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Perspectives on IVC Filter Placement and Retrieval

According to the US Food and Drug Administration (FDA), the use of inferior vena cava (IVC) filters has increased substantially over the years, from 167,000 in 2007 to an estimated 259,000 in 2012, and much of this increase has been attributed to the development of optional IVC filters.[1] Although the new optional filter technologies are exciting, there continues to be much debate about when to place, when to retrieve, and how to measure the long-term safety and effectiveness of IVC filters.

Endovascular Today assembled a roundtable of leading practitioners to discuss their use of IVC filters and why they think patient follow-up and filter retrieval are so critical.

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In your practice, when do you place IVC filters?

Dr. Sing: The majority of the vena cava filters we place are for active venous thromboembolic disease (VTED) with a contraindication to therapeutic anticoagulation. We also implant filters as a "bridge to anticoagulation" in surgical patients who need anticoagulation held preoperatively. In addition, we place filters in high-risk patients with bleeding risk that makes them unable to receive even prophylactic doses of anticoagulation.

Dr. Shishehbor: There are situations when most physicians agree an IVC filter is indicated—acute proximal (iliac or femoral vein) deep vein thrombosis (DVT) and/or pulmonary embolism (PE) with a contraindication to anticoagulation. Outside of this, there are many other situations where IVC filter placement has been controversial and, in general, physicians make their decisions on a case-by-case basis. I usually consider IVC filter placement for patients with large PE regardless of anticoagulation and, as Dr. Sing said, as a bridge for surgical patients with prior DVT and a need to stop anticoagulation preoperatively.

Dr. Fujitani: Our practice follows the guidelines published by the American College of Chest Physicians (ACCP), and we place IVC filters in patients with acute PE or DVT and a contraindication to anticoagulation.

Dr. Lynch: We place IVC filters for a variety of indications. Most patients have known VTED and a contraindication to anticoagulation therapy. We place a significant number of filters in patients with a history of VTED prior to orthopedic or bariatric surgery. We also occasionally place filters in patients with injuries that predispose them to VTED; however, we've seen placements for this indication go down over the last few years.

How do you choose which type of IVC filter to place?

Dr. Lynch: We still try to make a distinction between patients who should receive a permanent versus an

optional device, but when in doubt, we tend to place an optional IVC filter.

Dr. Fujitani: We primarily place optional IVC filters rather than permanent filters because they provide versatility as a patient's clinical situation changes. We look for a filter that will be easy to implant and fix securely to the IVC wall to prevent migration, tilt, and fracture. Ideally, it will have a high filtering efficiency for both large and small emboli, with no impedance to flow for long-term performance. Of course, the filter should be nonthrombogenic, biocompatible, and MR compatible. Lastly, technical ease of retrieval is very important for patient comfort and safety.

Dr. Shishehbor: There are a number of factors that cross my mind when choosing a filter—stability, low complication profile, and retrievability. Unfortunately, there are little head-to-head data comparing filter types, and the choice often comes down to physician experience and cost. Ultimately, my choice is based on ease of retrieval. I have found the BARD® Optional Filters (MERIDIAN® and ECLIPSE®) easier to retrieve than other filters because once the snare hook is engaged, the filter is pulled up into the sheath and removed. All other filters require an over-sheathing technique that could be more traumatic for the patient and more difficult for the physician.

Dr. Sing: Our filter choice is commonly based on the particular advantages of each device. The MERIDIAN® Filter is commonly used in our practice, as it is a very versatile optional IVC filter.

How would you characterize the importance of filter retrievability?

Dr. Sing: Filter retrieval is extremely important—especially for those patients who do not require long-term protection from PE. The long-term safety of current IVC filters is excellent, but it is not perfect, and many believe that complications related to fracture, migration, and caval occlusion can be avoided if the filter is removed.

Dr. Shishehbor: I agree. Filter retrieval is very important, and, as I mentioned before, retrievability is one of the most important considerations for me when deciding which filter to place. But I think we have to make a point very clear here—retrievable filters are all considered optional, meaning they are approved by the FDA as permanent devices and can be left in indefinitely. In rare cases in which the risk of retrieval outweighs the benefits, I leave the filter in permanently. At the very least, I believe all patients and filters should be evaluated for retrieval when possible.

Dr. Fujitani: Yes, filter retrieval is important, and we attempt to remove as many optional filters as possible. Although there are a number of patients with permanent indications for filter placement, most require the filter for only a finite period of time, and once that period of contraindication to anticoagulation or VTE risk passes, optional filter technology allows for retrieval.

Dr. Lynch: Philosophically, filter retrieval is very important to us because most of the optional devices that we place truly end up in patients who eventually do not need them. As advocates of optional IVC filter technology, we feel we should not only take an active role in patient follow-up but should also possess the skills to achieve a successful removal for each patient that does return.

Dr. Shishehbor: We know that approximately 80% to 85% of optional IVC filters are never retrieved. There are, of course, a number of reasons for this, but I think a big barrier is that many operators are uncomfortable with the retrieval procedure, which is why I advocate choosing a filter design that allows for easy retrieval.

What are some of your tools and tips for filter retrieval?

Dr. Fujitani: Our first step is always to obtain plain x-ray films of the abdomen and determine the type of filter. Knowing the filter type is critical for planning the retrieval, and for some patients, this information is not always readily available, especially if the filter was placed at a different institution. The filter type will tell us how to retrieve it (snare vs alternative device) and will also give us an idea of how challenging the case may be. For example, retrieval of some filter designs beyond 2 weeks may be particularly challenging due to profound tissue ingrowth at the attachment zones. We'll have to plan for this. Pre-retrieval vena cavagraphy is important to make sure there are no emboli caught in the filter. If sizeable emboli are noted, it is best to abort the procedure and postpone retrieval until a later date. Post-retrieval vena cavagraphy is also important to ensure the integrity of the vena cava wall and confirm no filling defects at the point of filter removal.

Dr. Sing: Timing is extremely important for retrieval. The longer the device stays in, the harder it may be to retrieve—mostly due to intimal overgrowth. I favor multi-loop snares and dual sheath retrieval systems. I like to be able to remove both the filter and inner sheath together and avoid "dragging" the filter through the sheath.

Dr. Shishehbor: I also like dual sheath systems. With a dual sheath system, you can collapse the filter with the inner sheath and, if necessary, advance the outer sheath to ensure the filter collapses completely. It is important to use more rigid sheaths to prevent tip damage during retrieval.

Dr. Fujitani: Most filters can be retrieved with standard techniques according to their instructions for use; however, there are times when the filter is tilted or malpositioned and more advanced endovascular techniques and tools may be needed.

Dr. Lynch: The literature is now rich with a number of techniques that can be used for these difficult IVC filter retrievals. While we rely heavily on the balloon-assisted and modified loop snare techniques we have described, we also use techniques described by others such as rigid endobronchial forceps, wire shaving, and various other loop snare techniques.

What are some of the challenges you see at retrieval, and how do you manage those challenges?

Dr. Shishehbor: Luckily, I have had very few challenges at retrieval. I do retrieve the majority of filters with the patient still on warfarin because I think the benefits of stopping warfarin are small compared to the risk of thrombosis without it.

Dr. Lynch: We have seen exceedingly few complications from IVC filter retrieval. When we do see complications, most are self-limiting and require no additional management. Issues related to filter fracture and embolization can be more common and sometimes require additional procedures to remove fragments from the IVC or lungs.

Dr. Fujitani: The majority of our filter retrievals are also uneventful. Occasionally, we find a complete through-and-through penetration of the vena cava with filters that have been in place for longer periods of time. Retrieval of these filters is usually successful with occasional findings of a transient "blush" at the penetration site on the completion vena cavagram. Most of these seal readily in the low-pressure environment of the vena cava, and we simply recommend waiting a few minutes and then repeating the cavagraphy to verify this.

Dr. Sing: Our most difficult filter retrievals are when the filter is tilted to the extent that the snare hook is embedded into the caval wall. This requires dislodging the tip of the filter, which can be tricky and time consuming. We've had great success with the in situ snare technique for these cases.

Dr. Fujitani: We use several different techniques in these rare cases of embedded filter tips. In some cases, we percutaneously access the femoral vein, snare the tip of the filter from below, and then pull it downward to free it from its embedded position. We then return to the transjugular approach to remove the filter using standard retrieval techniques.

Dr. Shishehbor: Overall, I think the best way to avoid complications is to be prepared. If it doesn't feel right, don't do it.

How do you get your optional IVC filter patients back for retrieval?

Dr. Fujitani: The FDA has strongly recommended that implanting physicians and clinicians responsible for the ongoing care of patients with retrievable IVC filters consider removing them as a soon as protection from PE is no longer needed. Unfortunately, in real-world practice, most optional IVC filters are still not removed for a number of reasons: the absence of organized follow-up, patient non-compliance, and healthcare insurance/systems issues, among others. In our practice, we have implemented a prospective follow-up protocol for our optional IVC filter patients and have a retrieval consultation visit once the filter is deemed no longer necessary.

Dr. Shishehbor: I think the best way to ensure follow-up is by building close relationships with the physicians responsible for the ongoing care of patients. We are lucky enough to have a very large vascular medicine group that works together to manage DVT, PE, hypercoagulable states, and anticoagulation therapy. This allows us to maintain close contact with the patient, and we are able to retrieve a significant portion of our optional filters. I think education is also important here. Primary care physicians, internists, and other allied health professionals need to understand the utility of filters and the importance of retrieval. Patients also need credible information about their optional IVC filter.

Dr. Sing: We have a log that is updated in "real-time" by the implanting physicians. It is checked every 2 weeks, and we begin to plan retrievals, if appropriate, after 30 to 60 days.

Dr. Fujitani: We have designed a prospective electronic medical database of patients in whom optional IVC filters have been placed with the intent of retrieval. This allows us to track the patient's progress. If a patient transitions to a clinical situation in which anticoagulation is no longer contraindicated, the filter is removed as soon as possible—often during the same hospitalization. For patients with a longer-term contraindication to anticoagulation, we contact them for follow-up appointments in the outpatient setting to assess filter retrieval. There is, of course, a moderate subset of patients where the filter is intended for permanent placement.

Dr. Lynch: We have had great success with our follow-up program, which combines an electronic medical record review with direct patient contact via letters. The letters help even if they do nothing more than initiate a conversation between patients and their primary care providers about filter management. Often, we find that insufficient information is present in the medical record to determine if a filter should be removed, and this contact with the patient becomes critical.

Dr. Fujitani: I know the BARD REACH™ Program is available for those without a dedicated follow-up program. It is a free web-based program delivered by McKesson Patient Relationship Solutions, who will reach out to your patients on your behalf via phone calls.

Tell us about your experience with the MERIDIAN® Vena Cava Filter (Figure 1).

Dr. Fujitani: I find the implantation of the MERIDIAN® Filter to be technically very intuitive. The unique design of the filter is intriguing, and I especially like the addition of the retrograde anchors at the shoulders and wrists of the stabilizing arms. In our practice, we've already seen a number of benefits from this new design, including a lower incidence of tilt and migration, which in turn has led to much easier retrievals even after protracted periods of implantation.

Dr. Lynch: Our experience with the MERIDIAN® Filter has largely been positive as well. We use it for patients who have a very high likelihood of returning for filter retrieval.

Dr. Sing: We only recently switched from the ECLIPSE® to the MERIDIAN® Filter and, so far, we have seen less tilt and much better orientation at retrieval. Compared to ECLIPSE®, we have noticed that MERIDIAN® is slightly more difficult to disengage from the vessel wall but nothing a little extra pull can't solve.

Dr. Shishehbor: I have been using the MERIDIAN® Filter for about a year now, and I especially like its centering capability and retrievability. I retrieve more than 90% of the filters I place, so ease of retrieval is a big consideration for me. I know the primary purpose of the new anchors is to prevent caudal migration, but, much more importantly for me, the shoulder anchors also assist in centering the filter and keep the snare hook away from the IVC wall. This has a huge impact on retrievability because, as we all know, the critical first step in filter retrieval is to engage the snare hook. This becomes much more difficult when the filter has tilted and the snare hook is embedded in the caval wall. With the MERIDIAN® Filter, I've been able to engage the snare hook for easy retrieval time and again. ■

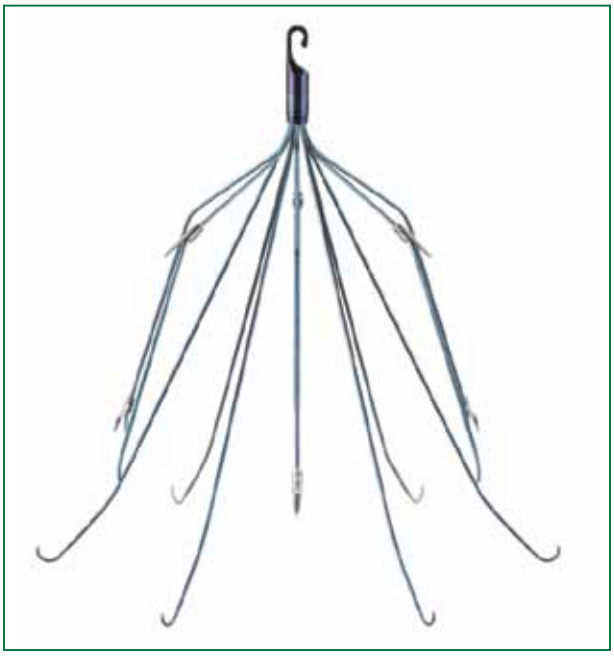

Figure 1. The MERIDIAN® Vena Cava Filter.

1. US Food and Drug Administration. Removing Retrievable Inferior Vena Cava Filters: Initial Communication, August 9, 2010.

MERIDIAN® VENA CAVA FILTER

Indications for Use: The MERIDIAN® Filter is indicated for use in the prevention of recurrent pulmonary embolism via permanent placement in the vena cava in the following situations: pulmonary thromboembolism when anticoagulants are contraindicated, failure of anticoagulant therapy for thromboembolic disease, emergency treatment following massive pulmonary embolism where anticipated benefits of conventional therapy are reduced, or chronic, recurrent pulmonary embolism where anticoagulant therapy has failed or is contraindicated.

The MERIDIAN® Filter may be removed according to the instructions supplied under Section labeled: Optional Procedure for Filter Removal.

Contraindications for Use: CAUTION: If the IVC diameter exceeds 28 mm, the filter must not be inserted into the IVC. The MERIDIAN® Filter should not be implanted in pregnant patients when fluoroscopy may endanger the fetus and risks and benefits should be assessed carefully; patients with an IVC diameter larger than 28 mm; or patients with risk of septic embolism.

Please consult labels and IFU for indications, contraindications, hazards, warnings, cautions, and instructions for use.