Case Report

Iliocaval fistula with high output cardiac failure

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Abstract

Fistulous communications between the common iliac arteries and inferior vena cava are very uncommon and usually occur as a result of trauma, aneurysmal rupture, or endovascular repair. They can present with signs of high output cardiac failure including hypotension, venous congestion, and pulmonary hypertension. This case outlines the utility of CTA in diagnosing iliacal fistulas and the importance of considering this diagnosis in a patient with signs of right heart strain and high output cardiac failure.

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Case

This is a case of a 64-year-old male with prior history of AAA (4.7 cm) and multiple episodes of deep vein thrombosis and pulmonary embolisms. The patient presented initially to the hospital with vague symptoms of shortness of air, chest pain, and abdominal pain. His labs showed an elevated creatinine of 1.85 suggestive of acute renal failure as well as elevated AST (365) and ALT (363) suggestive of a hepatocellular pattern of liver injury. Initial radiology exams included a duplex ultrasound of the lower extremities (negative for deep vein thrombosis but suggestive of some right heart strain), CT chest PE protocol (negative for pulmonary embolism but suggestive of pulmonary hypertension), and abdominal ultrasound with hepatic duplex (negative for acute pathology with limited duplex exam due to overlying bowel gas). The patient’s LFTs continue to rise and a liver biopsy was performed; the results of which were negative. The patient’s volume status worsened and nephrology was consulted with aggressive diuresis recommended. The patient’s condition improved and he was sent home to follow up for a repeat echocardiogram vs right heart catheterization to determine cause of possible right heart strain and follow up liver function tests to assess for resolution. At the next primary care visit, the patient had worsening lower extremity edema with decreased pulses and increased abdominal pain prompting a repeat admission to the hospital. At this time, a right heart catherization was performed showing high output heart failure and an abdominal bruise was auscultated on repeat physical exam. CTA of the abdomen pelvis was obtained showing an arteriovenous fistulous communication between the right common iliac artery and inferior vena cava. To our knowledge, the patient had not had any trauma or surgery to that region prior to presenting with these symptoms.

Although the endovascular repair was successful, the patient had respiratory compromise and needed continued intubation. His mental status continued to fluctuate, and he would often become extremely agitated. He was weaned to nasal cannula but continued to demonstrate signs of high output

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Fig. 1 – CTA Abdomen/Pelvis after contrast administration: The abdominal aortic aneurysm is seen as well as enhancement of the aorta and early enhancement of the inferior vena cava suggestive of a fistulous communication. The density inside the inferior vena cava is similar to the density in the lumen of the aorta.

cardiac heart failure including pulmonary edema and shortness of air. This progressed worsening acute kidney injury that did not resolve. After discussion of goals of care with family, the decision was made to stop all aggressive forms of treatment and admit the patient to inpatient hospice.

Discussion

Arteriovenous fistulous communication between the common iliac arteries and inferior vena cava (iliocaval fistula) is extremely rare (approximately <1%) compared to fistulous communications between the aorta and inferior vena cava (Fig. 1) [1]. They generally arise from prior trauma, aneurysmal rupture or endovascular repair in that region. Patients with an ilio-caval fistula generally take a longer time to develop high output cardiac failure than those with an aortocaval fistula. Often this diagnosis is missed due to the vague nature of complaints as was the case in this patient. Signs of high output cardiac failure include lower extremity edema, venous congestion involving the liver and kidneys, dyspnea, and hypotension. Other signs can include abdominal bruit with a possible pulsatile mass or ischemia of the legs.

Previous studies have mentioned that the time between presentation and diagnosis of an ilio-caval fistulas generally occurs between several weeks to months [2,3]. This was the case seen with our patient as his symptoms gradually worsened with multiple hospital admissions for vague chief complaints until the diagnosis was ultimately discovered.

In order to confirm the diagnosis of ilio-caval fistulas, diagnostic imaging is extremely important. CT angiography has largely started to replace conventional angiography for many vascular pathologies [3] due to its speed of acquisition and noninvasive nature (Figs. 2 and 3). Important features of an ilio-caval fistula include aneurysmal dilation of the common iliac artery and, possibly, a dilated IVC with similar density measurement of the aorta and IVC in portal venous phase imaging. Fluid within the retroperitoneum can be an important clue as well. It generally takes approximately 55-60 s for enhancement of the infrarenal IVC after contrast administration but when an ilio-caval fistula is present, early enhancement is seen due to diversion of flow by the shunt into the IVC resulting in retrograde opacification.

Ultrasound can be helpful in identifying an ilio-caval fistula but can be limited due to the overlying bowel gas as seen in our patient's case. Increased pulsatility of the spectral waveforms in both forward and reverse direction bilaterally can also suggest the possibility of increased right heart pressures as is seen in high output cardiac failure (Fig. 3).

Treatment of ilio-caval fistulas is determined on a patient by patient basis to determine benefit of endovascular repair [4]. In our case, the patient underwent successful endovascular fistula repair but, since many of the complications had been present for likely more than a few months, they had progressed to an irreversible state and the patient’s condition continued to deteriorate [5].

Fig. 2 – 3D RECONSTRUCTED IMAGE: 3D reconstructed image illustrating the aortic abdominal aneurysm and fistulous communication between the common iliac artery and inferior vena cava.
Conclusion

Arteriovenous fistulous communications between the common iliac arteries and inferior vena cava are relatively rare and can often be difficult to diagnose on initial presentation. This case details the classical imaging findings seen in an iliocaval fistula, the utility of CTA in diagnosing this condition, and the importance of considering this diagnosis in a patient presenting with signs of high output cardiac failure.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2019.01.005.

REFERENCES

[1] Lim RF, Stella DL, Dowling RJ, Campbell WA, Hebbard GS. Iliocaval arteriovenous fistula presenting with multiple organ failure. Australas Radiol 2006;50(4):381–5. doi:10.1111/j.1440-1673.2006.01606.x.
[2] Brewster DC, Cambria RP, Moncure AC, Darling RC, LaMuraglia GM, Geller SC. Aortocaval and iliac arteriovenous fistulas: recognition and treatment. J Vasc Surg 1991;13:253–64 discussion: 264-5. [PubMed].
[3] Shuman LS, MD. The catheter and the CT scan. J Lanc Gen Hosp 2010;5(1):16–17 Retrieved December 25, 2018.
[4] Makaloski V, Wyss TR. Iliocaval fistula: late complication after endovascular interventions. Eur Soc Vasc Surg 2016;52(1). https://doi.org/10.1016/j.ejvs.2016.03.020.
[5] Hickey NC, Downing R, Hamer JD, Ashton F, Slaney G. Abdominal aortic aneurysms complicated by spontaneous iliocaval or duodenal fistulae. J Cardiovasc Surg 1991;32:181–5.