Perioperative Duplex Ultrasound Following Endothermal Ablation of the Saphenous Vein: Is It Worthless?

2014

WHAT IS PASTE?

• Percutaneous Ablation Superficial Thrombus Extension.

• PASTE=EHIT + EnHIT

What is EHIT? What is EnHIT

• Endothermal Heat-Induced Thrombosis:

<table>
<thead>
<tr>
<th>EHIT Class</th>
<th>Description</th>
<th>Recommended Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thrombus extension into the saphenous vein, with cross-sectional area &lt;50%</td>
<td>Observation</td>
</tr>
<tr>
<td>2</td>
<td>Thrombus extension into the saphenous vein, with cross-sectional area &gt;50%</td>
<td>Therapeutic thrombolysis with urokinase</td>
</tr>
<tr>
<td>3</td>
<td>Complete occlusion of saphenous vein</td>
<td>Long-term anticoagulation</td>
</tr>
</tbody>
</table>

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 by EHIT:
    - At most 0.03%

Sufian S, Arnez A, et al. Incidence, progression, and risk factors for endovenous heat induced thrombosis after radiofrequency ablation. JVS 2013 April; 1(2); 159-64

Are EHITs even Dangerous?

- Our own short series:
  - 9 patients with EHIT 2
  - All monitored with serial duplex
  - 8/9 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...

CHEMICAL ADHESIVE
CA Thrombus Extension  What is it?

1. Pure thrombus
2. Thrombus/glue combinations
3. Pure glue extensions –user error

Eur J Vasc Endovasc Surg; 2014; 1/70 nEHIT 3
2 weeks of LMWH = RESOLVED

Sapheon Glue extension
FIH trial

First human use of cyanoacrylate adhesive for treatment of saphenous vein incompetence

First human use of cyanoacrylate adhesive for treatment of saphenous vein incompetence

TREATMENT ENHIT
• Feasibility trial 21% 0 treated f/u six months resolved
• eScope 1 ENHIT 3 treated with LMWH for 2 weeks resolved
• Do we know enough?
Consider the Following Treatment

Suggested N-EHIT Treatment
1. ENHIT 2 = EHIT 2 nothing
2. ENHIT3 = EHIT 3 nothing/LMWH?DOACS until gone
3. ENHIT4 = Not reported, consider anticoagulation until gone

Natural History

- Company no specific recommendations
- Trials 41% no anticoagulation. MDs prefer anticoagulation more central than the CFV
- Resolution within 3-4 weeks; no difference between anticoagulation or not
- Most patients receiving anticoagulation received 2 weeks

Classification
- 1. Non-occlusive thrombi extending from the GSV into the CFV
- 2. IM veins
- 3. DVT
  - Proximal DVTs (femoral and/or popliteal)
  - Distal DVTs tibial veins, peroneal, and or popliteal

Mechanical Occlusion Chemical Assisted (MOCA)

Recent, Global Peer-Reviewed Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients</th>
<th>Veins</th>
<th>Immediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>STADT ET AL</td>
<td>11 patients</td>
<td>29 veins</td>
<td>100%</td>
</tr>
<tr>
<td>OZEN ET AL</td>
<td>15 patients</td>
<td>63 veins</td>
<td>98%</td>
</tr>
<tr>
<td>KIM ET AL</td>
<td>16 patients</td>
<td>126 patients</td>
<td>100%</td>
</tr>
<tr>
<td>WITTE ET AL</td>
<td>18 patients</td>
<td>85 patients</td>
<td>91.8%</td>
</tr>
<tr>
<td>STANISIC ET AL</td>
<td>21 patients</td>
<td>50 patients</td>
<td>100%</td>
</tr>
<tr>
<td>BOERSMA ET AL</td>
<td>12 patients</td>
<td>50 patients</td>
<td>100%</td>
</tr>
<tr>
<td>BOOTUN ET AL</td>
<td>6 patients</td>
<td>RCT</td>
<td>92%</td>
</tr>
<tr>
<td>LANE ET AL</td>
<td>19 patients</td>
<td>RCT</td>
<td>93%</td>
</tr>
<tr>
<td>VANEKEREN ET AL</td>
<td>9 patients</td>
<td>92 patients</td>
<td>100%</td>
</tr>
<tr>
<td>TANG ET AL</td>
<td>20 patients</td>
<td>300 patients</td>
<td>100%</td>
</tr>
<tr>
<td>BISHAWI ET AL</td>
<td>10 patients</td>
<td>126 patients</td>
<td>100%</td>
</tr>
<tr>
<td>VUN ET AL</td>
<td>7 patients</td>
<td>127 patients</td>
<td>91%</td>
</tr>
<tr>
<td>DEIJEN ET AL</td>
<td>17 patients</td>
<td>449 patients</td>
<td>90%</td>
</tr>
</tbody>
</table>
Paradigm for Treatment
For EHIT and EnHIT

If Yes, LSK

No Rx

Re: LMWH or Oral Anticoagulants

EnHIT I

EnHIT II

EnHIT III

EnHIT IV

EnHIT II-IV

Oral Anticoagulants

What, Me Worry?