Perforator Vein Treatment:

You can’t tell people what they want to hear...
If you also want to tell them the truth*

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Disclosure

Steve Elias, M.D.

I disclose the following financial relationship(s):

Consultant/Advisory Board: Covidien Inc, Vascular Insights LLC
Ceci n’est pas une pipe

“The Treachery of Images”: Rene Magritte
Issues in General

- Goal - heal ulcer & prevent recurrence
- Decrease venous hypertension
- GSV, VV, Perforators, Suprainguinal
- Hypertensive threshold concept
- How low is low enough
- Anatomic ablation vs. clinical success
- Ulcer Healing vs. Ulcer Recurrence
DSM IV: Criteria

- Personality Type - normal variant
- Personality Disorder - pathologic
- Incompetent person ≠ Pathologic person
- Pathologic person = Incompetent person
- Incompetent vs. Pathologic Perforator
Duplex Ultrasound:
Diagnostic Modality of Choice

Primary criteria
Reversal of flow > 0.5 seconds

Secondary criteria
Bi-directional flow > 0.5 seconds
Perforator vein diameter ≥ 3.0 mm

Size @ fascia > 3.0mm
= 90% incompetence
Size @ fascia > 4.0mm
= 100% incompetence

Sandri, JL. Diameter-reflux relationship in perforating veins of patients with varicose veins: JVS; 30,5,11999
Incompetent or Pathologic?

“The duplex criteria for diagnosing IPVs are extremely important in the selection process...to ablate an IPV. An enlarged IPV diameter at the fascia > than 3.5 mm as well as duplex evidence of high volume and prolonged outward flow may indicate an IPV with significant pathophysiology.”

O’Donnell, T. Role of perforators in chronic venous insufficiency. Phlebology 2010;25:3-10
PV diameter $\geq 3.9$ mm

- Sensitivity = 73%
- Specificity = 96%
- NPV = 92%
- PPV = 86%
- Accuracy = 91%

$n = 524$

$n = 163$

Courtesy: Nicos Labropoulos
Lower calf posterolateral PV

Courtesy: Nicos Labropoulos
Midthigh medial PV reflux

Courtesy: Nicos Labropoulos
Pathologic vs. Incompetent (Perforators, Not People)

- $\geq 3.5$ mm
- Reflux $\geq 0.5$ secs.
- C5 – C6 patients
- IPV under or in proximity of ulcer
- Incompetent – as above but $< C5$ pts.

If You Do Believe (I Do Sometimes)

- SEPS – Subfascial Endoscopic Perforator Surgery
- PAPS – Percutaneous Ablation of PerforatorS
SEPS/PAPS: Indications

- CEAP 5,6
- CEAP 2 or 3 - if source of VV (thigh) or pain
- After GSV treatment or same time?
SEPS

- 1990’s
- Remote incisions
- Endoscopic visualization
- Subfascial ligation – clips, harmonic scalpel
- Outpatient
- Regional/General anesthesia
Anatomy of Lower Leg

- Ant. tributary of greater saphenous v.
- Boyd's perforator
- Posterior arch v.
- Proximal paratibial perforators
- "24 cm" perforator
- Cockett III perforator
- Cockett II perforator
- Cockett I perforator
- Greater saphenous v.
- Superf. peroneal n.
- Medial perforators of the foot
Endoscopic Instrumentation And Surgical Techniques
SEPS Techniques
Direct Subfascial Visualization
SEPS Advantages

Remote incisions - low wound complications

Visualize pathology

Identify more IPVs than pre op (2-3)

How do you know they’re IPVs?
SEPS Disadvantages

- Distal IPVs
- Swordfighting
- Learning curve
- General/Regional anesthesia
- ASC or OR setting
- Frustration and incomplete exploration
- Low adaptation rate by surgeons
Perforator Location Above Medial Malleolus 25 Patients (72 IPV)

0 – 5 cms. 24
6 – 10 cms. 24
11-15 cms. 10
Greater than 15 cms. 14

66% (48/72) within 10 cms of medial malleolus

Average = 2.9 IPV per patient

Single Port Scope

Elias, S. Single port SEPS: Less is more. AVF Feb. 2005
New Concept - PAPS

- Percutaneous
- Ablation
- PerforatorS
- Will PAPS replace SEPS?

Elias S. Will SEPS Be Around in 5 Years?, IVC Apr. 2005, Miami FL.
Elias S. The New Perforator Algorithm, IVC Apr. 2006, Miami FL.
PAPS: A Better Way

- Percutaneous – No incisions
- Ultrasound guided access
- Local anesthesia
- Office based
- Easily repeatable

Elias, S. Will SEPS be around in 5 years? IVC Apr. 2005; Miami Fl
PAPS Choices

- Radiofrequency - TRLOP
- Laser
- Liquid/Foam
- MOCA
- Natural extension of EVA GSV/SSV
- Enough energy to destroy vein
PAPS Radiofrequency Catheters
PAPS Laser Kit
PAPS Laser Kit Features
PAPS ACCESS
PAPS: ACCESS
Pre op IPV Duplex
Percutaneous USG Access
Post PAPS Changes - US
Post PAPS Changes - Duplex
Pre and Post PAPS
EHMC Technique

- **Access** – RFS, 21 g. needle, 16g. angiocath
- **Location** – just below fascia and above
- **Treat** – 2-3 segments approx. 1-2 mm apart
  - RF - 85 C, 60sec/quadrant, 4min,12min total
  - Laser – Pulsed 5 sec/15 W, 75 joules, 225 joules total
- **Compression** – 1 min with probe
- **Post Rx** – Confirm occlusion, deep flow
- **Follow up** – Eccentric wrap 48hr, stocking 2 wks.
EHMC Center for Vein Disease

- Total pts. - 31
- CEAP 4 - 8
- CEAP 5 - 5
- CEAP 6 - 18

- Total IPVs - 50
- Avg/pt - 1.6
- Avg size - 4.8mm
EHMC Overall (RF and Laser)

100% procedure success

- 88% closed @ 3 months (42/48)*
- 89% ulcer healing at 6 weeks (16/18)

* Excluding 2 undertreated IPV
EHMC Complications

- Nerve injury – 0%
- Vascular injury – 0%
- Hematoma – 1/50 (2%)
Results Others – USG Sclero

- 3% STD liquid
- .5-1 cc/IPV
- Compression 4 weeks
- 85% occlusion at 6 months
- No DVT/skin/nerve injury

Results Others – USG Sclero

- Sodium morrhuate 5% liquid
- 80 pts.
- 98% initial success
- 75% closed at 20 months
- No skin/nerve injury

Results Others - RF

- Lumsden - 91% closed @3 months (SCVS 05)
- Chang - 87% reflux free @ 6 mo.
  - 91% reflux free @ 12 mo. (VEITH 2006)
- Murphy - 90% closed @ 6 mo. (ACP 2006)
Results Others - Laser

- Kabnick - 85% closed @ 4 mo. (InVein 2006)
- Murphy - 100% closed @ 6 mo. (ACP2006)
- Proebstle - 100% closed @ 48hrs. (50 IPVs)
  - 100% closed @ 4 mo. (17 only)
  - C2 pts.
Recent Reports

- 1 yr. – 82% closed

- Treated truncal first and then IPV after **only 1 week**

- “Perforator incompetence was present if any outward flow was present with color...All IPVs were treated regardless of diameter.”

- “We treated all IPVs as part of our treatment plan regardless of VCSS or symptoms”

Marsh, P et al. 1 yr. outcomes of RFA of IPVs using RF stylet device. Phlebology 2010;25:79-84
The Treachery of Images: Whiteley Group Cont.

“IPV’s were re-identified intaop using DUS....

“But we did not routinely reassess competence of IPVs at this stage after treatment of truncal reflux” (only 1 week before)

“Diameter of IPV’s was not measured preop...so can’t comment on effect of tx”

- Endpoints – Closure only?Treating the image?
PAPS Results: Summary*

80% - 90% early closure 3 – 6 – 12 months
Access with experience 100%
Minimal morbidity
Technically harder than EVA GSV/SSV
Too many C2 patients done
Short term F/U only and most address ablation only**


The Big Problem: 2C*
No EBM for IPV Rx

- Dutch SEPS Trial
- ESCHAR Study
- Minimal follow up > 1 year
- The end is near unless.....
- Clinical Trials - isolate IPV’s

Clinical Trials

- Isolate IPV’s – Superficial/Deep issues
- Endpoints - recurrence not healing
- Endpoints - recurrence not ablation
- Define pathologic PV in trials/reports
- Candidates - C5 & C6
- Not C2 patients - let’s be realistic
DSM IV: Criteria

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- Incompetent Perf ≠ Pathologic Perf
- Pathologic Perf = Incompetent Perf
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Why does a dog lick himself? Because he can

- Just because we can do it
- Doesn’t mean we should do it
- Even if it is fun (PAPS)

- Insurance is correctly questioning
- Without facts we look like fools

- Prove it or forget it
- If not......The End Is Near
The End: Treat the Right Patient Not The Image

The Treachery of Images, Rene Magritte