SHORT REPORT

Atrial Embolization of a Vena Cava Filter with Dual Fixing System

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Introduction: Inferior vena caval filters are often seen as a safe and effective means of preventing pulmonary embolism in at-risk patients who have contraindications to pharmacological therapy. Filter migration is a rare event and there is no description in the literature with the Braile dual fixing system filter.
Report: This is a report of a case where filter embolization to the right atrium in a 60-year-old male patient led to tricuspid insufficiency, sepsis, and death.
Discussion: We would like to emphasize the "sailing effect" that probably occurred in this case.

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INTRODUCTION

Inferior vena cava filters (IVCFs) are used as a safe and effective means for the prevention of pulmonary embolism (PE) in high-risk patients who have contraindications to pharmacologic therapy.

We report here a patient who developed deep venous thrombosis (DVT) after brain abscess surgery, and was then implanted with an ICVF. The filter migrated to the atrium causing tricuspid insufficiency and death. This is the first report of a permanent IVCF with a dual fixing system embolizing to the heart.

REPORT

A 60-year-old man with right-sided hemiparesis on the fifth day following brain abscess surgery presented right iliofemoral venous thrombosis detected by color-Doppler ultrasound. Anticoagulant medication was contraindicated because of the recent neurosurgery. On the 15th post-operative day, a permanent 18—22 mm IVCF was implanted uneventfully via the left femoral vein. Before releasing the filter a cavography was performed for caval diameter measurement (Fig. 1). On the seventh post-implant day there was a progressive deterioration of cardiac function. A transesophageal echocardiography performed on the eighth day showed a mass measuring 3.1 cm at the largest diameter located in the right atrium. At the same examination, tricuspid valve vegetation on the atrial side, reflux, pulmonary hypertension, and substantial pericardial effusion were also found. The effusion culture was negative. The clinical instability of the patient was accredited to endocarditis. A thoraco-abdominal tomography was performed to investigate a possible IVCF infection and showed a metallic object in the right atrium (Fig. 2). A cardiotomy was performed, the filter and thrombus were removed from the right atrium, and a tricuspid valvuloplasty was performed. Two days after the procedure the patient died as a result of septic shock.

DISCUSSION

IVCFs are used for the prevention of PEs in at-risk patients with contraindications to anticoagulation, and patients with venous thromboembolism (VTE) who have failed anticoagulation.[1] In the case presented here, anticoagulation therapy was not permitted because of recent neurosurgery.

The Braile permanent filter, available in 18—28 mm and 28—32 mm diameters has been available on the Brazilian market for more than 7 years.[2] It comprises two stainless steel cones set at opposite apices with an hourglass shape. One cone measures 5 cm in length and has eight legs with hooks for anchoring to the venous wall. The other cone consists of four arms, 2 cm in length, and acts to affix and center the system. This dual fixing system is designed to prevent migration. Therefore, it was surprising to discover that the filter had dislodged from the IVC and embolized to the atrium.

Filter migration is a rare complication, and is defined as filter movement of at least 1 cm in a cranial or caudal position.[3]

The causes of migration can be grouped into three categories: mechanical, iatrogenic, and physiological. Mechanical causes are related to failure of the delivery device or of the filter itself. These generally occur during the deployment process. Iatrogenic causes include guide-wire and central venous access complications. Releasing the filter without knowing the diameter of the IVC is another cause of migration. Literature shows that caval diameters greater than 28 mm increase the probability of migration. Despite this observation, measurements of the IVC diameter were reported in only 18.4% of the cases in which complications occurred. IVC diameter, renal vein localization, and exclusion of vascular anomalies should be established in all patients for safe deployment.[4]

A physiological cause of IVC filter migration could be a temporary alteration in the morphology of the IVC. Bending over, coughing, and Valsalva maneuvers can dilate the cava

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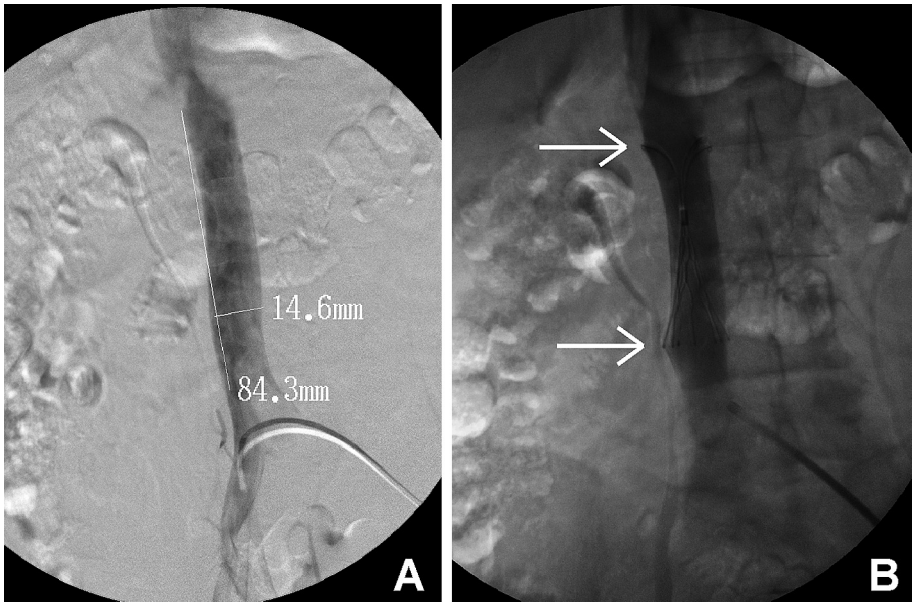

Figure 1. Phlebography, pre (A) and post (B) implant. Observe the correct position of the double anchorage system filter (arrows).

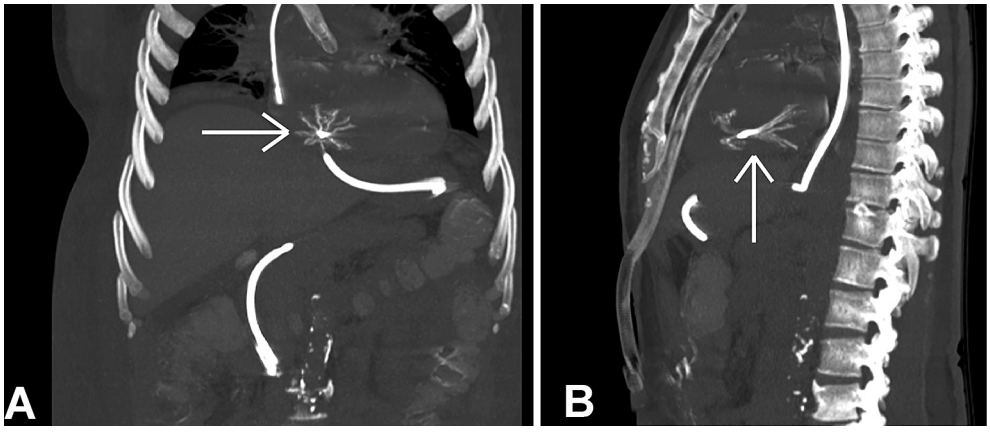

Figure 2. Tomography showing evidence of a metallic object in the right atrium (arrows). (A) Coronal and (B) sagittal axes.

and permit filter migration. A "sailing effect" by blood flow has been proposed by Rossi et al.,[5] which may induce migration of conical filters to the heart. This may be a potentially important factor when the filter stores a large thrombus burden. We assume that this effect played a role in our case, as there was no anatomical variation, no technical difficulty implanting the filter, and its diameter was appropriate for the IVC.

We emphasize that ICVFs are not free of complications. These can be serious; therefore, indications for filter placement should be followed. Finally, we suggest that after implantation, patients should follow up with imaging studies to assess the filter's position.

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CONFLICT OF INTEREST

None.

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