The Open Vessel Hypothesis: Applicability To DVT

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Disclosures

Dr. Ouriel is an employee of and holds equity in Syntactx, a contract research organization that performs research services for the following companies involved in the diagnosis and/or treatment of venous disease: Ekos, Inari, Medtronic, Gore, Cook, Veniti, Philips, InterVene.

The Open Vessel Hypothesis: What is it?

- **1941:** Blumgart et al. - Extent of acute MI in dogs was related to the duration of coronary artery occlusion. This hypothesis was termed the "open artery hypothesis" because it the extent of myocardial salvage was proportional to the time required to open the artery.

- **1990:** The MITI trial found that patients with thrombolytic opening of coronary occlusions within 70 minutes of symptom onset had a 1% mortality compared to 10% mortality if the artery was opened after 70 minutes.

Message: Clinical outcome is directly related to reconstitution of an occluded vessel.

What does this have to do with DVT?

- **ATTRACT:**
  - DVT (≤14d symptoms) in the iliofemoral system
  - 692 subjects; randomized to:
    a) anticoagulation + compression stockings, or
    b) Pharmacomechanical catheter-directed thrombolysis (PCDT) + above
  - 2 years, primary endpoint = PTS (Villalta >5 or ulcer)


ATTRACT: Primary Endpoint Failure

**Primary Finding:** No difference in 2-year PTS in the groups; 46.7% PCDT, 48.2% control (P= 0.6)

**Secondary Findings:**
- Subgroup of subjects with iliac DVT did better with pharmacomechanical thrombolysis. Moderate-Severe PTS in 18% vs. 28% of patients, respectively.
- But, no benefit in fem-pop DVT: 17% vs. 18% in the lytic vs. non-lytic groups.

S. Vedantham, SIR, Washington DC, March 4-9, 2017
Answer: The National Venous Registry; A Blast from the Past

<table>
<thead>
<tr>
<th>Location</th>
<th>Extent of Thrombolysis</th>
<th>Grade I</th>
<th>Grade II</th>
<th>Grade III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iliofemoral (N = 144)</td>
<td></td>
<td>18 (12%)</td>
<td>79 (55%)</td>
<td>47 (33%)</td>
</tr>
<tr>
<td>Femoropopliteal (N = 52)</td>
<td></td>
<td>9 (17%)</td>
<td>25 (48%)</td>
<td>18 (35%)</td>
</tr>
<tr>
<td>Total (N = 196)</td>
<td></td>
<td>27 (14%)</td>
<td>104 (53%)</td>
<td>65 (33%)</td>
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</tbody>
</table>

Acute resolution of thrombus is almost identical for iliofemoral and fem-pop DVT. So, why clinically worse for fem-pop DVT?


The Open Vessel Hypothesis Applied to Veins

- Symptoms will improve when veins can be reopened and when they remain open over the long term.
- We are more successful in restoring and preserving long-term patency for iliofemoral vs. femoropopliteal DVT.
- And, the reason is stents. Venous stents work quite well in the proximal veins but not for the femoropopliteal system.
- ATTRACT results may reflect this; better modalities exist (e.g. stents) for long-term treatment of venous obstruction in the iliofemoral system.
- Open veins = Good outcome.

Conclusion: The Open Vessel Hypothesis and DVT

- Effective treatments (e.g. pharmacomechanical thrombolysis) exist for acute DVT, irrespective of an iliofemoral of femoropopliteal location.
- Stents preserve long-term patency after acute restoration in the iliofemoral system, resulting in significant reduction in the post-thrombotic syndrome.
- Speculation for the Future: While we currently have no effective means to addressing long-term patency after PCDT in the femoropopliteal system, the advent of newer technology may improve results with more distal DVT.

Thank you...