Interventional treatment of perforator veins

Tobias Hirsch,
Practice for Vascular Diseases Halle, Germany
www.gefaessmedizin-hirsch.de
Disclosure

Tobias HIRSCH

I have the following potential conflicts of interest to report:

- Consulting: Medtronic, Sigvaris
- Honoraria: Medi, L&R, Juzo, Kreussler, Bauerfeind
Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices (Review)

Nesbitt C, Bedenis R, Bhattacharya V, Stansby G
“Implications for practice
Current data suggest that foam sclerotherapy and endovenous ablation (laser and radio-frequency) have similar outcomes as open surgery involving high ligation and stripping (HL/S)...”

USA: American Venous Forum 2011
UK: NICE Guidelines 2013
But what about?
>150 PV per leg

GSV
- Perforators of the femoral canal
- Paratibial perforators
- Posterior tibial perforators (Cockett)

SSV
- Profunda perforator (Hach)
- Popliteal fossa perforator
- Medial gastrocnemius perforator
- Lateral leg perforator
>150 PV per leg

**GSV**
- Perforators of the femoral canal
- Paratibial perforators
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**SSV**
- Profunda perforator (Hach)
- Popliteal fossa perforator
- Medial gastrocnemius perforator
- Lateral leg perforator
Percutaneous ablation of perforators (PAPS): Guidelines

<table>
<thead>
<tr>
<th>Guideline No.</th>
<th>Treatment of perforating veins</th>
<th>GRADE of recommendation</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.1</td>
<td>We recommend against selective treatment of incompetent perforating veins in patients with simple varicose veins (CEAP class C₂).</td>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td>13.2</td>
<td>We suggest treatment of “pathologic” perforating veins that includes those with outward flow of ≥500 ms duration, with a diameter of ≥3.5 mm, located beneath healed or open venous ulcer (class C₅-C₆).</td>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>13.3</td>
<td>For treatment of “pathologic” perforating veins, we suggest subfascial endoscopic perforating vein surgery, ultrasonographically guided sclerotherapy, or thermal ablations.</td>
<td>2</td>
<td>C</td>
</tr>
</tbody>
</table>
PV treatment: devices for PAPS

RFA
RFS Stylet (Medtronic™)

EVLT radial
ELVES slim (Biolitec®)
1,100µm
VenaCure (angiodynamics™)
400µm
Radiofrequency ablation
Female, 76
C6
2009 Stripping GSV
2014 ClariVein SSV
Cockett-III-perforator
RFA Stylet
Medtronic® RFAS
The role of perforators in chronic venous insufficiency

*Phlebology 2010; 25:3–10*

T F O’Donnell
Venous Center, Tufts Medical Center, Director of the Venous Centers at Tufts Medical Center and Dedham Medical Associates

<table>
<thead>
<tr>
<th>Factor</th>
<th>Proebstle</th>
<th>Marks</th>
<th>Bacon</th>
<th>Van den Bos</th>
<th>Hingorani</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients/ICPVs (#)</td>
<td>60/67</td>
<td>18/25</td>
<td>37/125</td>
<td>12/14</td>
<td>38/48</td>
</tr>
<tr>
<td>ICPV (Diam., mm)</td>
<td>3.3</td>
<td>4</td>
<td>NS</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Other Rx</td>
<td>50% GSV</td>
<td>6% GSV</td>
<td>&gt;90% GSV</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
<td>0.25</td>
<td>60</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Follow-up (mos.)</td>
<td>3</td>
<td>92</td>
<td>81</td>
<td>64</td>
<td>88</td>
</tr>
<tr>
<td>Occluded (%)</td>
<td>99</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>Complications</td>
<td>+</td>
<td>1</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Laser ablation
Male, 72
C3, phlebitis
bilateral insuff. GSV
profunda perforator
radial laser
ELVeS Biolitec® slim
Endovenous laser ablation of insufficient perforating veins: Energy is key to success

Doeke Boersma, Daan LJ Smulders, Olaf J Bakker, Ronald FF van den Haak, Bart AN Verhoeven and Olivier HJ Koning

Table 2. Overview on reported series of endovenous laser ablation in insufficient perforating veins.

<table>
<thead>
<tr>
<th>Wavelength</th>
<th>IPV (n)</th>
<th>Energy delivery</th>
<th>Watts</th>
<th>Follow-up</th>
<th>Anatomical success (%)</th>
<th>Major complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proebstle and Herdemann (^8)</td>
<td>940 nm</td>
<td>12(^a)</td>
<td>Pulsed</td>
<td>5–30</td>
<td>1 day</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>1320 nm</td>
<td>28(^a)</td>
<td>Pulsed</td>
<td>5–10</td>
<td>1 day</td>
<td>100</td>
</tr>
<tr>
<td>Hissink et al. (^9)</td>
<td>810 nm</td>
<td>58(^b)</td>
<td>Continuous</td>
<td>14</td>
<td>3 months</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DVT: 0%</td>
</tr>
<tr>
<td>Corcos et al. (^10)</td>
<td>808 nm</td>
<td>534(^c)</td>
<td>Continuous</td>
<td>6–10</td>
<td>3 months–6 years</td>
<td>72.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DVT: 0%</td>
</tr>
<tr>
<td>Park et al. (^11)</td>
<td>980 nm</td>
<td>26(^d)</td>
<td>Continuous</td>
<td>10</td>
<td>1 week–1–12 months</td>
<td>96.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paresthesia: 4%</td>
</tr>
<tr>
<td>Dumantepe et al. (^12)</td>
<td>1470 nm</td>
<td>24</td>
<td>Continuous</td>
<td>10</td>
<td>1 year</td>
<td>86.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paresthesia: 15%</td>
</tr>
<tr>
<td>Zerweck et al. (^13)</td>
<td>1470 nm</td>
<td>69(^e)</td>
<td>Continuous</td>
<td>8</td>
<td>1 week–1 month</td>
<td>94.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paresthesia: 1.8%</td>
</tr>
<tr>
<td>Boersma et al. (^8)</td>
<td>810 nm</td>
<td>94</td>
<td>Continuous</td>
<td>14</td>
<td>6 weeks</td>
<td>62.8</td>
</tr>
<tr>
<td></td>
<td>1470 nm</td>
<td>77</td>
<td>Continuous</td>
<td>6</td>
<td>6 weeks</td>
<td>45.5</td>
</tr>
</tbody>
</table>

\(^a\) Pulsed mode, \(^b\) Continuous mode, \(^c\) Continuous mode, \(^d\) Continuous mode, \(^e\) Continuous mode, \(^f\) Paresthesia and DVT.
Factors that influence perforator vein closure rates using radiofrequency ablation, laser ablation, or foam sclerotherapy

Eric S. Hager, MD, Christopher Washington, MD, Amy Steinmetz, RDMS, RVT, Timothy Wu, MD, Michael Singh, MD, and Ellen Dillavou, MD, Pittsburgh, Pa
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<table>
<thead>
<tr>
<th></th>
<th>RFA</th>
<th>EVLT</th>
<th>UGFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=296</td>
<td>93 (31%)</td>
<td>62 (21%)</td>
<td>141 (48%)</td>
</tr>
<tr>
<td>Closure rate 2 weeks</td>
<td>73%</td>
<td>61%</td>
<td>57%</td>
</tr>
</tbody>
</table>

**No influence:** PV size, deep vein reflux, OAC

**Influence:** BMI > 50 (closure rate 37%)
Adhesive Closure
Cyanoacrylate adhesive perforator embolization (CAPE) of incompetent perforating veins of the leg, a feasibility study

Irwin M Toonder¹, Yee Lai Lam¹, James Lawson² and Cees HA Wittens¹,³

Figure 1. Access of more than one IPV using 7F introducer sheaths.
Cyanoacrylate adhesive perforator embolization (CAPE) of incompetent perforating veins of the leg, a feasibility study

Irwin M Toonder¹, Yee Lai Lam¹, James Lawson² and Cees HA Wittens¹,³

Treatment of incompetent perforators in recurrent venous insufficiency with adhesive embolization and sclerotherapy

Krishna Prasad BP, Binu Joy, Ajith Toms and Teena Sleeba
Adhesive Closure

- feasible
- no standard protocol
- poor data
- high costs
“Regardless of method used successful closure of perforators appears predictive of wound healing with minimal morbidity”
Conclusion

Endovenous ablation of refluxing perforating veins is a good alternative to endoscopic surgery (C5, C6)

Try and collect data!
Thank you for your attention!

info@gefaessmedizin-hirsch.de