MOCA:
Mechanical Occlusion Chemically Assisted

Updates and Pearls

Steve Elias MD FACS FACPh
Director, Center for Vein Disease
Director, Wound Healing Center
Englewood Hospital Medical Center NJ

UPDATE: NOMENCLATURE

• MOCA
• MechanOChemical Ablation
• Mechanical Occlusion Chemically Assisted
• Better description of technique

Disclosures

• Medtronic Inc. – Medical Advisory Board
• Vascular Insights LLC – Medical Advisory Board
• LeMaitre Vascular – Consultant
• VVT Medical - Consultant

EVA: Categories*

• TT (Thermal, Tumescent)
• NTNT (Non Thermal, Non Tumescent)
• TNT (Thermal Non Tumescent)
• NTT (Non Thermal Tumescent)


UPDATE: CATEGORIES

• Technology
• Technique
• Results
• Reimbursement

MOCA Device
MOCA: 45 cm and 65 cm (85 cm)

MOCA: Catheter

MOCA: Wire Unsheathed

Wire Rotating

UPDATE: TECHNOLOGY

- 85 cm length – one access to ankle
- One way valve – (3 way stopcock) less chance of blood up sheath
- Safety tab on handle – pull to activate decreased risk of early rotation
MOCA: Mechanism of action

TECHNIQUE UPDATE #1
- GSV: 2 cm from SFJ (Elias 1 cm)
- SSV: “fascial” curve
- Prime sheath with sclerosant not saline
- Rotation for first 1 cm then inject
- Vortex and Spasm

Position: Wire 1 cm SFJ

TECHNIQUE UPDATE #2
- Pullback rate more important than volume
- Pullback – 1-1.5 mm/sec or 1cm/6 sec
- Concentration – 1.5% STS, 2% PLD
- Volume based on length/diameter -table
  - GSV – 8 -10 ml
  - SSV – 4-6 ml
- Volume is forgiving: Pullback is not
- Original study – 12 cc – No DVT/Phlebitis

TECHNIQUE UPDATE #3
- Treat 5-10 cm. then check for spasm
- Retreat with mechanical only
- >10 mm diameter – US compression
- Inject – slow drip to "prime wire"
- Divide length in 1/3 or 1/2 to judge volume
- C5, C6 – under ulcer and retrograde/angle up towards ulcer bed and foam first

MOCA: Contraindications
- GSV/SSV – post SVT
- Synechiae – can place but wire snags
- Large veins - >12 -15mm. (19mm)
- Calf perforators – usually too short
MOCA (NTNT): Advantages

- Non tumescent - discomfort/shorter
- Non thermal – 0% nerve injury
- All BK veins – GSV, SSV
- Suprafascial veins, thigh perforators
- Treat to lowest point of incompetence

UPDATE: Peer Reviewed Data

<table>
<thead>
<tr>
<th>Author/Journal</th>
<th>Title/Objective</th>
<th>Results/Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bishawi et al.</td>
<td>Prospective, multicenter study of MOCA in 126 Patients with lower extremity chronic venous disease.</td>
<td>• Closure at 3 months: 98% • Closure at 6 months: 94% • No VTE • Significant improvement of VCSS score (p&lt;0.001)</td>
</tr>
<tr>
<td>Boersma, et al</td>
<td>European Journal of Vascular and Endovascular Surgery, 2012</td>
<td>1 year results of MOCA in the SSV in 50 patients • Technical Success &gt; 100% • Closure at 1 year = 94% • No major complications, no nerve injury • VCSS decrease from 3 to 1</td>
</tr>
<tr>
<td>Van Eekeren, et al</td>
<td>Journal of Vascular Surgery, 2013</td>
<td>Prospective Observational Study of 68 patients with GSV incompetence treated with either RFA or MOCA • MOCA achieved 74% reduction in post operative pain compared to RFA • Lower post operative pain scores associated with significant earlier return to normal activity and work resumption</td>
</tr>
<tr>
<td>Elias, S, Raines JK</td>
<td>Phlebology, 2011</td>
<td>ClariVein system for ablation of the GSF Conducted in 30 legs • Mean closure at 260 days = 97.6% • Primary closure rate at 6 months is comparable to the best results with other techniques</td>
</tr>
<tr>
<td>Mueller, RL</td>
<td>Vascular and Endovascular Surgery, 2012</td>
<td>Literature review of MOCA relative to other ablation techniques • MOCA addresses deficiencies of thermal ablation; reduced side effects, streamlining procedure and broadening applications</td>
</tr>
<tr>
<td>Sullivan, LP</td>
<td>Phlebology 2013</td>
<td>To determine the efficacy of MOCA to below the knee GSV in patients with persistent venous ulcers following above the knee GSV ablation • Mean time to heal was 38 days • MOCA is effective in promoting ulcer healing in patients with persistent ulceration following above the knee ablation • Risk of nerve damage is reduced in the absence of thermal therapy • MOCA can be delivered directly to the veins feeding the ulcer</td>
</tr>
<tr>
<td>Moore, MJ</td>
<td>Vascular, 2013</td>
<td>Retrograde mechanochemical ablation of the small saphenous vein for the treatment of a venous ulcer • 3 month follow up had no report of pain or inflammation • Demonstrated improvement in symptoms • Ulcer decreased from 4 cm to 3 cm with granulation tissue of the ulcer base • VCSS score decreased from 6 to 12 • Repeat ultrasound showed an occluded SSV and competent deep system</td>
</tr>
</tbody>
</table>

UPDATE: Clinical Trials

- Imperial College London UK RCT • ClariVein® Vs. Venefit RF Abnormality = 100% • 6 Month follow up Q4 2014, Study Write up Q4 2014 • Presentations of Results Q1 2015, Publication Q2 2015 • Enrollment Complete |
- Maradona RCT Arnhem NL Principal Investigator Michel Reijnen • Establish optimal dosing level • 400 Patients • Study enrollment & write up ongoing |
- Histology Guilford UK Principal Investigator Mark Whiteley • Ex Vivo Establish mode of action by Histological evaluation • Mechanistic theory: shearing action allows sclerosant and damage of the media |

UPDATE: CODING/REIMBURSEMENT

- “Inappropriate to report codes 36475-36479 to describe newer alternative ablation techniques such as catheter directed foam or MOCA” |
- 37241 – newer procedures are “not embolization procedures” |
- 37799 – “unlisted procedure vascular surgery with direct reference to 36475 or 36478” |
- 10/15 – AMA CPT (SVS,AVF,SIR,ACP) • New code – 364X1 and 364X2 • RVU – SVS/AVF/SIR/ACP etc |
- Similar work, similar reimbursement |
UPDATES:
Improve Results and Decrease Errors

• >60,000 cases worldwide (GSV/SSV/AAGSV)
• > 90% occlusion rate – various intervals
• QoL – improves as any successful EVA
• DVT - < 0.5% worldwide
• No nerve injury
• Major step to reimbursement