Epidemiology of SVT

- Reported in 3 – 11% of population
- ?? Peak incidence in summer
- Varicose veins in 86 – 88%

Great Saphenous Vein – 63.4%*
≤ 3 cm from SFJ – 19.6%
Small Saphenous Vein – 14.2%
≤ 3 cm from SPJ – 42.7%
Other Superficial Vein – 36.4%
Bilateral – 7.6%


- Benign, self-limited condition
- Spontaneous resolution
- Only symptomatic treatment required
- Compression stockings
- Nonsteroidal anti-inflammatories

Historical View of SVT

Is the conventional wisdom correct?

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>n</th>
<th>DVT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gores</td>
<td>1962</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>Hafner</td>
<td>1964</td>
<td>94</td>
<td>10</td>
</tr>
<tr>
<td>Histo</td>
<td>1982</td>
<td>119</td>
<td>7</td>
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<tr>
<td>Pies</td>
<td>1963</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td>Hebert</td>
<td>1999</td>
<td>55</td>
<td>6</td>
</tr>
<tr>
<td>Skocek</td>
<td>1981</td>
<td>82</td>
<td>12</td>
</tr>
<tr>
<td>Lutter</td>
<td>1981</td>
<td>116</td>
<td>28</td>
</tr>
<tr>
<td>Bonnin</td>
<td>1991</td>
<td>37</td>
<td>10</td>
</tr>
<tr>
<td>Lutter</td>
<td>1991</td>
<td>186</td>
<td>4</td>
</tr>
<tr>
<td>Somjen</td>
<td>1996</td>
<td>262</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>1963</td>
<td>106</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

Acute Natural History of SVT - DVT

Nicolaides, Angiology 2002

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>n</th>
<th>PE %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gores</td>
<td>1962</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>Plate</td>
<td>1985</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>Lutter</td>
<td>1991</td>
<td>186</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>1963</td>
<td>254</td>
<td>4.7%</td>
</tr>
</tbody>
</table>
**Concurrent DVT / SVT**
*Quere I, J Vasc Surg 2012*

- Concurrent DVT in 198 of 844 (23.5%) lower limb SVT
- Proximal - 82 (41.8%)
- Distal - 114 (58.2%)
- Contiguous with SVT - 115 (58%)
- Non-contiguous – 83 (41.9%)

**Risk Factors for Concurrent DVT**
*Quere I, J Vasc Surg 2012*

- Clinical risk factors
  - History of DVT / PE - OR 1.7 (1.2 – 2.5)
  - Age > 75 – OR 2.2 (1.5 – 3.0)
  - Non-varicose veins – OR 3.0 (2.0 – 4.3)
  - Inpatient status – OR 4.6 (3.0 – 7.0)
- Ultrasound risk factors
  - ≤ 3 cm from SPJ – OR 3.3 (1.5 – 7.2)
  - ≤ 3 cm from SFJ – OR 3.6 (2.3 – 5.6)
  - Perforator vein involvement – OR 8.1 (5.2 – 12.5)

**Late Outcome After SVT**
*Prandoni P, Blood 2011*

- Case – control study
  - 737 patients with SVT not involving SFJ
  - 1438 controls
- Mean follow-up 26 ± 8 months

<table>
<thead>
<tr>
<th>SVT</th>
<th>Controls</th>
<th>Hazard Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death (n = 737)</td>
<td>3 (0.4%)</td>
<td>6 (0.4%)</td>
</tr>
<tr>
<td>Malignancy</td>
<td>26 (3.5%)</td>
<td>56 (3.9%) 0.86 (0.55 – 1.35)</td>
</tr>
<tr>
<td>Cardiovascular Events</td>
<td>32 (4.3%)</td>
<td>63 (4.4%) 0.97 (0.63 – 1.5)</td>
</tr>
</tbody>
</table>

**Does SVT Require Treatment?**
The CALISTO Trial, N Engl J Med 2010

- 3002 patients with acute, symptomatic SVT > 5 cm
- Placebo
- Fondaparinux 2.5 mg sc qd X 45 days
- Composite outcome
  - Death
  - Symptomatic PE / DVT
  - Extension to SFJ
  - Symptomatic recurrence

- No difference in major bleeding (0.1% in both groups)

**But... The Benefits Are Modest**
*Blondon M, Chest 2012*

- Number needed to treat (NNT) to prevent
  - Composite efficacy outcome – 20
  - Symptomatic PE or DVT – 88
  - Pulmonary embolism – 300
- Cost-effectiveness analysis
  - Fondaparinux associated with .004 life-years gained
  - Cost of fondaparinux - $1734
  - Incremental cost effectiveness ratio (ICER)
    - $141,000 per PE prevented
    - $475,388 per life year gained
    - $8,250,000 per life saved
- Grade 2 recommendation
  - Risks and benefits balanced
  - Choice of treatment depends on patient values
  - "Patients who place a high value on avoiding the inconvenience and cost of anticoagulation and a low value on avoiding the infrequent complications of anticoagulation are likely to decline anticoagulation"

**Treatment of VTE**
*ACCP Guidelines, Chest 2012*

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Description</th>
<th>Grade of Recommendation</th>
<th>Evidence Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1.1</td>
<td>In patients with SVT at least 5 cm in length, we suggest prophylactic fondaparinux or LMWH for 45 days</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>8.1.2</td>
<td>In SVT patients treated with anticoagulation, we suggest fondaparinux 2.5 mg over LMWH</td>
<td>2</td>
<td>C</td>
</tr>
</tbody>
</table>
Are there groups with a benign prognosis?

- Pooled analysis of 2 observational studies (POST & OPTIMEV)
- 1074 patients followed for 3 months
- 83.8% treated with anticoagulants

<table>
<thead>
<tr>
<th></th>
<th>Anticoagulated (n = 898)</th>
<th>Not Anticoagulated (n = 173)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent surgery</td>
<td>4%</td>
<td>8%</td>
<td>.03</td>
</tr>
<tr>
<td>Pregnancy-related SVT</td>
<td>5%</td>
<td>2%</td>
<td>.04</td>
</tr>
<tr>
<td>History of VTE</td>
<td>46%</td>
<td>28%</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Family history of VTE</td>
<td>16%</td>
<td>16%</td>
<td>.02</td>
</tr>
<tr>
<td>Known thrombophilia</td>
<td>1%</td>
<td>1%</td>
<td>.02</td>
</tr>
<tr>
<td>Chronic reduced mobility</td>
<td>0%</td>
<td>0%</td>
<td>.03</td>
</tr>
<tr>
<td>SVT involving GSV</td>
<td>70%</td>
<td>57%</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Involvement of SFJ/SPJ</td>
<td>12%</td>
<td>12%</td>
<td>.02</td>
</tr>
<tr>
<td>Perforator involvement</td>
<td>4%</td>
<td>1%</td>
<td>.05</td>
</tr>
<tr>
<td>Recurrent VTE</td>
<td>4.6%</td>
<td>6.6%</td>
<td>.11</td>
</tr>
</tbody>
</table>

Factors to be considered
ACCP Guidelines, Chest 2012

- No Anticoag Anticoag
- Isolated Tributary Involvement √
- GSV Involvement
  - Below Knee √
  - Above Knee
  - In Proximity To SFJ
- Perforator Involvement √
- Severe Symptoms √
- History of DVT / SVT √
- Malignancy √
- Inpatient Status

Acute Natural History - SVT Extension
Leizorovicz, A, Blood 2013

- 1500 placebo treated patients from CALISTO trial

- Thrombus extension is a marker of poor outcome
- Arbitrary distance from SFJ may be unimportant

9.3% DVT / PE 8.9% DVT / PE

Conclusions

- Historical view of SVT may not be entirely accurate
- At least a 20% incidence of concurrent DVT / PE
  - Non-contiguous in 43%
  - Clear risk factors
    - History of VTE
    - Age > 75
    - Non-varicose veins
    - Inpatients
    - Involvement of junctions or perforators
  - Observations suggest a role for activated coagulation
- Treatment requires judgment & discussion with patient
  - Small, but clearly defined benefits of anticoagulation
  - Routine anticoagulation is clearly cost-ineffective
  - High risk groups can be identified
  - Symptomatic extension requires treatment