

## ULTRASOUND GUIDED SCLEROTHERAPY (USGS) FOR PERFORATING VEINS (PV)

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The rationale for treating varices and perforating veins is aimed at the three main pathophysiological abnormalities: to reduce venous hypertension, to suppress leak points from the deep to the superficial venous system, and to reduce the varicose volume/length (reservoir).

### When to treat specifically perforating veins?

To suppress a varicose pattern that is mainly/solely fed by the PV, to avoid recurrent (persistent) varices after surgery, to heal an ulcer which is not cured by (appropriate) compression alone.

### Why not to treat PV (with USGS)?

As an isolated procedure, USGS (like other techniques used for treating PV), does not seem appropriate in case of deep venous obstruction.<sup>1</sup> It has been observed recently that thrombophilia is often associated with thrombotic complications of sclerotherapy,<sup>2</sup> therefore a precise clinical and biologic screening of patients must be defined prior to any treatment of varicose veins. A history of venous thrombosis must be searched for.

### When not to treat perforating veins (with USGS)?

The first obvious reason is that when they are competent or too small (<3mm diameter)<sup>3</sup> there is no need for suppressing them.

When they drain a varicose cluster (sometimes called "reentry"), there is a theoretical risk of worsening of the venous hypertension.

For medial leg perforators, when they are associated to an incompetent greater saphenous vein (GSV), 75% of them will become competent after removal of GSV.<sup>4,5</sup>

In all cases, a complete duplex assessment of the venous networks must be carried out before treatment, with the patient standing or sitting for this examination. Reflux duration of > 0.5 sec. indicates incompetence.<sup>6</sup>

### Indications for sclerotherapy of PV:

As indicated above, most PV will become competent after stripping of the GSV. Therefore, when not all PV are removed at the operation time, additional sclerotherapy will take care of residual incompetent PV.

Sclerotherapy as a primary treatment of PV is feasible for example to deal with the Dodd & Hunterian perforators, non saphenous networks (for example on the lateral aspect of thigh; Albanese network), incompetent medial leg PV without GSV incompetence, Recurrent Varices After Surgery (REVAS) related to certain cases of PV incompetence (femoral canal for example), recurrent varices after prior USGS or Sclerotherapy. Sclerotherapy of PV in patients with history of DVT is not a routine treatment, but can help to heal venous ulcers.

### Criteria for the choice of treatment (USGS vs. SEPS or vs. stab avulsion):

Diameter and duration of reflux should be considered as criteria for decision although there are no data to support this opinion. Veins with a diameter of more than 8 mm are more likely to be resistant to sclerotherapy. Patients should be more enthusiastic for sclerotherapy since the method is ambulatory, cheap and simple.

### Techniques of injections:

The usual "blind" sclerotherapy is sometimes possible if the vein has been marked by duplex imaging (if the duplex is not easily available). However, ultrasound guided sclerotherapy provides more safety and accuracy.<sup>7</sup> Duplex will also provide information on the good evolution of the sclerosing reaction on the further examinations (1 week or more).

The sclerosing agents which can be used are Sotradecol 3% or Polidocanol 3%, lower concentrations are advised at the first session if the PV are smaller than 4 mm in diameter, an initial volume of 1 cc at the first session is recommended. Compression of the leg with bandages or medical stockings is mandatory.

There is a lack of evidence regarding the results of the technique, further studies must be carried out.

Based on one short-term study<sup>8</sup> and on our own experience, we estimate that a primary occlusion is obtained in about 90 % of cases with 3 or less sessions. Regarding long-term results, no controlled study and no data on recurrence rate are available.

Criteria of assessment for future studies should include: duplex-visible sclerosis of the vein, pre and post therapeutic diameter and reflux duration, and plethysmographic evaluations as well.

The convenience of the technique and its overall price (calculated on a long-term follow-up, estimated with a life-long treatment) must be taken in account.<sup>9</sup>

Some of the potential complications of the techniques are non-specific to sclerotherapy of PV, such as thrombosis, necrosis and allergy. Edema and bulge of lipodermatosclerosis are more specific. These latter complications are more frequently observed in patients graded C3 and higher. They are decreased by an adequate compression.

### Pros & Cons of sclerotherapy of PV represent a good summary of the method:

Pros: Cheap, repeatable, painless and versatile.

Cons: Technically challenging, possible complications, no data on long term results.

### References

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## CASE OF PERFORATOR INCOMPETENCE

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This is a 65-year old woman with severe recurrent venous ulcerations of the left and right legs since May 1989. She has a history of bilateral DVT 20 years ago. The patient underwent left greater saphenous vein stripping in 1978 and 1985. She has normal pedal pulses.

Level 1: There is a 10x4 cm superficial ulceration above the left medial malleolus with moderate surrounding lipodermatosclerosis. No remarkable edema.

Level 2: Duplex scanning of the left leg (May 1989) showed absence of the greater saphenous vein. The common femoral and profunda femoris veins were patent and competent. There was partial recanalization of the superficial femoral and popliteal veins. The posterior tibial vein was also recanalized. No perforating veins were identified. Duplex scan Sep 1997: left superficial femoral and popliteal veins patent but partially compressible, posterior tibial vein incompetent, lesser saphenous vein incompetent, two incompetent perforators medial calf. APG Sep 1997: OF 16%, VV 68 ml, VFI 5.1 ml/sec, EF 65%, RVF 44.1%.

Level 3: Descending venography reveals valvular incompetence in the common femoral and proximal superficial femoral veins; contrast flows retrograde to the level of mid-superficial femoral vein. Lymphoscintigraphy: no abnormality left lower extremity.

Duplex Mar 1998: no change from Sep 1997. Three incompetent perforating veins medial calf.

CEAP Classification: C6s; Es; As,p,d; Po

Treatment?

(see figures 1-2, on p. 264)

## DISCUSSION

*DR. O'DONNELL: I do have a little problem with the use of the eponym "Cockett" for these operations. Cockett, as you know, originally described an extrafascial approach to perforators and reserved the subfascial approach for severe dense lipodermatosclerosis with ulcer. Actually, Dodd, Cockett's co-author of their classic text, abandoned the extrafascial approach very early on his experience because of wound complications. In addition he moved the incision postero-laterally. So what you call Cockett is not what Cockett himself described.*

*DR. O'DONNELL: This is a very interesting case, certainly not one of straightforward perforator incompetence in that there seems to be an element of deep venous obstruction. Our panel had very*

*interesting responses. I question you, gentlemen and ladies, can you provide any evidence that doing something to the perforating veins is going to make this patient better? I would submit that no one in the audience can show in a case like this that the hemodynamics improve. Indeed, most of the data in the literature shows no hemodynamic improvement in patients with post-thrombotic syndrome following interruption of the perforators. Going back to some of the early studies by our Scandinavian colleagues - occlusion of a perforating vein and measurements with electric magnetic flow meters and venous pressures showed no improvement in hemodynamics. And our own work confirms the same. Therefore, I find it very interesting in this case that we're going to treat the perforators alone, but I don't know to what end. Let me open it up to the panel after these "prejudicial" statements. Peter, from your North American SEPS Registry study you have a one in two chance at least with a short-term follow-up of having a satisfactory result i.e., -no ulcer recurrence, in this case if you interrupt the perforators; right?*

*DR. GLOVICZKI: Well, this is a difficult case, and I seldom perform perforator ligation in a patient with deep vein obstruction or with an element of deep vein obstruction. In this patient obstruction has been confirmed by APG studies. Unfortunately, we do not have an adequate evaluation of this patient. Ultimately, I think that I am going to suggest SEPS, but I would probably make another attempt of an ascending venography. I think an ascending venography in this patient would be quite critical.*

*DR. O'DONNELL: Why don't you show the ascending phlebogram that you did do, Paul - after the procedure?*

*DR. GLOVICZKI: You should have done the ascending venogram before the procedure.*

*DR. DEPALMA: One question that I missed completely is the status of the lesser saphenous.*

*DR. CORDTS: The lesser saphenous vein was incompetent*

*DR. DEPALMA: It was incompetent. Okay. That's important because the lesser saphenous gives an Achillean perforator as it crosses the tendon initially to Cockett 1. That is what Dr. Enrici's arcade shows as he dissects. I think that it's very important to deal with that inflow problem as well as interrupting perforators from above.*

*DR. O'DONNELL: Ralph, how do you deal with the incompetent lesser saphenous? Do you strip it out? Do you ligate it? What do you do?*

*DR. DEPALMA: Well, I think all of the action is down at the lower end, and I would divide it. I would ligate it and then just put the small skin incision out of the area of involvement and then come down directly on the Cockett 1, ligate that, remove the Achillean communication. Then I elevate the skin around it and then dress the dissected area firmly and keep the limb elevated.*

*DR. GLOVICZKI: I like invagination stripping of the lesser saphenous vein. I think it is nontraumatic and it preserves the sural nerve. These are frequently perforator veins connecting the lesser saphenous vein to the deep veins, so stripping is a better operation than ligation only.*

*DR. NEGLEN: I would like to turn this case around. If I understood it right, you had axial reflux in the superficial femoral vein that was patent and partially recanalized. So if we forget the perforators and then look at axial reflux in the deep system in a limb with stripping of the saphenous vein already performed, reflux flow*