When Temporary IVC Filters Become Permanent

With increasing utilization of temporary IVC filters comes a disturbing trend of dismal filter retrieval rates.

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The use of inferior vena cava (IVC) filters has increased dramatically in the last 2 decades.[1] Multiple factors have contributed to this phenomenon, including expanding indications for filter placement and continued development of new devices. Increased utilization has also coincided with the introduction of retrievable filters.

Retrievable filters are particularly attractive in patients who are considered to have a high risk for venous thromboembolic (VTE) events and a temporary contraindication to pharmacologic prophylaxis. Under these circumstances, patients can be bridged with a filter until their risk for VTE subsides and they no longer require protection, or until they no longer have absolute or relative contraindications to anticoagulation. Filters placed under these circumstances are considered prophylactic. Filters are considered therapeutic when placed in patients with documented VTE who have either a contraindication to or failure of anticoagulation.

Practice patterns vary significantly by institution and practitioner. Many centers in the United States have increasingly used prophylactic filters despite the lack of level 1 evidence to support their use.[2] The trauma population constitutes a significant proportion of these patients because their combined injuries frequently place them at substantial risk for VTE, while simultaneously placing them at risk for bleeding from associated intracranial or visceral injuries. Although the notion of a retrievable filter is attractive in these patients, it is also worth noting that they tend to be younger than the typical patient receiving a therapeutic filter.

DISCUSSION

It makes intuitive sense that a device placed in the vena cava for an extended period of time has a risk of complication. Even though IVC filters have been shown to be safe and effective, there have been a substantial number of filter-related complications reported in the medical literature.[3] Filter complications can be divided into several cate-

TABLE 1. CATEGORIES OF IVC FILTER-RELATED COMPLICATIONS

Placement-Related Complications
- Thrombosis of access vessel
- Incorrect positioning of filter
- Contrast-induced nephropathy

Intrinsic Device Failure
- Stent fracture
- Filter tilt
- Failure to prevent PE

Device-Related Complications
- Filter embolization
- Perforation
- Caval thrombosis

gories, including complications related to insertion, device failure, device migration/embolization/perforation, and thrombotic complications (Table 1). Apart from problems related to insertion or removal, the true risk of developing a complication after successful placement of an IVC filter is unknown but would be expected to increase with duration of implantation. Consequently, any mechanism whereby the indwelling time of IVC filters can be reduced should decrease long-term complications.

When retrieval is attempted, it is usually successful, but the majority of retrievable filters are left in place indefinitely. There are multiple reasons why this occurs, including ongoing indications for the filter, large trapped embolus or thrombosis, inability to retrieve the filter due to filter tilt or ingrowth, and loss of patient follow-up (Figure 1).

Additionally, a large number of retrievable filters are probably placed without any specific plan for retrieval. It would be expected that the majority of these patients would have an absolute indication for a filter (eg, failure of anticoagulation to prevent deep vein thrombosis [DVT]/pulmonary embolism [PE], or a complication related to anticoagulation necessitating filter placement). In patients in whom a retrievable filter is placed when there is no intention of removal, it begs the question: Why not place a permanent filter? In order to rationalize the use of retrievable filters in these patients, it would seem that the performance of the retrievable filter should be at least equivalent to that of a permanent filter. Data support the ability of retrievable IVC filters to prevent PE in in vitro studies.[4] There is also increasing evidence that retrievable filters are not inferior to permanent filters with regard to in vivo incidence of PE.[5] However, advocates for permanent filters will no doubt argue that there is a longer track record of success for older permanent devices compared to newer retrievable ones.[6]

Circumstances in which a retrievable filter is advantageous include (1) trauma patients with multiple injuries placing them at high risk for DVT, while simultaneously constituting a relative contraindication for pharmacologic DVT prophylaxis and (2) patients at an extremely high risk for DVT despite standard prophylaxis with plans to undergo surgery (eg, bariatric patients who are super morbidly obese and have additional risk factors for DVT).[7] Under these circumstances, a temporary filter can be placed with a plan for removal after the high-risk time period has passed (eg, the trauma patient with multiple long bone fractures and a splenic laceration and intracerebral bleed who has recovered and is ambulatory).

An additional factor contributing to the phenomenon of temporary filters becoming permanent relates to the length of indwelling filter time. The time frame during which a temporary filter can successfully be retrieved is not completely defined, but successful retrieval appears to be inversely correlated with the indwelling time of the filter. Despite this, there have been reports of filter removal years after placement.[8]

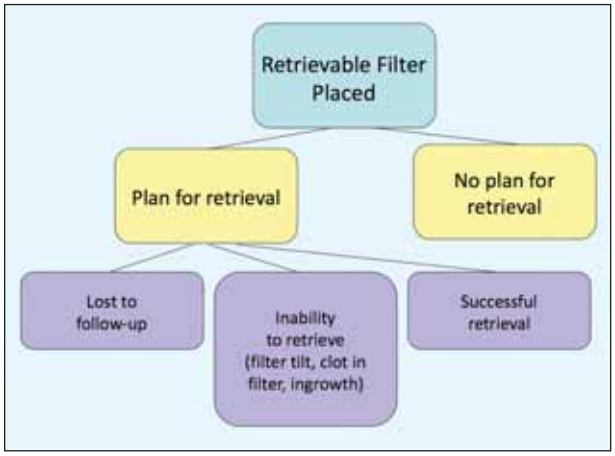

Figure 1. Fate of retrievable IVC filters after placement.

WHICH PATIENTS ROUTINELY HAVE THEIR FILTERS REMOVED?

There are several studies in the literature specifically looking at filter retrieval. A multicenter retrospective review sponsored by the American Association for the Surgery of Trauma analyzed a cohort of 446 trauma patients receiving retrievable filters (predominantly for prophylaxis) and found only 22% were actually removed.[9] The majority of patients who failed to have their filters retrieved did so because they were lost to follow-up. The investigators concluded that the physician placing the filter should be responsible for follow-up in hopes of improving retrieval rates. Johnson et al followed 72 military trauma patients who received retrievable IVC filters over a 4-year period. Only 18% of the filters were actually removed, but only one-third of all filters placed were for prophylactic indications.[10] The combined military and civilian experience has consistently produced overwhelmingly poor filter retrieval rates for the reasons discussed earlier.

CONCLUSION

The dramatic increase in IVC filter utilization that we are currently witnessing may lead to significant increases in filter-related complications in the coming years. It is imperative that filter removal be attempted in a timely fashion and that physicians who place filters understand the implications of prolonged and unnecessary indwelling filters. Ironically, patients with the most to gain from PE prevention stand to lose the most if they have a retrievable filter left in place that ultimately leads to a complication. Specifically,

today's young patients who accumulate enough time with a filter in place will be more prone to filter fracture, embolization, perforation, and caval thrombosis.

All prophylactic procedures must be carefully considered because they may place an asymptomatic patient at risk for a procedural complication. It is our job to assess the risk of the proposed procedure in order to determine whether the risks outweigh the benefits. In the absence of any rigorous data supporting the role for temporary filters, we are obligated to minimize the long-term risks to patients by first questioning the indications for filter placement, and when deemed appropriate, making a commitment to responsibly retrieve filters in a timely fashion. ■

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