

Case Report

Infected aortic pseudoaneurysm caused by an inferior vena cava filter

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Background: Inferior vena cava filters are widely used to prevent pulmonary embolism, but they can cause serious complications.

Case Presentation: A 45-year-old man with multiple abscesses was transferred to the emergency department from another hospital. Computed tomography revealed bilateral subscapular abscesses, septic pulmonary embolism, and an abdominal aortic pseudoaneurysm with an abscess at the site of the inferior vena cava filter limb inserted 12 years before. After admission to our hospital, surgical drainage of the bilateral subscapular and right wrist joint abscesses was performed; subsequent treatment with ampicillin improved the patient's condition. Inflammation resolved on the 19th hospitalization day, and abdominal aortic replacement surgery was performed. The patient's postoperative course was uneventful. He returned to the previous hospital for rehabilitation after 40 days of hospitalization.

Conclusion: Inferior vena cava filters could cause serious complications.

Key words: Abscess, aortic replacement surgery, infected aortic pseudoaneurysm, inferior vena cava filter, pulmonary embolism

INTRODUCTION

INFERIOR VENA CAVA (IVC) filters are widely used to prevent pulmonary embolism but can cause serious complications. However, cases of infected aortic pseudoaneurysm complicated by arterial injury resulting from IVC filters are rare. Herein, we describe the clinical course of a 45-year-old man with an infected aortic pseudoaneurysm caused by an IVC filter.

CASE REPORT

A 45-year-old man with multiple abscesses was transferred to our emergency department from another hospital. He had undergone placement of an IVC filter due to deep vein thrombosis 12 years before admission. The filter could not be retrieved because the tip of the filter limb penetrated the IVC wall and extended into the aortic wall

(Fig. 1). Twenty days before transfer, the patient noticed swelling and heat in his lower extremities. The next day, he had malaise and bilateral swelling of his hands. Fifteen days before transfer, he was admitted to another hospital due to chills and disorientation for 2 days. The patient was diagnosed with sepsis and multi-organ failure. *Streptococcus pyogenes* was detected in the blood culture, and ampicillin and clindamycin were administered. From the third day of admission, the patient's temperature increased to 38°C. Despite this, his general condition, pain, and swelling of the extremities improved thereafter. A computed tomography (CT) scan performed on the day before the transfer revealed septic pulmonary embolism, subscapular abscesses, and enlargement of the soft tissue density around the IVC filter. The patient was transferred to our hospital for multimodal treatment. His pharmaceutical history included warfarin, and his social history included daily consumption of 430 g alcohol.

Upon admission, vital signs were generally stable and body temperature was 37.6°C. Physical examination revealed swelling, redness, and tenderness of the right and left knee joints. The right wrist joint was fixed in a flexed position because of pain. His chest and abdominal examinations were normal.

Laboratory values revealed a white blood cell count of 9.24 K/ μ L and the differential blood count included 78%

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Fig. 1. Enhanced computed tomography scan of a 45-year-old man, carried out in the previous hospital 1 year before the index admission for an infectious aortic pseudoaneurysm caused by an inferior vena cava filter. The scan reveals the tip of the filter limb penetrating the inferior vena cava wall and extending into the aortic wall (arrow).

neutrophils. The levels of C-reactive protein and procalcitonin were 15.18 mg/dL and 0.09 ng/mL, respectively. A full-body CT scan revealed bilateral subscapular abscesses, septic pulmonary embolism, and an abdominal aortic pseudoaneurysm with an abscess at the site of the IVC filter limb (Fig. 2A).

The effectiveness of the course of ampicillin leading up to the transfer increased the suspicion of an infected aortic pseudoaneurysm; ampicillin was given at 12 g daily. On day 5 of admission, drainage and debridement of the bilateral subscapular and right wrist joint abscesses were performed. In addition, antibiotic treatment was changed to ceftriaxone (4 g/day) because of drug eruption. The patient's condition improved postoperatively. A CT scan on hospital day 13 revealed that the aortic pseudoaneurysm was further enlarged (Fig. 2B). We determined that the pseudoaneurysm was associated with infection based on the fact that CT showed a rapidly growing soft tissue shadow that appeared to be an abscess around the inferior vena cava, and the tip of the filter limb penetrated the aortic wall into the pseudoaneurysm that was rapidly enlarging. On hospital day 19, when all inflammation had resolved, abdominal aortic replacement surgery was performed. Intraoperatively, a small amount of turbid ascites was observed; there was no obvious abscess but adhesions were present. Filter removal and IVC reconstruction were not carried out due to excessive damage to the body. However, the filter limb that penetrated from the IVC wall was cut off. Histopathological examination revealed infiltration of inflammatory cells from

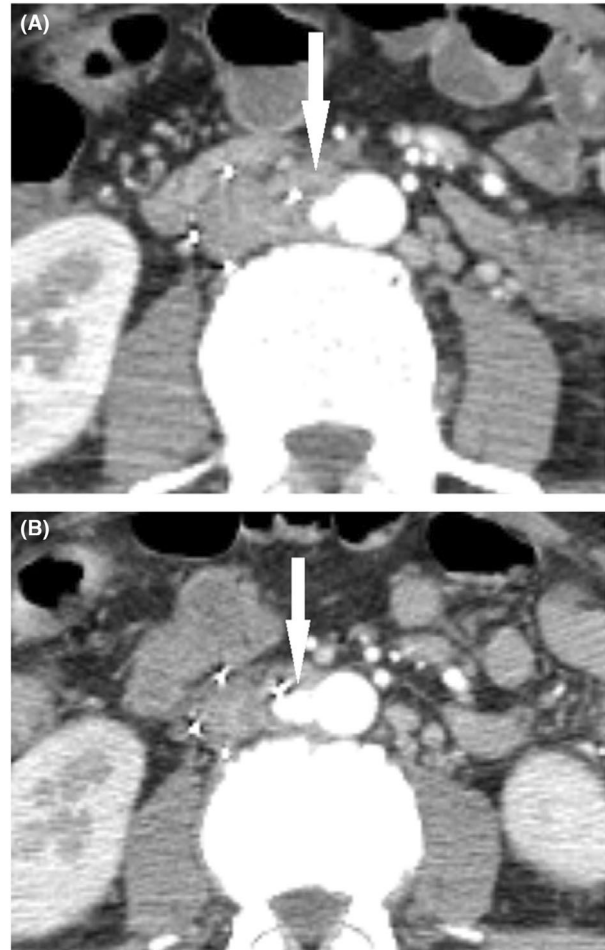


Fig. 2. (A) Enhanced computed tomography scan of a 45-year-old man on hospital day 2, indicating an abdominal aortic pseudoaneurysm with an inferior vena cava (IVC) abscess at the site of the IVC filter limb (arrow). (B) Enlargement of the aortic pseudoaneurysm (arrow) evident on hospital day 13.

the adventitial side in the aortic wall with mild arteriosclerosis. Although no bacteria were detected in the aortic wall culture, a diagnosis of infected pseudoaneurysm was made because of turbid ascites and the pathological findings including the infiltration of inflammatory cells. The absence of bacteria in the lesion was thought to be due to long-term antibacterial drug treatment. The postoperative course was uneventful, and CT revealed the disappearance of the pseudoaneurysm on the hospital day 20 (Fig. 3). Antibiotic treatment was changed to oral cefalexin (2,000 mg/day) on hospital day 30. After 40 days in our institution, the patient returned to the previous hospital for rehabilitation. He was treated with antibiotics for an additional 1 month and was discharged with good progress.



Fig. 3. Enhanced computed tomography scan of a 45-year-old man with an infectious aortic pseudoaneurysm caused by an inferior vena cava filter. The scan was carried out on hospital day 20 and shows the disappearance of the pseudoaneurysm (arrow).

DISCUSSION

THIS IS A rare case of an infected aortic pseudoaneurysm caused by an IVC filter.¹ The patient had a higher risk of severe invasive streptococcal infection due to high alcohol intake. Secondary infective aortitis occurred in the pseudoaneurysm. Aortic pseudoaneurysms generally occur as a result of infection, chronic inflammation, or trauma.² An infected aneurysm is classified by localized dilation of an artery caused by the destruction of the vessel wall. An infected aneurysm can develop when infection of the arterial wall causes the formation of a new aneurysm or when a pre-existing aneurysm becomes secondarily infected.

Inferior vena cava filters are widely used to prevent pulmonary embolism in patients with deep vein thrombosis who cannot receive anticoagulant therapy or who have undergone catheter intervention, thrombolytic therapy, or pulmonary arterial thrombosis removal. The IVC filters can be safely implanted in most cases, but they can be associated with complications. In a systematic review of published works, among 9,002 patients in whom 15 types of IVC filters were placed, penetration was reported in 19% of patients, and 19% of those cases showed evidence of organ or structural involvement. Aortic injury is a relatively rare complication, accounting for 19% of organ or structural involvement.³ Temporary IVC filters have a higher complication rate than permanent IVC filters, and the incidence of complications increases with the length of time that a temporary filter is left in place.^{4,5} In the present case, severe complications occurred 12 years after IVC filter placement.

Strict follow-up and stent-graft interpolation have been reported as the best treatment options for pseudoaneurysms caused by aortic injury due to IVC filters.^{6,7} Our patient was suspected to have an infectious aneurysm and a surrounding abscess, and aortic graft replacement was carried out by laparotomy. There was a certain risk of rupture while waiting for surgery. Surgery was undertaken after the active infection had resolved because it had considerable risks. The risk was determined to be higher because the IVC filter remained in place, and there was concern about relapse infection. Considering that the IVC filter with infection remains, the duration of antibiotic treatment should be determined from the clinical course, including blood and imaging tests. If the IVC filter causes infection again, the IVC filter should be removed, at additional risk.

CONCLUSION

CLINICIANS SHOULD BE aware of the potentially serious, albeit rare, complications associated with IVC filter use. It is also important to know that infectious aortic pseudoaneurysms related to IVC filters can be initially treated with appropriate antibiotics followed by surgery when the timing is optimized.

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DISCLOSURE

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Registry and registration no. of the study/trial: N/A.

Animal studies: N/A.

Conflict of interest: None.

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