Why Temporary Filters are not Removed: Clinical Predictors in more than 1000 consecutive cases

Disclosures

Abbott Laboratories
WL Gore
Endologix
Levbeth Medical

Strong believer in the value of temporary IVC filters
Northwestern Experience

- Retrospective review
- Two separate prospective databases from 2008 to 2013
- Protocol:
  - Each filter is evaluated and scheduled for removal

Removal Protocol

- Local anesthesia, transjugular approach, outpatient

Removal

Wire manipulation in case of angulation

Removal

Endoforceps
**Removal**

- Excimer laser in severe attachment to caval wall

**Results**

- 1021 filters were implanted from 2008-2013
  - Removal attempted (60%)
  - Removal not attempted (40%)

- Most were lost to follow-up
- Advised not to be removed
- Transferred to other hospitals
- Died

- 40% of temporary filters were not removed despite
  - Protocols and personal dedicated to remove IVC filters
  - 95% Technical success

**Results**

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- 95% Technical success
**Literature**

<table>
<thead>
<tr>
<th>Author</th>
<th>Removal %</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarosiek, et al</td>
<td>58/679 (8.5%)</td>
<td>JAMA 2013</td>
</tr>
<tr>
<td>Lucas, et al</td>
<td>61/113 (53%)</td>
<td>Am Surg 2012</td>
</tr>
<tr>
<td>Augerinos et al</td>
<td>237/401 (59.1%)</td>
<td>Eur J Endovasc Surg 2013</td>
</tr>
<tr>
<td>Current</td>
<td>588/1021 (60%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor/Group</th>
<th>Group A</th>
<th>Group B</th>
<th>Odds Ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>270 (44)</td>
<td>225 (44)</td>
<td>1.609 (1.25-2.070)</td>
<td>0.00002</td>
</tr>
<tr>
<td>History of VTE (%)</td>
<td>351 (57)</td>
<td>273 (67)</td>
<td>1.991 (1.224-3.208)</td>
<td>0.005</td>
</tr>
<tr>
<td>Cancer (%)</td>
<td>153 (25)</td>
<td>200 (49)</td>
<td>2.071 (2.274-3.8610)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Neurologic disease (CVA, dementia, paralysis) (%)</td>
<td>34 (6)</td>
<td>35 (8)</td>
<td>3.351 (1.377-4.317)</td>
<td>0.002</td>
</tr>
<tr>
<td>VTE + contraindication to AC (%)</td>
<td>320 (87)</td>
<td>283 (70)</td>
<td>3.031 (2.036-4.549)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>VTE + complication after AC (%)</td>
<td>31 (5)</td>
<td>49 (12)</td>
<td>2.729 (1.390-5.403)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>VTE + failure of AC (%)</td>
<td>11 (2)</td>
<td>13 (3)</td>
<td>2.215 (0.954-5.232)</td>
<td>0.06</td>
</tr>
<tr>
<td>VTE High risk (%)</td>
<td>20 (5)</td>
<td>20 (5)</td>
<td>0.460 (0.273-0.773)</td>
<td>0.03</td>
</tr>
<tr>
<td>Prophylactic</td>
<td>39 (10)</td>
<td>39 (10)</td>
<td>0.173 (0.076-0.391)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

**Conclusion**

- The use of snares, endoforceps and laser allow for removal of 95% of temporary filters.
- Despite this high technical success, 40% of temporary filters were never removed.
- Common causes are lost to follow up and conversion to permanent.
- This is associated to advanced age, cancer and neurologic diseases.

**Conclusion**

The presence of risk factors (age, cancer, neurologic disease) should alert physicians against the use of temporary filters that will never be removed and instead using a permanent one.