University of Nebraska Medical Center
Nebraska Medicine

Graduate Medical Education Research Journal

Volume 5 | Issue 2 Article 10

December 2023

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This is a case of an 82-year-old patient who presented with recurrent polymicrobial bloodstream infections and no obvious undrained source of infection. She had prior double barrel iliocaval stenting for post thrombotic syndrome. The patient underwent exploratory laparotomy and primary repair of a duodenal-caval fistula with a fascia lata patch and an omental pedicle flap. No further bloodstream infections were documented after the repair. This discussion highlights an uncommon complication of IVC stenting, its presentation as well as the operative approach used to repair the fistula.

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doudenum, inferior vena cava, fistula

Recurrent Polymicrobial Bloodstream Infections as Harbingers of a Duodenal-Inferior Vena Cava Fistula

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https://doi.org/10.32873/unmc.dc.gmerj.5.2.010

Abstract

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Introduction

Duodenal-caval fistula (DCF) is rare and is associated with a high mortality. Reported causes of DCF include abdominal trauma, irradiation, foreign body ingestion, migration of an IVC filter, IVC replacement with prosthetic graft and peptic ulcers.[1] There have been no prior reports of this related to IVC stent placement. Diagnosing a DCF can be challenging. The presentation is generally associated with sepsis and gastrointestinal bleeding. CT scan and upper endoscopy may help to confirm a diagnosis.[2] Various surgical techniques have been described for repair.

Case

An 82-year-old woman presented with recurrent fevers and leukocytosis. She previously had distal inferior vena cava (IVC)-to-common iliac vein stents placed at an outside institution for post thrombotic syndrome 3 years prior to presentation. She was initially hospitalized one month prior to presentation with an Enterobacter cloacae bloodstream infection. She was treated with intravenous (IV) antibiotics and discharged on oral therapy. Two weeks later she was readmitted with persistent fevers and blood cultures grew Candida albicans and gram-positive rods. Evaluation including a urinalysis and computed tomography (CT) of the chest, abdomen and pelvis did not identify a source. A transesophageal echocardiogram showed no endocarditis. She was treated with oral fluconazole and levofloxacin and discharged. She became lethargic and hypotensive resulting in a third readmission for sepsis and found to have a Candida glabrata bloodstream infection. IV antimicrobial treatment was modified to include micafungin, meropenem, vancomycin, and doxycycline. She was transferred to our facility for further care. A CT of the abdomen and pelvis demonstrated a small amount of gas within the lumen of the IVC stent **(Figure 1A)**. Vascular surgery was consulted and determined that a stent infection was unlikely. The gas within the lumen of the stent was considered iatrogenic from air introduced during IV access. No other signs of infection were present in the surrounding tissue. A positron emission tomography (PET) CT scan was obtained and demonstrated mild focal increased uptake near the IVC stent, concerning for stent infection **(Figure 1B)**. However, she had been improving clinically on combination antimicrobial therapy and was deemed to be a high-risk surgical candidate given her medical comorbidities. She was subsequently discharged on IV micafungin with a plan for oral fluconazole thereafter.

She was readmitted 2 days later with sepsis, and found to have a polymicrobial bloodstream infection with Streptococcus viridans and Lactobacillus spp. She was started on IV micafungin, vancomycin, and meropenem. A CT angiogram demonstrated increased intraluminal gas without definite soft tissue infection. Vascular surgery was reconsulted to evaluate for stent infection, and with recurrent polymicrobial bloodstream infections in the context of suspicious intraluminal air, there was concern for duodenal-caval fistula (DCF). A small bowel enteroscopy failed to reveal abnormalities in the stomach, duodenum, or jejunum. She was taken to the operating room for exploratory laparotomy and suspected DCF repair. The duodenum was found to be adherent to the IVC and there was a communication between them **(Figure 2)**. The duodenal perforation was repaired primarily in two layers **(Figure 3)**. Some purulence was encountered and sent for culture. The culture grew vancomycin-resistant Enterococcus faecium. The segment of the exposed IVC stent that was occluded was partially removed and the IVC wall was excised **(Figure 4)**. Complete IVC reconstruction was avoided due to the patient's overall clinical status. With no saphenous veins available, a fascia lata patch was used to repair the IVC **(Figure 5)**. The IVC repair was then covered with an omental pedicle flap. The patient tolerated the procedure well and was subsequently discharged to rehab on post-operative day 10. She was continued on oral fluconazole, IV daptomycin, and IV ampicillin/sulbactam at discharge. At her one-month follow-up appointment, the patient

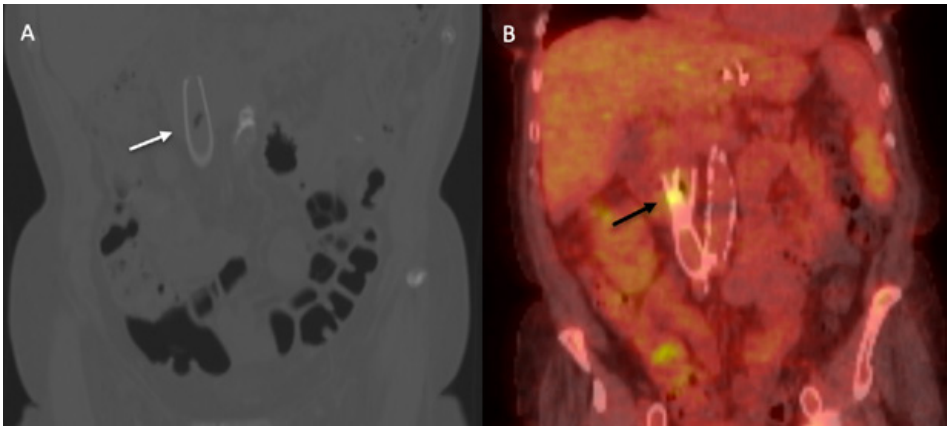

Figure 1. A. Computed Tomography (CT) Scan with intraluminal gas near inferior vena cava (IVC) stent. **B.** Positron emission tomography (PET) CT Scan with increased uptake in the area of the inferior vena cava (IVC) stent.

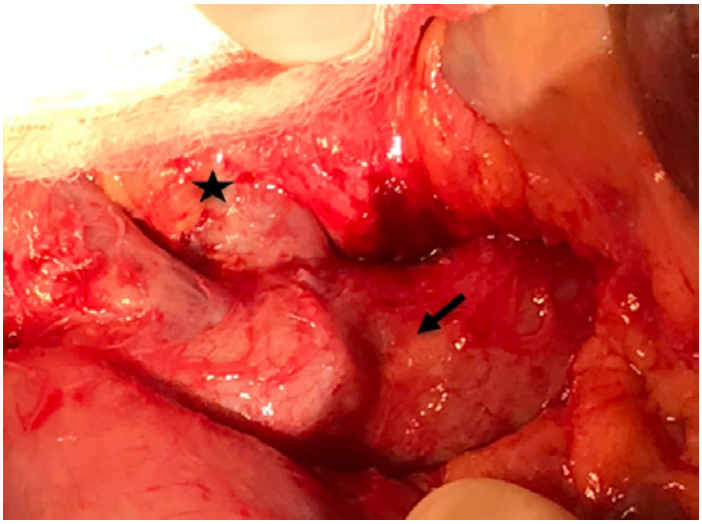

Figure 2. Duodenum (arrow) adherent to the inferior vena cava (star).

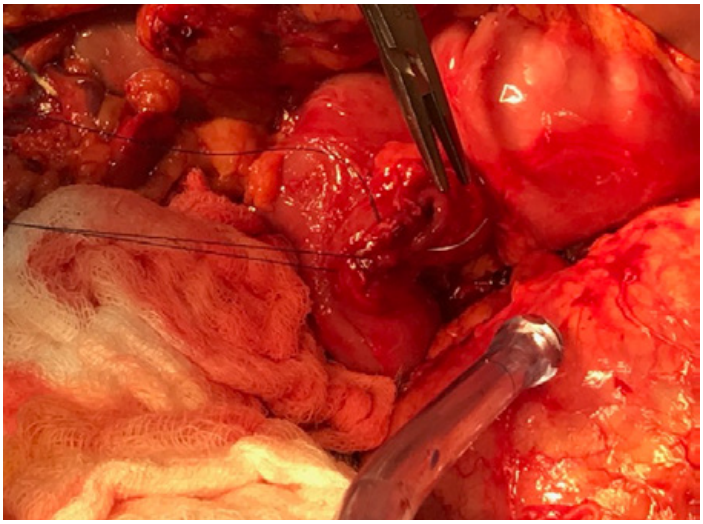

Figure 3. Duodenal repair.

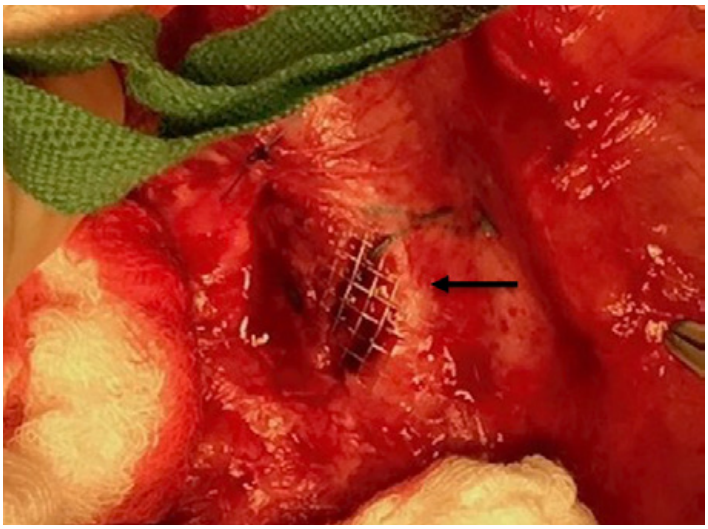

Figure 4. Exposed inferior vena cava stent.

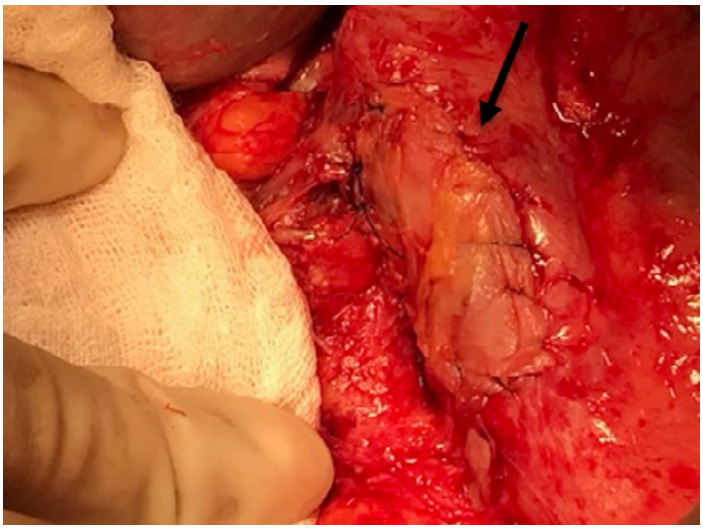

Figure 5. Inferior vena cava (IVC) repair with fascia lata patch.

was doing well clinically. A CT scan showed no fluid collections or concerns for DCF recurrence, and she had no further episodes of bloodstream infections. For long term follow-up, it is now nearly 5 years after her surgery. The patient continues to do well clinically with no recurrent infections.

Discussion

A high clinical suspicion is necessary to diagnose a DCF. The presence of recurrent sepsis with polymicrobial bloodstream infections, abdominal pain, or gastrointestinal bleeding should raise the possibility of DCF, especially if a foreign body is present.[3] Characteristics on CT scan that can aid in the diagnosis include thrombus or air bubbles in the IVC, fluid collection surrounding the IVC or duodenum, or presence of a foreign body such as a stent or IVC filter. Air bubbles in the IVC may be produced by bacteria or forced in by gut peristalsis.[4] In this patient the presence of air in the IVC was initially thought to be iatrogenic. However, the continued presence of air within the lumen of the IVC led to the suspicion of DCF when an alternative diagnosis was not apparent. This patient had very large IVC stents in a double barrel fashion, which may have played a role in the eventual erosion and enteric communication.

Medical management can be an option to treat a DCF in patients that are poor operative candidates. Various techniques have been described to repair a DCF. Jeng and colleges report a generally accepted practice to excise an infected graft followed by reconstruction.[5] Other surgical options include primary repair of the duodenum with an epiploic or jejunal patch.[1] Pancreaticoduodenectomy with gastrojejunostomy and choledochojejunostomy has been reported.[6] Hamblin and Ryu also reported a case of endovascular stent grafting to control a fistula in a patient that was not a surgical candidate.[7]

Our case has certain unique elements. The entire foreign body (stent) was not removed. Since that segment of the IVC was occluded and the parallel stent was patent and controlling the patient's edema, we elected not to perform a complete resection and reconstruction, considering her comorbidities. With the lack of other autogenous tissue, a fascia lata patch was utilized to repair the fistula with a successful outcome. We have utilized this as reinforcement for aortic repair in an infected field. The character of the tissue and assumed resistance to infection along with relative ease of harvest with minimal added morbidity and time, made this an ideal choice for this case. The most likely etiology

of infection was the enteric communication rather than primary stent infection; therefore, with the source (DCF) removed and receipt of appropriate IV antibiotics, the probability of recurrent infection was lower with bare metal stents in place. The decision for treatment in this complicated syndrome should consider the patient's current stent function and involvement of surrounding structures, the expected mortality of the proposed surgical plan, and the patient's clinical status and overall prognosis.

Conclusion

This is a unique case that highlights a serious complication of IVC stenting, challenges in diagnosis, and complex treatment decision making. ■

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