

Inferior Vena Cava Filter Retrieval with Rigid Endobronchial Forceps Resulting in Redeployment in the Superior Vena Cava

A patient presented to our practice for inferior vena cava filter (IVCF) retrieval approximately 9 months after placement of a Bard Denali® (Tempe, AZ, USA) filter because the patient was able to resume oral anticoagulant therapy. The IVCF was properly placed in an infrarenal location without complication. Although endobronchial forceps (#4162; Lymol Medical, Woburn, MA, USA) is not a standard first-line approach, we practice at a teaching institution and thus proceeded with forceps-assisted retrieval for educational purposes.^[1,2] The filter was grasped at what was thought to be the neck and over-sheathed with an 18F sheath (Performer™; Cook Medical) [Figure 1]. It is not typical practice at our institution to use fluoroscopy to visualize the filter once it is over-sheathed and above the diaphragm. As the filter was being removed through the sheath, the filter snapped and only a single tine was removed. Fluoroscopy demonstrated that the filter was no longer within the sheath but had redeployed in the superior vena cava (SVC) [Figure 2]. A laceration was noted along the vascular sheath [Figure 3]. Subsequently, a wire was reintroduced through the sheath and into the

inferior vena cava (IVC). A new sheath (Performer™) was placed with its tip above the filter. We attempted to grasp the hook of the filter using a 20-mm Amplatz Goose Neck snare (Medtronic; Minneapolis, MN, USA); however, the hook of the filter was tilted into the left brachiocephalic vein, abutting its superior wall. To reposition the hook back in line with the vascular sheath, we employed the wire-loop snare technique,^[3] which tilted the filter back in line with the vascular sheath but did not allow us to over-sheath the filter. Thus, the rigid endobronchial forceps was reinserted through the sheath, adjacent to the wire loop snare, and used to grasp the hook of the filter [Figure 4]. The filter was then removed through the sheath in its entirety. Venography of the IVC and SVC [Figure 5] demonstrated no evidence of immediate complication, and spot radiographs did not show residual filter fragments. The patient tolerated the procedure well and was discharged home the same day.

Endobronchial forceps are a safe device, typically best for IVC filters with long dwell times, substantial tilt, or with a

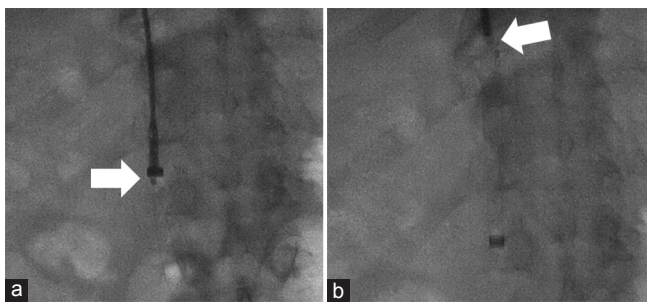


Figure 1: (a) The filter being grasped by the endobronchial forceps before being over-sheathed. (b) The endobronchial forceps were not securely on the filter apex at the time of retrieval

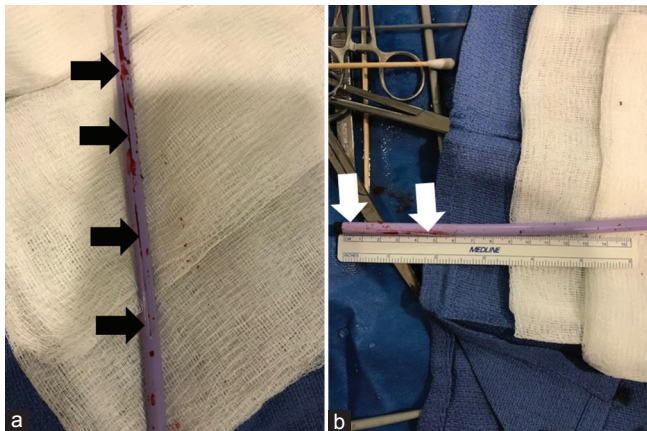


Figure 3: (a) A photograph of the laceration in the vascular sheath (black arrows). (b) A photograph demonstrating the length of the laceration (white arrows) against a ruler

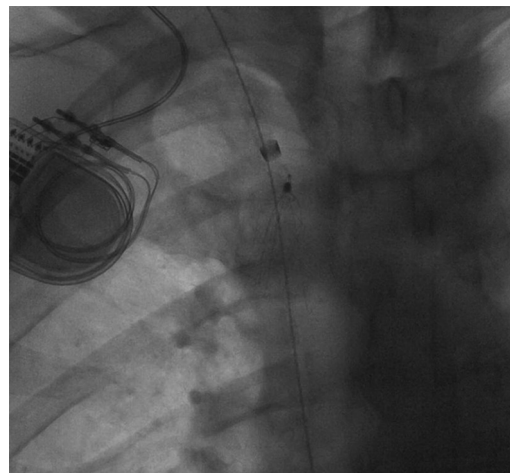


Figure 2: A radiograph demonstrating the filter deployed in the superior vena cava, adjacent to a guidewire and the vascular sheath

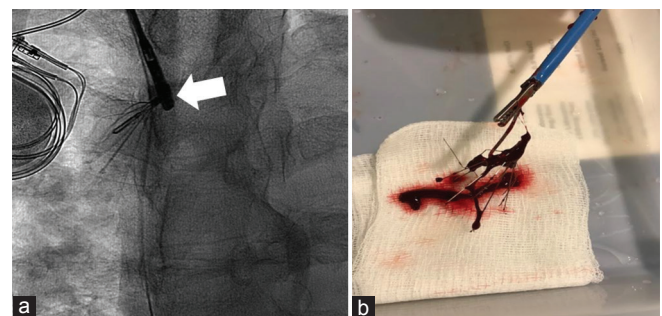


Figure 4: (a) The endobronchial forceps grasping the filter in the superior vena cava. (b) A photograph of the intact filter after removal



Figure 5: (a) A digital subtraction venogram of the inferior vena cava showing no evidence of stenosis, thrombosis, or extravasation. (b) A digital subtraction venogram of the superior vena cava showing no evidence of stenosis, thrombosis, or extravasation

wall-embedded tip.^[3-5] We suspect the forceps grabbed the base of the neck instead of hook, which caused the grasp to be unstable, allowing the hook to tear through the sheath. The laceration then allowed the filter to become redeployed in the SVC. The key to successfully retrieve the filter was to maintain vascular access and assess the location of the filter. Steps to prevent this uncommon event to occur include: confirming that the endobronchial forceps grasped the hook/apex of the filter in two planes, using a sheath within a sheath to prevent against laceration or damage to the sheath, and direct visualization under fluoroscopy as the filter is being removed through the sheath. This case emphasizes that special attention to detail is needed to minimize this rare complication.

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Conflicts of interest

There are no conflicts of interest.

Emilio Cazano, Andrew John Gunn

Department of Radiology, Division of Interventional Radiology,
University of Alabama at Birmingham, Birmingham, AL, USA

Address for correspondence:

Dr. Andrew John Gunn,
Department of Radiology, Division of Interventional Radiology,
University of Alabama at Birmingham, 619 19th St S, NHB 623,
Birmingham 35249, AL, USA.
E-mail: agunn@uabmc.edu

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