

Case Report

Bidirectional Forceps-Mediated Retrieval of the OPTease IVC Filter

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Abstract

Attempts to retrieve IVC filters with prolonged dwell times often require advanced techniques. Additionally, cylindrical filters such as the OPTease present unique challenges to retrieval. This report details the use of endobronchial forceps from bidirectional approaches to generate the shear force necessary to remove an OPTease filter.

Keywords: IVC filter; Complex IVC filter retrieval; Deep vein thrombosis

Introduction

Vena cava filters play an important role in the temporary protection from pulmonary embolism, however prolonged dwell times lead to difficulty with removal of IVC filters as they can become embedded and fibrotic. We report a case of successful removal of an OPTease™ (Cordis, Bridgewater, NJ) retrievable vena cava filter by introducing bidirectional traction with endobronchial forceps from both jugular and femoral approaches.

Case Presentation

Institutional review board granted waiver of consent for this case report. A 39-year-old woman had an OPTease IVC filter placed prophylactically for bariatric surgery 4 years before presenting to our institution with bilateral lower extremity pain, swelling, shortness of breath, and hypotension. Venous duplex ultrasound demonstrated occlusive DVT involving bilateral common femoral veins and MRI/MRA of the chest and abdomen revealed pulmonary embolus in the right interlobar artery as well as an infrarenal OPTease IVC filter with clot extending to the bilateral external iliac veins. The patient underwent successful single-session pharmacomechanical thrombolysis and thrombectomy with the Angiojet™ (Boston Scientific, Marlborough, MA, USA) thrombectomy system from bilateral popliteal vein approaches. Completion venography demonstrated brisk venous outflow, no filling of collateral veins, and no residual clot burden within the bilateral lower extremity venous outflow or IVC. A loop snare (Argon, Plano TX) introduced failed

to engage the hook of the filter from femoral approaches. Given the length of the procedure and sedation time, decision was made to maintain the patient on therapeutic anticoagulation and stage the removal of the IVC filter in a separate setting.

Two days following lower extremity thrombolysis and thrombectomy, the patient was brought back to Interventional Radiology for OPTease filter retrieval. General anesthesia was induced and the right Internal Jugular (IJ) vein was accessed. Inferior venacavogram demonstrated a patent IVC with a tilted OPTease filter and moderate amount of thrombus associated with the cranial apex of the filter (Figure 1A). A 16 Fr sheath was placed in the IJ vein and hydrophilic wire-loop snare technique was used to control the cranial apex of the filter. Despite reciprocated bursts of blunt dissection with the IJ vein sheath, the filter could not be freed from the wall of the IVC. Right Common Femoral (CF) vein was accessed and a 16Fr sheath was placed. Through the CF vein sheath, rigid endobronchial forceps were introduced to loosen the caudal hook of the filter. Once the hook was freed and engaged with the endobronchial forceps (Figure 1B), the IJ and CF vein sheaths were advanced towards one another, however enough parallel shear force could not be generated to dissect the filter struts free of the caval wall. A second set of endobronchial forceps was introduced through the IJ vein sheath and used to capture the cranial apex of the filter (Figure 1C). With forceps control of both cranial and caudal aspects of the OPTease filter, bidirectional blunt dissection was performed successfully and the filter was removed from the IJ access sheath (Figure 1D). Of note, the filter struts did fracture during this maneuver, however the filter was controlled and removed in its entirety, confirmed by gross inspection (Figure 1E) and spot radiographs of the abdomen and chest. Completion inferior venacavogram demonstrated the IVC was patent with mild stenosis and no evidence of extravasation (Figure 1F). At 1 and 6-month post-procedure clinic visits, the patient had no clinical symptoms of PE or DVT. Venous duplex ultrasound at 1 month post-procedure demonstrated right peroneal and posterior tibial vein thrombus and repeat study at 6 months demonstrated no DVT in either lower extremity.

Discussion

Attempts to retrieve IVC filters with prolonged dwell time often

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result in failure of standard techniques and need for advanced tools such as wire loop-snare, endobronchial forceps, or laser extraction sheaths [1]. Cylindrical OPTEASE filters offer challenges unique from conical filters because the side struts are entirely in contact with the caval wall and frequently require extensive dissection [2]. Nevertheless, multiple reports and small series have demonstrated that these cylindrical filters are retrievable [2-4]. Bidirectional traction is sometimes required to separate the entire length of side struts from the caval wall by applying parallel shear force in each direction with vascular sheaths [4]. In cases with extensive caval wall incorporation such as the one presented above, adequate shear force could only be generated with sufficient counter-traction, beyond that possible with wire loop-snare control of the filter apex. To apply the necessary force, endobronchial forceps were required to control both ends of the filter. While bidirectional approaches and the utility of forceps to remove OPTEASE filters have both been described previously, this is the first report of successful OPTEASE filter removal using bidirectional endobronchial forceps following failure to remove the filter with conventional techniques. As no special apparatus such as endovascular laser sheath is required, this technique is both more widely applicable and results in minimal cost to the patient and hospital.

Conclusion

Bidirectional use of endobronchial forceps can safely and effectively be used for retrieval of the OPTEASE IVC filter when conventional methods fail.

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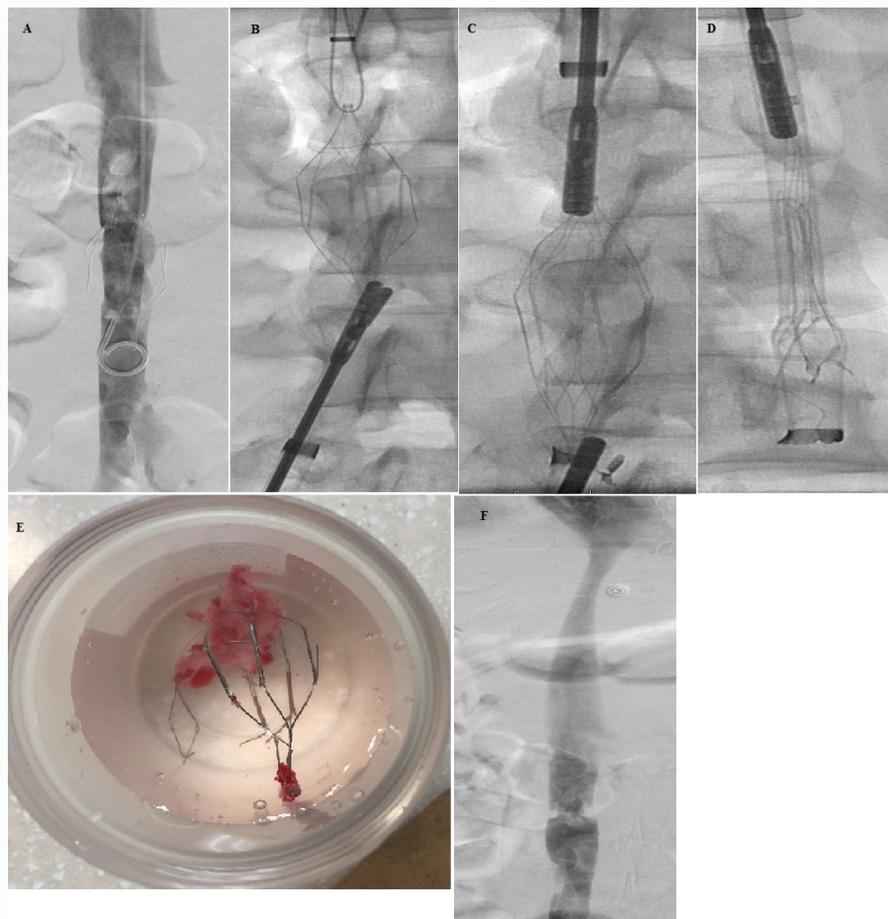


Figure 1: 39 year old woman with history of prophylactic OPTEASE IVC filter placement 4 years ago prior to bariatric surgery presented with bilateral lower extremity deep vein thrombosis and pulmonary emboli. (A) Pre-procedure digital subtraction inferior venacavogram demonstrates patent IVC with a moderate amount of thrombus associated with the cranial apex of the OPTEASE filter. (B) Fluoroscopic image demonstrates cranial end of the filter engaged with wire loop-snare and caudal end engaged with endobronchial forceps. (C) Fluoroscopic image demonstrates both ends of the OPTEASE filter engaged with endobronchial forceps. Note the flaring of the femoral venous sheath tip from attempts at dissection. (D) Fluoroscopic image demonstrates OPTEASE filter freed from the caval wall and captured within the internal jugular venous sheath. (E) Gross image of removed OPTEASE filter. (F) Digital subtraction inferior venacavogram demonstrating patent IVC without extravasation or significant stenosis after removal of filter.