# Duplex Guidance for Foam Sclerotherapy: Challenging the limits of vein size and depth


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*No disclosures*

# Ultrasound-guided foam sclerotherapy is a safe and clinically effective treatment for superficial venous reflux

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*Objective:* To test the hypothesis that ultrasound-guided foam sclerotherapy (UGFS) is a safe and durable treatment for superficial venous reflux (SVR) associated with CEAP clinical grade 2-6 disease.

*UGFS for CEAP 2-6 SVR is associated with low complication and retreatment rates.*

# Duplex ultrasound and efficacy criteria in foam sclerotherapy from the 2nd European Consensus Meeting on Foam Sclerotherapy 2006, Tegernsee, Germany

F. X. Breu[1], S. Guggenbichler[2] and J. C. Wollmann[3]

*VASA 2008*

## Consensus 1: Ultrasound guidance during foam sclerotherapy

For the puncture of *non-visible* varicose veins, ultrasound guidance is an important tool to prevent mispuncture. For the direct puncture and injection of non-visible great saphenous veins (GSV), small saphenous veins (SSV), perforating veins and *non-obvious* varicose veins in the groin or in the popliteal fossa, guidance by ultrasound imaging (preferably by duplex) is mandatory.
For other non-visible varicose veins, guidance by ultrasound imaging is recommended.

*For non-visible veins*


## Consensus 2: Increasing safety during GSV or SSV treatment with foam sclerotherapy

To increase safety, the following is recommended during treatment of GSV or SSV with foam sclerotherapy:

- Ultrasonographic monitoring of foam distribution
- If foam[1] is detected in the deep venous system, muscle activation such as ankle dorsiflexion should be performed
- Avoidance of immediate compression over injected areas
- Injection of very viscous foam
- No movement of the patient and leg for 2–5 minutes, no Valsalva manoeuvre and no muscle activation

*Increased safety*

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**Consensus 6: Duplex criteria for evaluating the effects of foam sclerotherapy**

Duplex criteria for evaluating the therapeutic effects of foam sclerotherapy in the treated veins are

- Occlusion – patency
- Length of occlusion
- Flow – no flow
- Antegrade flow – reflux (> or < 1 sec)
- Compressibility of the vein
- Diameter of the vein
- Morphologic changes (fibrosis / thickening of the vein wall)
- Absence of vein

| Grading / Name | | Duplex findings | Clinical | Symptoms |
|---|---|---|---|---|
| 2 Full success | No reflux | Complete disappearance of the treated vein<br>or<br>"Fibrous cord" (incompressible echogenic cord in the position of the treated vein)<br>Complete occlusion (incompressibility) of the treated vein segment<br>Patency of the treated vein segment with reduced diameter and antegrade flow | Normalised (i.e. no visible varices) | Absent or improved |
| 1 Partial success | Reflux < 1 sec. | Partial incompressibility and Partial occlusion of the treated vein segment Diameter reduction | Normalised or improved (i.e. smaller Visible varices) | Absent or improved |
| 0 No success | Reflux > 1 sec. or unchanged | Complete (or incomplete) patency and/or<br>No change in diameter | Unchanged or worsened (i.e. larger varices and / or clinical CEAP deterioration) | Unchanged or worsened |

*Therapeutic goals are different from esthetic goals*

# *Sclerotherapy in USA: What's new?*

- *Patients (mostly after vein ablation)*
- *Payment sources (USA – most HMOs, MCR)*
- *Veins classification (indications, Tx modality)*
  - *Teleangiectasias (red), spiders (blue) = not covered*
  - *Reticular veins (1 - 4 mm) - symptomatic*
  - *Varicosities (4 – 9 mm) - symptomatic duplex-guided foam*
- *Accuvein, other lighting not covered*
- *Solutions (efficiency, complications, price, dose)*

# *Unwanted veins: classification*

***Tiny***

***Small***

***Large***

# Gadgets : What is necessary?


Syris 600


AccuVein Laser

# *Solution – Polidocanol (0.5% and 1%)*

*Study in rats*

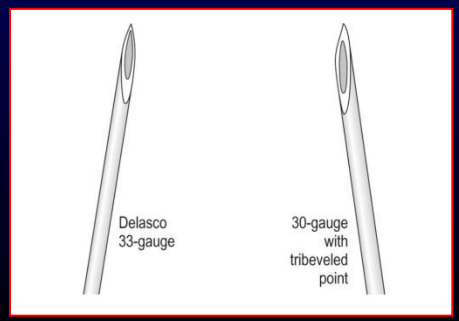
- *Volumes <0.5 mL : no cutaneous necrosis regardless of concentration (liquid or foam)*
- *Volumes >0.5 mL:*
  - *Liquid: necrosis from concentration ≥1%*
  - *Foam: necrosis from concentration ≥ 2%*

*Schuller-Petrovic S. et al. Subcutaneous injection of liquid and foam polidocanol: extravasation is not responsible for skin necrosis during reticular and spider veins sclerotherapy. JEADV 2011,25,983-986*

# Procedure Set - up

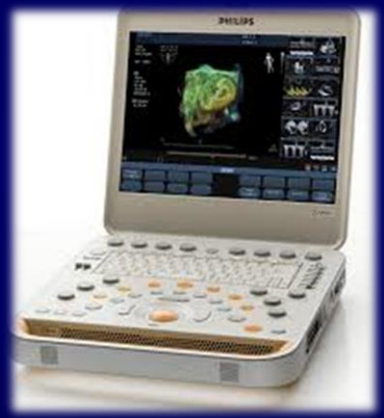

30G

- Alcohol (skin disinfection)
- Gauze, cotton balls, gloves
- Paper tape / silk tape / Coban tape
- 5 cc syringe x 2; 1 cc syringe
- 3-way stop-cock; fill needle
- Saline flush; 0.5% and 1% polidocanol
- 25G 1.5 inch needle + T-tube extension
- 32G and 33G silicone coated needles
- 25G butterfly needle



# *Duplex – Guided Foam Sclerotherapy (DGFS) (18 months; 600 cases)*

- *Patients after trunk veins treatment (ablation, removal)*
- *Persistent symptoms (CEAP 2-6), approved by insurance*
- *Veins identified by duplex mapping*
- *L 15-7 MHz*

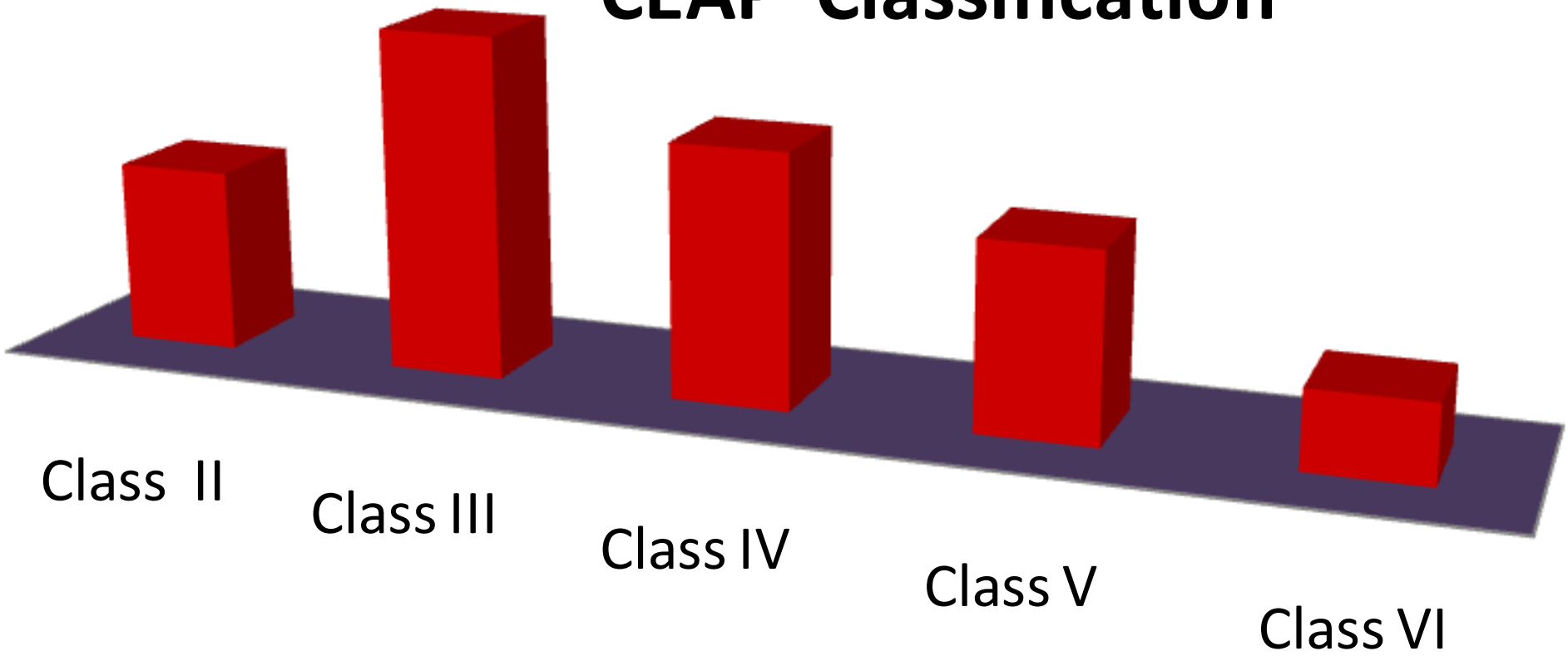


- *Used 2-8 cc of polidocanol (<4 mm – 0.5%, >4 mm – 1%)*
- *Leg wrapped with Coban tape x 72 hours*

# *Duplex – Guided Foam Sclerotherapy (DGFS) (18 months; 600 cases)*

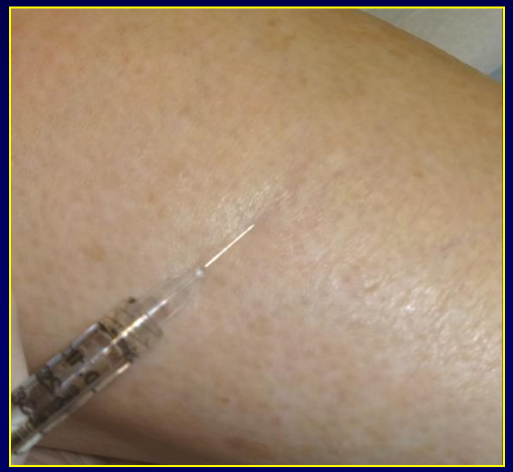
- *312 Patients; 218 Females (70%)*
- *243 patients (78%) bilateral procedures*
- *Mean Age 61.4 ±14.9 (Range 23 - 90 y)*
- *CEAP 2 – 6 (Average 3.7 ± 1.2)*
- *359 Foam ; 241 Foam + Sclerotherapy (esthetics benefit)*
- *1-5 procedures per patient (1.9 avg); 1-3 procedures per leg*
- *Veins diameter 1mm – 14 mm (Average 3.5 ± 2.9)*

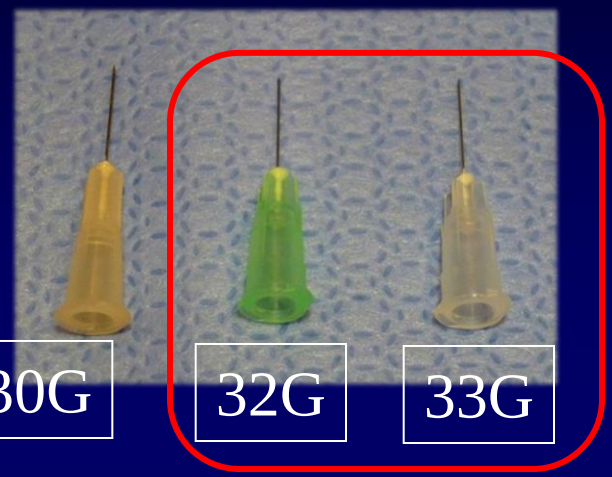
# Patients Distribution According to CEAP Classification



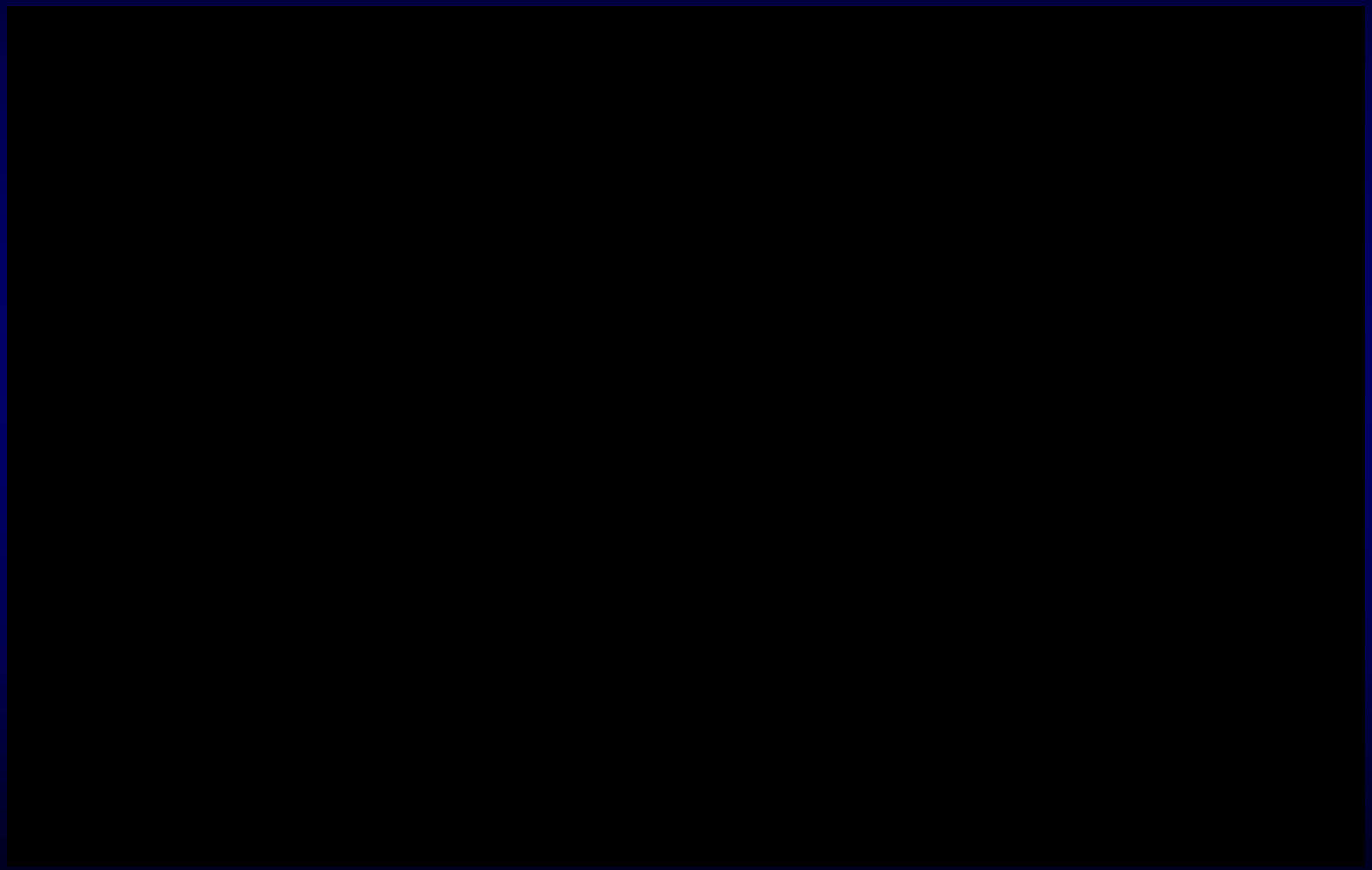
# *“Tiny” veins – Polarized Lighting*

# *“Tiny” veins - teleangictasias*

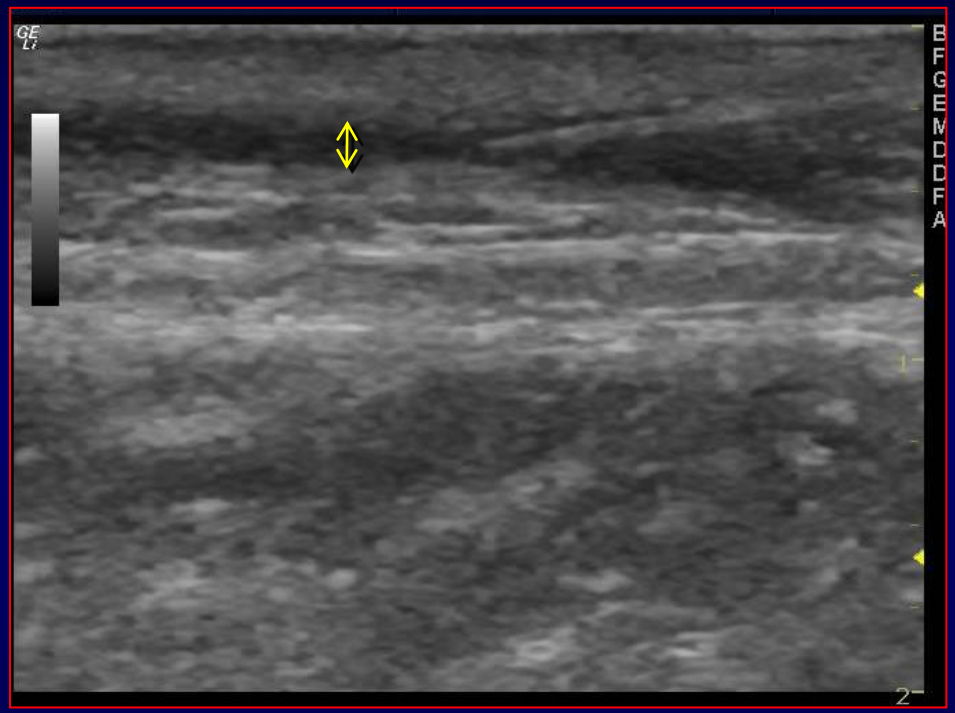





# *“Small” veins – Accuvein Laser Illumination*



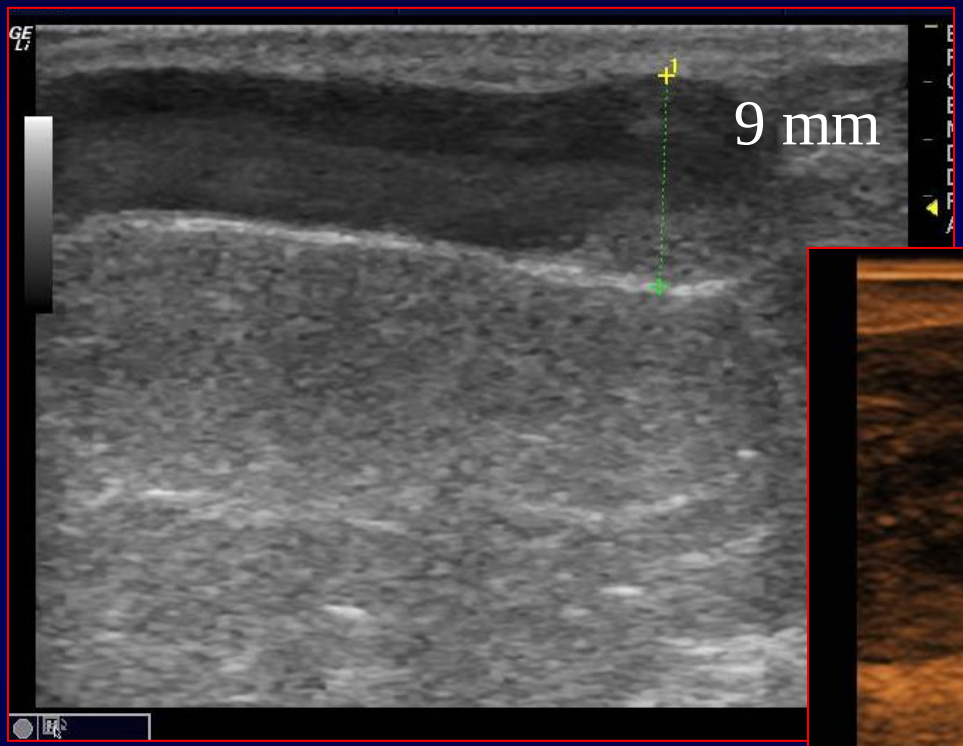
# *Duplex guided foam ablation (Small)*



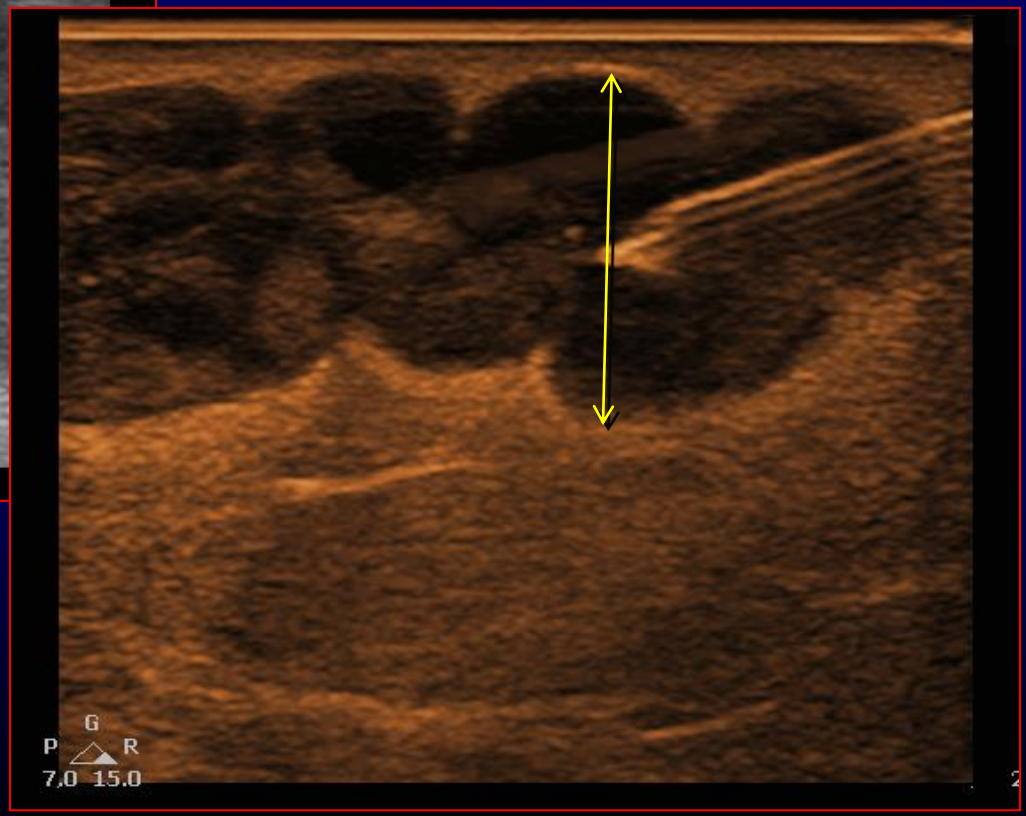
1.2 mm

1 mm

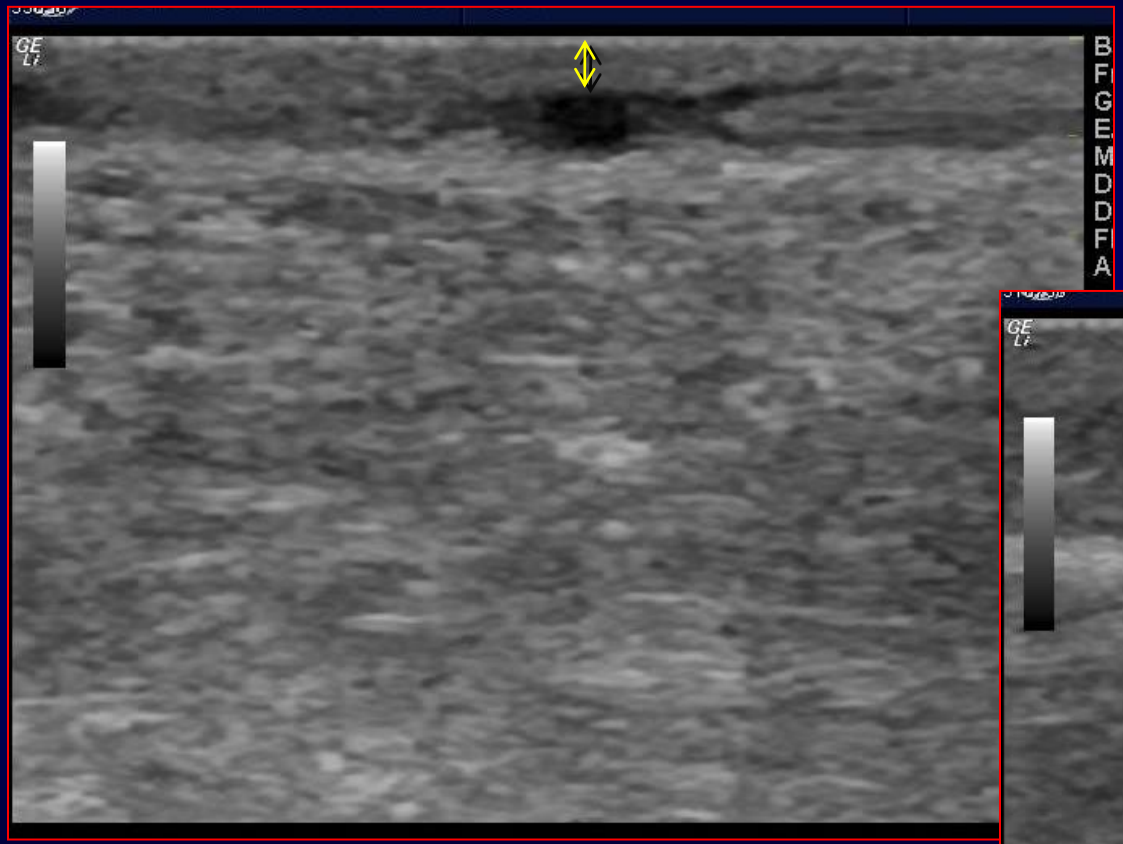
# *Duplex guided foam ablation (Large)*



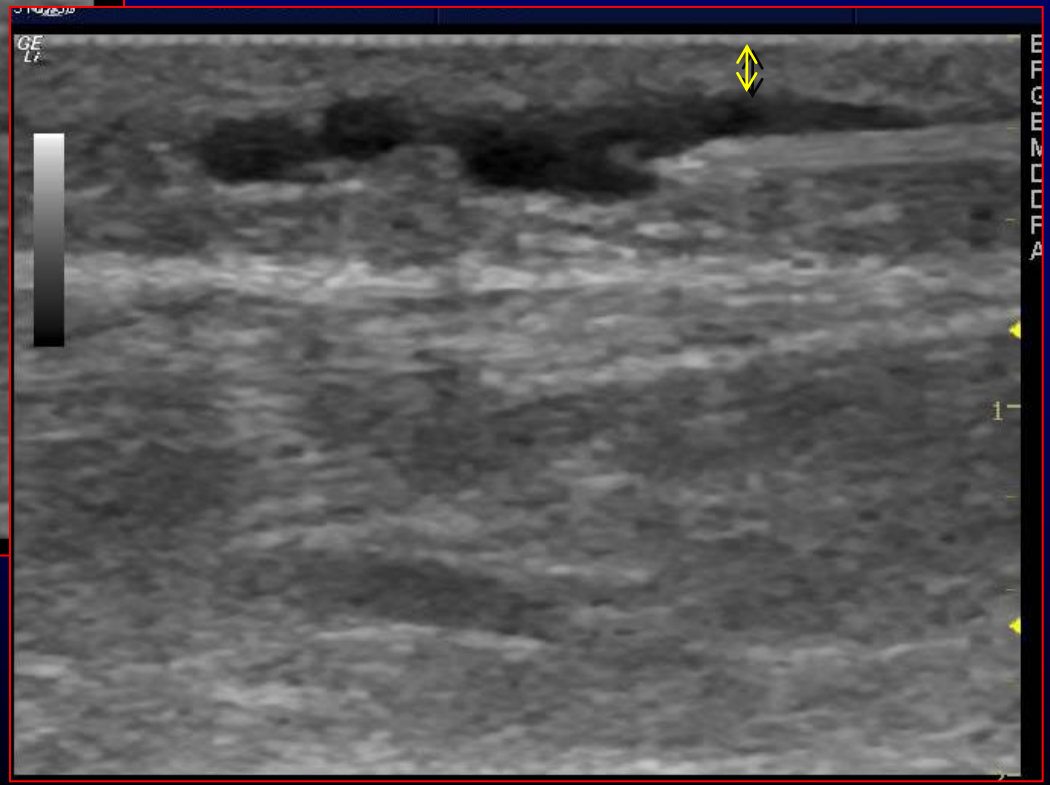

14 mm



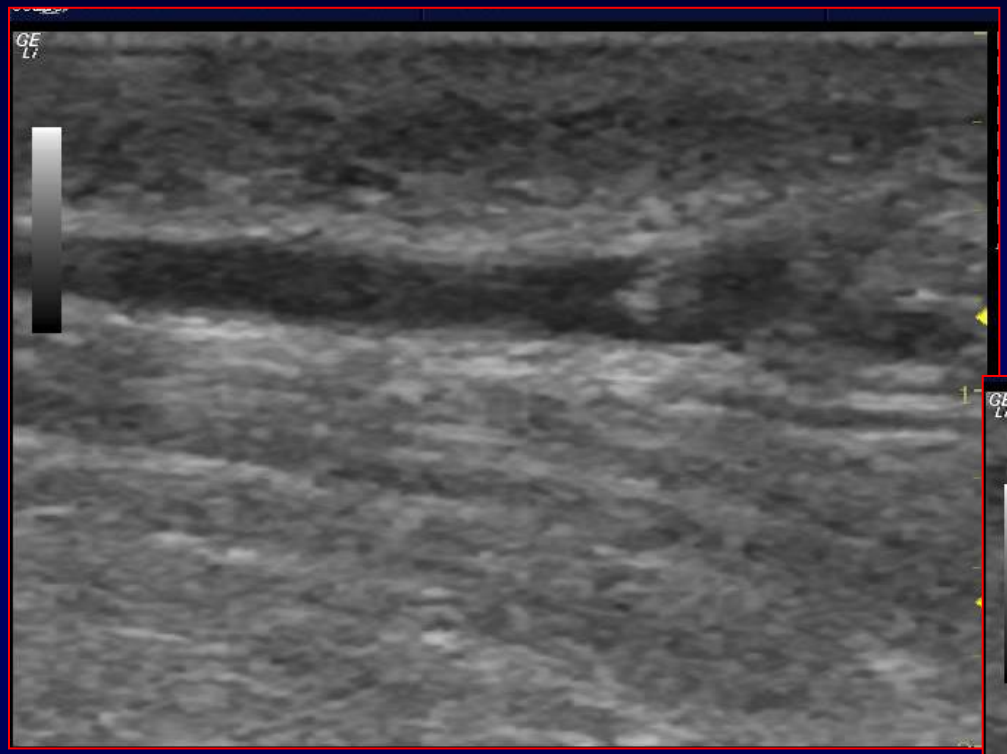
# *Duplex guided foam ablation (Superficial)*



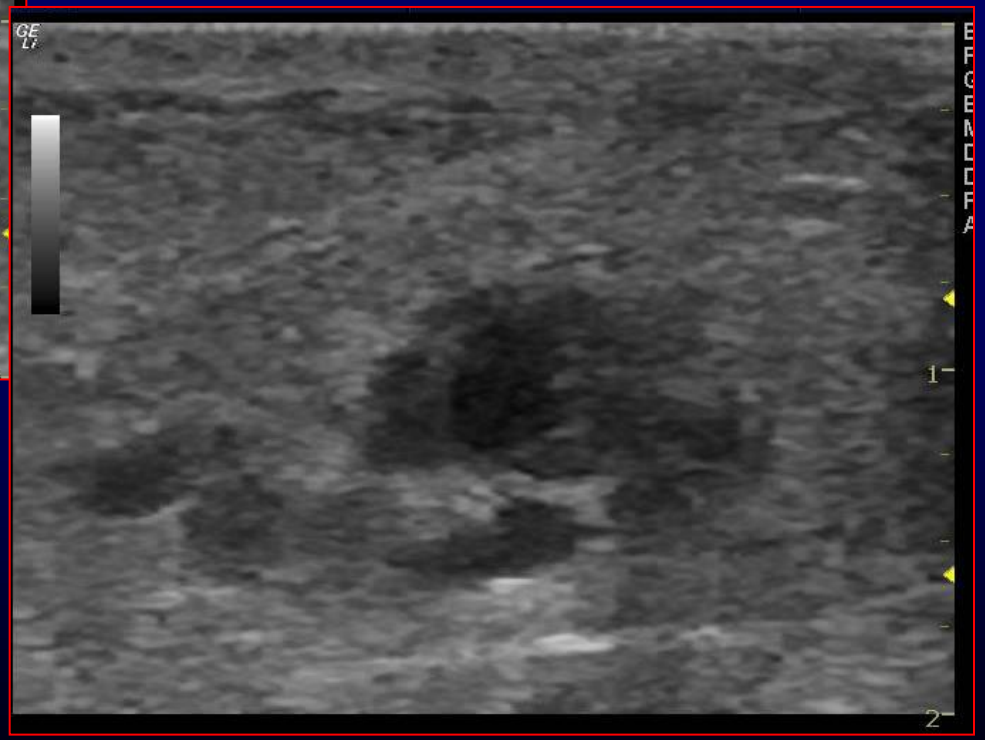
1 mm



# *Duplex guided foam ablation (Deep)*

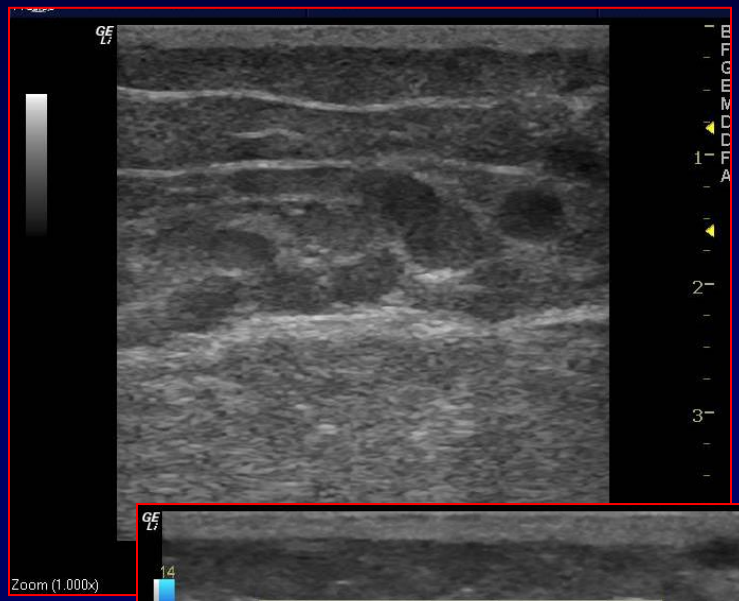


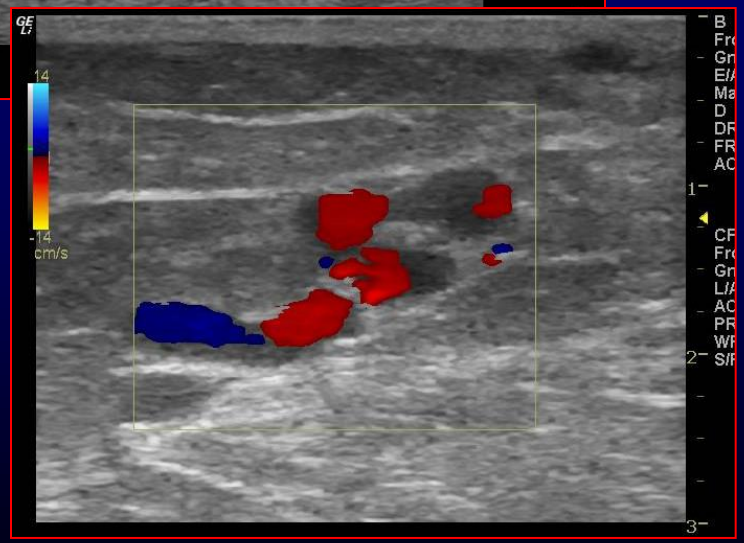
8 mm

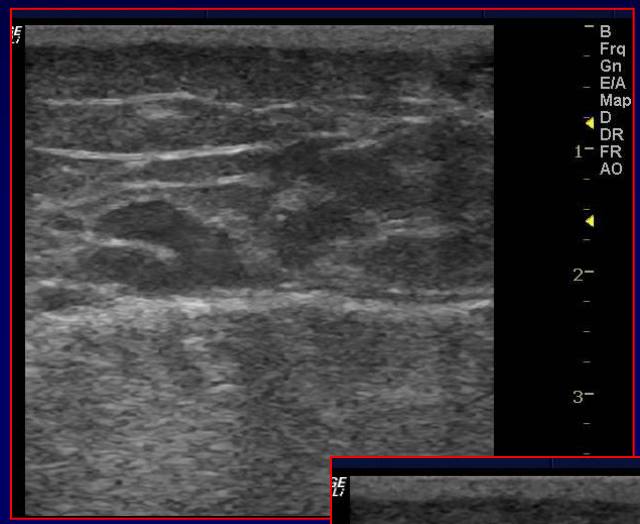


17 mm

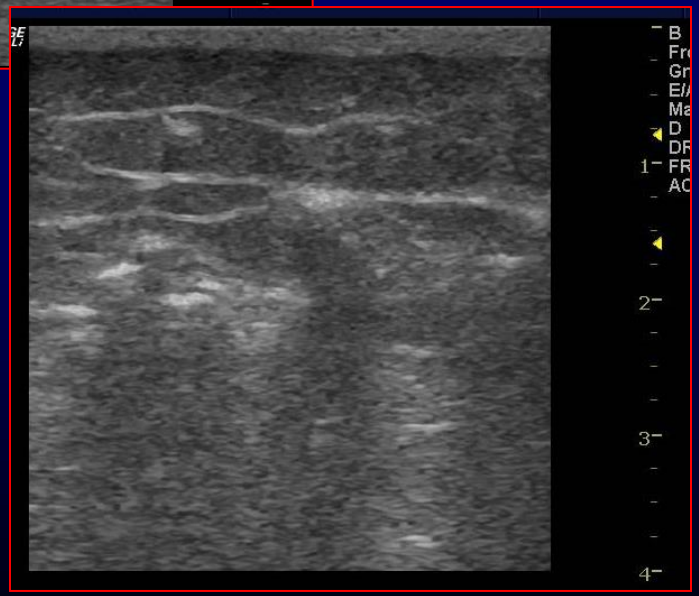
# *Deep varicosities clusters (27 cases – 4.5%)*



>20 mm



# *Large veins – DGFS*


313641
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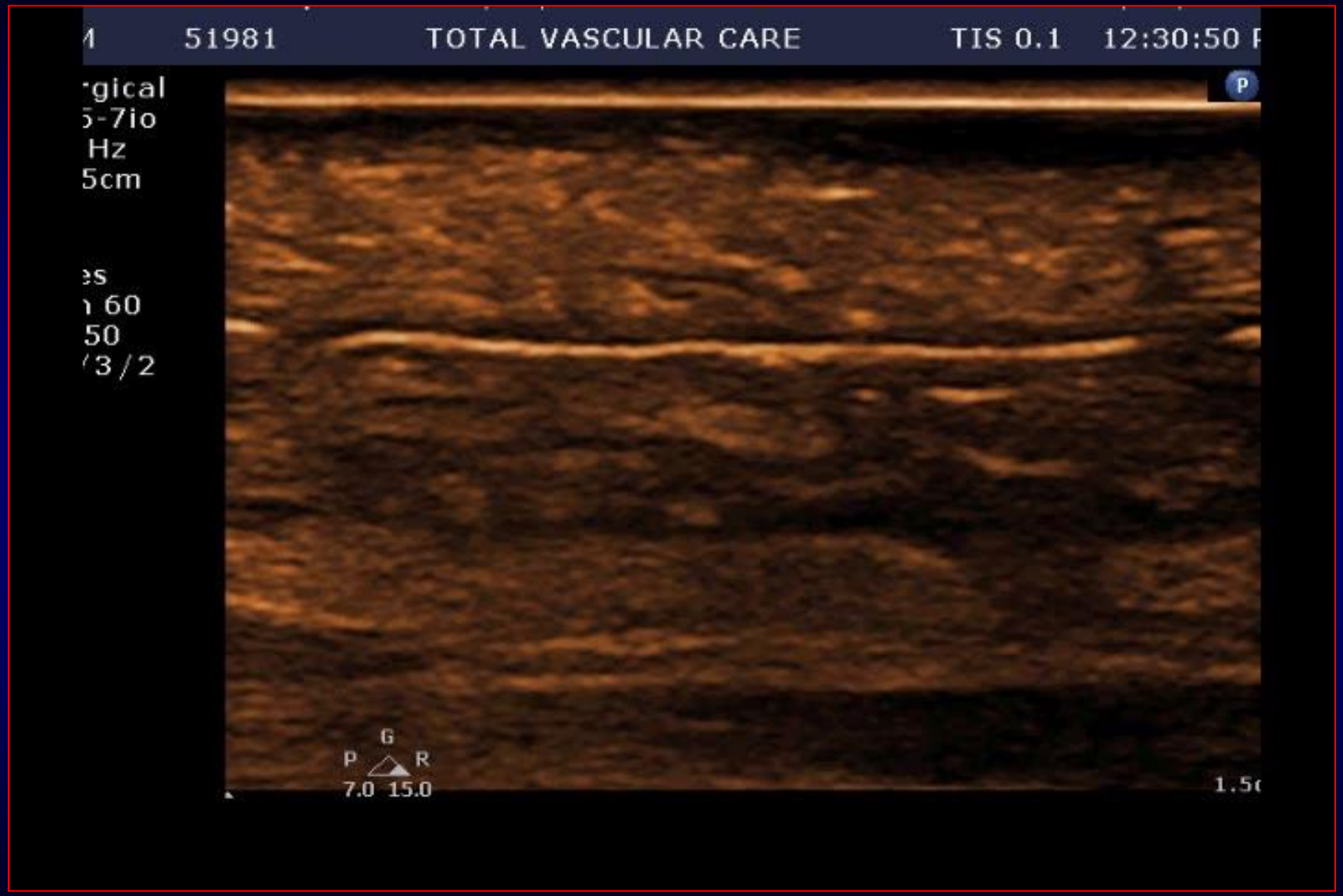
# *Large Superficial Varicosities*

# *Large Superficial Varicosities*

# *Large Superficial Varicosities - Results*

10 weeks

# *Varicosities feeding reticular / spider patches*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# *DGFS Results*
# *(18 months; 600 cases)*

- *Target veins obliteration:*
  - *Complete – 570 cases (95%)*
  - *Partial – 24 cases (4%)*
  - *Failure – 6 cases (1%)*
- *Hyperpigmentation persistent for > 3 mo – 18 cases (3%)*
- *232 (39%) trapped blood drainage, 12 (2%) refused*
- *DVT (2%) PTV – 7 cases, CMV – 5 cases, no extension*
- *SVT (1.3%) immediate – 4 cases , remote – 4 cases*

# *DGFS Results*
# *(18 months; 600 cases; 312 patient)*

- *Overall patients satisfaction:*
  - *Happy - 301 (96.5%)*
  - *Partially satisfied – 8 (2.5%)*
  - *Unhappy – 3 (1%)*
    - *1st patient with personality dysmorphic disorder , had several plastic surgeries*
    - *2nd patient with denial of ulcer presence after spontaneously ruptured veins*
    - *3rd patient complaining of pain after injections while results are very good*

# *Conclusions*

- *Foam sclerotherapy approval for HMO coverage in the USA is a major breakthrough which makes this procedure available to a very large patient population (age, indication, insurance plans)*
- *Overwhelming majority of the patients undergoing saphenous veins ablation qualify and benefit from Duplex Guided Foam Sclerotherapy (DGFS)*
- *Duplex guidance for foam sclerotherapy can be used for almost any vein with diameter >1mm and depth >1mm*
- *DGFS of feeding deeper veins helps treat larger areas of reticular and spider veins with smaller sclerosing agent amount.*
- *Duplex guidance is irreplaceable for foam sclerotherapy of deep (cluster) varicose veins which feed recurrent varicosities formation*

# *Conclusions*

- *Small veins with diameter <2mm and depth <1mm can be treated with polarized lighting visualization systems (worth investing)*
- *Transilluminators (infrared, laser) can largely be replaced with duplex scanners provided technical operator skills (worth training)*
- *Smallest diameter needles (32G and 33G) allow successful sclerotherapy of very small teleangiectasias (0.26 – 0.24 mm)*