SM Vascular Medicine

Case Report

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A Very Rare Case of a 15-Year-Old Inferior Vena Cava Filter with Erosion to T12 Corpus Vertebrae

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Abstract

A patient with extensive abdominal and pelvic procedures following a motor vehicle accident who had Inferior Vena Cava Filter (IVCF) implantation due to contraindication to other anticoagulation therapies presents with severe lower abdominal and back pain, fever, left lower extremity, and subsequent right lower extremity swelling. Venous Doppler ultrasound revealed extensive deep venous thrombosis (DVT) of the left lower extremity. In addition, the abdominal CT scan illustrated suspicious erosion of IVCF to the T12 vertebral body. This case report focuses on erosion and invasion of a prolonged-dwelled IVCF to adjacent organs as a long-term complication. Our patient had the IVCF for 15 years, the longest dwell time reported in the literature.

Keywords: IVCF complication; DVT; Anticoagulation

Abbreviations

IVCF: Inferior Vena Cava Filter, **DVT**: Deep Venous Thrombosis, **MRI**: Magnetic Resonance Imaging, **VTE**: Venous Thromboembolism, **PE**: Pulmonary Embolism, **CT**: Computed Tomography.

Case Report

A 45-year-old male with a medical history significant for obesity with a BMI of 40 and non-insulin-dependent diabetes mellitus presented to the emergency department with fourteen days of low-grade fever and severe left lower quadrant abdominal pain with radiation to his back and left flank region. His fever was responsive to acetaminophen therapy at home. On further investigation, the patient reported having a significant abdominal and pelvic operation after being involved in a motor vehicle accident 15 years ago. At that time, chemical anticoagulation to prevent venous thromboembolism (VTE) was warranted, considering the extent of traumatic event that resulted in splenectomy. Hence, a retrievable IVCF was placed, given the anticipated short-term contraindications to chemical anticoagulation. However, the IVC filter was never removed due to the patient's failure to follow up.

On arrival at the emergency department, the patient's temperature was 98.3 F. He was tachycardic with a blood pressure of 189/110 and respiratory rate of 18. The comprehensive metabolic panel was within the normal limits. The patient was noted to have mild leukocytosis of 11.3 K/uL with normocytic anemia of 13.7 g/dL. Urinalysis was positive for 3+ blood. Abdominal CT was significant for perivesicular fatty infiltration, which may be associated with cystitis, borderline enlarged left external iliac chain lymph node, and hepatomegaly with steatosis. It also revealed IVCF placement with possible bony involvement (Figure 1).

The patient was admitted to the medicine service for further evaluation and management. His left leg started to swell during his hospitalization and became more painful. He also developed a low-grade chronic mild to a moderate fever of 100 to 100.4 F, which responded to Tynelol therapy. Arterial and venous doppler ultrasound was performed, which revealed occlusive thrombosis throughout the left femoral vein, profunda femoris vein, and a part of the common femoral vein. It also illustrated an occlusive thrombosis at the junction between the femoral vein and the great saphenous vein. The patient was started on heparin, and interventional radiology and vascular surgery were consulted for possible removal of the IVC filter. During this time, the pain

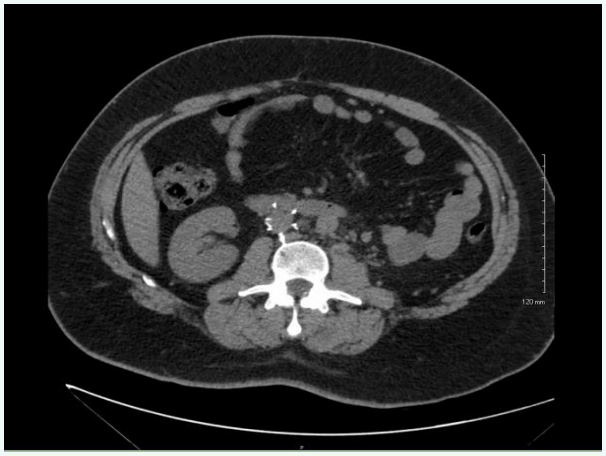

Figure 1 Abdominal CT scan illustrating an IVCF located at the level of T12 with possible bony erosion to corpus vertebrae of the T12.

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progressed to severe low back pain with radiation to the bilateral lower extremities with stabbing quality.

Interventional radiology and vascular surgery assessment with MRI revealed IVC thrombosis with extension down to the left distal femoral vein (Figure 2).

Since the patient had the IVC filter for a long time, the concern of erosion to the venous structure and the bone was raised. The patient was transferred to a tertiary care hospital. The large venous thrombus was unable to be removed, and instead, a tPA catheter was placed to reduce the clot burden and enable easier clot removal during a future procedure. Subsequently, the IVC filter was removed partially, and extensive stents were placed (figure 3, 4). The patient continued to be on anticoagulation with rivaroxaban and clopidogrel with regular follow-up appointments with his vascular surgeon.

Figures 3 and 4. Coronal and parasagittal views of the abdominal CTA illustrate the partial removal of the IVCF filter and the placement of the extensive stents.

Discussion

Patients who have had traumatic incidents that involved a closed head injury, multiple long bone fractures, or pelvic fractures are at high risk of thromboembolism (1). These patients will benefit from the placement of prophylactic inferior vena cava filtration (IVCF). Although IVCF prevents pulmonary embolism (PE), they have some complications that need to be monitored and addressed accordingly. The complications of IVCF insertions can be broadly categorized into three groups; the risk associated with the insertion, risk of failure of the device, and long-term complications (2). Some of the long-term complications include filter migration, IVC thrombosis, strut disintegration, or erosion of filter struts into the vena cava and or surrounding organs (3). For instance, in a case report of an IVCF placement in a pregnant patient with deep vein thrombosis DVT at the eighth month of gestation, failure to follow up for removal led to duodenal erosion (4). In another case, in a patient with a history of antiphospholipid syndrome and several episodes of DVT and PE, an IVCF failed to be removed for ten years and eventually led to the perforation of the filter limbs through the residual IVC wall (5). Another patient who had recurrent DVT and was non-compliance with anticoagulation had an IVCF placement. After four years, she presented with hydronephrosis of her right kidney, where it was found that one of the IVCF limbs projected into the lumen of the right ureter causing proximal hydroureteronephrosis (6). Lastly, a patient with placement of IVCF due to DVT in the setting of a concurrent gastrointestinal bleed, that prohibited therapeutic anticoagulation, had the IVCF for four years, leading to an L2 vertebral body erosion (7).

Figure 2 Abdominal MRI revealed IVC thrombosis as indicated with the yellow arrow.

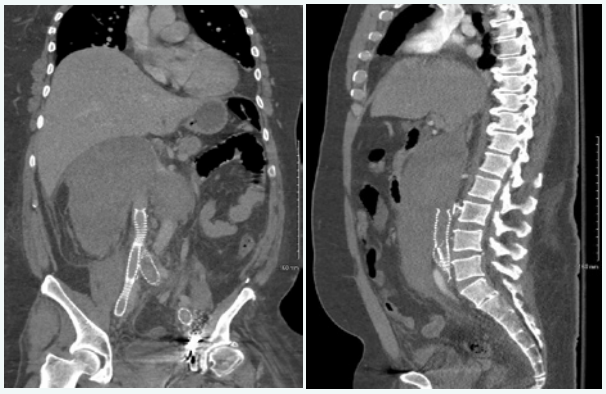

Figure 3,4 Coronal and parasagittal views of the abdominal CTA illustrate the partial removal of the IVCF filter and the placement of the extensive stents.

We present a case where the IVCF dwell time is fifteen years due to non-compliance with follow-up. In our case, the patient presented with abdominal and lower back pain, and fever as one of the reported associated symptoms in patients with extensive DVT. Moreover, findings from the RIETE registry reported that patients who presented with fever initially would have a worse prognosis and a higher mortality rate (8). Although IVCF placement is sometimes necessary, removing the IVCF should be a priority once other anticoagulation mechanisms are permitted. Erosion to the neighboring anatomical structures seems to be the most common issue of an IVCF with prolonged dwell time. Although some of the literature reported cases of asymptomatic IVCF with long-term placement, the outcome of ignoring the IVCF can be deleterious because of the anatomical location of the IVCF placement. As mentioned previously, erosion and invasion to the aorta, ureter, duodenal, and vertebral bodies are some of the most reported sites. Although the duration can be different, the older the IVCF placement is, the more erosive they become. In addition, the rate of the extensive thrombosis events tends to be increased, as in our patient from IVCF location at T12 to the distal femoral vein.

Conclusion

With this information and the preceding cases mentioned above or reported in the literature, we should be more careful about the long-term sequela of the IVCF placement. Erosion to the neighboring anatomical structures is the most common issue, although it rarely occurs. Patients should be advised and guided towards a better anticoagulation therapy since IVCF is only intended to be utilized as a short-term solution.

Abbreviations

IVCF: Inferior Vena Cava Filter, **DVT**: Deep Venous Thrombosis, **MRI**: Magnetic Resonance Imaging, **VTE**: Venous Thromboembolism, **PE**: Pulmonary Embolism, **CT**: Computed Tomography.

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