

# IVC Filter Use in the Setting of Catheter-Directed Thrombolysis: A Clinical Case Study



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#### BACKGROUND

Venous Thromboembolism (VTE), which includes Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE), affects about 1 per 1000 adults annually.<sup>1</sup> There are multiple therapeutic options for the patients presenting with VTE including Catheter- Directed Thrombolysis (CDT).<sup>2</sup> CDT is a minimally invasive procedure in which an infusion catheter placed directly through the thrombus burden, delivers thrombolytic agents directly into the venous thrombus.<sup>2</sup>

The option to place a temporary, retrievable or permanent inferior vena cava (IVC) filter prior to CDT to prevent procedure-related clot migrations and subsequent pulmonary embolism (PE) remains operator dependent and controversial. <sup>2</sup> This case study demonstrates the effective use of an IVC filter prior to CDT.

#### **CASE PRESENTATION**

69-year-old male with PMHx including bladder CA, s/p laproscopy radical cystectomy, HTN, hyperchromatosis, and former smoker presented to the emergency department with left lower extremity pain for one day.

- The lower extremity pain was constant and worsening.
- Exacerbating factors included movement and walking and pain was relieved by rest.
- Denied fever, rash, edema, chest pain, shortness of breath or back pain
- Risk factors included age, male, recent surgery and immobility.
- On physical exam the patient had left leg erythema, warmth, and asymmetrical swelling from groin to toe. Arterial pulses intact.

Differential Diagnosis: DVT, cellulitis, trauma, venous insufficiency, lymphatic obstruction, tumor or fibrosis obstructing iliac vein

### DIAGNOSTICS

Left lower extremity non-invasive report showed extensive DVT throughout the entire left lower extremity extending from the external iliac veins distally into the calf that involved the posterior tibial veins. The peroneal veins were not seen.

### **INTERVENTION**

The patient was referred to Interventional Radiology to proceed with an adjuvant IVC filter placement and catheter-directed thrombolysis of the DVT. During the intervention, the IVC filter was placed and recanalization of the occluded left femoral vein with percutaneous transluminal angioplasty (PTA) was performed. At this time, the left lower extremity thrombolysis catheter was placed traversing the thrombus burden and infused with a tissue plasminogen activator drip overnight. The subsequent day, the patient returned to the IR suite, given an intravenous heparin bolus, and mechanical thrombectomy along with PTA of the left superior popliteal, femoral, common femoral, external and common iliac veins was performed. Mechanical thrombus was retrieved. In the post-intervention venogram, a large thrombus was visualized within the IVC filter, therefore, the IVC filter was not removed. The patient will follow-up in 6 weeks for IVC filter retrieval given resolution of thrombus within the IVC filter.

### DISCUSSION

In this case, this patient received an adjuvant IVC filter prior to CDT that was able to disable thrombusmigration that could potentially have caused a lifethreatening pulmonary embolism. A meta-analysis of 9,157 patients showed that compared with anticoagulation therapy, CDT was associated with an increase in PE (1.5-fold). <sup>3</sup> There are many studies that evaluate the relative and absolute indications for placing an IVC filter, and in recent years the temporary placement of IVC filters relative indications; patient with acute or prior VTE considered at higher risk for either bleeding complications from anticoagulation or hemodynamic instability, has increased.<sup>4</sup>

On review of the literature, it remains unclear whether there are substantial benefits of adjuvant IVC filter use during CDT, making adjuvant IVC filter use provider and case dependent.

## **CONCLUSION**

As demonstrated with this patient, placement of an IVC filter prior to CDT can potentially be effective in reducing thrombus from becoming a pulmonary embolism.



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Figure 1. Un-subtracted venogram of the inferior vena cava prior to IVC filter placement



Figure 2. Post-intervention venogram of the inferior vena cava demonstrating thrombus burden within the IVC filter