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## CASE REPORT

### Inferior vena cava filter thrombosis

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#### Key Clinical Message

Patients with inferior vena cava (IVC) filters – particularly permanent filters – are at increased risk for recurrent deep venous thrombosis (DVT). Judicious use of IVC filters, as well as the prompt retrieval of temporary IVC filters, substantially reduces the risk of IVC thrombosis.

#### Keywords

Deep venous thrombosis, diffuse large cell lymphoma, inferior vena cava filter, thrombus.

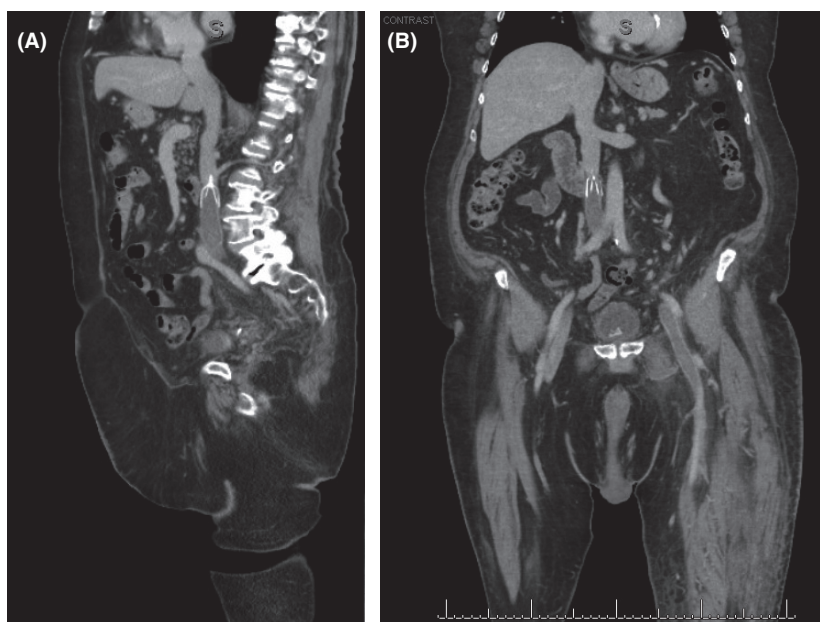
A 77-year-old Hispanic man with a history of recurrent deep venous thromboses (DVTs), diffuse large B-cell lymphoma (DLBCL) in complete remission, and numerous other medical comorbidities presented to our hematology clinic to re-establish care for surveillance of his lymphoma. Approximately 5 years prior to this presentation, he was diagnosed with a DVT of the left lower extremity at an outside hospital. For unclear reasons, an infrarenal inferior vena cava (IVC) filter was placed and treatment with warfarin was initiated. The patient reported completing the therapy as prescribed.

Two years later, he was diagnosed with DLBCL and was treated with six cycles of rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone (R-CHOP) chemotherapy, which was complicated by catheter-associated superficial vein thromboses of the left basilic and cephalic veins, and a DVT of the right subclavian vein. Therapeutic low-molecular-weight heparin was initiated and long-term anticoagulation was recommended. Several months after completing chemotherapy, the patient discontinued anticoagulation in favor of consuming pomegranates after reading that they were potent anticoagulants. During the office visit, he endorsed a 3-week history of symptomatic swelling in his bilateral

lower extremities. On physical exam, the patient had bilateral, asymmetric lower extremity edema, with pitting edema extending superiorly to the level of the mid-thigh. There was no palpable lymphadenopathy or splenomegaly.

Doppler ultrasound of the left lower extremity revealed extensive, occlusive thrombus extending from the left popliteal to the common femoral vein. CT venogram (Fig. 1A and B) demonstrated thrombosis extending from the IVC filter inferiorly to the proximal right external iliac vein and throughout nearly all of the visualized portions of the left venous system. There was no evidence of lymphadenopathy worrisome for relapsed lymphoma. The patient was restarted on systemic anticoagulation and subsequently lost to follow-up.

Inferior vena cava filters are being used at an increasing rate to prevent venous thromboembolism in a variety of clinical scenarios [1]. In a case series of 30 patients, 29 were  $\geq 60$  years of age suggesting that IVC filter thrombosis is primarily a disease of the elderly [2]. Although these devices reduce the risk of pulmonary embolism, IVC filters increase the risk of other complications. The PREPIC study randomized 400 patients with proximal DVTs to treatment with systemic anticoagulation and placement of



**Figure 1.** Inferior vena cava (IVC) thrombosis (A) Computerized tomography (CT) venogram demonstrating thrombosis of the IVC filter extending inferiorly (sagittal reconstruction). (B) CT venogram with extensive IVC thrombus extending from the IVC filter into the venous system of the left lower extremity (coronal reconstruction).

a permanent IVC filter versus anticoagulation alone. The mortality rate between the groups was similar, however, the placement of an IVC filter was associated with an increased risk of recurrent DVT that persisted to 8 years of follow-up [3, 4]. Inferior vena cava filter thrombosis was observed in 26/200 patients (13%) and represented nearly half (45.6%) of the symptomatic recurrent DVTs reported [4]. The PREPIC2 study, which evaluated retrievable IVC filters, demonstrated a significantly lower rate of filter thrombosis (3/193 patients, 1.6%) that correlates with filter retrieval [5].

Little is known about the circumstances under which our patient's IVC filter was placed and why it was not retrieved. Although his lymphoma remained in remission, multiple risk factors increased his risk for a recurrent DVT [6, 7]. A multivariate analysis from the PREPIC study showed that malignancy at study inclusion increased the incidence of recurrent DVT. The patient's history of prior DVT, advanced age, and the presence of an intravascular foreign body (IVC filter) placed him at increased risk for recurrence.

Two guidelines, both from 2006, recommend the placement of retrievable (temporary) IVC filters whenever reversible contraindications to anticoagulation are present. These contraindications include recent hemorrhage, surgery, major trauma, etc.). Other circumstances include embolic prophylaxis during the mechanical removal of a thrombus, and in the setting of a massive or submassive

pulmonary embolus. In each of these cases, the filter may be retrieved after anticoagulation is resumed. Alternatively, permanent filters may be deployed in individuals who are not anticipated to be candidates for systemic anticoagulation. Occasionally, patients with reversible contraindications to anticoagulation will not have their temporary IVC filter retrieved and it will become permanent. Regardless of the indication for placement,

In summary, patients with IVC filters – particularly permanent filters – are at increased risk for recurrent DVT. Judicious use of IVC filters, as well as prompt retrieval of IVC filters that are intended to be temporary, substantially reduces the risk of IVC thrombosis.

## Conflict of Interest

None declared.

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