Clinical picture

A misfired Greenfield filter; 21 years later!

A 35-year-old male developed deep vein thrombosis (DVT) and pulmonary emboli in 1986. He was subsequently diagnosed with protein S deficiency. As a high risk for further thromboembolic events, the patient underwent inferior vena cava (IVC) and superior vena cava (SVC) Greenfield filter placement at an outside institution (in 1986).

At the age of 56 years (in 2007), the patient was diagnosed with pancreatic cancer and staging CT scans were performed. CT scan of the chest showed a Greenfield filter in the region of the proximal SVC with the tip at the level of the distal left brachiocephalic vein. A note was also made of some of the prongs of the filter outside the lumen of the SVC (arrows).

In retrospect, the patient informed us that he has been aware that his SVC filter was misfired during deployment. Malposition of the filter was known at the time of surgery, but it was decided not to remove the filter. The patient has been also on lifelong anticoagulation with coumadin.

Discussion

Vena cava filters are effective for the prevention of pulmonary embolism with the rate of recurrent pulmonary embolism is 4%.1 Vena caval filters are not without their risks. Complications may occur during, immediately after placement or up to years after placement.2 The concept of vena cava interruption was described for the first time by Armand Trousseau in 1865.3 The first IVC filter was made in 1967. There is now a variety of permanent and removable IVC filters available.1

We do not have complete records from the time of the procedure, but it highly likely that our patient received the stainless steel Kimray-Greenfield filter (SSGF), which was introduced first surgically since 19734 and later on since 1984 percutaneously.5 The early models such as SSGF were too rigid. Therefore, many modifications of material and shape have been developed and tested since. Newer filters together with the benefit of concurrent fluoroscopy...
led to significant decrease of occurrence of filter malposition during placement from as high as 14–18% in early reports to <2%. Filters components penetrating adjacent structures and producing clinical consequences have been reported as occurring in 0.3% of cases. Due to specific details of individual cases our current knowledge about removal of malpositioned venous filters comprises mostly of case reports. In addition, the retrieval of misplaced permanent venous filter is not a trivial procedure. In cases, when misplaced filter does not cause any symptoms it may remain in place and followed. Our report documents that this approach is possible and patients may remain asymptomatic without any limitations for long period of time.

In spite of large amount of data generated about the use of IVC filters, there are limited data on their efficacy in many clinical circumstances. IVC filters appear to be effective in the prevention of PE, but are associated with an increased risk of recurrent DVT. They represent important therapeutic alternative for patients with DVT and contraindication to anticoagulation. It is warranted that patients who appear to have failed anticoagulation are thoroughly evaluated for underlying hypercoagulable condition (such as e.g. antiphospholipid syndrome) prior to placing a vena caval filter.

Since often venous plication is considered for a temporary condition retrievable filters have become available for clinical use. Their efficacy and safety, however, needs to be first tested as rigorously as we are testing the number of new anti-thrombotic medications that currently are under evaluation in clinical trials.

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References