamically postoperatively and was successfully weaned off inotropic support. Continued monitoring in the ICU ensured recovery with no further surgical complications noted at the time of second-look surgery.

Discussion:

Blunt mesenteric trauma remains a diagnostic challenge due to its subtle presentation. This case demonstrates the severity of internal injuries despite minimal external signs. Bucket-handle mesenteric tears, vascular injuries, and associated bowel ischemia underscore the need for high clinical suspicion and rapid surgical response [5,6].

Isolated SMV injuries are uncommon but can be life-threatening due to rapid hemorrhage. They are usually caused by penetrating abdominal trauma. But blunt trauma leading to isolated SMV injuries are even rare. Patients often present with hemodynamic instability, requiring urgent surgical intervention.

Isolated superior mesenteric vein (SMV) injuries resulting from blunt abdominal trauma are exceedingly rare. A retrospective study conducted over 13 years in a large Level I urban trauma center identified 51 patients with SMV injuries; of these, 13 (24%) sustained the injury through blunt trauma. The remaining 38 (76%) had penetrating injuries. Among the 13 patients with blunt trauma, the overall survival rate was 55%, with a 65% survival rate in those without associated injuries to more than three vessels. In contrast, the survival rate for isolated SMV injuries was 55%, highlighting the critical importance of early diagnosis and appropriate surgical management in improving outcomes. [9]

Another study reviewed 24 patients with portal vein (PV) and SMV injuries, of which 15 had SMV injuries. Seventy percent of these injuries resulted from blunt trauma. The overall mortality rate was 63%, with 11 deaths due to exsanguination, two from SMV thrombosis, and two from sequelae of other injuries. This underscores the high mortality associated with SMV injuries, particularly when compounded by other traumatic injuries. [10]

A case report documented an isolated SMV injury following a low-speed car accident where the patient collided with the steering wheel. Despite minimal abdominal symptoms, imaging revealed perihepatic and perisplenic fluid. Laparotomy confirmed an SMV injury, which was repaired with end-to-side anastomosis. The patient had an uneventful recovery, emphasizing the importance of high clinical suspicion and timely surgical intervention even in cases with subtle presentations. [11]

Collectively, these studies highlight that while isolated SMV injuries from blunt abdominal trauma are rare, they carry significant morbidity and mortality. Early recognition and appropriate surgical management are crucial for improving patient outcomes.

Venous injuries, particularly to vessels like the SMV or IVC, can be challenging to detect on contrast-enhanced abdominal CT. Unlike arterial injuries, which often present with active contrast extravasation or pseudo-aneurysm, venous injuries may not exhibit clear signs unless there is ongoing bleeding or a large hematoma. Factors contributing to this difficulty include slower venous flow, delayed opacification, and overlapping structures in the mesentery or retroperitoneum. Small venous leaks may be missed if imaging is not timed correctly or if oral contrast obscures subtle findings. Therefore, a high index of suspicion is required, and diagnostic laparoscopy or laparotomy may be necessary if clinical signs suggest vascular injury despite inconclusive imaging.

Access is gained through a midline laparotomy, with mobilization of the small bowel to expose the mesentery. Bleeding is controlled by securing proximal and distal ends of the SMV. Repair options include lateral venorrhaphy, ligation (if adequate collateral circulation exists), or interposition grafting. Ligation may be necessary in unstable cases but carries a risk of bowel ischemia. Prompt recognition and surgical control are critical for survival.[8].

In our case, we went ahead with primary vascular rent repair after good proximal and distal control was obtained as there was clear visual evidence of multiple puncture wounds and small lacerations over SMV and SMA and clearly no partial division or complete transection. Hence decision for primary repair f/b relook surgery after 48 hours for bowel viability chosen.

Conclusion:

This case highlights the potentially devastating consequences of blunt abdominal trauma from steering wheel impact and discusses the rare scenario of an isolated SMV tear following blunt abdominal trauma and timely management leading to optimal results.. Timely imaging, resuscitation, and damage control surgery are crucial for survival. Early relook laparotomy plays a key role in identifying delayed complications and confirming bowel viability.

References:

1. Watts DD, Fakhry SM. Incidence of hollow viscus injury in blunt trauma: an analysis from 275,557 trauma admissions from the EAST Multi-Institutional HVI Trial. *J Trauma*. 2003;54(2):289-294.
2. Fakhry SM, Brownstein M, Watts DD, Baker CC, Oller D. Relatively short diagnostic delays (<8 hours) produce morbidity and mortality in blunt small bowel injury: an analysis of time to operative intervention in 198 patients from a multicenter experience. *J Trauma*. 2000;48(3):408-414.
3. Dauterive AH, Flancbaum L, Cox EF. Blunt intestinal trauma. A modern-day review. *Ann Surg*. 1985;201(2):198-203.
4. Malhotra AK, Fabian TC, Katsis SB, Gavant ML, Croce MA, Minard G, et al. Blunt bowel and mesenteric injuries: the role of screening computed tomography. *J Trauma*. 2000;48(6):991-998.
5. Stewart RM, Myers JG, Dent DL, Ermis P, Gray GA, Villarreal DH, et al. Seven hundred fifty-three consecutive abdominal stab wounds: a prospective study. *Am Surg*. 1997;63(7):598-604.
6. Allen GS, Moore FA, Cox CS Jr, Mehall JR, Duke JH. Delayed diagnosis of blunt duodenal injury: an avoidable complication. *J Am Coll Surg*. 1998;187(4):393-399.
7. Aldouri, Amer. (2017). Navigating the Root of the Mesentery: A Guided Approach to an Artery-First Pancreatoduodenectomy. *Journal of Pancreatic Cancer*. 3. 78-83. 10.1089/pancan.2017.0016.
8. Mattox KL, Moore EE, Feliciano DV. *Top Knife: The Art and Craft of Trauma Surgery*. 1st ed. Malmö: Arnica; 2005.
9. □ Haan JM, Hoag JB, Collier BR, et al. Superior mesenteric venous injuries: to ligate or to repair? *J Trauma*. 2007 Mar;62(3):713-7. doi: 10.1097/01.ta.0000206164.68477.25.
10. □ Lee JM, Lee SH, Han SW, et al. Portal vein and superior mesenteric vein injury in blunt trauma: a single-center experience. *J Trauma Acute Care Surg*. 2019 Nov;87(5):1081-1087. doi: 10.1097/TA.0000000000002416.
11. □ Sosa JL, Picazo M, Merino P, et al. Isolated superior mesenteric vein injury: a case report of blunt abdominal trauma. *Surg Case Rep*. 2020 May 19;6(1):79. doi: 10.1186/s42238-020-00139-7.