Foam sclerotherapy of saphenous veins comparing the effect of injection via needles and catheters of different size

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EVF St. Petersburg 2015
Foam sclerotherapy is well established, but results are inferior to thermo-occlusion. Could this be due to the size of the injection tool?

- catheter 1.7 mm
- microcatheter 1.2 mm
- needle 0.65 mm
- vein 8.6 mm
hypotheses

- small injection tools will mix foam with blood or form a foam layer floating on blood;
- large injection tools will potentially replace blood completely with foam;
- considering size relations, tool diameters have to be compared to vein diameters at the time of injection (smaller than in the standing patient).
comparative prospective study

- 50 patients (n = 10 each tool + 20 catheter pullback)
- insufficiency of the GSV, diameter: 6.0 – 17.8 mm
- segment length intended to treat: 45 – 50 cm
- clinical examinations 2 weeks, 8 weeks, 6 months: ultrasound (3D-Scan, color mode, stress tests)
- if required, additional sclerofoam injections
methods

- local anaesthesia
- vein access
- 1 min. leg elevation
- horizontal leg position for injection
- 3 x injection (Aethoxysklerol 1%, 1+4 with air)
- or foam deployment in catheter pullback mode
- continuous ultrasound monitoring
- junction: compression by transducer edge, 1 min.
results

Occlusion of the target segment (2 weeks)

<table>
<thead>
<tr>
<th></th>
<th>no flow</th>
<th>no reflux (&gt;0,5 s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>catheter pullback mode</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>catheter</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>microcatheter</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>needle</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
results

additional sclerofoam treatments < 6 months

catheter pullback mode 0/20

catheter 0/10

microcatheter 2/10 3 sessions

needle 4/10 6 sessions

FU 6 months: all target veins occluded
results

Time consumption: initial procedures
(local anaesthesia - first bandage)

- microcatheter: mean 5:02 min.
- needle: mean 5:12 min.
- catheter 3 x inj.: mean 5:42 min.
- catheter pullback: mean 3:45 min.
## Results

### Total time consumption including additional mapping + injection procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Mean Time (min.)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter pullback</td>
<td>3:45</td>
<td>2:40 – 5:32</td>
</tr>
<tr>
<td>Catheter 3 x inj.</td>
<td>5:42</td>
<td>4:06 – 7:12</td>
</tr>
<tr>
<td>Microcatheter</td>
<td>7:36</td>
<td>6:15 – 9:40</td>
</tr>
<tr>
<td>Needle</td>
<td>9:48</td>
<td>8:05 – 11:35</td>
</tr>
</tbody>
</table>
results

complications

• no adverse events
• no bleedings from puncture sites
• no larger hematoma when using catheters

[catheter access]

[needle access]
results

average size relations at the time of injection

- catheter 1.7 mm
- microcatheter 1.2 mm
- needle 0.65 mm

vein, \( d = 3.0 \ (2.5 - 3.2) \ mm \)

Catheter size close to vein diameter: Effective blood replacement by foam injection.
conclusions

Foam sclerotherapy of saphenous veins...

- highly effective when **catheters** are used instead of microcatheters or injection needles;
- **time saving** when using catheters in spite of effort (guide wire, sterile coverings) as all procedures are "**one-step to success**";
- ready to compete with thermo-occlusion.

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