analysis showed that of the 65,041 devices placed in future deep vein thrombosis (DVT) and IVC thrombo-
sications, which increase over time, including a high risk of
over the past decade.1 However, Medicare database
has led to a doubling in the placement of these devices
associated risks of long-term permanent devices. Confi-
tation embolization of Bard retrievable vena cava filters and clinical implica-
tions including cardiac perforation and tamponade. Arch Intern Med 2010;
170(20):1827-1831.

INVITED COMMENTARY

Efforts to Optimize Patient Benefit From Inferior Vena Cava Filters

heoretically, retrievable inferior vena cava
(IVC) filters offer the advantage of prevention
of pulmonary embolism (PE) without the asso-
ciated risks of long-term permanent devices. Confi-
dence in the efficacy and safety of retrievable IVC filters
has led to a doubling in the placement of these devices
over the past decade.1 However, Medicare database
analysis showed that of the 65,041 devices placed in
2008, only an estimated 15% were retrieved.1 As these
devices may be associated with significant complica-
tions, which increase over time, including a high risk of
future deep vein thrombosis (DVT) and IVC thrombo-
sis, all efforts should be made to avoid unnecessary long
indwelling time. The US Food and Drug Administration
(FDA) released a statement in August 2010 urging cli-
nicians to remove these devices as soon as the risk of
PE has subsided. This was based on finding nearly 1000
reported complications associated with these devices, a
review prompted by an article published in the Archives
that described an alarmingly high filter fracture rate
with certain devices.2,3

Barriers to IVC filter retrieval include physician refu-
sal, perhaps due to lack of appreciation for conse-
quences of permanent devices, ongoing contraindica-
tion to anticoagulation, long indwelling time, and loss
of patients to follow-up. To decrease the number of IVC
filters that are left in place permanently, we should first
help educate clinicians to identify appropriate candi-
dates for placement. Recent studies suggest that only half
of all IVC filter placements were appropriate per profes-
sional society guidelines.4 Next, a system should be in
place to track the fate of the device. Leaving this up to
the patient or primary care physician is not acceptable.
Institution of an IVC filter clinic has been shown to re-
sult in a 2-fold increase in retrieval rates.3 A weekly mul-
disciplinary review of filter placement request and indi-
cation, repositioning, and retrieval resulted in an 80% reduc-
tion in retained devices without an absolute indica-
tion.5 Mandatory postmarketing registries would pro-
vide information on both complication and retrieval rates.

In this issue of the Archives, Godoy-Garcia and col-
leagues6 advance this field further with their report of their
experience with removal of IVC filters after a prolonged
indwelling time. In their cohort, the most common
indication for placement was prevention of venous throm-
boembolism (VTE) when pharmacologic prophylaxis was
contraindicated (53%), followed by VTE despite antico-
agulation (31%) and contraindications to anticoagula-
tion secondary to bleeding complications in patients
known VTE (9%).

While the only available randomized control trial evalu-
ating IVC filter efficacy shows a reduction in both short-
and long-term recurrence of PE in patients with
acute DVT, these patients all received anticoagulation
and therefore were not representative of the patients who most
commonly receive these devices.8,9 There is currently no
high-level data to support the most common use of IVC
filters, that is prevention of VTE in patients who are not
anticoagulated.

IVC Filter Placement. The controversy surrounding pa-
tient selection for IVC filter placement is reflected in the
disparate recommendations found in guidelines from vari-
ous sources (Table). The only currently agreed-on indi-
cation for IVC filter placement is prevention of PE in
the setting of DVT and a contraindication to anticoagu-
lation. Other indications remain controversial. While filters
were once commonly placed in patients who devel-
oped recurrent or progressive DVT or PE despite anticoagulation,
now most experts recommend an increase in intensity of anticoagulation or initiation of an
alternative anticoagulant rather than placement of a device. Despite practitioners’ concerns, free-floating thrombus
has not been associated with increased risk of embolization and is not an indication for device placement. Inferior vena cava filters are often considered in patients with recent PE, poor cardiopulmonary reserve, and residual proximal DVT, but the lack of demonstrated mortality benefit challenges this practice.

IVC Filter Retrieval. Because retrievable filters often become permanent, the risk-benefit analysis performed prior to placement should involve weighing the long-term consequences of recurrent DVT and IVC thrombosis with reduction in nonfatal PE. Inferior vena cava filters should be used primarily in patients who have acute VTE with an absolute contraindication to anticoagulation and should be removed as soon as full-dose anticoagulation can be safely tolerated. Health care providers should remember that while these devices may decrease the risk of PE, they do not prevent DVT nor are they a substitute for anticoagulant treatment of VTE. While recommended retrieval time varies by filter type, Godoy-Garcia and colleagues8 offer data to suggest that later removal was relatively safe for those devices studied. Through a combination of increasing appropriate use, increased retrieval, and more data on safety and efficacy, we can optimize patient benefit from use of these filters.

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Table. Recommendations for IVC Filter Placement

<table>
<thead>
<tr>
<th>Indication for IVC Filter Placement</th>
<th>ACCP10</th>
<th>AHA11</th>
<th>British Committee for Standards in Hematology12</th>
<th>Thrombosis Interest Group of Canada13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute VTE and contraindication to anticoagulation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>VTE despite anticoagulation</td>
<td>Yes</td>
<td>Yes</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
<tr>
<td>Preoperatively in patients who have had recent VTE (within one month) and must have anticoagulation interrupted for surgery</td>
<td>NR</td>
<td>NR</td>
<td>Yes (VTE within 4 weeks prior to surgery)</td>
<td>NR</td>
</tr>
<tr>
<td>Proximal DVT in patient with poor cardiopulmonary reserve</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>Yes (VTE within 2 weeks prior to major surgery)</td>
</tr>
<tr>
<td>Free-floating thrombus</td>
<td>NR</td>
<td>NR</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Thrombolysis with proximal DVT</td>
<td>NR</td>
<td>NR</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Primary prophylaxis in selected high risk patients (surgical, trauma, etc)</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>No</td>
</tr>
</tbody>
</table>

Abbreviations: ACCP, American College of Chest Physicians; AHA, American Heart Association; DVT, deep venous thrombosis; IVC, inferior vena cava; LMWH, low-molecular-weight heparin; NR, not reported; VTE, venous thromboembolism.

RESEARCH LETTER

Cigarette Smoking Cessation and Total and Cause-Specific Mortality: A 22-Year Follow-up Study Among US Male Physicians

Since the 1950s, studies have linked cigarette smoking to total and cause-specific mortality. Few studies have comprehensively presented patterns of total and cause-specific mortality reduction

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