Interest and limits of endoluminal laser ablation and radiofrequency ablation

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The different endovenous treatments

- Radiofrequency thermoablation.
- Laser thermoablation (EVLA).
- Steam thermoablation.
- Ablation by cyanoacrylate glue (VenaSeal): no tumescence.
- Mecanochemical ablation (MOCA).
- Foam sclerotherapy.
Current indication of varicose vein treatments: US recommendations

- Endovenous treatment should constitute the first treatment of choice for people with confirmed varicose veins and truncal reflux:
  - IA compared to surgery.
  - IA compared to foam.
Evolution, Germany, C2-C3

(GS, < 10 mm diameter)

<table>
<thead>
<tr>
<th></th>
<th>Cross- und Saphenektomie</th>
<th>endoluminale Lasertherapie</th>
<th>endoluminale Radiofrequenztherapie</th>
<th>Schaumsklerotherapie</th>
<th>extraluminale Valvuloplastie</th>
</tr>
</thead>
<tbody>
<tr>
<td>vor 20 Jahren</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>vor 10 Jahren</td>
<td>75</td>
<td>43,75</td>
<td>6,25</td>
<td>6,25</td>
<td>6,25</td>
</tr>
<tr>
<td>heute</td>
<td>25</td>
<td>37,5</td>
<td>37,5</td>
<td>12,5</td>
<td>6,25</td>
</tr>
</tbody>
</table>

Phlebologie 2019, 48:87-93
Required conditions for thermoablation

- Have a color duplex scan and master the exploration technique.
- Master the echoguided puncture.
- Master the Seldlinger method and the fiber positioning.
Indications

- Stage C2 to C6 (CEAP) of venous chronic disease, mostly C2-C4.
- Effective on « rectilinear » recurrences with significant perforating veins.
- Anticoagulation: no contraindication.
Indication according to the depth of the trunk to be treated

- Intrafascial, «deep» and rectilinear: thermal ablation.
- Suprafascial: phlebectomy.
- Both: mixed treatment.
Essentiel points related to thermoablation

- Protocol well followed.
- Quality of the result:
  - On the correct indication.
  - On the quality of tumescence.
  - On the amount of energy delivered.

- Less collateral damage, pain and morbidity than surgery.
Tumescence

- 500 cc NaCl 0.9 % or Ringer’s solution.
- Addition of 25 cc lidocaïn 1 %.
- Addition of 5 cc sodium bicarbonate 8.4%.
Study of the energy delivered (radiofrequency)

- 1 cycle for a vein diameter less than 6 mm.
- 2 cycles of 7 to 10 mm.
- 3 cycles for more than 10 mm.

- Dr. Lebard, presentation SEP: 3 cycles of 9-11 mm; 4 cycles of 11-15 mm; 5 cycles of 15-18 mm!

C. Lebard, F. Zucarelli, Phlébologie
2017; 70; 3, 50-55
To consider...

- Local anesthesia at the point of puncture (needle 30 G).
- No narcosis or spinal anesthesia.
- Tumescence: lower flow.
- Antithrombotic prevention: enoxaparine 40 mg sc for 5 days.
- Immediate walking.
- Short work interruption.
Results of persistent occlusion after several years

- EVLA and radiofrequency: similar results greater than 90%.
**Complete occlusion (GS, at 3 months, 1 year, 5 years)**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>3 months</th>
<th>1 year</th>
<th>5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVLA 980</td>
<td>n=159 (95.7%)</td>
<td>n=107 (99.1%)</td>
<td>n=114 (88.4%)</td>
</tr>
<tr>
<td>EVLA 1470</td>
<td>n=212 (100%)</td>
<td>n=155 (98.7%)</td>
<td>n=153 (93.3%)</td>
</tr>
<tr>
<td>RFA</td>
<td>n=189 (99.5%)</td>
<td>n=125 (99.1%)</td>
<td>n=107 (85.6%)</td>
</tr>
</tbody>
</table>
Prospective study: JVS 2013: results at 5 years.

Five-year results from the prospective European multicentre cohort study on radiofrequency segmental thermal ablation for incompetent great saphenous veins

T. M. Proebstle1, B. J. Alm2, O. Göckeritz3, C. Wenzel3, T. Noppeney4, C. Lebard5, C. Sessa6, D. Creton7 and O. Pichot6

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- 8 European centers (Germany and France).

- Occlusion rate:
- Immediate occlusion 99.5% to 100%.
- at 2 years: 96.9% occlusions (98% without reflux).
- at 5 years: 91.9% occlusions (95% without reflux).
- 1.5% repermeation per year.
FAST GROUP STUDY
few side effects:

- Bruising: 5.8%
- Paresthesia: 3%
- Pigmentations: 2%
- Hematoma: 1.4%
- SVT: 1%
- DVT = 0%

3 days           3 months
Return to normal activity in 1.6 days.
Conclusions: Moderate profile of side effects.

T. Proebstle, Phlebologie 2010;39:69-71
EHIT: (Endovenous Heat induced thrombosis)

Kabnick (13) les classe en 4 catégories (schémas)

- Type 1: pôle supérieur avant la jonction
- Type 2: extension en VFC moins de 50 % en diamètre
- Type 3: plus de 50 % en diamètre
- Type 4: occlusion fémorale complète
Results for 5 years, personal retrospective serie (1)

- n = 100
- Average age : 56.5
- Female : 91%
- CEAP : 93% : C2 ; 5% : C3 ; 2% : C4
- Average diameter saphenous vein : 6.3 mm.
- Average diameter below knee : 5.5 mm.
- Associated phlebectomy in 53%
- Initial blockage of the catheter passage : 13%
Results at 5 years (2): side effects

- Deep vein thrombosis: 0%
- Superficial vein thrombosis: 1%
- Pulmonary embolism: 1%
- Bruising: often
- Infection: 0%
- Cutaneous burn: 0%
- Paresthesia: 7% (all transient)
- Matting: 1%
- Pigmentation: 1%
Results at 5 years (3)

- Saphenous visible: 7%
- Failure: 2% (both small saphenous vein)
- Trunk visible: 0%
- Subjectively, overall improvement: 93%
- Would accept to repeat: 100%
Limits of endovenous thermal ablation.

- Tortuosity of the vein.
- Diameter ... rather no.
- Saphenous vein very superficial.
- Major sequelae of thrombophlebitis.
- Technical failure (puncture, spasm, passage of the catheter).
- Pain or intense stress ... hospital environment.
- Small saphenous vein: nerves: exceptional.
Anatomical rules to avoid complications

- Make an abundant tumescence to protect the nerves and the skin.
- Control the thermal energy applied.
Advantage of thermal ablation

- Ambulatory, without hospitalization.
- Under local anesthesia by tumescence.
- Not very painful intraoperatively.
- Fast recovery of the activity.
CLOSURE 3E JOUR

Dist 1.67 cm
Dist 1.12 cm
Conclusion

- Classic surgery is no longer suitable for first-line use according to international recommendations.
- The heat treatments are not very painful and are very effective.
- They can be practiced both in the hospital and in the office.
- The method seems simple, but requires experience.
Thank you for your attention