Endoablation of Incompetent Perforators for Healing Chronic Venous Ulcers

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Conflict of Interest

None

Medial Calf Perforating Veins

Posterior tibial (Cockett) perforators
Lower
Middle
Upper

Para-tibial perforator
Perforators contribute to ambulatory venous hypertension

- Number and diameter of perforators increases in advanced CVI
- 70% of the IPV have hemodynamic significance
- 45% of perforators are not abolished with saphenous ablation


The duration of reflux in an incompetent perforating vein is at least

1. 30 ms
2. 100 ms
3. 250 ms
4. 500 ms
5. 1 s

Guidelines for evaluation and treatment

A perforator diameter of 3.5 mm was associated with reflux in 90% of cases.
When to Treat Them?

Incompetent Pathologic Perforators (C5 – C6)

No deep venous obstruction

Open Surgical Treatment of Incompetent Perforators

Linton Procedure ➔ SEPS

Mid-term results of endoscopic perforator vein interruption for chronic venous insufficiency: Lessons learned from the North American Subfascial Endoscopic Perforator Surgery registry

Randomized clinical trial of the effect of adding subfascial endoscopic perforator surgery to standard great saphenous vein stripping.

- RCT: 38 limbs with, 34 without SEPS
- No difference in pain, mobility, varicose vein recurrence and QOL scores at 1 year
- No added benefit of SEPS to HL/S in C2 disease

Perforator Interruption in Simple Varicose Veins (C2)
Dutch SEPS Trial

- RCT on best medical treatment vs. SEPS and saphenous ablation
- No difference at 29 months
- SEPS beneficial
  - in recurrent and in medial ulcers
  - in centers of excellence


The Cyclical Nature of Surgery for Incompetent Perforating Veins

Duplex-directed hook phlebectomy*

- Muller hook phlebectomy
- U/S guidance
- 23 limbs, 18 patients
- No complications
- 12/12 ulcers healed, 2/12 recurred

*Seiwert, Comerota et al. Annual Meeting, AVF 2006

Duplex guided sclerotherapy

Masuda et al. JVS 2006;43; 551-557

- Sodium Morrhuate 5%
- 80 limbs
- 75% occlusion at 20 months
- 1 skin necrosis, no DVT
- Improved Venous Severity and Disability Score (p<0.01)
- IPV recurrence higher in Class 6
- Multiple treatments are frequently needed

Adopted from O’Donnell

*Seiwert, Comerota et al. Annual Meeting, AVF 2006
**Duplex Guided Radiofrequency Ablation**

- 545 perforators treated
- 93% (6/82) occlusion rate at 1 year

**Duplex Guided Laser Ablation**

*Elias S, Peden E Vascular 2007;15:281-289*
- 50 IPVs
- Occlusion rate at 1 month: 90%

**Laser Ablation of Perforating Veins**

- 16-gauge angiocatheter (600-m laser fiber)
- 21-gauge micropuncture needle (400-m laser fiber)
- Pulsed technique: 15 watts with 4-second pulse intervals
- Each vein is treated twice (2 x 60 J = 120 J)

**The impact of ablation of incompetent superficial and perforator veins on ulcer healing rates**

*Michael Harlander-Locke, Peter F. Lawrence, MD, Ali Alkaffah, MD, Juan Carlos Jimenez, MD, David Rigberg, MD, and Brian D. Roentgen, MD San Diego and Los Angeles, Calif*

Objective: We assessed the impact of endovenous ablation of incompetent superficial (great saphenous, SSV) and small saphenous (SST) and perforator (perforator saphenous [PFP]) veins on healing rates of venous ulcers in patients who had failed conventional compression therapy.

Methods: Patients with ICAP 6 ulcers were treated with weekly compression in a dedicated wound care center. Ulcer size and depth were tracked prospectively. These ulcers that showed no measurable improvement after 5 weeks of compression were underwent ablation at least one incompetent vein.

Results: We performed 130 consecutive endovenous ablation procedures (74 superficial and 66 perforator) on 110 venous ulcers in 88 limbs. Ulcer size had been present for 71 ± 6 months with an initial ulcer area of 23 ± 5 cm². Following successful ablation, ulcer healing rate for healed ulcers improved from 1.0 ± 1 cm²/month to 4.4 ± 1 cm²/month (P < .05). Ulcer healing rate for healed ulcers, based on the last visit aborted, was GSV = 6.4 cm²/month, SSV = 4.8 cm²/month, and PFP = 2.9 cm²/month. After a minimum observation period of 6 months (mean follow-up, 12 ± 1.25 months), 76.3% of patients had healed ulcers in 53 ± 9 days. Twelve patients with 26 ulcers did not heal: two patients died from unrelated illnesses, six patients had new ulcers, and four patients have been lost to follow-up. Of the healed ulcers, 53% healed in 6 weeks, 74% healed in 12 weeks, and 94% healed in 26 weeks. Conclusions: There is measurable improvement in ulcer size and ultimate healing following ablation of incompetent superficial and perforator veins. (J Vasc Surg 2012;56:458-64.)

110 ulcers, 88 limbs, 140 endovenous ablations (74 saphenous, 66 perforators)
The impact of ablation of incompetent superficial and perforator veins on ulcer healing rates

Michael Hartman-Lutter, MD, Ali Alkhaff, MD, Juan Carlos Jimenez, MD, David Rigberg, MD, and Brian DeRobertis, MD, San Diego and Los Angeles, Calif.

Objective: We assessed the impact of endovenous ablation of incompetent superficial (great saphenous [GSV] and small saphenous [SVS]) and perforator (posterior tibial [PTP]) veins on the healing rate of venous ulcers in patients who had failed conventional compression therapy.

Methods: Patients with CEAP 6 ulcers were treated with weekly compression in a dedicated wound care center. Ulcer size and depth were tracked prospectively. Those ulcers that showed no improvement after 3 weeks of compression therapy underwent ablation of at least one incompetent vein.

Results: We performed 1,940 consecutive endovenous ablation procedures (74 superficial and 66 perforator) on 119 venous ulcers in 88 limbs. Ulcers had been present for 71 ± 6 months with an initial ulcer area of 23 ± 6 cm². Following successful ablation, the healing rate for healed ulcers improved from 1.9 ± 1.0 cm/month to 4.4 ± 1.5 cm/month (P < 0.05). Ulcer healing rate for healed ulcers, based on the last veins ablated, was GSV 0.4 ± 0.6 cm/month, SVS 4.8 ± 0.8 cm/month, and PTP 3.9 ± 0.9 cm/month. After a minimum observation period of 6 months (mean follow-up, 12 ± 1.2 months), 56.5% of patients healed in 14 ± 14 days. Twelve patients with 26 ulcers did not heal; two patients died from unrelated illnesses, six patients are still actively healing, and four patients have been lost to follow-up. Of the healed ulcers, four patients with six ulcers remained.

Conclusions: Ulcer healing rates increased significantly following ablation. This highlights the importance of these veins in ulcer pathogenesis. Ulcers that failed ablation were mainly located in the upper half of the leg and were associated with significant pain.

75 ulcers, 45 PTS, 86 perforators
Initial success: 58%, eventual success: 71%
No complications!

Endovenous ablation of incompetent perforating veins is effective treatment for recalcitrant venous ulcers

Peter F. Lawrence, MD, Ali Alkhaff, MD, David Rigberg, MD, Brian DeRobertis, MD, Hugh Gelabert, MD, and Juan Carlos Jimenez, MD, Los Angeles, Calif.

Objective: Endovenous closure of incompetent saphenous veins has been reported to facilitate venous ulcer healing; however, there is little information about the effectiveness of perforator ablation (PA) in healing venous ulcers. We report our experience with PA with venous ulcers responsive to prolonged compression therapy.

Methods: Patients with nonhealing venous ulcers of >3 months’ duration underwent duplex ultrasonography to assess their lower extremity venous system for incompetence of superficial, perforating, and deep veins. Patients who had either no saphenous incompetence or persistent ulcers after saphenous ablation underwent PA of incompetent perforating veins >3 mm in diameter. Initial treatment was performed on the perforator vein adjacent to the ulcer with additional incompetent perforators treated if ulcer healing failed.

Results: Seventy-one ulcers with 86 associated incompetent perforating veins were treated with PA in 45 patients with CEAP 6 ulcers. patients. Duplex imaging demonstrated the perforator vein in 71% of cases. Eighty-six percent of ulcers healed with at least 1 perforator ablation. Of those ulcers requiring more than 1 perforator ablation, 100% healed with additional perforator ablation. Mean days to healing with successful perforator ablation (PA): 10%. Mean days to healing: 138 days (1.5 perforators) 90% of ulcers healed with at least 1 PA. No healing without PA.

SEPS vs. Other Methods?

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<thead>
<tr>
<th>SEPS</th>
<th>Phlebectomy</th>
<th>PAPS</th>
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<tbody>
<tr>
<td>Proven efficacy</td>
<td>++</td>
<td>+</td>
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<tr>
<td>Long term data</td>
<td>++++</td>
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Duplex Guided

Proven efficacy
Long term data
Invasive procedure
Treats all IPVs
Return to work
Repeatable
Guidelines of the SVS/AVF on Treatment of Perforating Veins

<table>
<thead>
<tr>
<th>N of Guideline</th>
<th>Guideline</th>
<th>Grade of Recommendation</th>
<th>Grade of Evidence</th>
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<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>
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<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>
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<td>13.3</td>
<td>For treatment of “pathologic” perforating veins, we suggest SEPS, ultrasonographically guided sclerotherapy, or thermal ablations.</td>
<td>2</td>
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ENDOVENOUS ABLATIONS OF INCOMPETENT PERFORATORS

YES

- Treat incompetent perforating veins selectively
  - in patients with large perforators (≥3.5 mm)
  - in C5-C6 disease
  - when they are located underneath of healed or active ulcers

Thank You!