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Case Report

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Embolization of a Variant Left Hepatic Artery Aneurysm: A Case Report

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Abstract

Hepatic artery aneurysms are focal dilatations within the hepatic arterial vasculature. They have the highest rate of rupture of all visceral artery aneurysms, and as a result, require prompt diagnosis and treatment. We present the CT and angiographic appearance of a rare dumbbell-shaped, ruptured hepatic artery aneurysm occurring in a Michel type II variant left hepatic artery. To the best of our knowledge, this is only the fourth case report of a ruptured HAA in this location, and only the second to be managed endovascularly.

Keywords

Hepatic artery aneurysm, Variant left hepatic artery, Coil embolization, Michel class II, Angiography

Introduction

Hepatic artery aneurysms (HAAs) are a relatively rare pathology, with an overall prevalence of 0.002% - 0.4% [1-3]. They are the second most common type of visceral artery aneurysm after splenic artery aneurysms and have the highest rate of rupture at 44% [3, 4]. Depending on the size of the aneurysm, epigastric pain and biliary duct obstruction can be common presenting symptoms. Diagnosis is typically first made using contrast enhanced computed tomography (CT) of the abdomen or CT angiography. Coil embolization and open repair are two common management options in the event of aneurysmal rupture [1, 5]. We present here the unique case of an endovascularly treated, spontaneously ruptured aneurysm of a variant left hepatic artery arising from the left gastric artery.

Case Report

A 61-year-old Caucasian female presented to a primary care emergency department with several days history of severe epigastric and chest pain. The patient's past medical and surgical history included gastroesophageal reflux disease and a laparoscopic vaginal hysterectomy and bilateral salpingo-oophorectomy 8 months prior. The patient's family history was significant for familial aneurysmal disease. On exam, the patient was mildly tachycardic but maintaining a normal blood pressure. The patient's abdominal examination was significant for diffuse tenderness to palpation, worse in the upper quadrants, with no rigidity, guarding, or peritonitic signs.

An IV contrast-enhanced CT scan of the chest and abdomen was performed

to assess for evidence of a pulmonary embolism. This CT scan instead demonstrated severe hemoperitoneum with blood pooling around the liver and in the hepatorenal recess. It also demonstrated a replaced left hepatic artery arising from the left gastric artery with two regions of focal dilatation consistent with aneurysms, and evidence of active bleeding from this site (Figure 1).

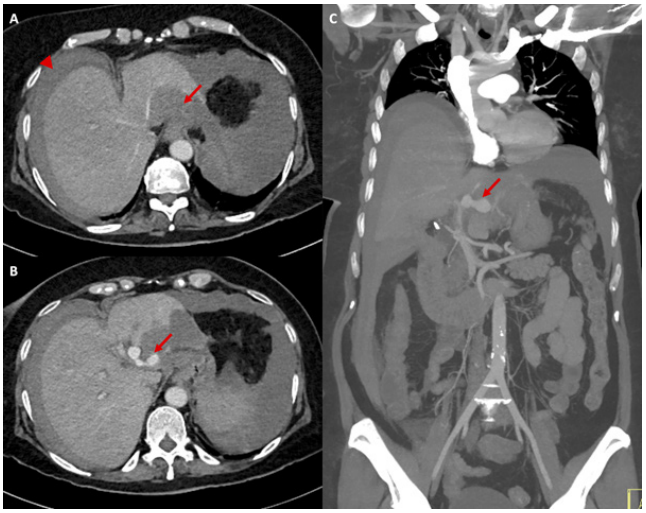

Figure 1: Axial slices and a coronal reformat of an abdominal CT scan performed with IV contrast. (A) An arrowhead demonstrates diffuse large volume hemoperitoneum and an arrow demonstrates active extravasation. (B) An arrow demonstrates the left hepatic artery with two areas of focal dilatation, in a dumbbell shape. (C) An arrow demonstrates the variant left hepatic artery arising from the gastric artery, with a dumbbell shaped aneurysm.

The vascular surgery and interventional radiology teams at a tertiary care centre were alerted and the patient was transferred emergently via helicopter. The patient was taken to the interventional radiology suite, a 5 French sheath was placed, and catheter angiography was performed. Angiography more clearly demonstrated the variant left hepatic artery and corresponding dumbbell-shaped aneurysm with a single inflow and outflow (Figure 2).

A 2.8 Progreat microcatheter and several detachable coils were used to embolize both the outflow and inflow vessels of the aneurysm. The inflow vessel was further embolized using gel-foam. Completion angiography from the left gastric artery and common hepatic artery demonstrated no residual filling of the aneurysm. The patient did well post-operatively and was seen in clinic for follow-up 3 weeks later. An IV contrast-enhanced CT scan of the abdomen was performed at that time, which demonstrated complete embolization of the aneurysmal variant left hepatic artery with normal enhancement of the liver and no negative sequelae (Figure 3).

Discussion

HAA is a rare but clinically important pathology with a male to female predominance of 3:2, occurring most frequently in the fifth to sixth decade of life [6]. 47% of HAAs occur in

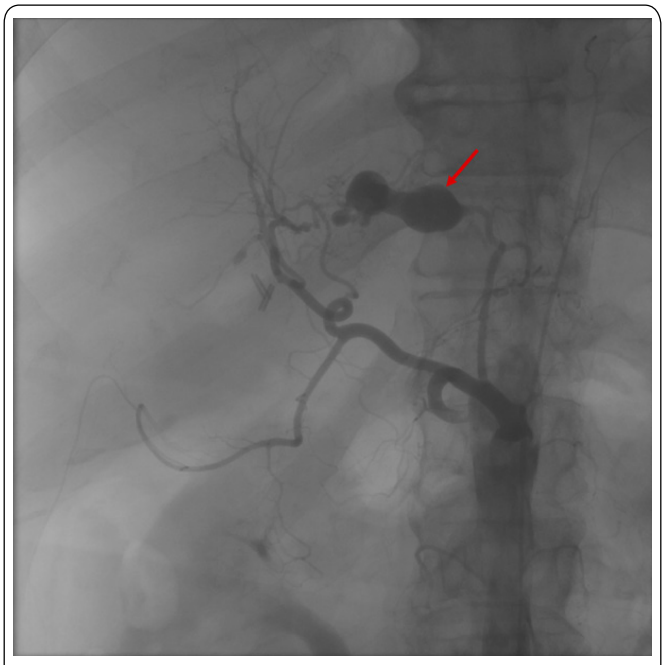

Figure 2: Selected angiographic image of a celiac axis angiogram. An arrow again demonstrates a dumbbell-shaped aneurysm arising from a variant left hepatic artery.

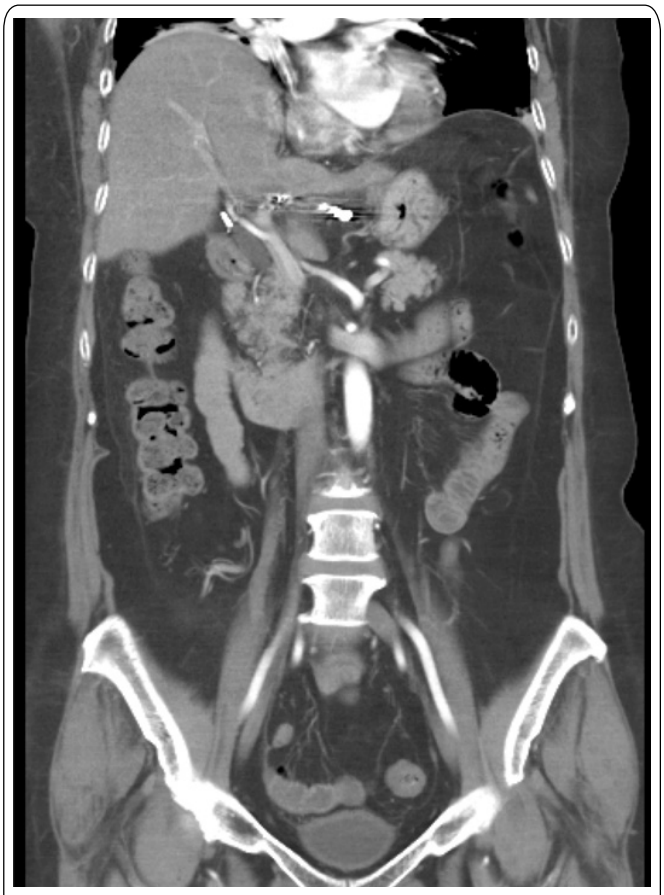

Figure 3: Coronal reformat of a 3-week follow-up abdominal CT scan performed with IV contrast. Satisfactory embolization of the left hepatic artery aneurysm is visible with corresponding beam hardening artifact due to the inserted coils. Near complete resolution of the free fluid within the abdomen is also demonstrated.

the right hepatic artery branches, 38% occur in the common and proper hepatic branches, while only 13% occur in the left hepatic artery branches [7]. This patients' presentation was complicated by an anatomic variant of the hepatic vasculature in which the left hepatic artery arose from the left gastric artery rather than the common hepatic artery. This Michel type II variant has a prevalence of around 3% in the general population and accounts for around 16% of all variant hepatic anatomy [8].

Etiologically, HAAs are most frequently caused by atherosclerosis and medial degeneration, which are responsible for 30% and 24% of cases respectively [6, 9]. Other etiologies of HAA include trauma, surgery, diagnostic instrumentation, periarterial inflammation from an adjacent inflammatory process, and infection [6]. Clinical manifestations of HAAs are non-specific, and patients are often asymptomatic prior to rupture. Epigastric and right upper quadrant abdominal pain, gastrointestinal hemorrhage, and jaundice are common symptoms [7].

Focused assessment with sonography for trauma (FAST) is often the initial imaging modality in stable and unstable patients where intraabdominal hemorrhage is suspected. Visualization of free intraperitoneal fluid can inform and expedite subsequent investigations and management. Diagnosis of HAA is typically made using contrast-enhanced CT scan or CT angiography, which are able to clearly demonstrate the vessel lumen and aneurysm. The sensitivity and specificity of multi-detector CT angiography in detecting HAA has been previously reported at 100% [10]. Selective catheter angiography is then performed to guide management by identifying the presence of other aneurysms and further delineating the vascular anatomy [6, 11].

Treatment of ruptured HAAs is performed either endovascularly or surgically and depends on a number of factors. Important considerations include size and location of the aneurysm, patient comorbidities, and patient stability. Currently, endovascular embolization is the preferred treatment for all causes of HAA and demonstrates a high rate of success [12]. Open surgical management is typically reserved for hemodynamically unstable patients with extrahepatic aneurysms larger than 2 cm, who fail a trial of endovascular intervention [13].

Conclusion

This was a case of an endovascularly treated, spontaneously ruptured aneurysm of a Michel type II variant left hepatic artery. HAAs in this location are rare, with only three cases previously documented in the literature [13-15], and only one previous case treated endovascularly [15]. In cases of spontaneous intraperitoneal bleed, visceral artery aneurysm should always be considered. HAAs are a rare but clinically important differential diagnosis in patients with acute abdominal pain, gastrointestinal bleeding, or jaundice.

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None declared.

Conflict of Interest

The authors declare no conflict of interest.

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