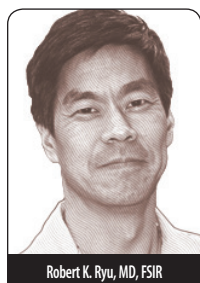


Filter Retrieval Programs: What's Working?

A look at the current use of IVC filters and methods for improving retrieval rates.



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The rationale for retrieving as many inferior vena cava filters (IVCFs) as possible is clear: the US Food and Drug Administration (FDA) squarely placed the responsibility for retrieving IVCFs on the shoulders of the “implanting physicians” in both 2010 and 2014.^{1,2} If you, as a practitioner, choose to ignore the FDA’s warning, you do so at the avoidable risk of potential injury to your patient. Rather than point out specific programs or tactics to improve IVCF retrieval rates, we would like to highlight three important themes that all physicians who implant and retrieve IVCFs should incorporate into their practices, if they haven’t already.

ACCOUNTABILITY

It is as simple as this: if you implant an IVCF, you are responsible for taking it out when it is no longer needed. All elements of your practice should reflect that you’ve accepted this responsibility; for example, the report of the procedure at the time of placement should include a statement specifically addressing a follow-up plan to ensure that timely retrieval will be attempted. Also, there should be clear evidence and documentation of an active decision-making process (ideally including input from all relevant practitioners) if a retrievable IVCF is left in as a permanent device. Determined and focused strategies to track all IVCF patients are time- and resource-intensive but

have been very effective in improving retrieval rates.^{3,4} Hospitals need to recognize and support these efforts. Institutional IVCF retrieval rates would be a very easy, widespread, and standardized metric for governmental or private payers who may want to assess “best practices” in the near future.

EXPERTISE

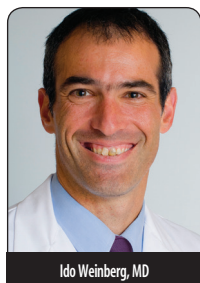
Approximately 80% to 85% of IVCFs are successfully retrieved using a simple endovascular snare technique. Of course, that means that 15% to 20% require advanced retrieval techniques, including loop snare, forceps, lasers, fibrin cap disruption, or balloon displacement.⁵ All practitioners who are implanting IVCFs should acquire and develop expertise in these techniques. Technical failure should be a rare reason for a patient taking on the long-term risk from device-associated complications. All practitioners should aim to achieve a 95% threshold for successful retrievals. This metric should also apply to all IVCFs, regardless of dwell time; the notion that filters in place for over 6 months are “too dangerous to remove” is a fallacy.⁶ To that end, IVCF vendors should establish a national referral network of centers of excellence for those patients whose retrieval have failed at their local institutions. Plans are underway to develop focused, continuing medical education programs devoted to developing technical and clinical expertise in IVCF retrieval techniques.

PROCESS

The concept of accountability has been reported, studied, and discussed extensively. Various methodologies to improve IVCF follow-up have shown requisite increases in filter retrievals. That said, we believe that follow-up is only the end of the story. The beginning of the narrative is through careful prospective evaluation

to determine the need for a permanent or retrievable IVCF. Practitioners can no longer blindly accept a retrievable device as equivalent in durability or stability to a permanent device. A clinical service built around prospective consultation and objective decision making improves retrieval rates.^{7,8} Once again, providing this level of service can be time consuming and requires a significant team effort. Nevertheless, a comprehensive process of prospective consultation combined with postprocedural accountability and the development of technical mastery of advanced retrieval techniques will yield the benefits of venous thromboembolic disease prevention that IVCFs offer and avoidance of the potential complications of retrievable devices. All of us can, and must, commit to providing this “best patient care” experience.

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IVCFs are being overutilized and underretrieved in the United States. However, there are several challenges in improving IVCF retrieval. First, these devices are being inserted by multiple providers for varying indications. These specialists include members of cardiology/vascular medicine, interventional radiology, and vascular surgery. Traditionally, each physician is responsible for their own patients and their postprocedural care. Implementing a system-wide, central method for IVCF-related retrieval has the potential to be met with resistance. Second, many patients who receive IVCFs and their primary care physicians are not necessarily aware

of potential IVCF-related risks and thus do not always appreciate the efforts for their retrieval. In fact, some are unaware of the filter being placed at all. Third, many patients are lost to follow-up after being discharged.

Over the years, several methods have been described to address these issues and to improve IVCF retrieval. These often included a dedicated staff member who would be responsible for following patients while utilizing a spreadsheet, such as an Excel spreadsheet. Disadvantages of such systems are obvious, as they are inherently labor intensive, reliant on one specific person, and are hard to implement in large institutions.

The Massachusetts General Hospital Fireman Vascular Center has been striving to improve IVCF appropriate use in terms of placement and to increase retrieval rates, while addressing the problem in a reproducible and efficient manner. In order to achieve this, we have implemented two programs: a computerized reminder system and reminder bracelets.

In most hospital systems, it is reasonable to assume that most IVCFs are linked to a billing event. This billing event can be used to trigger a dedicated system that both tracks the presence, as well as the retrieval, of IVCFs. At Massachusetts General, there is a system that reminds billing providers to retrieve the IVCF starting 6 weeks after placement and monthly thereafter. The system not only collects data about the filter retrieval rate, but also about the specific reason if an IVCF has not been removed. Thus, this computerized system allows for the collection of much richer information and for true quality initiatives that address not only retrieval rates, but IVCF-related practice patterns as a whole. The main limitation of this system is that it does not obviate the need for operator collaboration, because the clinician of record will need to respond to the structured reminder emails. Another limitation is that it does not engage patients and other providers. Nonetheless, our preliminary data show that by implementing this system, we have achieved IVCF-related appropriateness of > 80% while significantly reducing dwell times.

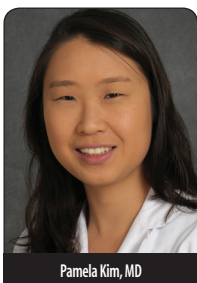
For the second part of our approach, reminder bracelets are placed on the wrists of patients who have received an IVCF. These bracelets signify the presence of an IVCF and also have a phone number printed on them for patients and providers to call in order to facilitate retrieval. By using these bracelets, we ensure that patients are aware of the presence of the implantable foreign body and share in the responsibility of retrieving the IVCF, when possible. These bracelets have the added benefit of being inexpensive. The main limitation of these bracelets is that they do not eliminate

the need for an actual person to collect the data and address patient calls. However, preliminary pilot data that we have collected are promising and point to an improved IVCF retrieval rate and shortened IVCF dwell time in patients who have received bracelets as compared to historical averages.

In conclusion, IVCFs are associated with a significant complication rate that may be reduced by prompt and complete retrieval. Although, traditionally, retrieval has been the responsibility of the clinician who has placed these devices (and still should ultimately be their responsibility), various external systems can be utilized to help them perform this task. Preliminary data show that a coordinated effort can achieve an improved IVCF retrieval rate while significantly reducing dwell times. We are in the process of assessing these programs on a larger scale, as well as their impact on IVCF-related complications.



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Venous thromboembolism (VTE) is a leading cause of morbidity and mortality in hospitalized patients. IVCFs have been used to prevent pulmonary embolism in patients with deep vein thrombosis who cannot be anticoagulated.¹⁻³ Multiple types of IVCFs have been brought to market, including a variety of retrievable filters, in order to have the option to remove filters that are no longer clinically indicated. However, such retrievable filters are often not removed for a variety of reasons, with average retrieval rates below 20% nationally. In 2010, the FDA issued a statement on the importance of close follow-up of patients who have these devices in order to assess eligibility for retrieval.⁴ Current American Academy of Chest Physician guidelines also

recommend early retrieval of IVCFs.¹ To ensure compliance with these guidelines, our tertiary care institution developed a team to specifically follow all IVCFs that are placed and ensure their timely retrieval.

VTE TEAM APPROACH

Our VTE team was established in 2009 and included a vascular surgeon attending and a dedicated nurse practitioner. It has since grown to include a second dedicated nurse practitioner and a phlebology fellow. All VTE events are monitored by the team, along with all IVCFs that are placed at the institution by the different service lines. All patients are placed into a custom database, and each patient is provided education about IVCFs and the importance of retrieval prior to placement of the filter and at discharge. While in the hospital, each patient is monitored daily for the commencement of anticoagulation at therapeutic doses. When therapeutic, the primary team is contacted for feasibility of IVCF retrieval while still an inpatient, and retrieval is then performed by the vascular surgery department. If a patient is discharged, the VTE team monitors progress by communicating with the physician monitoring the patient's anticoagulation. When it is determined that the patient can safely be anticoagulated, he or she is scheduled for a follow-up visit with the vascular surgery outpatient office and subsequently for IVCF retrieval, if appropriate. If a patient has a permanent filter, the VTE team performs a phone call follow-up at 9 months to ensure there are no filter-related complications.

Prior to the development of the VTE team, there were 243 IVCFs placed at our institution (159 retrievable filters, 51 placed for a prophylactic indication) over a 2-year period. Of these, only 9% were ultimately retrieved. After the VTE team was established, the total number of IVCF placement drastically decreased to < 50 on average per year. Additionally, the retrieval rate averaged 66% in the 6 years following the development of the VTE team (Table 1). The amount of patients lost to follow-up has also declined, with only 2% of patients lost to follow-up (3/59 patients across three services) in 2015.

RETRIEVAL DATA FROM THE LITERATURE

Reported temporary IVCF retrieval rates were between 20% and 40% in the literature prior to 2010.⁵ Since then, retrieval rates have increased from 41% to 86%.^{2,5-7} Increased reports on the complications of IVCFs, standardization of guidelines on IVCF use, along with the FDA safety communication in 2010 all served to better educate the medical community to decrease the use of IVCFs and increase the rate of retrieval.^{1,3,4}

TABLE 1. IVCF PLACEMENT AND RETRIEVAL RATES

	2007–2009	CREATION OF VTE TEAM	2010	2011	2012	2013	2014	2015
Total IVCFs placed	243		33	38	43	46	77	59
Prophylactic filters	51		4	0	1	3	4	2
Total retrieved/%	14/9%		14/100%	9/75%	5/63%	5/31%	12/71%	14*/56%*

*Eleven patients pending follow-up.

Studies have shown that having a systematic strategy and a dedicated team for following patients enhances filter retrieval, even within a few months of establishing such a system.⁵⁻⁷ This analysis reveals that these results are sustained within all hospitalized patients several years after development of a specialized VTE team. This is mainly due to close communication with patients and their primary practitioners, which leads to a decreased number of patients who are lost to follow-up, more appropriate management of anticoagulation, and arrangement of timely retrieval. As such, it is critical for the team to maintain efforts for continuous monitoring and follow-up, otherwise compliance can drop. ■

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