

Inferior Mesenteric Vein Injury After Bovine Abdominal Trauma

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INTRODUCTION

Major abdominal vascular injury occurs in up to 25% of vascular trauma cases. Blunt trauma is the prevalent mechanism in most European countries [1]. The inferior mesenteric vein (IMV), as a lower-pressure vessel, can be a source of significant venous bleeding following abdominal trauma. Mesenteric venous injuries are difficult to identify radiologically and to manage intraoperatively. Injuries to the IMV are rarely described in the literature, and there are no established guidelines for this specific vessel. Large animal-related injuries represent a distinct form of rural trauma that might involve, among others, blunt abdominal injuries with mesenteric and vascular disruption [2].

We present a clinical case of blunt abdominal trauma caused by a bovine kick to the abdomen resulting in a constellation of different injuries including mesenteric hematoma and IMV injury. This case report followed the CARE guidelines for case reports.

CASE PRESENTATION

A 53-year-old woman with no significant past medical history presented to the Emergency Department at a tertiary referral trauma center after a direct blunt abdominal trauma from a bovine kick. She was hemodynamically stable on primary assessment but cool extremities and abdominal tenderness on palpation were noticed. The patient immediately underwent a whole-body computed

tomography (CT) trauma scan, which showed a large retroperitoneal hematoma with active contrast extravasation in venous phase in the mesentery to the right of the midline (Figure 1). The IMV was lying adjacent to the hematoma (Figure 2) and contrast extravasation and appeared partially compressed, thereby venous bleeding was suspected but arterial bleeding could not be ruled out. There were radiological signs consistent with moderate pancreatic injury as well.

In view of these findings, an urgent midline exploratory laparotomy was performed with a senior vascular surgeon present. The entire abdominal cavity was explored, approximately 1.5 liters of blood was evacuated and the abdomen was packed for initial hemorrhage control. Contusion of the pancreas was confirmed and a hematoma of the duodenum was noted. A mesenteric hematoma was identified in the mesocolon in the territory of the IMV. Owing to the suspected vein injury on CT and the absence of progression of the hematoma, exploration of the IMV and smaller mesocolic vessels was not performed. A drain was placed proximal to the pancreatic

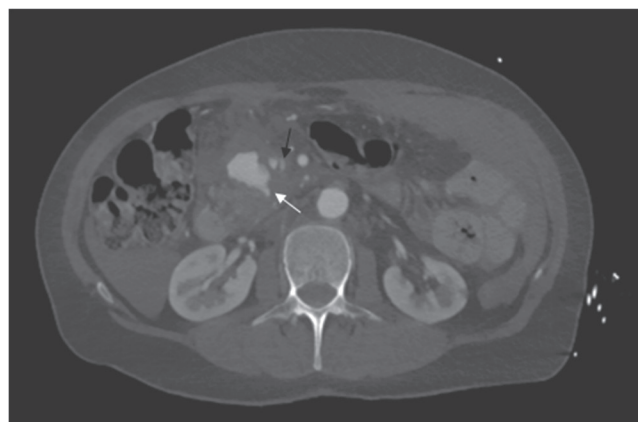


Figure 1 Computed tomography (CT) trauma scan in venous phase showing retroperitoneal hematoma (white arrow) with active contrast extravasation in the mesentery to the right of the midline, in close proximity to the inferior mesenteric vein (black arrow).

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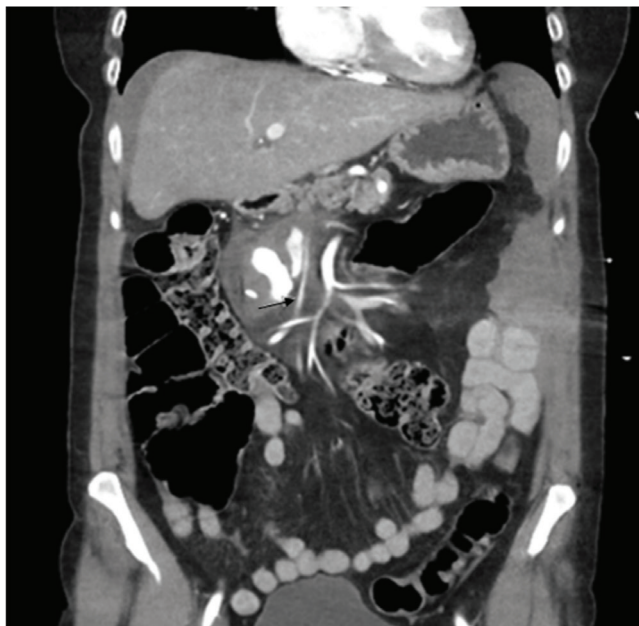


Figure 2 Computed tomography (CT) trauma scan in venous phase showing the inferior mesenteric vein (black arrow) coursing in close proximity to the hematoma.

contusion and the mesenteric hematoma. During surgery, the patient received blood transfusion of 1 unit of whole blood, 1 unit of red blood cells, and 2 units of plasma. Hemostasis was confirmed throughout the abdominal cavity and the abdomen was closed. Postoperatively the patient remained hemodynamically stable. Secondary and tertiary trauma surveys were completed and revealed no further injuries or signs of bleeding. Control CT showed no signs of hematoma progression (Figure 3). Outpatient clinical and radiological follow-up showed no complications and satisfactory clinical condition.

Timeline:

Day 1 – trauma, whole-body CT and operation, day 2 – CT control, day 5 – CT control, day 11 – CT control, day 12 – hospital discharge, 1 month – outpatient follow-up, 2 months – outpatient follow-up, 3 months – outpatient follow-up, 4 months – outpatient follow-up.

DISCUSSION

Farm-related injuries are an important healthcare issue in agricultural settings, with bovine-related trauma accounting for a share of those incidences. Only a limited number of cases has been described in the literature though [2]. The bovine kick, like other trauma mechanisms involving domestic livestock, delivers massive forces and high-energy transition concentrated over a small surface area, which can lead to severe and complex injuries. Traumatic mesenteric venous injury is rare and associated with high morbidity if treatment is delayed [1]. There is limited evidence available to guide the management of those injuries. In general, venous injuries are more difficult to manage than arterial because of challenges related



Figure 3 Control computed tomography (CT) performed 11 days after trauma, showing no signs of hematoma progression (white arrow).

to exposure and distal vascular control, in addition to the thin and fragile nature of venous walls, making primary repair technically demanding [3]. Mesenteric arterial injury repair options include primary repair, ligation, interposition graft, extra-anatomic bypass, or temporary vascular shunting. Stent grafts have been described only in a small case series [4]. Endovascular embolization is generally not recommended owing to the risk of bowel ischemia; however, in selected cases, super-selective embolization targeting the bleeding vessel can be performed [5]. Unlike traumatic mesenteric arterial injuries, mesenteric venous hemorrhage may be tamponaded by surrounding tissues and hematoma formation, resulting in self-terminated bleeding. This leads to a main dilemma between non-operative management and operative management, which essentially is a risk–benefit question about avoiding the risk of converting a tamponaded venous injury into uncontrolled hemorrhage during the exploration. Operative exploration is recommended when other injuries are associated, as well as Zone 1 central retroperitoneal hematomas [6]. Non-exploration of a stable, non-pulsatile mesenteric hematoma with intact bowel viability has been proposed as a possible strategy in blunt trauma [7]. In that case “blow-out” injuries of visceral organs with associated spillage should be excluded.

Ligation of major abdominal veins can lead to venous congestion and midgut ischemia but is considered as an acceptable strategy in a damage control situation of a hemodynamically unstable patient. According to current guidelines on the management of vascular trauma by the European Society for Vascular Surgery (ESVS), the IMV injuries may be ligated more liberally compared with other major abdominal veins [4]. Ligation of the superior mesenteric vein (SMV) carries an increased risk of splanchnic hypervolemia and, thereby, potentially cardiovascular collapse. Repair of SMV injuries can be accomplished in several ways, including venorrhaphy, shunting, or bypass. Synthetic material should be avoided in the setting of abdominal contamination, and autologous vein should instead be considered [8]. Reconstruction of the IMV, however, has not been extensively described in the literature [1, 3, 4].

There are no established endovascular techniques for the treatment of traumatic mesenteric venous injuries [4, 9, 10]. Balloon occlusion can be used for proximal and distal control of vena cava. Coiling of venous injury bleeding is not an established method [3].

Limitations

As a single case report, the findings are not generalizable to non-operative management being superior to surgical exploration of the IMV. The venous nature of the injury was presumed from imaging and visual inspection and was not confirmed by direct vessel exploration.

CONCLUSION

Animal-related blunt abdominal trauma can lead to complex injury patterns, including rare and poorly described mesenteric venous injuries with IMV involvement. This case illustrates the potential value of observational management in mesenteric venous injury at the intersection of vascular surgery and damage-control principles in trauma. Non-operative management of the venous injury may be a safe and effective strategy in selected cases, after individualized decision-making. Further reports are needed to guide the management of these uncommon but potentially serious injuries.

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Ethics Statement

Ethical approval was not required for this case report, as it describes a single anonymized clinical case and does not constitute research involving human participants. Verbal informed consent was obtained from the patient for publication of this case report and any accompanying images. All identifying information has been removed or altered to ensure patient anonymity.

Conflicts of Interest

The author declares that they have no conflicts of interest.

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Author Contributions

Christina Papadopoulou drafted the manuscript.

Data Availability

The data that support the findings of this case report are available from the corresponding author upon reasonable request.

Declaration of the Use of Generative AI in the Writing Process

AI-assisted language editing (ChatGPT, version 5.2, OpenAI) was used to improve English language. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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