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CASE REPORT

Managing the Challenges of Extensive Thrombus Burden Involving the IVC

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This case study illustrates the removal of considerable occlusive thrombus burden from the inferior vena cava (IVC) around an indwelling IVC filter and the iliac veins in an elderly patient with multiple comorbidities. The procedure was done under monitored anesthesia care with discharge to home the same day.

CASE PRESENTATION

An 85-year-old man presented to our outpatient clinic with severe bilateral lower extremity swelling, skin texture and color changes, and inability to ambulate even short distances due to thigh and calf claudication. Symptoms were present for approximately 2 months with increasing severity. He had an IVC filter insertion 4 years prior for a deep vein thrombosis (DVT) in his right lower extremity with inability to anticoagulate due to a now-resolved GI bleed. A recent ultrasound performed in his primary care physician's office demonstrated an occlusive thrombus in his right common femoral vein. On evaluation, he had very tense and tender calves and thighs with significant venous stasis changes noted in both ankles and small preulcerative lesions at the right medial malleolus. Pulses were not palpable due to his edema, but he had multiphasic Doppler signals in both legs, and his feet were warm with pink coloration. His medical history is significant for hypertension, hyperlipidemia, chronic obstructive pulmonary disease, and coronary artery disease. A repeat venous duplex demonstrated occlusive DVT in both lower extremities at the common femoral veins and multiple venous collaterals in the thighs and pelvis. A CTA scan of his abdomen and pelvis performed 4 months previously was reviewed and did not demonstrate any iliac vein or IVC thrombosis, nor retroperitoneal masses. Ankle-brachial index values in the office with exercise were within normal limits. Given the amount of edema present in the patient's legs with symptoms of venous claudication, the decision was made to proceed with venogram and possible thrombolysis.

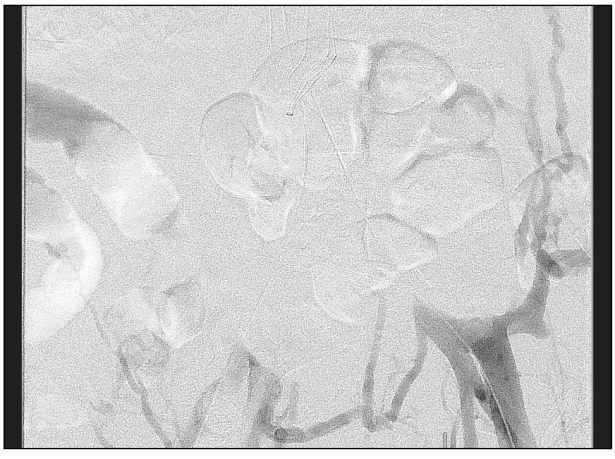

Figure 1.

TREATMENT TECHNIQUE

The patient was brought to the outpatient catheterization lab, and after repeat evaluation with venous ultrasound, he was placed supine on the treatment table. Monitored anesthesia care (local anesthesia and sedation) was administered. Access was achieved bilaterally in the mid-superficial veins with 8-F sheaths under ultrasound guidance. Initial imaging with ultrasound showed noncompressible common femoral veins. Hydrophilic guidewires were advanced through the semi-soft thrombus in the iliac veins and the more chronic thrombus in the IVC. Initial venography demonstrated an occluded IVC and proximal iliac veins (Figure 1). The common femoral vein on the left was patent, and numerous collaterals were present in the pelvis providing drainage from both legs to the azygos system. A low-lying and distorted Optease IVC filter (Cordis, a Cardinal Health company) was present within the occluded IVC, and organized thrombus extended above the IVC filter (Figure 2). An 8-F AngioJet™ ZelanteDVT™ thrombectomy catheter was used to Power Pulse™ the thrombus from proximal to distal through the iliac veins with 10 mg TPA in 100 mL normal saline solution using both superficial femoral vein access points to treat the respective occluded Iliac veins. After 30 minutes of dwell time, thrombectomy was performed of the occluded segments. A total treatment time of 200 seconds was performed within the venous system, and immediate follow-up venogram demonstrated now-patent vessels (Figure 3). IVUS evaluation was performed

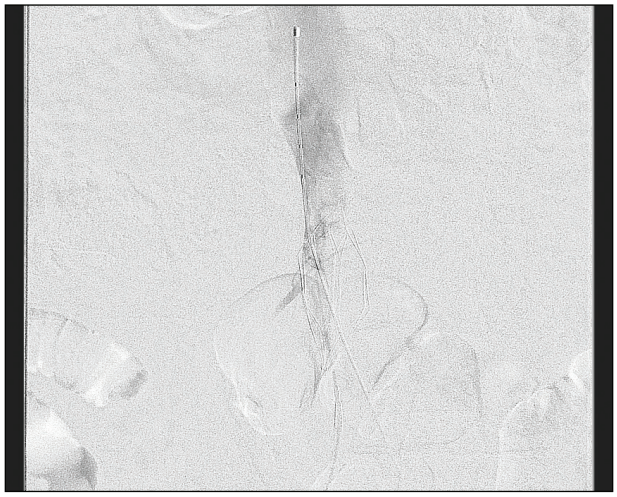

Figure 2.

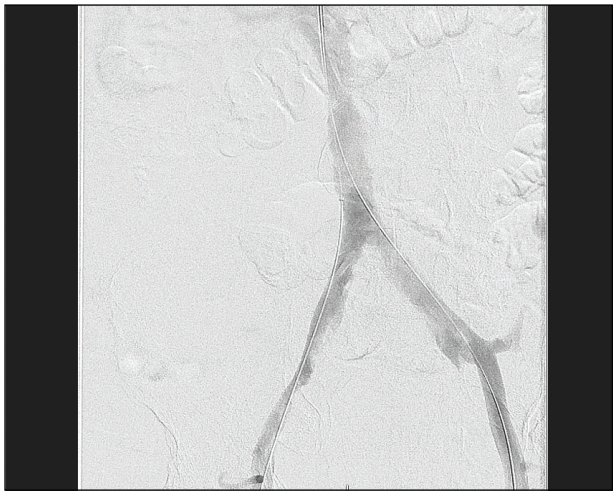

Figure 3.

through both access points into the infrarenal IVC and did not demonstrate any evidence of caval or iliac vein narrowing. No angioplasty was performed on the venous system. Both sheaths were removed in the holding area without complications. The patient's legs were wrapped from the ankles to the thighs with elastic bandages. After 2 hours of recovery, the patient was discharged home with oral anticoagulation. On the follow-up telephone call the next day, the patient reported mild hematuria that was dissipating and no significant pain in either access location. Upon presentation in the clinic 14 days postprocedure, he had lost 22 pounds, his legs were no longer edematous, and he was ambulating without pain. Following consultation with hematology and his primary care physician, he was brought back to the interventional lab 4 weeks later for laser extraction of his embedded IVC filter. Although he has no evidence of inherited thrombophilia, the patient will be maintained on anticoagulation indefinitely due to the risk of rethrombosis. He is also taking low-dose aspirin for his cardiac issues.

DISCUSSION

IVC thrombosis is an underrecognized disease process, likely as a component of insufficient imaging. Venous ultrasound fails to adequately image the intra-abdominal IVC and the proximal iliac veins; and CT, if not done with a venous phase, may fail to identify acute thrombus or external compression. Previously thought to be the sequelae of a hypercoagulable state, IVC occlusion is reported as a consequence of indwelling IVC filters in 10% to 15% of patients with long-standing caval interruption. Other reasons for IVC thrombus include malignant and nonmalignant compression or encroachment of the cava, abscesses, hematoma/trauma, and hemodialysis. At its core, IVC thrombosis and occlusion can be viewed as an extension of lower extremity DVT, which causes more severe edema/ulceration and venous claudication. In symptomatic individuals, treatment can be successfully undertaken through endovascular means even with chronic clot and with/through an indwelling IVC filter. The ZelanteDVT catheter, with its increased infusion and extraction abilities over previous generations of mechanical thrombectomy catheters, allows for the safe removal of considerable thrombus burden within the veins.

Access in patients with proximal DVT and lung disease is always challenging, because they are often unable to tolerate prone positioning. It has been our practice to obtain access at the superficial femoral vein if the patient is unable to lay prone for venous treatment, as this access point establishes excellent sheath "purchase" to allow for common femoral vein imaging and device leverage for diseased proximal segments. Even large sheaths (11 F) in this area are associated with few site complications. We typically remove sheaths from the mid-superficial femoral veins in the holding area after ACT values drop under 200, but even these can be removed safely in patients receiving full anticoagulation if care is taken to compress the vein puncture locations appropriately. ■

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Disclosures: None.

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