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Case Report

Post traumatic arterial occlusive mesenteric ischemia: a rare case report[☆]

Khalid Khan, MBBS, CABR, Fatema Bunajem, MD*, Fatema Alkhan, MD

Radiology Department, Salmaniya Medical Complex, Bahrain

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ABSTRACT

Mesenteric ischemia is an uncommon condition with very high mortality rates characterized by inadequate blood supply, inflammatory injury, and subsequent necrosis of the bowel wall. Acute arterial mesenteric ischemia is usually caused by cardiac emboli, atherosclerotic vascular disease, aortic aneurysm, or dissection. We report a case of a 60-year-old male who presented to the accident and emergency department complaining of abdominal pain following blunt abdominal trauma. An urgent contrast enhanced computed tomography scan demonstrated superior mesenteric artery thrombosis with ischemic small bowel. Surgical intervention was carried out with resection of the necrotic bowel followed by anastomosis. Acute occlusive mesenteric ischemia needs to be considered in cases of blunt trauma presenting with abdominal pain. Proper early diagnosis and management is essential as it carries a high risk of morbidity and mortality.

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Introduction

Acute mesenteric ischemia (AMI) is a disease that results in cessation of blood flow to the mesenteric circulation, as a result the metabolic demand of the visceral organs cannot be sufficiently fulfilled, resulting in subsequent infarction [1]. AMI account for 0.1% of all hospital admissions [2]. This disease can be classified into arterial and venous mesenteric ischemia. The arterial disease can be further classified as occlusive mesenteric ischemia (OMI), due to thrombus or embolism and non-occlusive mesenteric ischemia (NOMI) [2]. The venous form of mesenteric ischemia is due to mesenteric vein thrombosis (MVT). Usually, patients present with vague symp-

toms leading to delay in the prompt diagnosis and increase in mortality rate ranging from 60% to 80% [1].

Mesenteric artery thrombosis is a severe and life-threatening condition typically of the superior mesenteric artery (SMA), which provides the primary arterial supply to the small intestine, cecum, ascending colon, and most of the transverse colon [2–3]. The reported incidence of SMA thrombosis is around 12.9 per 100,000 person-years and the risk increases with age [3]. Causes of acute mesenteric arterial ischemia include the following: cardiac emboli due to conditions like arrhythmia, recent MI or valvular disease; atherosclerotic vascular disease emboli; decreased cardiac output from chronic heart failure or myocardial infarction and dehydration [4]. Post traumatic venous thrombosis is a

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* Corresponding author at: Department of Radiology, Salmaniya Medical Complex, Manama, Bahrain

E-mail address: f.bunajem@gmail.com (F. Bunajem).

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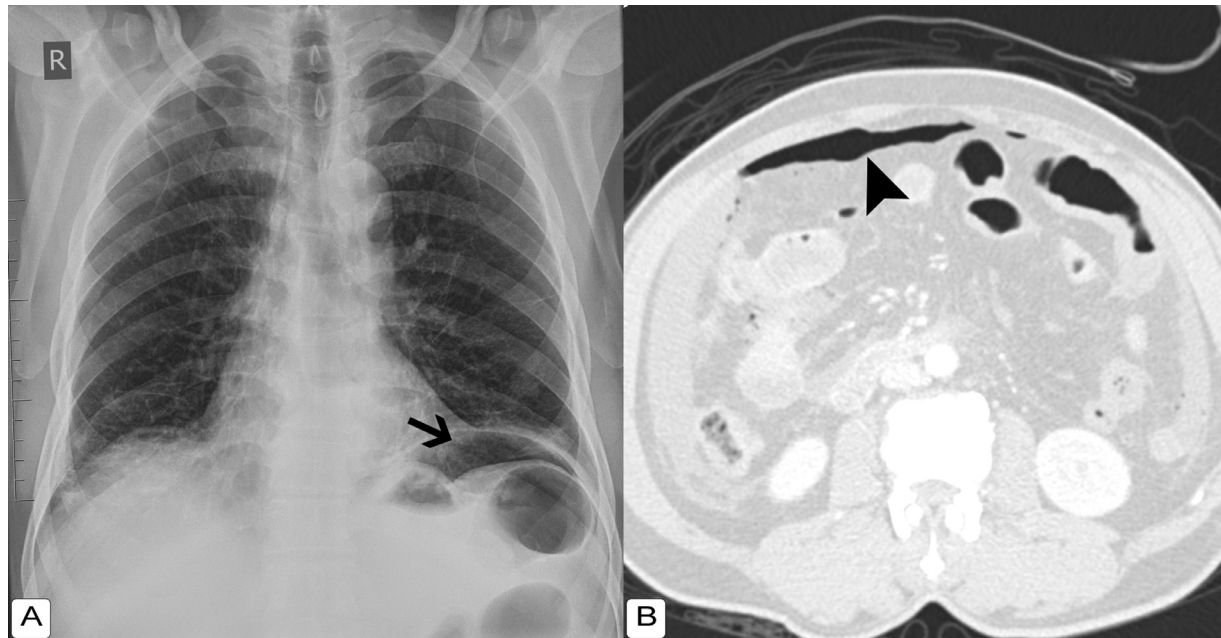


Fig. 1 – (A) Plain chest radiograph showing free air under the left hemidiaphragm (arrow). (B) Axial section of CT abdomen showing free air along the anterior abdomen [arrowhead].

known complication after trauma but arterial thrombosis after trauma is rarely reported [5]. In this report, we describe a case of acute SMA occlusion after blunt abdominal trauma leading to small bowel infarction.

Case Report

A 60-year-old male who was a carpenter by profession, presented to the accident and emergency department with history of acute abdominal pain of 1 day duration after sustaining blunt trauma to the abdomen with a wooden board while working in his workshop. He had no past medical history, in particular, there was no history of cardiac disease, thrombophilia or other major thrombotic risk factors.

At the time of presentation, he was conscious, alert, and oriented but he was in respiratory distress. His vital signs revealed a heart rate of 110 beats per minute, blood pressure of 97/75 mm Hg and a respiratory rate of 40 breaths per minute. He was afebrile. On physical examination, there were no open wounds in the abdomen or chest, no flank ecchymosis and no source of external bleeding. However, there was significant generalized tenderness over the abdomen with guarding.

Full blood tests were ordered (complete blood count, coagulation profile, blood glucose, renal and liver function tests). The patient also underwent radiological examination in the form of plain chest radiograph which revealed free air under the left hemidiaphragm indicating pneumoperitoneum (Fig. 1). Bowel injury was suspected therefore a contrast enhanced CT of the chest, abdomen and pelvis was ordered which confirmed the findings of significant free air in the abdomen anteriorly indicating pneumoperitoneum. There was

also a large filling defect noted at the origin of the superior mesenteric artery with some flow of contrast seen distally for a short distance, followed by an abrupt cutoff of contrast and no enhancement of the distal branches, specifically the jejunal branches of the SMA in keeping with thrombosis (Fig. 2). The visualized small bowel loops, especially the jejunal loops were dilated and surrounded by free fluid. No definite enhancement of the bowel walls could be seen. In comparison, the distal ileal loops were normal in caliber showing intact wall enhancement. These findings were highly suggestive of mesenteric bowel ischemia, and together with the pneumoperitoneum and the free fluid, there was high possibility of bowel infarction and perforation (Fig. 3). Other associated findings were that a small splenic subcapsular hematoma suggesting grade II splenic injury (Fig. 4).

Initially, the patient was stabilized with intravenous fluid administration, antibiotics, and analgesia. Emergency exploratory laparotomy was performed immediately. Surgical exploration revealed the presence of bowel content in the peritoneal cavity with a small jejunal perforation measuring 0.5×0.5 cm located about 145 cm away from duodenojejunal junction. During the procedure a repair of the perforation was performed. In the following postoperative day, the patient was given a scheduled second look, which revealed extensive gangrene of the ischemic small bowel segment which was non-viable. About 125 cm of necrotic small bowel was resected and end-to-end anastomosis of the viable bowel was done.

In the postoperative period, gastrografin study was performed to assess for integrity and status of the bowel. The study concluded that there was no extravasation of the contrast to suggest leakage and no dilation or strictures were seen. The patient had uneventful recovery.

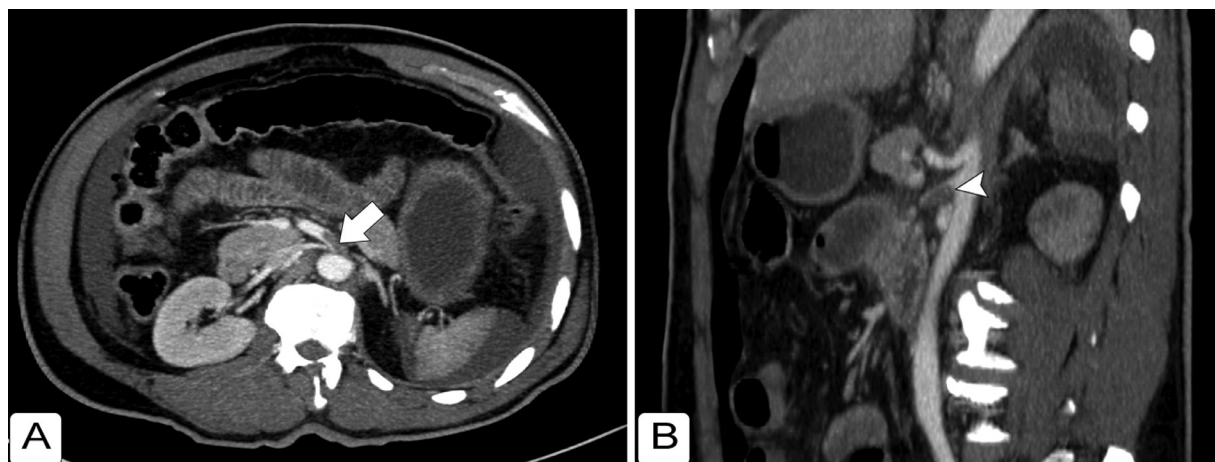


Fig. 2 – Contrast enhanced CT of the abdomen in axial (A) and sagittal (B) section showing filling defect in the superior mesenteric artery.

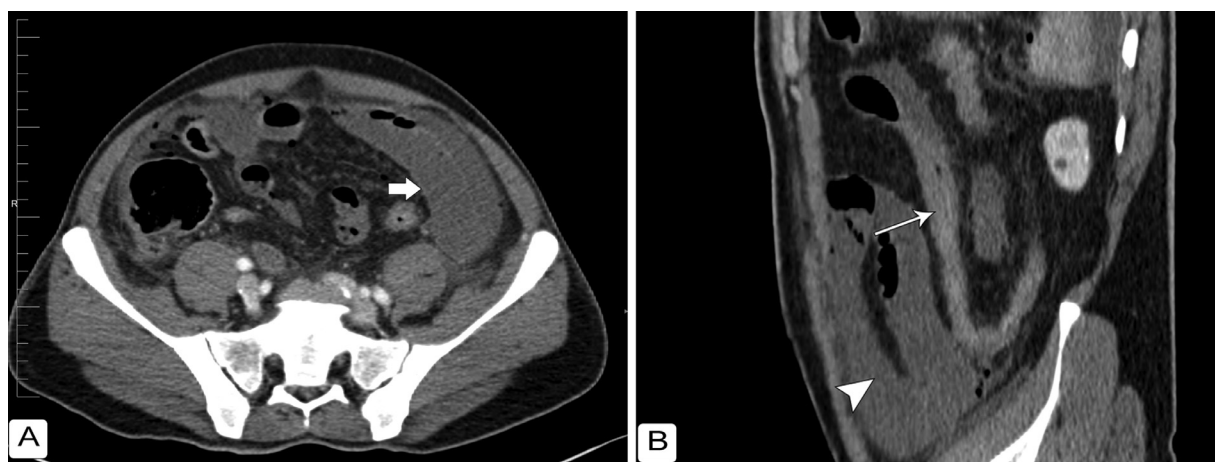


Fig. 3 – (A) Contrast enhanced CT of the abdomen in axial section showing dilated small bowel loops with non-enhancing walls (arrow). (B) Contrast enhanced CT of the abdomen in sagittal section showing dilated, non-enhancing bowel loops (arrowhead), in comparison to normal caliber bowel with enhancing walls [long arrow].

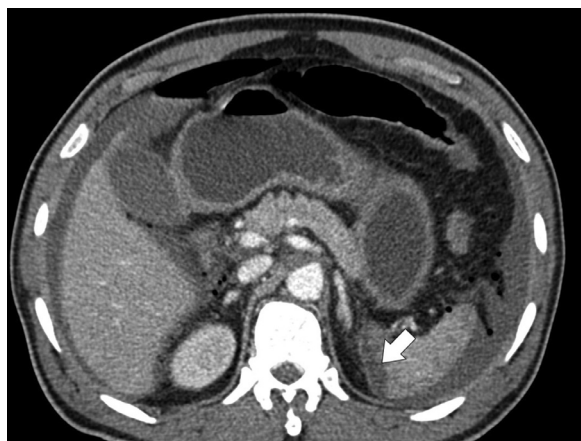


Fig. 4 – Contrast enhanced CT of the abdomen in axial section showing subcapsular splenic hematoma (arrow).

Discussion

AMI is characterized by decreased blood flow through the mesenteric vessels, resulting in ischemia and subsequent gangrene of the bowel wall. AMI can be classified as arterial or venous. The arterial disease can be subdivided into non-occlusive and occlusive mesenteric ischemia. The nonocclusive form generally affects patients suffering from hypotension due to cardiac, renal, or liver disease [6]. The occlusive type results from occlusion of the lumen of mesenteric artery leading to ischemia. Mesenteric ischemia due to venous disease is related to mesenteric venous thrombosis (MVT).

Abnormalities in the composition of blood, the nature of blood flow and the quality of the vessels wall can contribute to thrombosis [7]. The most common risk factors that contribute to the development of thrombosis includes atherosclerosis, advanced age, malignancies, heart disease and arrhythmias. Blunt trauma should also be taken into consideration as it car-

ries risk of thrombosis. In several studies, penetrating or blunt trauma has been explained as the cause of acute thrombosis, the mechanism of thrombus formation in the setting of blunt trauma is explained by disruption of the intimal or medial vessel wall [8].

Most of the case reports describing post traumatic mesenteric ischemia are because of mesenteric venous thrombosis involving the superior mesenteric vein rather than the artery. Only a handful of cases have been reported of SMA thrombosis after trauma. One such previous published study reported a case of a middle-aged male with traumatic injury to the abdomen where findings of bowel ischemia and multiple large thrombosis were seen in the superior mesenteric artery on autopsy [7].

AMI is considered as a rare entity, but it carries a high mortality rate with complications of short-bowel syndrome in the surviving patient [9]. Most of the patient who suffer AMI results from occlusion of the SMA. On the other hand, the non-occlusive type is far less common [10].

SMA is the second major branch of the abdominal aorta and located at the level of the first lumbar vertebral body [11]. This artery branches into jejunal, ileocolic, middle colic, and colic arteries which supply most of the intestinal system [11].

The clinical manifestation of AMI can be severe abdominal pain, nausea, vomiting and diarrhea. The most important finding is pain which appears to disproportionate to physical examination findings. In all elderly patients with severe abdominal pain, the diagnosis of AMI should be suspected as the risk increases with age [1].

Certain laboratory studies may be performed for suspected AMI; however, these studies will not establish the diagnosis. Some studies concentrated on laboratory tests including lactate and D-dimer levels, bases excess, leukocyte count and certain biomarkers like alpha-glutathione S-transferase and intestinal fatty acid binding protein (I-FABP) but they were unable to reach a definitive diagnosis [1]. Recent studies reported that radiological testing is more important. The gold standard for the diagnosis of AMI is multi-detector CT angiography which has proved to be highly sensitive (94%) and specific (95%) [1].

Treatment depends on the etiology of mesenteric ischemia with nonocclusive AMI treated medically, whereas occlusive AMI is treated with surgery. Any patient with mesenteric ischemia and signs of peritonitis or possible bowel infarction, regardless of etiology, should undergo urgent surgical intervention for the resection of ischemic or necrotic bowel [12].

It is obvious that AMI due to SMA thrombosis is a serious and life-threatening condition, and once necrosis of the bowel take place the prognosis of this disease will be unfavorable. Therefore, patients should be assessed properly with focused early diagnosis, quick intervention, and supportive intensive care [10].

with history of blunt trauma as mesenteric thrombosis after trauma is rare. Most of the literature described venous thromboembolism as a known complication after trauma rather than arterial thromboembolism. Therefore, a high degree of suspicion helps in the appropriate investigation, early intervention, and prompt management of AMI.

Patient consent

Informed consent has been obtained from the patient and all identifying details have been omitted. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Conclusion

This case report highlights the importance of considering arterial thrombosis in the differential diagnosis of a patient