Factors Associated with Unsuccessful Inferior Vena Cava Filter Retrieval: A Large Series Multi-institutional Experience
Nothing to disclose.
Background

- Chronic inferior vena cava filters (IVCf) have many complications:
  - Filter migration (3-69%)
  - Venous insufficiency (30-35%)
  - Structure penetration (9-24%)
  - Filter fracture (~1%)

- Awareness of timely IVCf removal is increasing.

- Yet, there are no guidelines on when to retrieve or what factors are associated with successful versus unsuccessful retrieval.
Purpose

- Our retrospective analysis identified factors associated with unsuccessful removal.
Materials and Methods

- Retrospective review
- Multi-hospital
- May 2013 to September 2017
- Records reviewed for:
  - Demographics
  - Body mass Index (BMI)
  - Creatinine (Cr)
  - Hypercoagulable state
  - Dwell Time
  - Presence of Thrombus
  - Type of filter
  - Filter Angle
  - Fluoroscopy time
## Results

<table>
<thead>
<tr>
<th></th>
<th>Successful Retrieval</th>
<th>Unsuccessful Retrieval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Retrievals</td>
<td>242</td>
<td>17</td>
<td>0.6447</td>
</tr>
<tr>
<td>Age</td>
<td>56.1</td>
<td>57.8</td>
<td>0.6447</td>
</tr>
<tr>
<td>Male gender (%)</td>
<td>45.9</td>
<td>35.4</td>
<td>0.4575</td>
</tr>
<tr>
<td>Dwell Time (Days)</td>
<td>377.1</td>
<td>813.6</td>
<td>*0.0279</td>
</tr>
<tr>
<td>BMI</td>
<td>31.1</td>
<td>32.5</td>
<td>0.4999</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.14</td>
<td>1.17</td>
<td>0.9038</td>
</tr>
<tr>
<td>Hypercoagulable State (%)</td>
<td>15.7</td>
<td>29.4</td>
<td>0.1716</td>
</tr>
<tr>
<td>Presence of Thrombus (%)</td>
<td>11.1</td>
<td>23.5</td>
<td>0.1304</td>
</tr>
<tr>
<td>IVC Filter Angulation (°)</td>
<td>9.5</td>
<td>12.8</td>
<td>0.3044</td>
</tr>
<tr>
<td>Fluoroscopy Time (min)</td>
<td>13.6</td>
<td>47.0</td>
<td>*0.0001</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Filter type</th>
<th>Successful Retrieval (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bard Denali</td>
<td>28 (96.5%)</td>
<td>29</td>
</tr>
<tr>
<td>Cook Celect</td>
<td>50 (98%)</td>
<td>51</td>
</tr>
<tr>
<td>Option Elite</td>
<td>136 (93.2%)</td>
<td>146</td>
</tr>
</tbody>
</table>
Discussion

- ↑ Dwell time and procedural time were correlated with unsuccessful IVCf removal.
- No significant association between degree of IVCf angulation.
- Relatively high successful retrieval rates for most commonly used filter types (Bard Denali, Cook Celect, and Option Elite).
Discussion

The diagram illustrates the dwell time for successful and unsuccessful IVCF retrieval cases. The x-axis represents the IVCF retrieval status (Successful or Unsuccessful), and the y-axis shows the number of days. The data is visualized using box plots, which indicate the distribution of dwell times. The successful retrieval cases show a shorter and less dispersed dwell time distribution compared to the unsuccessful cases, suggesting a possible correlation between dwell time and retrieval success. Further analysis would be required to establish any definitive conclusions.
Conclusion

- These findings reinforce the importance of timely clinical follow up and expedited removal of IVCf as soon as clinically appropriate to delay significantly increasing unsuccessful retrieval rates. However, the median dwell times were similar, suggesting other yet undiscovered factors may be at play.
References

