Limitations of observational research published in 7 major internal medicine journals (New England Journal of Medicine [NEJM], Lancet, JAMA, BMJ, PLoS Med, Annals of Internal Medicine, and JAMA Internal Medicine) from January 1, 2013, to June 30, 2013. Data are proportions of the indicated journal documents and associated news stories that mention any study limitation (dark blue bars) or contain an explicit statement that causality cannot be inferred (light blue bars). NEJM Journal Watch articles were categorized as press releases for NEJM articles.

Discussion | Limitations of observational research published in high-impact journals were infrequently mentioned in associated news stories. Inadequate acknowledgment of limitations in the journal sources might contribute to the low proportion of news stories that mentioned limitations of observational research. Limitations were rarely mentioned in the study abstracts or journal press releases, the content of which is associated with that of news stories, but were commonly “buried” in lengthy Discussion sections. A fundamental limitation of observational research—the inability to attribute causation—was rarely mentioned in journal documents or news stories and was often accompanied by a disclaimer. In news stories, disclaimers were frequently attributable to study investigators, consistent with evidence that authors of observational studies often make clinical practice recommendations based on their work and that academic press releases exaggerate research outcomes.

A possible consequence of inadequate reporting of limitations of observational research is that readers consider the reported associations to be causal, promoting health practices based on evidence of modest quality. Up to 50% of such practices prove ineffective when tested in randomized clinical trials. Giving greater prominence to the limitations of observational research, particularly in the publication abstract and journal press releases, might temper this enthusiasm and reduce the need for subsequent reversals of practice.

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Critical revision of the manuscript for important intellectual content: All authors.

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Retrieval of Inferior Vena Cava Filters With Prolonged Dwell Time: A Single-Center Experience in 648 Retrieval Procedures

Retrievable inferior vena cava filters (IVCFs) offer temporary protection from pulmonary embolism without the
long-term sequelae of a permanent implant; however, most are never removed. Prolonged presence of IVCFs has been associated with retrieval failure rates as high as 43% and device-related complications, including fracture, device migration, organ penetration, and an increased risk for venous thrombosis.3

We aimed to evaluate the technical success rate of IVCF retrieval after prolonged dwell times. We hypothesized that the retrieval success rate is independent of IVCF dwell time and that there is no significant difference in procedure-related rates of adverse events.

Methods | We included all IVCF retrieval procedures performed from January 1, 2009, through December 1, 2014. A standard retrieval technique (vascular sheath and snare device) was used in all cases. When standard techniques failed, adjunctive techniques included a directional sheath, loop wire, balloon disruption, endobronchial forceps, and laser sheath-assisted photothermal ablation. Primary study outcomes included technical success and procedure-related adverse events. This study was approved by the institutional review board of Northwestern University. All patients provided written informed consent.

We identified potential factors that affected technical success and adverse events, including IVCF dwell time, use of adjunctive techniques, and patient characteristics. We constructed binary logistic regression models to estimate odds ratios (ORs) with 95% CIs for the examined covariates. We examined the relationship between filter dwell time and use of an adjunctive technique with multivariable analysis.

We separated the cohort into 2 subgroups with dwell times of less than and at least 6 months. We used the χ² test to examine the covariates and procedural fluoroscopy time. Significance was accepted at P < .05. Our data analysis was performed on February 15, 2015.

Results | We identified 648 retrieval procedures (Table 1), of which 143 were outside referrals. Mean (SD) age of the patients was 56 (16.4) years, and 318 were male (49.1%). Mean (SD) fluoroscopy time was 9.2 (12.7) minutes.

We achieved technical success with standard retrieval techniques in 536 procedures (82.7%); with adjunctive techniques, 63 (97.4%). Dwell time did not affect technical success (OR, 0.98 [95% CI, 0.95-1.01]; P = .12). Adjunctive techniques were necessary for IVCF retrieval in 95 procedures (14.7%) and were significantly associated with technical success (OR, 3.97 [95% CI, 1.31-11.95]; P = .01). Table 2 summarizes the findings of the subgroup and logistic regression analyses. Multivariable analysis revealed a significant relationship between filter dwell time and the use of adjunctive techniques (P < .001).

No procedure-related mortality occurred. Three patients required brief hospital admission; the remaining patients underwent outpatient procedures. Eighteen procedure-related adverse events (3 major and 15 minor) occurred; major events were related to access site complications. The rate of adverse events was not associated with filter dwell time (OR, 1.00 [95% CI, 0.98-1.01]; P = .17).

Table 1. Filters Used in Study

<table>
<thead>
<tr>
<th>Filter Type (Manufacturer)</th>
<th>No. of Procedures</th>
<th>Dwell Time, Mean (SD), mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALN (ALN Implants Chirurgicaux)</td>
<td>32</td>
<td>1.7 (1.2)</td>
</tr>
<tr>
<td>Celect (Cook Medical, Inc)</td>
<td>388</td>
<td>3.2 (7.3)</td>
</tr>
<tr>
<td>Celect Platinum (Cook Medical, Inc)</td>
<td>3</td>
<td>2.0 (1.6)</td>
</tr>
<tr>
<td>Crux (Volcano Corp)</td>
<td>1</td>
<td>0.4 (NA)</td>
</tr>
<tr>
<td>Denali (Bard Peripheral Vascular, Inc)</td>
<td>12</td>
<td>2.1 (1.3)</td>
</tr>
<tr>
<td>Eclipse (Bard Peripheral Vascular, Inc)</td>
<td>9</td>
<td>2.0 (1.4)</td>
</tr>
<tr>
<td>G2 (Bard Peripheral Vascular, Inc)</td>
<td>22</td>
<td>9.8 (22.2)</td>
</tr>
<tr>
<td>G2X/Express (Bard Peripheral Vascular, Inc)</td>
<td>4</td>
<td>4.0 (3.5)</td>
</tr>
<tr>
<td>Meridian (Bard Peripheral Vascular, Inc)</td>
<td>1</td>
<td>2.6 (NA)</td>
</tr>
<tr>
<td>Optease (Cordis Corp)</td>
<td>13</td>
<td>1.4 (1.1)</td>
</tr>
<tr>
<td>Option (Argon Medical Devices, Inc)</td>
<td>80</td>
<td>3.6 (5.0)</td>
</tr>
<tr>
<td>OptionELITE (Argon Medical Devices, Inc)</td>
<td>1</td>
<td>1.3 (NA)</td>
</tr>
<tr>
<td>Günther Tulip (Cook Medical, Inc)</td>
<td>82</td>
<td>6.2 (13.8)</td>
</tr>
<tr>
<td>All</td>
<td>648</td>
<td>3.7 (8.8)</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not available.

Table 2. Subgroup and Multivariable Analyses

<table>
<thead>
<tr>
<th>Variable</th>
<th>Subgroup Analysisa</th>
<th>Multivariable Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technical Success</td>
<td>Adverse Events</td>
</tr>
<tr>
<td></td>
<td>OR (95% CI)</td>
<td>P Value</td>
</tr>
<tr>
<td>Dwell Time, mo</td>
<td>&lt;6 (n = 596)</td>
<td>≥6 (n = 52)</td>
</tr>
<tr>
<td>Mean (SD) age, y</td>
<td>56.2 (16.5)</td>
<td>50.4 (14.4)</td>
</tr>
<tr>
<td>Male sex</td>
<td>293 (49.2)</td>
<td>25 (48.1)</td>
</tr>
<tr>
<td>Adverse events</td>
<td>11 (1.8)</td>
<td>7 (13.5)</td>
</tr>
<tr>
<td>Technical success</td>
<td>596 (97.7)</td>
<td>52 (94.2)</td>
</tr>
<tr>
<td>Adjunctive techniques</td>
<td>62 (11.1)</td>
<td>33 (67)</td>
</tr>
<tr>
<td>Fluoroscopy time, mean (SD), min</td>
<td>8.4 (11.7)</td>
<td>18.1 (18.8)</td>
</tr>
<tr>
<td>Dwell timeb</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Abbreviations: NA, not applicable.

a Unless otherwise indicated, data are expressed as number (percentage) of procedures.
b Despite subgroup analysis suggesting an increased rate of procedure-related adverse events in the subgroup with prolonged dwell times, multivariable analysis demonstrates that filter dwell time and the rate of procedure-related adverse events are not associated.
Reports of device-related complications have increased with the growing use of retrievable IVCFs,\(^3\) resulting in a 2010 safety communication from the US Food and Drug Administration urging removal of these devices when their use is no longer indicated.\(^4\) Prolonged IVCF dwell times have been associated with increased risks for device-related complications\(^5\) and retrieval failure,\(^7\) resulting in the perception that retrieval of IVCFs with prolonged dwell times should not be attempted.

Smaller studies have described high rates of technical success when retrieving IVCFs with prolonged dwell times,\(^3\) now corroborated in our larger study. Retrievable IVCFs with prolonged dwell times can be removed with a high degree of technical success without increasing the rate of procedural adverse events. Adjunctive retrieval techniques positively affect retrieval rates and are often needed for retrieval of IVCFs with prolonged dwell times.

Study limitations include the evolution of adjunctive techniques during the study period. The use of these techniques was operator dependent and was not objectively assigned. In addition, this single-center experience may not translate broadly.

Retrievable IVCFs can be removed safely with a high rate of technical success, regardless of dwell time. These findings support the US Food and Drug Administration’s goal of removing devices that are no longer necessary by eliminating a limit on dwell times. Weighed against the risks of prolonged dwell times of retrievable IVCFs, removal of these devices should always be attempted.

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Deaths Due to Cigarette Smoking for 12 Smoking-Related Cancers in the United States

The 2014 US Surgeon General’s Report provided the estimated annual number of smoking-attributable deaths during 2005 to 2009 from cancer overall and lung cancer specifically but not separately for the 11 other cancers found to be caused by smoking.\(^1\) Current estimates of smoking-attributable mortality for specific cancer sites are based on data from 2000 to 2004.\(^2\) Updated estimates are needed because smoking patterns and the magnitude of the association between smoking and cancer death have changed in the past decade. From 2000 to 2012, smoking prevalence decreased from 23.2% to 18.1%.\(^3\) In contrast to this favorable trend, recently published data revealed that the risk of cancer death among smokers can increase over time.\(^4\) Therefore, we estimated the number and proportion of deaths in the United States in 2011 attributable to cigarette smoking for 12 cancers caused by smoking.

Methods | For 12 cancers established as caused by smoking, we used the standard formula\(^5\) to calculate the population-attributable fraction (PAF) within strata defined by sex and age group (35-54, 55-64, 65-74, and ≥75 years) using SAS statistical software, version 9.3 (SAS Institute Inc). The PAFs were calculated using smoking prevalence (current, former, or never) from the 2011 National Health Interview Survey\(^3\) and age- and sex-specific relative risks (RRs) for former and current smoking from the Cancer Prevention Study II (CPS-II)\(^6\) (for the 35- to 54-year age group, follow-up from 1982-1988) or the pooled contemporary cohort (PCC)\(^6\) (for other age groups, follow-up from 2000-2011). The National Health Interview Survey provides smoking prevalence estimates based on in-person interviews of a nationally representative sample of US adults. The

Previous Presentation: Preliminary results of this study were presented at the 40th Annual Meeting of the Society of Interventional Radiology; March 2, 2015; Atlanta, Georgia.