Complications and Management of Varicose Vein Treatments, Including EHIT 1-4

Lowell S. Kabnick, MD, RPhS, FACS, FACPh

No Conflicts with This Talk

Endovenous Thermal Ablation

• Complications
  • Minor (51%)
  • Bruising (2.3%)
  • Haemotoma (3.8%)
  • Temporary numbness (7.4%)
  • Phlebitis (46.7%)
  • Sensation of tightness (24.8%)

Endovenous Laser

• Serious complications
  • Skin burns (0.6%)
  • DVT (0.4%)
  • PE (0.1%)
  • Nerve injury (0.8%)

Australian MSAC review of all available literature on the procedure.

Wire

Wire/Fiber
Hyperpigmentation

Post Ablation Burns

Burns are rare
DVT and Nerve Injuries occur about 1%

Cases

Reference

Dermatologic Surgery


Endovenous Laser Ablation–Induced Complications: Review of the Literature and New Cases

Cox et al., 2000

DVT and Nerve Injuries occur about 1%
• 56 yo female with symptomatic VV
• Previous history of swelling “now and again”
• VV of the medial thigh, no swelling
• Rt. GSV reflux from SFJ to proximal calf
• Office EVLT of GSV performed without incident
• One week postop duplex exam
  • GSV closed
  • No EHIT 2

Post Therapy 3yrs later

Steps to Avoid Thermal Skin Damage

Postoperative Complication
• 68 year old female with symptomatic VV of the left thigh.
• GSV reflux within the facial compartment to midthigh and then epifascial below the knee
• RF performed, entry site below the knee
• Extra tumescent anesthesia placed around the vein in the epifascial area (originally under the skin and post T 1 cm below the skin)
• 1 wk postoperatively
  • Closed GSV
  • NO EHIT 2
  • Complaining of pain in around the epifascial GSV
  • Palpate a cord
  • No erythema
  • 3 months postoperative U/S closed GSV

35 year old female attorney
• Presents to the office for second opinion s/p thermal ablation, 3 months ago, of her proximal thigh GSV and thigh and calf SAGSV complaining of brownish discoloration along the pathway of her procedure.

PMH: none
PSH: none
Allergies: none

This is Why
S/P Endothermal Ablation

Hyperpigmentation

Post Ablation Burns

Skin Retraction

<table>
<thead>
<tr>
<th>Sample</th>
<th>Skin Retraction (% Healed)</th>
<th>Division of Vascular and Endovascular Surgery</th>
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<tbody>
<tr>
<td>A</td>
<td>85</td>
<td>Division of Vascular and Endovascular Surgery</td>
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<tr>
<td>B</td>
<td>90</td>
<td>Division of Vascular and Endovascular Surgery</td>
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Diffuse phlegmonous phlebitis after endovenous laser treatment of the greater saphenous vein

Kath M. Down, MD, Geog M. Houssos, MD, Wolfgang Weigand, MD, and Andrea Stankov, MD, New Jersey

Endovenous laser treatment (EVLT) has become a valuable and safe option in the treatment of venous veins. Although long-term results are lacking, most patients report benefit in the short term from EVLT. Expected postoperative complications are limited, consisting mostly of pain, edema, inflammation, phlebitis, or acute deep vein thrombosis. The most frequent complications are infections of the saphenous vein, formation of new varices, and acute deep vein thrombosis. In this study, we report 3 cases of phlegmonous phlebitis of the greater saphenous vein that were treated with surgical resection and anticoagulation. The patients received treatment with a combination of surgical excision and anticoagulation, resulting in complete resolution of symptoms and complete healing.
stroke following endovenous laser treatment of varicose veins

Division of Vascular and Endovascular Surgery

Endovenous Heat Induced Thrombosis (EHIT)

Lowell S. Kabnick, MD
American Venous Forum
Florida, Feb 2006

EHIT Classification

Class 1

- Venous thrombosis to the superficial – deep junction (ie. Sapheno-femoral junction or the sapheno-popliteal junction)
- Not extending into the deep system

Class 2

- Into the deep venous system
- Non-occlusive
- Thrombus with a cross sectional diameter of less than 50%
**Class 3**
- Into the deep venous system
- Non-occlusive thrombus
- Cross sectional diameter of > 50%

**Class 4**
- Total occlusion of the involved vein

**Mechanism of EHIT?**
- Forward progression of thermal injury to the vein wall from chromophore/light reaction and steam bubbles
- Injury and closure of the superficial epigastric vein
- Anatomy and angle of the superficial axial deep venous interface?

**Spontaneous Thrombus Vs EHIT Differences?**
- Displays a different echogenicity
- EHIT is echogenic 24hrs
- Spontaneous thrombus hypoechoic for weeks
- Propagation absent in EHIT
- Resolution in 10-14 days

**What, Me Worry?**

**What is the Natural History**

- Hypoechoic versus Hyperechoic
Pathological Differences

Why Look for EHIT?

What we thought then...

• EHIT 2 post-op duplex:
  - Doctor: you have a clot
  - Patient: oh my blood thinners

What we know now...

• Incidence of EHIT:
  - All-comers:
    - EHIT 1-4: 3-4%
    - EHIT 2: 1-2%

• Incidence of PE secondary to EHIT:
  - At most 0.03%

• Are EHITs even Dangerous?

• Just to repeat Our own short series:
  - 9 patients with EHIT 2
  - All monitored with serial duplex
  - 6/9 placed on therapeutic LMWH
  - 9/9 had resolution of EHIT within 14 days

After resolution of EHIT:

• Chest CT showed PE in 2/9
• All patients were asymptomatic
• None suffered significant sequelae
• What does it mean?
Let's Look at Thrombus Burden

• How much thrombus does it take to cause a clinically significant PE?
• Nobody knows…
• Is an EHIT 2 enough?
• Probably not…

Why we shouldn't look for EHITs

<table>
<thead>
<tr>
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<th>Incidence</th>
<th># of patients</th>
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<tbody>
<tr>
<td>Number of thermal ablations performed annually</td>
<td>&gt;300,000* in the U.S. 40,000 in the UK</td>
<td></td>
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<tr>
<td>Incidence of EHIT 2</td>
<td>2%</td>
<td>6,000/y U.S 800/y UK</td>
</tr>
<tr>
<td>Incidence of clinically significant PE from EVLA/RFA</td>
<td>0.01%</td>
<td>30 4</td>
</tr>
<tr>
<td>Number of duplexes performed to find 1 EHIT</td>
<td>50</td>
<td>(300,000 + 6,000)</td>
</tr>
<tr>
<td>Number of duplexes performed to potentially prevent 1 PE</td>
<td>10,000 (300,000 + 10)</td>
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* A conservative estimate generated from sales figures provided by Medtronic and Angiodynamics

Rate of spontaneous major bleeding on therapeutic LMWH

• 1.2%*

• Pool of potential patients who might be put on therapeutic LMWH
  • 6,000 (2% of 300,000 cases yearly)
  • 1.2% of 6,000 patients = 72 major spontaneous bleeds


At most 30 patients a year will have a clinically significant PE...

However, 72 patients will bleed from therapeutic LMWH...

New Suggested Paradigm

New York University
LSK
Take Home

- EHIT 2 is **not** dangerous
- Not necessary to Rx
- For now EHIT 3, 4
- LMWH or DOACs