CASE OF THE MONTH

An uncommon cause of abdominal pain following blunt abdominal trauma

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Received 21 May 2011
Revised 14 June 2011
Accepted 14 June 2011

DOI: 10.1259/bjr/20841300

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History

A 47-year-old otherwise healthy male presented to the emergency department 5 days after being involved in a motorcycle accident during which he hit his abdomen on the handlebars. The patient did not seek medical attention at the time of the accident. At the time of presentation to the emergency department, he was complaining of mild epigastric and left upper quadrant abdominal pain that was exacerbated by lying down, but had no relationship to eating. In addition, he was feeling increasingly distended, and was concerned that his stools were smaller in calibre and less frequent. The patient was experiencing mild nausea, but denied vomiting and had not been experiencing diarrhoea. He was afebrile and physical examination was remarkable only for mild tenderness to palpation in the epigastrium. Laboratory studies revealed an elevated lipase (166 U l^{-1}). A contrast-enhanced CT scan of the patient's abdomen and pelvis was obtained (Figure 1). What are the significant findings?

Diagnosis

The findings on the CT scan are compatible with intimal injury and focal thrombus involving the distal coeliac axis and proximal common hepatic and splenic arteries. No clear stigmata of pancreatic injury were evident on the CT scan, despite the mildly elevated lipase. There was no evidence of bowel ischaemia. The patient was seen by the vascular surgery team, who recommended conservative management given that there were no signs or symptoms of mesenteric malperfusion. He was started on daily oral aspirin 81 mg in the hope that the coeliac artery would recanalise, and the plan was for follow-up with the vascular surgery service. The patient was discharged and subsequently lost to follow-up.

Discussion

Blunt abdominal trauma results in injury to the major intra-abdominal vasculature in approximately 5–10% of cases [1]. Of all of the vessels, the coeliac axis is the least likely to be injured [1]. In the majority of cases, traumatic injury to the coeliac artery is associated with injury to other intra-abdominal organs, including the small bowel, duodenum, pancreas, colon or stomach. Only a few cases of isolated blunt traumatic injury to the coeliac axis have been reported [2–5]. The intimate anatomical relationship of the coeliac axis to the median arcuate ligament has been proposed as a factor contributing to isolated coeliac artery injury secondary to blunt trauma. Conditions that weaken the vessel wall, including hypertension, atherosclerotic disease, fibromuscular dysplasia or cystic medial necrosis, may increase the risk of injury to the vessel during blunt trauma [6]. The clinical presentation of injury to the coeliac axis can vary markedly from a lack of symptoms or mild epigastric pain to major haemorrhage and shock. The imaging findings and subsequent management will vary accordingly [1, 3].

The diagnosis of coeliac artery injury is most commonly made on contrast-enhanced CT performed as part of a trauma work-up. The findings may include a luminal filling defect, an intimal flap, or surrounding haematoma or inflammatory change. Two-dimensional or three-dimensional reconstructions, especially in the sagittal plane, can be extremely helpful for detecting these findings and characterising the extent of injury. Catheter angiography is generally reserved for cases of suspected or known dissection. In addition to confirming the diagnosis, collateral flow distal to the occlusion can be evaluated, which can help determine the extent of revascularisation that is necessary. MR angiography of coeliac dissection has been reported, and it may gain an increasing role in the future. However, it is currently used only in those patients who are haemodynamically stable, who have relatively mild disease or symptoms, or who have contraindications to iodinated contrast material.

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(a)

(b)

Figure 1. (a) Axial and (b) sagittal contrast-enhanced CT images of the abdomen demonstrate a focal filling defect (arrows) in the distal aspect of the coeliac trunk extending into the proximal common hepatic artery and the origin of the splenic artery. The common hepatic artery is narrowed by 50%. There is a small amount of perivascular haematoma. The common hepatic and splenic arteries are patent distal to the filling defect. The pancreas (arrowheads) is unremarkable.

Management of injury to the coeliac artery varies depending on the clinical presentation. Acute haemorrhage from a torn vessel is a surgical emergency requiring laparotomy and possibly thoracotomy to achieve haemostasis. In addition, the incidence of associated bowel ischaemia and necrosis is high, and surgical intervention is indicated in such cases to resect necrotic bowel and attempt to salvage ischaemic bowel. Not all injuries to the coeliac artery will require operative intervention though. Symptomatic coeliac injury resulting in dissection is treated with endovascular stenting, while asymptomatic injuries can be managed conservatively with antiplatelet therapy or anticoagulation to prevent extension of the clot and allow for possible recanalisation [3, 4].

The case presented here highlights some important points with regard to coeliac arterial injury. The first one is that patients are often asymptomatic, present with mild or vague symptoms, or have confounding or distracting injuries. While there was no radiographic evidence of pancreatic injury in our patient, it is likely that his symptoms were at least partially due to mild pancreatic injury given the elevated lipase. This highlights the importance of maintaining a high index of suspicion when reviewing these cases. In addition, our case highlights the need for prompt diagnosis of any injury to the coeliac artery. Even asymptomatic or mildly symptomatic patients can benefit from proper diagnosis. While they may not require intervention or operation, appropriate medical therapy will decrease the risk of thrombus formation and propagation, as well as increasing the chance of vessel recanalisation.

In summary, traumatic injury to the coeliac axis resulting from blunt trauma is a rare but important clinical condition. Isolated injury to the coeliac artery has been reported, but the majority of cases have associated injuries to adjacent structures. The clinical presentation varies from asymptomatic to life-threatening secondary to haemorrhage or bowel ischaemia. Accordingly, the appropriate management will vary and involve some combination of medical therapy, vascular intervention and/or urgent surgery. Clinicians and radiologists alike should maintain a high index of suspicion for injury to the mesenteric vessels, including the coeliac axis, in patients presenting after blunt abdominal trauma.

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