Complete Varicose Vein Surgery Improves VCSS: Advantages of Ablation Plus Transilluminated Powered Phlebectomy (TIPP)

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No Disclosures

Varicose Veins are a very common clinical problem, 10-15% of all men and 20-30% of all women afflicted with this chronic condition.

Varicose veins can cause a number of symptoms from pruritus, leg heaviness and aching to thrombophlebitis and occasionally eczema, lipodermatosclerosis, and even ulceration.

The annual incidence of development has been estimated 2% per year, associated with multiple pregnancies, obesity, family history, and increasing age.

Patients may present with isolated superficial reflux amenable to saphenous vein ablation, EVLT or RFA.

However, there is controversy over how to handle the visible varicosities, as ablation alone will often not eradicate visible varicosities - what the patient has come to their doctor for...eradiation of the varicosities

There are multiple techniques available to eradicate the varicose “bumps”, from sclerotherapy to stab phlebectomy to transilluminated powered phlebectomy, so called TIPP

Advantages of TIPP:
- Eradication of a large reservoir of varicosities with a minimal number of incisions;
- The ability to see all of the varicosities due to transillumination with complete removal of varicosities;
- Shortening of what can be a long procedure

Transilluminated Powered Phlebectomy
There have been 9 clinical series published on the use of TIPP. However, no study has examined:

- To what degree severity of disease is improved in patients with varicosities
- The true rate of thrombotic complications following this procedure

To evaluate improvement in venous disease and post-operative complications in patients undergoing Transilluminated Powered Phlebotomy (TIPP)

To identify predictors of improvement in patients undergoing TIPP

To compare outcomes of TIPP with alternate methods of treating venous reflux and varicosities

Data collected prospectively in venous treatment database

Collected parameters:
- Basic demographic data
- CEAP classification
- VCSS score (pre and post)
- Type of procedure
- Peri-operative complications

1056 limbs undergoing procedures for significant varicose veins and venous insufficiency from 3/31/2008-6/4/2014

All patients underwent peri-operative thromboprophylaxis with 5,000IU heparin and if exhibiting a 2006 Caprini risk score ≥ 8, a standard protocol of one week post-operative daily enoxaparin prophylaxis (40 mg)

Patients were encouraged to ambulate immediately post-operatively and were compressed for at least 2 weeks. All patients were imaged at 7 days, 3 and 12 months, then yearly

399 isolated RFA
580 combined procedures with RFA plus TIPP
77 TIPPs alone

As there were no thrombotic complications for TIPP alone, RFA and RFA + TIPP groups were compared

Patients in the RFA group were:
- older (54 vs 51 years, p<.001)
- heavier (BMI 31 vs 29.6, p=.006)
- no statistical differences in gender, pre-op Caprini score, and largest treated vein

Patients' overall pre-op VCSS (8.8±3.8) and CEAP (3.2±1.1) scores reflected the significant advanced disease status of our patients.
On multivariate analysis, no predictors of thrombosis (DVT/PE/EHIT) were identified in setting of utilizing thromboprophylaxis protocol.

### VCSS Change and Complications

<table>
<thead>
<tr>
<th></th>
<th>RFA</th>
<th>RFA + TIPP</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCSS improvement</td>
<td>3.2 ± 3.1</td>
<td>3.8 ± 3.4</td>
<td>.019</td>
</tr>
</tbody>
</table>

### VCSS Change

<table>
<thead>
<tr>
<th>VCSS change</th>
<th>Total VCSS</th>
<th>RFA</th>
<th>RFA+TIPP</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>pain</td>
<td>1.08</td>
<td></td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td>varicose</td>
<td>0.79</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>edema</td>
<td>0.45</td>
<td></td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>pigments</td>
<td>0.21</td>
<td></td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>inflammation</td>
<td>0.10</td>
<td></td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>induration</td>
<td>0.27</td>
<td></td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>ulcer #</td>
<td>0.08</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ulcer duration</td>
<td>0.11</td>
<td></td>
<td>0</td>
<td></td>
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<tr>
<td>ulcer size</td>
<td>0.03</td>
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<td>0</td>
<td></td>
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<tr>
<td>compression</td>
<td>-0.13</td>
<td></td>
<td>-0.20</td>
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</tr>
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</table>

### Literature

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>N (pt)</th>
<th>N (limb)</th>
<th>CEAP</th>
<th>% Female</th>
<th>Age</th>
<th>Routine US</th>
<th>DVT</th>
<th>EHIT</th>
<th>Hematoma</th>
<th>Parasthesia</th>
<th>Follow up</th>
<th>VCSS</th>
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</thead>
<tbody>
<tr>
<td>Arumugasamy, et al.</td>
<td>2002</td>
<td>20</td>
<td>20</td>
<td>NR</td>
<td>80%</td>
<td>55-60</td>
<td>No</td>
<td>0.0%</td>
<td>NR</td>
<td>95%</td>
<td>0%</td>
<td>42 days</td>
<td>NR</td>
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<tr>
<td>Chesire, et al.</td>
<td>2002</td>
<td>114</td>
<td>117</td>
<td>2.3</td>
<td>78%</td>
<td>50.8</td>
<td>No</td>
<td>0.9%</td>
<td>NR</td>
<td>12%</td>
<td>37%</td>
<td>42 days</td>
<td>NR</td>
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<tr>
<td>Scavee, et al.</td>
<td>2003</td>
<td>40</td>
<td>40</td>
<td>2.55</td>
<td>70%</td>
<td>52</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>45%</td>
<td>5%</td>
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<tr>
<td>Shamiyeh, et al.</td>
<td>2003</td>
<td>30</td>
<td>41</td>
<td>2.36</td>
<td>70%</td>
<td>51</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>4.90%</td>
<td>NR</td>
<td>42 days</td>
<td>NR</td>
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<tr>
<td>Aremu, et al.</td>
<td>2004</td>
<td>141</td>
<td>188</td>
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<td>42.5</td>
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<td>NR</td>
<td>NR</td>
<td>9.10%</td>
<td>18%</td>
<td>365 days</td>
<td>NR</td>
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<tr>
<td>Chetter, et al.</td>
<td>2006</td>
<td>29</td>
<td>29</td>
<td>2.2</td>
<td>66%</td>
<td>48</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>6.89%</td>
<td>13.80%</td>
<td>42 days</td>
<td>NR</td>
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<tr>
<td>Passman, et al.</td>
<td>2007</td>
<td>169</td>
<td>221</td>
<td>2 to 3</td>
<td>81%</td>
<td>42</td>
<td>No</td>
<td>0.9%</td>
<td>NR</td>
<td>10.90%</td>
<td>2.30%</td>
<td>60 days</td>
<td>NR</td>
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<tr>
<td>Franz, et al.</td>
<td>2009</td>
<td>339</td>
<td>NR</td>
<td>77%</td>
<td>51</td>
<td>No</td>
<td>0.3%</td>
<td>NR</td>
<td>0%</td>
<td>0%</td>
<td>90 days</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>Kim, et al.</td>
<td>2012</td>
<td>299</td>
<td>NR</td>
<td>47%</td>
<td>50.6</td>
<td>No</td>
<td>NR</td>
<td>NR</td>
<td>3.40%</td>
<td>2.20%</td>
<td>365 days</td>
<td>NR</td>
<td></td>
</tr>
</tbody>
</table>

### Sclerotherapy Laser Ablation

- **No. of subjects:** 12,708, 22,980, 21,637, 11,529, 32,311, 30,722
- **No. of procedures:** 39,689, 35,750, 33,992, 13,770, 62,750, 159,316
- **Subject-level AEs:** DVT 104/12,708 (0.82%), PE 19/12,708 (0.15%), DVT 701/22,980 (3.05%), PE 58/22,980 (0.25%), DVT 954/21,637 (4.41%), PE 68/21,637 (0.31%), DVT 277/11,529 (2.40%), PE 33/11,529 (0.29%), DVT 1110/32,311 (3.44%), PE 73/32,311 (0.23%), DVT 795/30,722 (2.59%), PE 75/30,722 (0.24%)

### Procedure Level AEs

- **DVT:** 228/39,689 (0.57%), PE 33/39,689 (0.08%)
- **PE:** 1191/35,750 (3.33%), PE 196/35,750 (0.55%), PE 1653/33,992 (4.86%), PE 196/33,992 (0.58%), PE 470/13,770 (3.41%), PE 152/13,770 (1.10%), PE 1913/62,750 (3.05%), PE 247/62,750 (0.39%), PE 1645/159,316 (1.03%), PE 236/159,316 (0.15%)

Regarding DVT, 4/6 (67%) following RFA and 17/19 (89%) following RFA + TIPP were infra-popliteal.

SVTs were mostly asymptomatic findings noted on post-operative duplex imaging.

These data suggests that ablation of axial reflux plus TIPP produces improved outcomes in VCSS and should be first-line therapy when patients present with significant varicose veins and venous insufficiency.

Use of a standardized thromboprophylaxis system results in a low thrombotic complication rate, obviating need for routine post-operative duplex surveillance.
Conclusions
Ablation of axial reflux with TIPP produces improved outcomes in VCSS and should be first-line therapy when patients present with significant varicose veins and venous insufficiency.

Use of a standardized thromboprophylaxis protocol results in a low thrombotic complication rate.

In the literature, rates of symptomatic DVT of 4.9% with RFA and 3.4% - 5.3% with surgery have been noted. Our rates with surveillance are below these values, likely due to our standardized approach to thromboprophylaxis.