CONTROVERSIES & UPDATES IN VASCULAR SURGERY
JANUARY 22-24 2015
MARRIOTT RIVE GAUCHE & CONFERENCE CENTER PARIS, FRANCE

Factors influencing the success of foam sclerotherapy by ultrasound guidance

Quels sont les facteurs influençant le succès de la sclérothérapie à la mousse échoguidée ?

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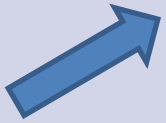
Disclosure

Speaker name:

Claudine HAMEL-DESNOS

- I do not have any potential conflict of interest

What does success mean?

- Good efficacy 
- Good safety 

INFLUENCE of the FOAM

Foam Production

- AIR (1A);
- Two-way connector/Tessari method (1A)
- Highly viscous foam (1C)
- The time between foam production and injection should as short as possible (1C) **(experience++)**

CO2+O2 ?? (1C)

- so far, no demonstration of significant clinical benefit for safety
- more complicated (and more expensive)
- much less stable and requires higher volumes and the use of a short cannula (not the best technique)

- Rabe et al. European guidelines for sclerotherapy in chronic venous disorders. Phlebology 2014
- Peterson,Goldman. An investigation into the influence of various gases and concentrations of sclerosants on foam stability. Dermatol Surg 2011
- Morrison et al. Comparisons of side effects using air and carbon dioxide foam for endovenous chemical ablation. J Vasc Surg. 2008
- Wright et al. Varisolve European Phase III Investigators Group. Varisolve® polidocanol microfoam compared with surgery or sclerotherapy in the management of varicose veins in the presence of trunk vein incompetence: European randomized controlled trial. Phlebology 2006
- Hesse, Breu et al. Sclerotherapy using air or CO2-O2 foam. Phlebologie 2012

Foam stability and quality

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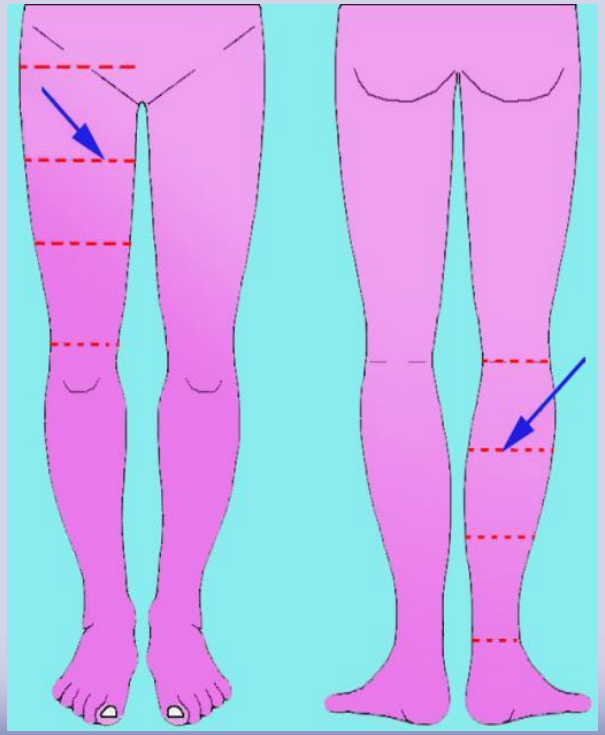
- Addition of glycerin?
- Pre-cooling the foam?
- 5 µm filter?
- Different ratios for different concentrations (1+2 to 1+8?)?
- Avoid silicone ? Avoid plastic tubes ? (long catheter, tube for cannula…)
- At least 25 Gauge needle ?

No clinical evidence to draw conclusions

- *Valuenzela et al. Foam sclerosants are more stable at lower temperatures. Eur J Vasc Endovasc Surg 2013*
- *Rial et al. Polidocanol foam stability in terms of its association with glycerin. Phlebology 2014*
- *Cameron et al. Sclerosant foam structure and stability is strongly influenced by liquid air fraction. Eur J Vasc Endovasc Surg 2013*
- *Parsi K. Venous gas embolism during foam sclerotherapy of saphenous veins despite recommended treatments modifications. Phlebology 2011*

INFLUENCE of the TACTIC



The Good Tactic

- ✓ Good initial venous examination (clinical and DUS++)
- ✓ Treatment :
  - From proximal to distal and largest to smallest
  - For GSV/ASV (and SSV) one puncture should be done in the proximal thigh (calf)

- ✓ Multiple injections can reduce the passage of the sclerosant into the deep veins
- ✓ Introduce fresh sclerosant along the length of the vein could improve the results of sclerotherapy

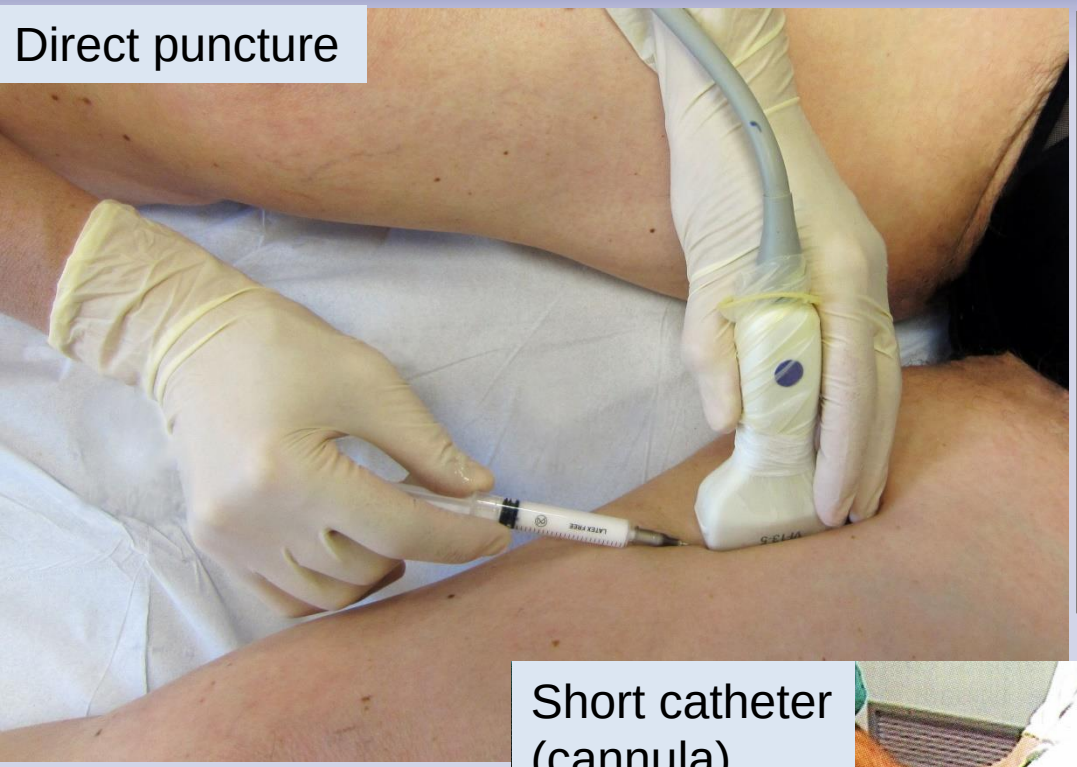
Deactivation of STS by blood proteins (Watkins)

- *Rabe et al. European guidelines for sclerotherapy in chronic venous disorders. Phlebology 2014*
- *Yamaki et al. Multiple Small-Dose Injections can reduce the passage of sclerosant foam into deep veins during foam sclerotherapy for varicose veins. Eur J Vasc Endovasc Surg 2008*
- *Watkins. Deactivation of sodium tetradecyl sulphate injection by blood proteins. Eur J Vasc Endovasc Surg 2011*

INFLUENCE of the TECHNIQUE

USGFS techniques

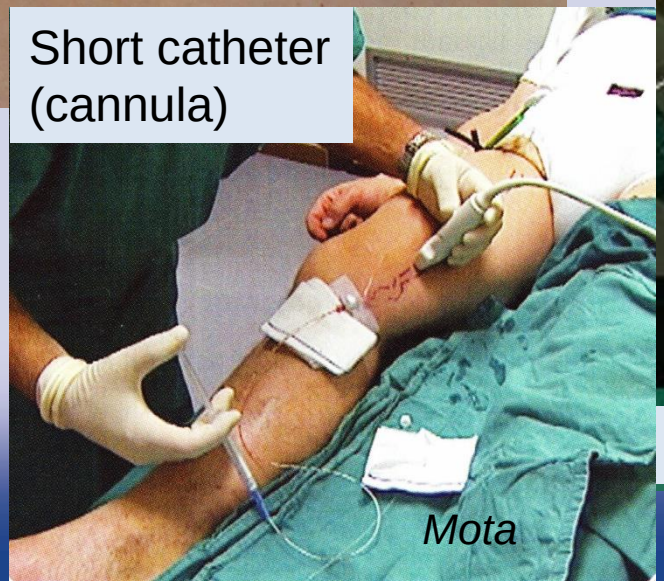
Direct puncture



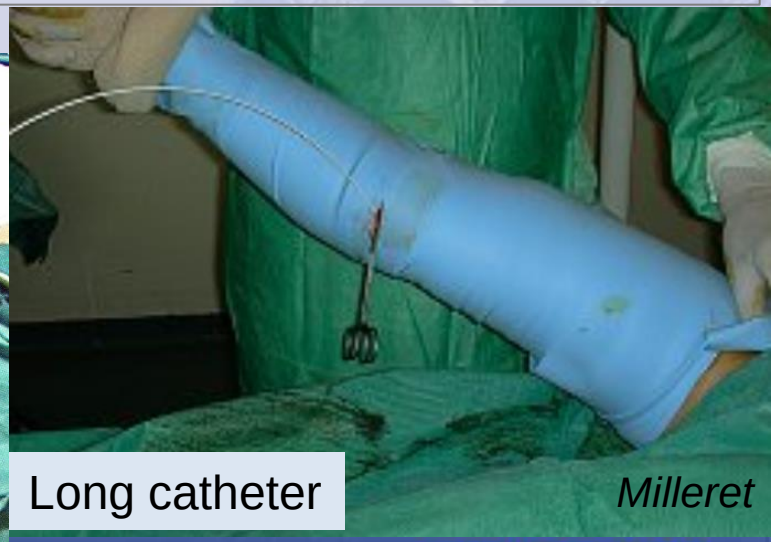
So far, there is no clinical evidence that USGFS by **direct puncture** with needle is the best technique, but:

- It meets the recommendations for good tactic;
- It is the most used,
- the most accurate (allows a tailored treatment)
- and the **simplest one**

Short catheter (cannula)



Mota



Long catheter

Milleret

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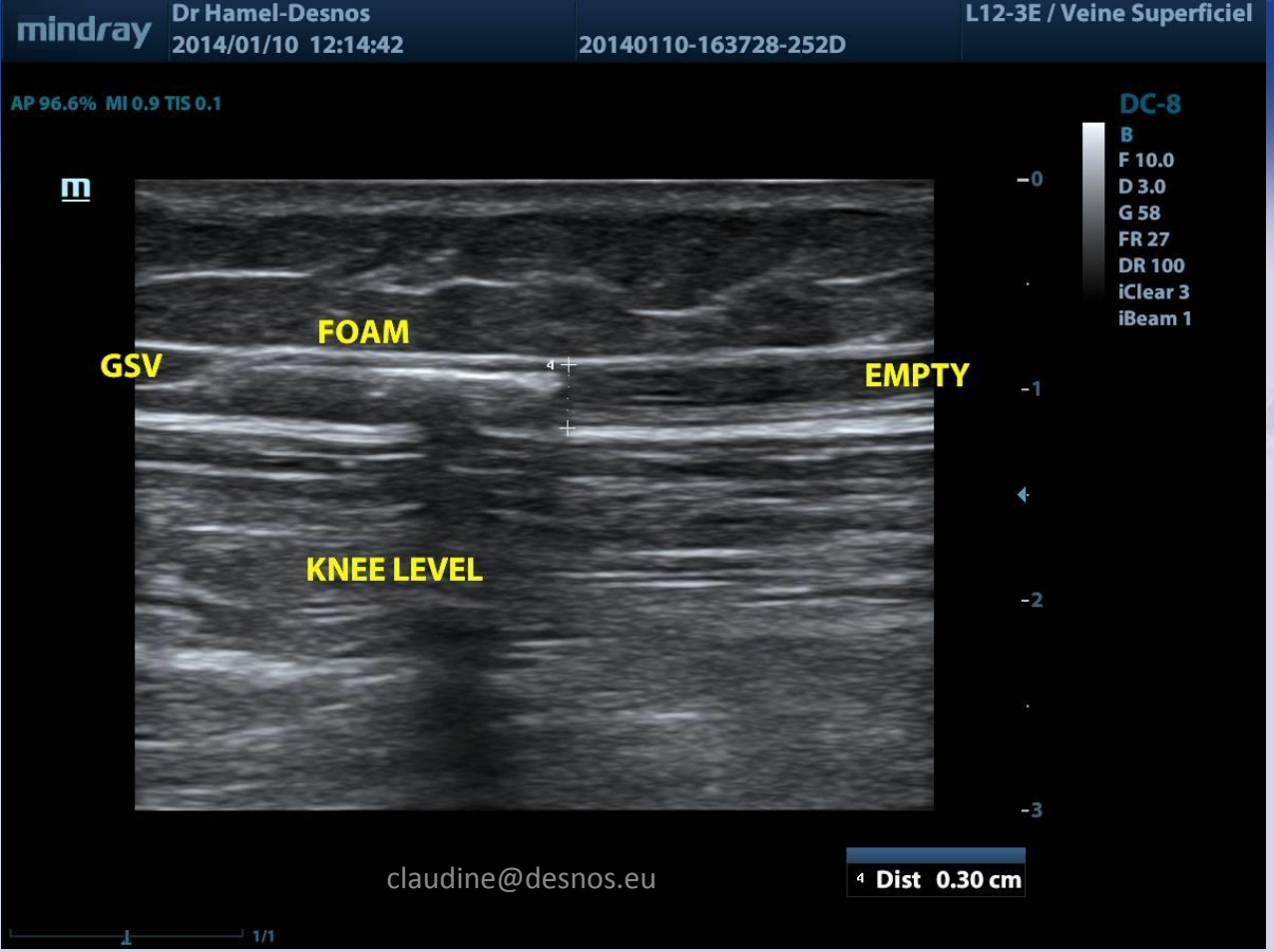
INFLUENCE of the DOSAGES

Volumes and concentrations

		POL FOAM	STS FOAM
TRIBUTARY VARICOSE VEINS		**up to 2% (1B)**	**up to 1% (1C)**
SAPHENOUS VEINS	<4 mm	**up to 1% (1B)**	**up to 1% (1C)**
	≥4 and ≤8 mm	**1-3% (1A)**	**1-3% (1B)**
	>8 mm	**3% (1A)**	**3% (1B)**
PERFORATING VARICOSE VEINS		**1-3% (2B)**	**1-3% (2B)**

Recommended maximum volume of foam is
10 ml per session in routine cases (2B)
Larger foam volumes increase the risk of a thrombosis

Rabe et al. European guidelines for sclerotherapy in chronic venous disorders. Phlebology 2014



The direct puncture allows you to adjust volume and concentration very accurately

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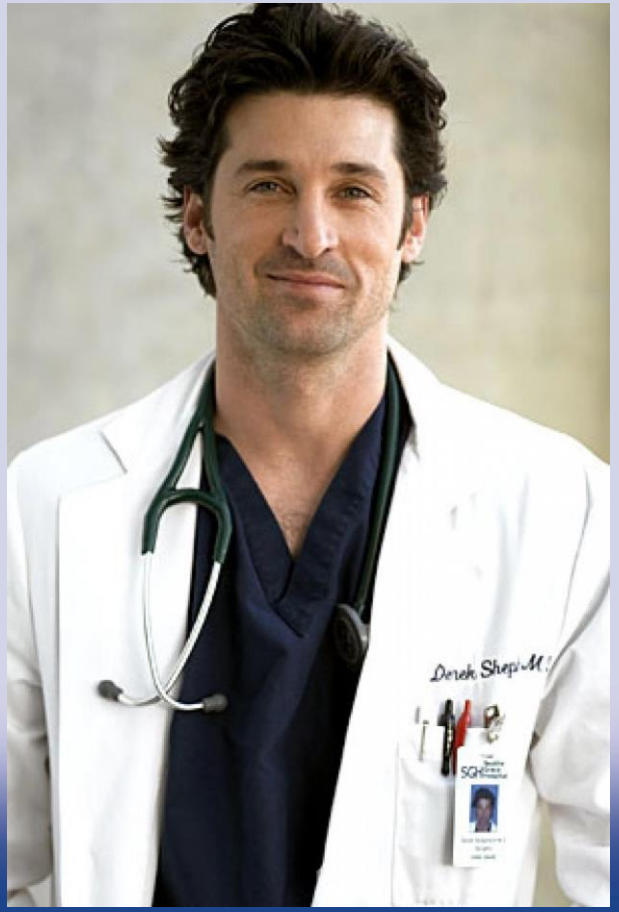
INFLUENCE of the OPERATOR



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Success depends on the operator

- Rabe et al.: GSV reflux elimination (3M-FU, mean volume **4** mL):
  - 6 centres : **96%**
  - 4 centres : **39%**
- Wright et al. : Surgeons (S) vs Phlebologists (P)
  - occlusion : **68%** for **S** vs **94%** for **P** (3M-FU)
  - mean volume (Varisolve®) : **25** mL for **S** vs **15** mL for **P**
- Hamel-Desnos et al. : 2 experienced centres
  - occlusion **100%** for both (1 single session, mean volume **4** mL; independent assessment at 1 M-FU)

- Rabe et al. Efficacy and Safety of Great Saphenous Vein Sclerotherapy Using Standardised Polidocanol Foam (ESAF): A Randomised Controlled Multicentre Clinical Trial. Eur J Vasc Endovasc Surg. 2008

- Wright et al. Varisolve European Phase III Investigators Group. Varisolve® polidocanol microfoam compared with surgery or sclerotherapy in the management of varicose veins in the presence of trunk vein incompetence: European randomized controlled trial. Phlebology 2006

- Hamel-Desnos et al. Foam sclerotherapy of the saphenous veins: randomized controlled trial with or without compression. Eur J Vasc Endovasc Surg 2010

INFLUENCE of COMPRESSION

Compression after sclerotherapy for varicose veins

"Evidence of efficacy is still lacking"

- Rabe et al. Europ. Recom.: 2 C
- NICE : No recommendation for its use. If used, « do not use for more than 7 days »

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- *Rabe et al. European guidelines for sclerotherapy in chronic venous disorders. Phlebology 2014*
- *Hamel-Desnos et al. Foam sclerotherapy of the saphenous veins: randomized controlled trial with or without compression. Eur J Vasc Endovasc Surg 2010*
- *National Institute for Health and Clinical Excellence (NICE). Varicose veins in the legs. The diagnosis and management of varicose veins. July 2013; NICE clinical guideline 168; guidance.nice.org.uk/cg168*

Tumescence

- **Interfascially**
- **Under US-guidance**
- *Tumescence with or without vasoconstrictor agent?*
- *Short cannula? long catheter?*
- *Before or after foam injection?*

- *Van Cleef J-F. La tumescence dans l'ablation chimique. Phlébologie 2014*
- *Thibault P. Internal compression (peri-venous) following ultrasound guided sclerotherapy to the great and small saphenous veins. Aust.NZ.J.Phleb. 2005*
- *Parsi K. Catheter-directed sclerotherapy. Phlebology 2009*
- *Cavezzi A, Tessari L. Foam sclerotherapy techniques: different gases and methods of preparation, catheter versus direct injection. Phlebology 2009*
- *Cavezzi A et al. Peri-venous tumescence infiltration in long catheter foam sclerotherapy of great saphenous vein combined with phlebectomy of the varicose tributaries: any benfit? EVF congress, Florence June 2012*
- *Van Cleef J-F, Tiret J-P. Mousse sclérosante associée à des inejctions adrénalinées périneineuses pour des grandes veines saphènes de 8 mm et plus: étude préliminaire Congrès Versailles, juin 2013.*
- *Devereux N, Recke AL, Westermann L, Recke A, Kahle B. Catheter-directed foam sclerotherapy of great saphenous veins in combination with pre-treatment reduction of the diameter employing the principals of perinenous tumescent local anesthesia. Eur. J. Vasc. Endovasc. 2014*

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Extrafascial compression

- Alpha-technique (Esmarch bandage)
- « External Compression »

- Milleret R, Garandeau C. Sclérose des grandes veines saphènes à la mousse délivrée par cathéter écho-guidé sur veine vide: Alpha-technique. Bilan des 1000 premiers traitements. Phlébologie 2006

- Gachet G, Galem K. L'écho-sclérose mousse des varices sous compression ou « tumescence externe » : l'étude MOUSSECOMP. Phlébologie 2014

Catheter-directed Foam Sclerotherapy of Great Saphenous Veins in Combination with Pre-treatment Reduction of the Diameter Employing the Principals of Perivenous Tumescent Local Anesthesia

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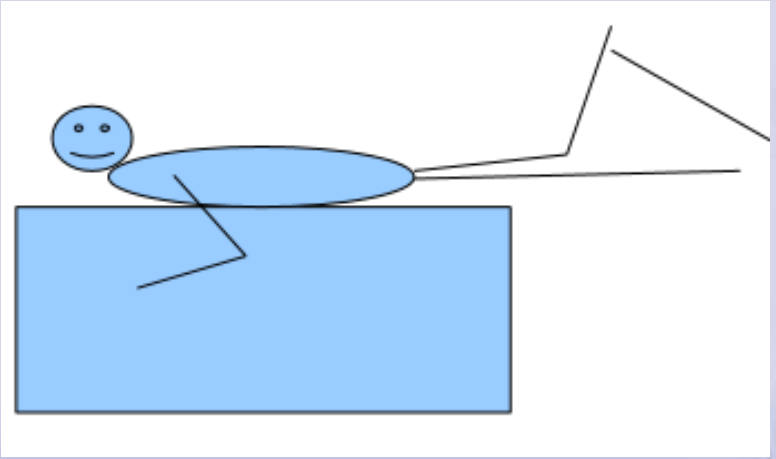
[a] Department of Dermatology, University of Schleswig-Holstein, Campus Luebeck, Germany
[b] Dermatological Practise, Hamburg, Germany

Conclusion: No benefit could be found using additional TA to reduce the vein diameter before the treatment.

The only published RCT

Devereux et al. Catheter-directed foam sclerotherapy of great saphenous veins in combination with pre-treatment reduction of the diameter employing the principals of perinenous tumescent local anesthesia. Eur. J. Vasc. Endovasc. 2014

INFLUENCE of MANEUVERS and OTHERS



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- Elevation of the leg (before, after ?)
- Compression of the junction
- Prolonged lying posi
- Foot and a ements
- A pation
- old Valsalva maneuver (putting on socks/shoes)
- FWS (foam wash-out sclerotherapy)

No evidence of a clinical benefit

European guidelines do not recommend elevation of the leg or compression of the junction

- *Rabe et al. European guidelines for sclerotherapy in chronic venous disorders. Phlebology 2014*
- *Parsi K. Venous gas embolism during foam sclerotherapy of saphenous veins despite recommended treatments modifications. Phlebology 2011*
- *Hill et al. Assessment of techniques to reduce sclerosant foam migration during ultrasound–guided foam sclerotherapy of the great saphenous vein. J Vasc Surg 2008*
- *Morrison et al. Studies on safety of foam sclerotherapy. In: Bergan, Chang eds. Foam sclerotherapy: A Textbook 2008*
- *Thomasset et al. Ultrasound Guided foam sclerotherapy : factors associated with outcomes and complications. Eur J Vasc Endovasc Surg 2010*
- *Ceulen et al. Blocking the sapheno-femoral junction during ultrasound –guided sclerotherapy- Assessment of a presumed safety-measure procedure. Eur J Vasc Endovasc Surg 2010*
- *Raymond-Martimbeau. Air Embolism Complications Associated with Sclerotherapy, Phlébologie 2012*

CONCLUSION

- **Foam quality**
- **Tactic and technique**
- **Experience (operator)**

- **Air-foam**
- **From proximal to distal; staged technique and direct puncture with needle**
- **Good skills (including Venous DUS) and training**

Make it simple !