Novel Nonthermal Versus Thermal Endovenous Ablation in Superficial Venous Incompetence
A Systematic Review and a Metanalysis

Ahmed Hassanin MD
Royal College of Surgeons in Ireland
Dublin, Ireland
Disclosure

Speaker name:

AHMED HASSANIN

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest
Outline

• Introduction
• Study Objectives
• Methodology
• Results
• Conclusion
Introduction

• Endovenous Thermal Ablation (ETA) is a reliable alternative to traditional open approaches
• ETA in the form of laser (EVLA) and radiofrequency ablation (RFA) offer lower rates of morbidity
• ETA is recommended as first-line therapy (NICE Guidelines)
Study Objectives

- Novel Non-Thermal Ablation (NTA) techniques (MOCA) and (CAVA) developed to remove thermal injury risk
- Both preclude the risk of nerve damage while CAVA obviates the need for post-interventional compression stockings
- Review data is yet to be established

MOCA (Clarivein, Vascular Insights, Madison, CT, USA)
CAVA (Venaseal, Medtronic, Santa Rosa, California, USA and Variclose, Biolas, Ankara, Turkey)
Methodology

- Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA)
- PICO (Patient Intervention Comparison and Outcomes)
Primary outcomes

Technical success

Secondary outcomes

1. Procedural pain: numeric scale (0-10) or Visual Analogue Scale (VAS)

2. Post-operative complications:
   2.1 Deep venous thrombosis (DVT)
   2.2 Haematoma, parasesthesia and phlebitis

3. Quality of life: Aberdeen Varicose Vein Questionnaire (AVVQ)

4. Modification of disease severity: Venous Clinical Severity Score (VCSS)
Results

Initial search for citation: Pubmed, Embase, Cochrane, CINAHL (n = 313)

Manuel search of bibliographies of included studies (n = 124)

Abstracts screened (n = 437)

Duplicates excluded (n = 92)

Full-text articles assessed for eligibility (n = 13)

Full-text articles excluded, with reasons (n = 7)
- 3 papers = Protocols
- 4 papers = Preliminary results of included trials

Studies included in quantitative synthesis (n = 6)
<table>
<thead>
<tr>
<th>Study</th>
<th>Morrison</th>
<th>Lane</th>
<th>Koramaz</th>
<th>Bozkurt</th>
<th>Vun</th>
<th>Van</th>
<th>Eekeeren</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Design:</td>
<td>RCT</td>
<td>RCT</td>
<td>Retrospective</td>
<td>Prospective</td>
<td>Prospective</td>
<td>Prospective</td>
<td>Prospective</td>
</tr>
<tr>
<td>Duration:</td>
<td>24-months</td>
<td>6-months</td>
<td>12-months</td>
<td>12-months</td>
<td>6-weeks</td>
<td>6-weeks</td>
<td></td>
</tr>
<tr>
<td>Number of participants:</td>
<td>222</td>
<td>170</td>
<td>339</td>
<td>310</td>
<td>127</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Interventions (randomised):</td>
<td>CAVA (n=108)</td>
<td>MOCA (n=87)</td>
<td>CAVA (n=150)</td>
<td>CAVA (n=154)</td>
<td>MOCA (n=57)</td>
<td>MOCA (n=34)</td>
<td></td>
</tr>
<tr>
<td>RFA (n=114)</td>
<td>RFA (n=83)</td>
<td>EVLA (n=189)</td>
<td>EVLA (n=156)</td>
<td>RFA (n=50)</td>
<td>RFA (n=34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EVLA (n=40)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjunct treatment of non-trunca varicosities</td>
<td>None</td>
<td>Phlebectomies</td>
<td>Phlebectomies</td>
<td>Staged sclerotherapy or phlebectomies at 3-months</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Mode of anaesthesia</td>
<td>Local anaesthesia</td>
<td>Local anaesthesia</td>
<td>Not reported</td>
<td>Local anaesthesia</td>
<td>Not reported</td>
<td>Local anaesthesia</td>
<td></td>
</tr>
</tbody>
</table>
Technical Success

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>NTA Events</th>
<th>Total Events</th>
<th>TA Events</th>
<th>Total Events</th>
<th>Weight</th>
<th>Risk Ratio M-H, Random, 95% CI</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vun 2014</td>
<td>52</td>
<td>57</td>
<td>84</td>
<td>90</td>
<td>1.3%</td>
<td>0.98 [0.89, 1.08]</td>
<td>2014</td>
</tr>
<tr>
<td>Bozkurt 2016</td>
<td>136</td>
<td>142</td>
<td>130</td>
<td>141</td>
<td>3.6%</td>
<td>1.04 [0.98, 1.10]</td>
<td>2016</td>
</tr>
<tr>
<td>Lane 2017</td>
<td>54</td>
<td>62</td>
<td>55</td>
<td>59</td>
<td>0.9%</td>
<td>0.93 [0.83, 1.05]</td>
<td>2017</td>
</tr>
<tr>
<td>Koramaz 2017</td>
<td>150</td>
<td>150</td>
<td>189</td>
<td>189</td>
<td>92.5%</td>
<td>1.00 [0.99, 1.01]</td>
<td>2017</td>
</tr>
<tr>
<td>Morrison 2018</td>
<td>68</td>
<td>72</td>
<td>68</td>
<td>74</td>
<td>1.7%</td>
<td>1.03 [0.94, 1.12]</td>
<td>2018</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>483</strong></td>
<td><strong>553</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>1.00 [0.99, 1.01]</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total events</td>
<td>460</td>
<td></td>
<td>526</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau^2 = 0.00; Chi^2 = 3.64, df = 4 (P = 0.46); I^2 = 0%
Test for overall effect: Z = 0.16 (P = 0.87)

NTA (460/483) (95.2%) and TA (526/553) (95.1%)

(Pooled Risk Ratio (RR)=1.00 [95% CI, 0.99,1.01])
Identified excellent rates of technical success at one-year (89.1 and 94.5 %) for MOCA and CAVA respectively.
Using a visual analogue scale “VAS” a mean difference of \(-18.11\) (95% CI, \(-36.7, 0.48\)) favors NTA.
Procedural Complications

- NTA associated with a significant reduction in rates of ecchymosis and haematoma formation compared to TA [RR=0.43 (95% CI, 0.23, 0.78)]
No statistical significant difference in other outcomes
A mean difference between groups of 0.27 (95% CI, -0.57, 0.04) favours NTA
No difference was identified between cohorts at baseline and upon completion, with a mean difference between groups of -0.52 (95% CI, -1.05, 0.01)
Conclusion

• NTA offers an effective and safe alternative to TA
• Additionally, periprocedural pain data and marginally better QoL favor NTA
• However, further powered trials and long-term results are warranted
Thank You
Novel Nonthermal Versus Thermal Endovenous Ablation in Superficial Venous Incompetence
A Systematic Review and a Metanalysis

Ahmed Hassanin MD
Royal College of Surgeons in Ireland
Dublin, Ireland