New Treatments in Superficial Venous Disease

Robert Foster MD
Disclosures

Speaker’s Bureau:
• ABBOTT
• COOK

Honorarium:
• Trainer: MEDTRONIC
• Trainer: ENDOLOGIX

Consultant:
• MEDTRONIC ENDOVENOUS ADVISORY BOARD
VENOUS PATHOLOGY

• HOW COMMON IS IT IN YOUR PRACTICE?
• HOW DOES THE VENOUS SYSTEM WORK?
• HOW DO YOU RECOGNIZE THE PATHOLOGY?
• WHEN DO YOU TREAT?
• HOW DO YOU TREAT IN 2016?
• WHO IS GETTING DENIED?
• WHAT TECHNOLOGY IS NEXT?
Epidemiology: Prevalence

More than 30 million Americans suffer from varicose veins or a more serious form of venous disease called Chronic Venous Insufficiency (CVI).¹

Of the over 30 million Americans affected:

• Only 1.9 million seek treatment annually¹,²
• While the vast majority remain undiagnosed and untreated


*Statistics based on individuals over the age of 40.
Prevalence and Etiology of Venous Insufficiency

Venous reflux disease is 2x more prevalent than coronary heart disease (CHD) and 5x more prevalent than peripheral arterial disease (PAD) \(^1\)

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### Possible Risk Factors and Symptoms of Venous Insufficiency

**Possible risk factors for venous insufficiency:**
- Gender
- Age
- Heredity
- Pregnancy
- Standing occupation
- Obesity
- Prior injury or surgery

**Symptoms of venous insufficiency:**
- Leg pain, aching, or cramping
- Burning or itching of the skin
- Leg or ankle swelling
- “Heavy” feeling in legs
- Skin discoloration or texture changes
- Open wounds or sores
- Restless legs
- Varicose Veins
Etiology & Pathophysiology: CEAP

C₀: Asymptomatic. No visible or palpable signs of venous disease
C₁: Spider veins, reticular veins, telangiectasias
C₂: Varicose Veins
C₃: Edema
C₄: Pigmentation, Lipodermatosclerosis
C₅: Healed Skin Ulcers
C₆: Open Skin Ulcers

Increased Pain and Reduced Quality of Life

Photos courtesy of Rajabrata Sarkar, MD PhD
Venous return to right side of heart accomplished thru the actions of the calf muscle pump and venous valves.
Normal flow to the heart
Normal valve function
Abnormal valve function

Birmingham
Venous Hypertension
Venous reflux study

Normal valve closure after augmentation

Abnormal valve closure after augmentation
INDICATIONS FOR TREATMENT:

• LIFESTYLE LIMITING SYMPTOMS
• SKIN DISCOLORATION
• PAINFUL VARIX
• ACTIVE ULCERATION
• RECURRENT CELLULITIS
INSURANCE REQUIREMENTS:

- LIFESTYLE LIMITING
- REFLUX TIMES GREATER THAN 500ms
- FAILED CONSERVATIVE THERAPY FOR 90 DAYS
  - COMPRESSION 20-30 mmHg
- VESSEL SIZE REQUIREMENTS
- LOCATION REQUIREMENTS
- BMI REQUIREMENTS
- 90 DAY GLOBALS
- NO SPIDERS
Conservative Therapy

- Leg elevation (30 min 3-4 x daily)
- Exercise
- +/- diuretics
- Compression stockings
  - Contraindicated in setting PAD, acute cellulitis
- Skin Care
  - daily cleansing, use of emollients, and application of barrier protection
  - In setting of itching, mid potency topical steroid
WHAT DO YOU DO?
Phlebitis from a thrombosed varix
Microphlebectomy
Chemical Ablation: Sclerotherapy

- Most commonly used for tributaries and reticular veins.
- Sodium tetradecyl sulfate, polidocanol, and hypertonic saline most commonly used agents.
- Endothelial damage the result of either osmotic action or protein denaturation.
Foam Sclerotherapy: Complications

- Phlebitis
- Skin staining
- Failure
- Residual lumps
- Matting
- Embolus (CVA)
- DVT
- Ulceration (rare)
- Anaphylaxis (very rare)
Improved foam
THERMAL ABLATION

Tumescent needle
Injection sites
The Venefit Procedure
Using the ClosureFast Catheter

- Minimally invasive treatment option for patients with varicose veins and CVI
- Controlled and consistent radiofrequency (RF) energy to the ClosureFast™ catheter
- The catheter heats the vein wall and contracts the vein wall collagen, thereby occluding the vein
Mechanochemical Ablation - MOCA

ClariVein*
Elias Study – Results

Closure Rate: 96.70%
Duration: 260 days

Elias and Raines Mechanochemical Tumescentless Endovenous Ablation: Final Results of the Initial Clinical Trial. Phlebology 2012;27:67-72
# How Does MOCA Compare to RFA?*

<table>
<thead>
<tr>
<th>Proebstle Study&lt;sup&gt;1,2&lt;/sup&gt;</th>
<th>VS</th>
<th>Elias Study&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-center</td>
<td></td>
<td>Single-center</td>
</tr>
<tr>
<td>396 limbs (326 patients)</td>
<td></td>
<td>30 limbs (29 patients)</td>
</tr>
<tr>
<td>99.6% occlusion at 6 months</td>
<td></td>
<td>96.7% occlusion at 260 days</td>
</tr>
<tr>
<td>90.0% occlusion at 5 years</td>
<td></td>
<td>No data at 5 years</td>
</tr>
</tbody>
</table>

1 Dietzek A. RF Segmental ablation: 5-year data. Annual Symposium on Vascular and Endovascular Issues, Techniques, Horizons (Veith Symposium) New York City; November 19, 2013
3 Elias and Raines Mechanochemical Tumescentless Endovenous Ablation: Final Results of the Initial Clinical Trial. Phlebology 2012;27:67-72

*ClosureFast long-term data is shown for perspective only and not meant to imply that the data can be used in a head-to-head comparison with the data from the Elias study.
Summary of Clinical Efficacy

Rasmussen et al. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins. BJS 2011;98:1079-1087
Dietzek A. RF Segmental ablation: 5-year data. Annual Symposium on Vascular and Endovascular Issues, Techniques, Horizons (Veith Symposium) New York City; November 19, 2013
Todd KL 3rd, et. al. The VANISH-2 study: a randomized, blinded, multicenter study to evaluate the efficacy and safety of polidocanol endovenous microfoam 0.5% and 1.0% compared with placebo for the treatment of incompetence. Phlebology; 2013 Jul 17

<table>
<thead>
<tr>
<th>Time</th>
<th>CLF</th>
<th>EVLA</th>
<th>MOCA</th>
<th>UGFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-8 Weeks</td>
<td>99.7%</td>
<td>98.6%</td>
<td>95.2%</td>
<td>94.2%</td>
</tr>
<tr>
<td>3-6 Months</td>
<td>98.6%</td>
<td>96.7%</td>
<td>83.7%</td>
<td>90.0%</td>
</tr>
<tr>
<td>1 Year</td>
<td>96.7%</td>
<td>88.0%</td>
<td>92.0%</td>
<td>86.0%</td>
</tr>
<tr>
<td>5 Years</td>
<td>100.0%</td>
<td>102.0%</td>
<td>102.0%</td>
<td>90.0%</td>
</tr>
</tbody>
</table>

Percent Occlusion
VENASEAL PROCEDURE:
NON-TUMESCENT, NON-THERMAL, NON-SCLEROSANT
### Adhesives in Medicine

<table>
<thead>
<tr>
<th>Adhesive</th>
<th>Date</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanoacrylate (CA) Adhesives</td>
<td>1950s</td>
<td>Wound adhesives</td>
</tr>
<tr>
<td>Histoacryl Blue™*</td>
<td>1980s</td>
<td>Skin incisions</td>
</tr>
<tr>
<td>Dermabond™*</td>
<td>1998</td>
<td>Skin incisions/lacerations</td>
</tr>
<tr>
<td>Ethicon OMNEX™*</td>
<td>1998</td>
<td>Surgical adhesive</td>
</tr>
<tr>
<td>Trufill™*</td>
<td>2000</td>
<td>Liquid embolic system (AVM applications)</td>
</tr>
<tr>
<td>Indermil™*</td>
<td>2002</td>
<td>Skin incisions/lacerations</td>
</tr>
</tbody>
</table>

**FDA Cleared Cyanoacrylate Adhesives**

(not mutagenic, pyrogenic, hemolytic, sensitizing, irritating or cytotoxic)


*Trademark of its respective owner.
Safety of Cyanoacrylate Adhesives

- Widely used medical tissue adhesive.\(^1\)
- Antimicrobial effect against gram-positive organisms.\(^2\)
- Used safely on millions of patients with no reported carcinogenicity in humans (1986 study).\(^2\)

2. Quinn J., Tissue Adhesives in Clinical Medicine, 2nd ed.(2005) p 34-35
Properties of Ideal Cyanoacrylate for Venous Closure

- Ideal viscosity
- Polymerize quickly
- Soft and elastic
- Maintains a strong bond
- Eliminate need for compression stockings*

*Some patients may benefit from compression stockings post procedure.
Cyanoacrylate in the Vessel

- When cyanoacrylate (CA) comes in contact with blood or plasma, it begins to polymerize.
- The body encapsulates the polymer as a foreign body.
- CA triggers inflammatory reaction in the vessel wall resulting in occlusion.

Almeida J. et.al. Cyanoacrylate adhesive for the closure of truncal veins: 60 day swine model results. Vasc and Endovasc Surg (2011) 000(00) 1-5. DOI 10.1177/1538574411413938
http://ves.sagepub.com p.1
Features of the VenaSeal™ Procedure

Procedure Features

- Eliminates need for tumescent anesthesia.
- No risk of thermal injury.
- No post treatment compression stockings needed.¹,²*
- Rapid return to normal activities.²

² Gibson, K. A Randomized, controlled study comparing cyanoacrylate adhesive embolization with radiofrequency ablation for treatment of incompetent great saphenous veins VeClose study. German Society of Phlebology, 2014.
*Some patients may benefit from compression stockings post procedure.
Clinical Studies with the VenaSeal™ Closure System

- **Feasibility Study**
  - 38 Patients, enrollment completed Aug. 2011
  - 1, 3, 6, 12, 24 and 36 month follow-ups
  - Primary endpoints: safety and efficacy

- **eSCOPE** *(European multicenter study)*
  - 70 patients, enrollment completed Sept. 2012
  - 2 day, 1, 3, 6, 12, 24 and 36 month follow-ups
  - Primary endpoint: closure w/o use of sedation, tumescent anesthesia or compression stockings

- **VeClose** *(U.S. pivotal trial)*
  - 242 Patients, enrollment completed Sept. 2013
  - 3 day, 1, 3, 6, 12 months and 2, 3 year follow-ups
  - Primary endpoint: non-inferior to RFA in GSV closure
  - Secondary endpoint: superiority in reduction of post procedural pain and bruising

2 Proebstle, T et al., The european multicenter cohort study on cyanoacrylate embolization of refluxing great saphenous veins. JVS: Venous and Lymphatic Disorders 2014; Accepted for publication.
3 Gibson, K. A Randomized, controlled study comparing cyanoacrylate adhesive embolization with radiofrequency ablation for treatment of incompetent great saphenous veins VeClose study. German Society of Phlebology, 2014.
VeClose (U.S. pivotal trial)

- Prospective, randomized 1:1 comparing the VenaSeal™ system (VSCS) to RFA (ClosureFast™ catheter).

- Demonstrate safety and effectiveness of the VenaSeal™ closure system (VSCS) for the treatment of lower extremity truncal reflux by showing non-inferiority at three months to RFA using the ClosureFast™ system.

- **3-Months:**
  - RFA: 94.3%
  - VSCS: 98.9%

- **6-Months:**
  - RFA: 94.3%
  - VSCS: 98.9%

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1 No adjunctive treatments for 3 months

Gibson, K. A Randomized, Controlled Study Comparing Cyanoacrylate Adhesive Embolization With Radiofrequency Ablation For Treatment Of Incompetent Great Saphenous Veins VeClose Study - German Society of Phlebology, 2014.
VENOSEAL©

• **PROS**
  - NO HEAT
  - NO TUMESCEENCE
  - NO COMPRESSION NEEDED

• **CONS**
  - LEAVE SUBSTANCE IN VESSEL
  - CASH TILL ~ 2018
• Persistence of Sx
• Unilateral swelling
• Recurrent DVT
• Venous claudication

• Deep Vein Occlusion/Stenosis/Compression