The Abandoned Inferior Vena Cava Filter: Is it a Big Deal? Inferior Vena Cava Filter Retrieval Rates and Clinical Outcomes of Non-Retrieval

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Background
Many patients with inferior vena cava filters (IVCF) never have them retrieved and there are no adequately sized studies examining IVCF retrieval rates and clinical events in patients with abandoned IVCFs. In this retrospective cohort study, we evaluated the differences in rates of venous thromboembolism, mortality and retrieval success as a function of time in patients who underwent IVCF retrieval within 12 months vs. patients in whom the filter was never retrieved.

Methods
Enrollment included 1,709 patients who underwent IVCF placement between 1/2011 -12/2017 within the Aurora Metro Health System. Procedure dates, recurrent deep vein thrombosis (DVT), pulmonary embolism (PE) and mortality dates were collected. Endpoints between patients who underwent successful filter retrieval within 12 months and those with abandoned IVCF (never retrieved after 12 months of follow-up) were compared via multivariate regression analyses.

Results
Successful IVCF retrieval was achieved in 770 of 1,709 patients who underwent placement. The success rate was 98.2% in the first retrieval attempt. There was a significant (p=0.018) decrease in retrieval success rate as time from insertion increased. The first retrieval attempt success rate was 93% with a range of 1 to 3 attempts per patient.

Baseline Characteristics

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Retrieved</th>
<th>Abandoned</th>
<th>Hazard ratio (95% conf interval)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent DVT</td>
<td>8.1%</td>
<td>11.9%</td>
<td>0.65 (0.42 to 1.00)</td>
<td>0.05</td>
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<tr>
<td>Recurrent PE</td>
<td>5.2%</td>
<td>7.1%</td>
<td>0.70 (0.41 to 1.18)</td>
<td>0.18</td>
</tr>
<tr>
<td>All-Cause Mortality</td>
<td>8.8%</td>
<td>28.9%</td>
<td>0.50 (0.35 to 0.70)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Discussion and Conclusion
IVCF abandonment was associated with a significantly increased rate of recurrent DVT and all-cause death. However, true cause and effect of filter placement on mortality cannot be certain. It is suspected that patients who did not undergo retrieval were high risk for retrieval or near death which may have dissuaded operators from removing the filter. Patients in the abandoned group were on average, approximately 10 years older and had higher incidences of comorbid conditions.