IVC Filter Placement: Is Intersociety Consensus Possible?

An examination of the varying societal guidelines on the use of inferior vena cava filters in treating patients with venous thromboembolism.

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Venous thromboembolism (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE), is prevalent. Even in modern practice, mortality rates associated with VTE remain high.[1,2] The cornerstone of VTE therapy is anticoagulation; however, advanced therapies are usually reserved for those with very severe, hemodynamically significant PE or limb-threatening DVT.[3] Advanced therapy typically includes administration of thrombolytic agents or hemodynamic support (eg, extracorporeal membrane oxygenation).

Inferior vena cava filters (IVCFs) are also commonly offered to patients with VTE.[3] However, to date, there are few randomized data available to support the use of IVCFs as part of the treatment of VTE. Still, IVCF use has dramatically increased in the past 2 decades in the United States,[4] mainly paralleling the development of retrievable IVCFs.[5] In contrast, IVCFs are used far less commonly in Europe. In 2012, an estimated 9,070 IVCFs were implanted in Europe as compared with 224,700 in the United States.[6] Although the reason for this practice deviation has never been properly studied, it can be suggested to relate to differing societal guidelines, multiple medical specialties involved in treating patients with VTE (eg, radiology, hematology, pulmonology, angiology), and varying reimbursement-related incentives.

The 8-year results of the PREPIC study showed that placement of an IVCF was associated with an increased risk for DVT and a decreased incidence of PE. However, IVCF insertion was not associated with reduced mortality.[7] Therefore, IVCF placement solely for the purpose of preventing recurrent PE may not be justified. A second study, PREPIC2, utilized retrievable IVCFs and showed similar results, even in patients with increased risk factors for VTE.[8]

Despite the aforementioned paucity of data to show efficacy (especially related to definitive outcomes), most guidelines support the classic indications for IVCF insertion. These classic indications include an acute contraindication for anticoagulation, a major complication of anticoagulation in patients with acute VTE, and failure of anticoagulation even with an increased dose.[9] That said, some societies apply these criteria even more stringently. For example, certain guidelines only recommend an IVCF if DVT is present and not for isolated PE.

On the other hand, in practice, IVCFs are used in other instances altogether, such as in trauma patients, periprocedurally during bariatric surgery, and as an adjuvant to thrombolytic therapy in massive PE. These "soft" indications mainly rely on anecdotal reports and small case series. As such, it may not be surprising that there is a lack of uniformity in the way societies address these soft indications.

SOCIETAL RECOMMENDATIONS

Table 1 summarizes the IVCF-related guidelines published by several prominent societies.[3,10-13] We chose to elaborate on several potential indications for IVCF placement that differ among guidelines or come up frequently in clinical practice.

Poor Cardiopulmonary Reserve

IVCFs are sometimes advocated as an additional measure for patients who can tolerate anticoagulation; however, this is not a straightforward indication. On one hand, the failure rate of appropriate anticoagulation—within

TABLE 1. SOCIETAL GUIDELINES ON INDICATIONS FOR IVCF PLACEMENT

Indication	ACCP[3]	AHA[10]	ESC[11]	ACR[12]	SIR[13]
Absolute contraindication for AC	Supported	Supported	Supported	Supported	Supported
Major complication of AC	Supported	Supported	Supported	Supported	Supported
AC failure	Not supported	Supported	Supported	Supported	Supported
VTE patient without an absolute contraindication for AC	Not supported	Not supported	Not supported	May be appropriate	Not addressed
As an adjuvant for AC or TT in VTE	Not supported*	Not supported	Not supported	May be appropriate with TT for DVT	Not addressed
Patients presenting with massive PE	Not supported	May be appropriate	Not supported	Not addressed	Supported only in patients with residual DVT
Trauma	Not supported	Not supported	Not supported	May be appropriate	Supported
Bariatric surgery	Not supported	Not supported	Not supported	Not supported	Not supported
Poor cardiopulmonary reserve	Not supported	Not supported	Not supported	May be appropriate	Supported
Free-floating iliofemoral DVT	Not supported	Not supported	Not supported	May be appropriate	Supported
CTEPH	Not supported	Not supported	Not supported	May be appropriate	Not addressed

Abbreviations: AC, anticoagulation; ACCP, American College of Chest Physicians; ACR, American College of Radiology; AHA, American Heart Association; CTEPH, chronic thromboembolic pulmonary hypertension; DVT, deep vein thrombosis; ESC, European Society of Cardiology; IVCF, inferior vena cava filter; PE, pulmonary embolism; SIR, Society of Interventional Radiology; TT, thrombolytic therapy; VTE, venous thromboembolism.
*Although not supporting the use of IVCF, the potential for benefit in highly selected patients is discussed.

all comers receiving anticoagulation—is low, with fatal PE occurring in 0.19% during a 3-month treatment period.[14] On the other hand, appropriate anticoagulation sometimes lags behind clinical presentation by as much as 48 hours. Therefore, an IVCF may be relevant in patients with poor cardiopulmonary reserve who may not tolerate even a small additional PE. Examples of such patients include PE in the setting of significant heart failure and significant chronic obstructive pulmonary disease. Although not supported by standard cardiovascular societies, the American College of Radiology and Society of Interventional Radiology consider IVCF placement in this specific subgroup.[12,13] A retrospective study by Stein and Matta showed reduced in-hospital mortality in patients with PE and chronic obstructive pulmonary disease who received an IVCF, especially those ≥ 80 years,[15] probably because of their related poor pulmonary function and possible pulmonary hypertension. Another retrospective study showed reduced in-hospital and 3-month all-cause mortality in unstable patients with PE treated with an IVCF in conjunction with anticoagulation.[16] Within limitations of retrospective, database-derived data, it is reasonable to believe that unstable patients with poor cardiopulmonary reserve are those who benefit the most from IVCF insertion.

Free-Floating DVT

In clinical practice, patients who have a proximal DVT are sometimes known to develop PE during or shortly after an ultrasound scan. Some believe these free-floating DVTs are prone to embolize while acute. However, although data are scarce and outdated, the presence of a free-floating DVT does not necessarily imply imminent PE. A retrospective analysis by Baldridge et al examined 73 patients with free-floating DVT, of which nine were diagnosed with PE. Of those nine patients, only two (22%) had a PE event after the diagnosis of DVT. When assessing follow-up ultrasound studies, most free-floating thrombi do not embolize but rather attach to the vascular wall.[17] Nevertheless, the American College of Radiology and Society of Interventional Radiology agree that IVCF placement in these patients is reasonable based on a consensus statement alone.

Trauma

Prophylactic IVCFs are sometimes inserted in patients at high risk for VTE, such as those suffering from multiorgan trauma and, especially, spinal cord injury. No randomized controlled studies have addressed this issue. Consensus statements—mainly coming from radiology

societies—have supported the use of IVCFs in these patients, especially when prophylactic anticoagulation is contraindicated. A retrospective study by Sarosiek et al examined 451 trauma patients with IVCF insertion versus matched controls and found no significant difference in mortality.[18] However, this study received criticism for unadjudicated outcomes. A meta-analysis of eight trials found low-level evidence of reduced PE incidence in trauma patients with no clear effect on mortality.[19] Further prospective trials are needed to support broad IVCF use in this subgroup.

The risk for developing VTE is also high in patients suffering from spinal cord injury. Data are conflicting in this patient category, with some studies showing an increased risk for developing a DVT without a reduction in PE.[20] A small study of 45 patients with spinal cord injury undergoing IVCF placement found no PE events, but results were not control-matched and the study was underpowered.[21] Perhaps not surprisingly, a systematic review published in 2017 regarding prevention of VTE in spinal cord injury failed to draw firm conclusions regarding IVCF placement in these patients.[22]

Bariatric Surgery

Similarly, IVCFs are sometimes advocated for use in patients undergoing bariatric surgery. Several small, retrospective studies have examined the efficacy of these devices in this setting. Although a significant number of VTEs occur in the periprocedural phase of bariatric surgery and PE is considered the leading cause of death complicating this procedure, no study has found an advantage of IVCFs[23]; this indication is not supported by any of the societal guidelines.

CONCLUSION

Despite the lack of high-quality studies to support their use, societal guidelines agree regarding the classic indications for IVCFs, mainly relying on the natural history of VTE. More discordance, however, lies within the softer indications, with some societies allowing for an expansion of IVCF indications based on fewer, less robust data. Our opinion is that IVCFs may have some role to play in select patients outside the most stringent criteria. In practice, such decisions must be tailored on a patient-by-patient basis and should be documented based on the best available data. We also recognize the slippery slope this may represent. Therefore, institutional mechanisms should be implemented for appropriate decision-making and tracking outcomes. ■

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