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A rare case of fusiform celiac artery aneurysm after penetrating trauma

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ABSTRACT

INTRODUCTION: Visceral artery aneurysms are an uncommon clinical problem with aneurysms of the celiac artery only making up a small percentage of all visceral artery aneurysms. The more common splenic and hepatic aneurysms are often symptomatic with pain or rupture and associated hemorrhage. **PRESENTATION OF CASE:** We present a case of an otherwise healthy 30 yo male with an asymptomatic, posttraumatic arterial aneurysm of the celiac artery. He initially presented to our trauma center after sustaining multiple gunshot wounds which required multiple abdominal surgeries. He represented four weeks later with 3 days of flank pain and fever. Extensive workup yielded an incidental finding of 14 mm fusiform aneurysm of the celiac artery with associated dissection. This was not present on imaging during his initial hospitalization. The patient underwent successful endovascular management.

DISCUSSION: Visceral artery aneurysms are rare and when identified often require early intervention. Posttraumatic etiologies are often due to penetrating trauma as in the case presented. Modern high resolution imaging can identify those that are not yet symptomatic.

CONCLUSION: Posttraumatic visceral artery aneurysms are rare with an incidence of 0.01–0.2%, however they have a potential for high mortality if undiagnosed or untreated. An aggressive operative approach can lead to favorable outcomes.

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1. Introduction

Visceral artery aneurysms (VAA) are a relatively uncommon clinical problem and aneurysms of the celiac artery make up only 4% of all visceral artery aneurysms [2,3]. These often present as symptomatic at the time of diagnosis with either pain or rupture [2,4]. However, advances in imaging modalities have increased the incidental findings of these types of aneurysms [2,5]. We present the case of a 30-year-old male with no significant medical history who was incidentally found to have an aneurysm of the celiac artery on high resolution computed tomography imaging. This finding was approximately one month after being treated with multiple abdominal operations after sustaining multiple thoracoabdominal gunshot wounds. Computed tomography angiography confirmed the lesion. Here we present a case of posttraumatic visceral artery aneurysm, as well as discuss etiologies and management options for this clinical finding. This work has been reported in line with the SCARE criteria [1].

2. Presentation of case

We present a case of an otherwise healthy 30 year old male with an asymptomatic, posttraumatic arterial aneurysm of the celiac artery, found incidentally four weeks after discharge. He had initially presented to our level 2 trauma center after sustaining multiple gunshot wounds to the chest and abdomen. During his hospitalization he underwent three abdominal surgeries. At initial operation the patient underwent three areas of small bowel resection, left hemicolectomy and was managed with open abdomen. He was subsequently returned to surgery for re-anastomosis and end transverse colostomy. At the third operation his midline fascia was closed. His initial radiographic imaging did not demonstrate evidence of vascular injury nor was any found upon exploration. He was discharged after 18 days in the hospital. Four weeks later he represented with complaints of fever and flank pain for three days. He was found to have a fluid collection in the left paracolic gutter concerning for abscess. Incidentally he was also noted to have a 14 mm fusiform dilation of the celiac artery with proximal dissection (Figs. 1 and 2).

His only complaints were that of fever and left flank pain. He denied any other symptoms. His vital signs upon presentation were temperature of 99.5 Fahrenheit, pulse of 89beats per minute, respirations of 14, and blood pressure of 131/88 mmHg. Laboratory values were significant for leukocytosis of 14.3 with-

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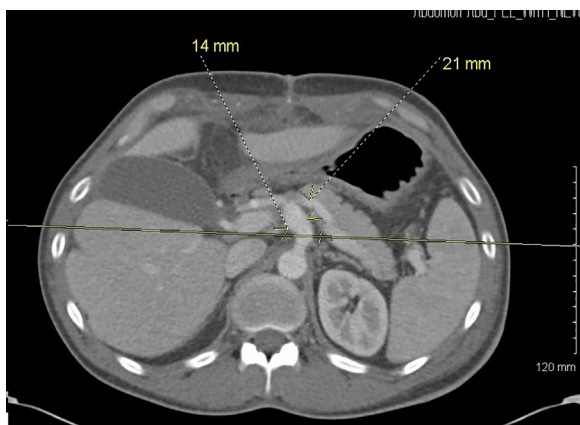


Fig. 1. Axial view, illustrating celiac artery aneurysm.



Fig. 2. Coronal view, illustrating celiac artery dissection.

out left shift. After being treated with incision and drainage of his left flank abscess our patient was sent for angiographic studies. Computed tomography angiography confirmed a 14mm dilatation of the celiac artery with a lucent line through its mid-portion suggesting possible dissection. The origin of the celiac axis otherwise appeared normal with no apparent abnormalities of distal celiac artery branches or the superior mesenteric artery and inferior mesenteric artery. After treating the patient with IV fluids and antibiotics the patient was referred to vascular surgery for further management. He went on to have successful endovascular repair.

3. Discussion

Visceral artery aneurysms include both true aneurysms, limited by all three layers of the arterial wall which progressively dilate and thin, and pseudo aneurysms, where there is a tear of the vessel with associated *peri*-arterial hematoma [2,6]. True aneurysms can be further categorized based on morphology as fusiform, saccular, or a combination of the two. The etiology of aneurysms can be congenital or due to underlying arterial disease, infection or injury. Those aneurysms resulting from traumatic injury are most commonly due to penetrating mechanisms [7]. Splanchnic aneurysms are defined as those affecting the celiac, superior mesenteric, and inferior mesenteric arteries and their branches. Visceral artery aneurysms are relatively rare with a reported incidence of 0.1–0.2% [2,8]. They do however carry a high mortality potential of 8.5% if they rup-

ture, which has been reported anywhere between 10 and 100% in some series [3,9]. Celiac artery aneurysms are the rarest of these subtypes of aneurysms comprising 4 percent of all visceral artery aneurysms. Though many visceral aneurysms are symptomatic at presentation, celiac artery aneurysms are often asymptomatic at presentation with approximately 85 percent discovered on incidental imaging studies. This is due to high quality high resolution CT and MRI imaging now readily available [2,4,5,10].

Common etiologies of celiac aneurysms include congenital defects, hypertension, pregnancy, trauma, atheroma, cystic medial necrosis, fibromuscular dysplasia and previous abdominal surgery [11,12]. Our case of celiac artery aneurysm presented in an unusual manner. It was discovered incidentally as a 14 mm fusiform celiac axis dilatation. This finding is unusual because it was discovered approximately one month after traumatic injury to the abdomen when no such findings were noted on initial imaging. One such explanation for the etiology is blast injury from the penetrating trauma. Hassantash et al. reported traumatic visceral artery aneurysms presenting on average 12.5 weeks after penetrating trauma, however these typically presented with hemorrhage [7]. Another etiology could be of mycotic in origin. Our patient's hospital course was complicated with intra-abdominal abscesses post operatively [2]. In this particular case, CT angiography showed associated dissection of the celiac artery wall leading to a pseudo aneurysm. Patients with visceral artery pseudo aneurysms have an antecedent history of arterial trauma, intraabdominal inflammation, malignancy or biliary tract manipulation [2]. The pathogenesis of these visceral artery aneurysms is poorly characterized with retrospective studies showing atherosclerosis accounting for 32% [5,13].

After treating our patient for his chief complaint of a left flank abscess with incision and drainage and appropriate antibiotics, he was referred to vascular surgery for evaluation and management of his celiac artery aneurysm. A very similar case reported in 2005 treated a 2.3-cm supraceliac aortic pseudo aneurysm secondary to complications from abdominal gunshot wounds with a 16 × 55-mm AneuRx stent-graft. Follow-up imaging at 12 months revealed a patent vessel with full pseudo aneurysm exclusion [14]. Overall management should focus on preventing aneurysmal expansion and rupture with the type of management depending on the location of the visceral artery being treated. Collateral supplies of critical end organs should be noted. While in the case of celiac artery aneurysms collateral supply is provided by pancreatoduodenal and gastroduodenal arteries, if the collateral supplies are not adequate, then concurrent arterial bypass surgery is necessary [2]. The type of aneurysm also plays a major role in management options. Pseudo aneurysms can be treated with proximal and distal coil embolization, while true aneurysms with coil packing. Furthermore, saccular arterial formations can be treated with neck catheterization which allows limitation to the sac. This is accomplished with coils, glue, thrombin and grafts. If the arterial dilation is fusiform, like in our patient, endovascular exclusion with the placement of coils in afferent and efferent arteries is necessary to achieve complete occlusion [2,7,15,16]. Definitive treatment specifically of celiac artery aneurysms can include aneurysmectomy with primary reanastomosis as well as an aorto-celiac synthetic prosthesis bypass [13].

4. Conclusion

Celiac artery aneurysms are the rarest of the visceral artery aneurysms encountered in the clinical setting. The majority are asymptomatic unless they reach critical diameters. Etiologies can be difficult to assess on a patient to patient level but usually include atherosclerosis, congenital defects, intra-abdominal inflammation

and trauma. Early recognition and intervention is paramount as mortality rates can reach up to 40 percent for ruptured vessels. Although there are no consensus guidelines which address this clinical problem studies have shown, early endovascular management to be most effective. Overall management should focus on preventing these aneurysms from expansion and eventual rupture.

Conflicts of interest

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Ethical approval

Institutional review board approval was obtained prior to moving forward with this report.

Consent

Written informed consent has been obtained from the patient. All identifying details have been omitted.

Author contribution

All authors involved in the report contributed to the concept of the paper, the data collection and to the writing of the manuscript. All authors reviewed the paper prior to the final manuscript to be submitted.

Guarantor

Andrea Pakula.

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