Traitement endo-veineux des saphènes incontinentes : Actualités

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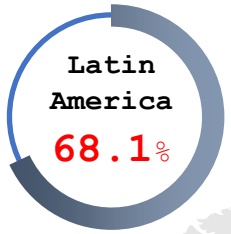
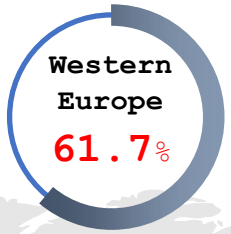
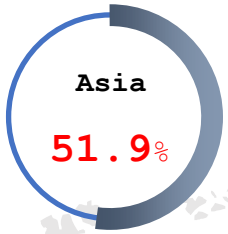
Libéral – Alger

Epidemiology

Global prevalence & clinical stages of CVD







clinical stage (C)

	Eastern Europe	Latin America	Western Europe	Asia	Africa
C0s	31.9%	31.9%	38.4%	48.7%	NA
C1	19.0%	25.2%	21.4%	18.4%	NA
C2	21.3%	19.2%	15.4%	13.7%	NA
C3	17.5%	13.4%	15.8%	13.6%	NA
C4	9.5%	9.3%	7.4%	5.0%	NA
C5	2.1%	2.5%	1.2%	0.6%	NA
C6	0.8%	1.5%	0.4%	0.7%	NA

Adapted from: Vuylsteke ME, et al. Angiology. 2018;69(9):779–785; Salim S, et al. Global Ann Surg. 2021;274(6):971–976.

NA not available data

Epidemiology

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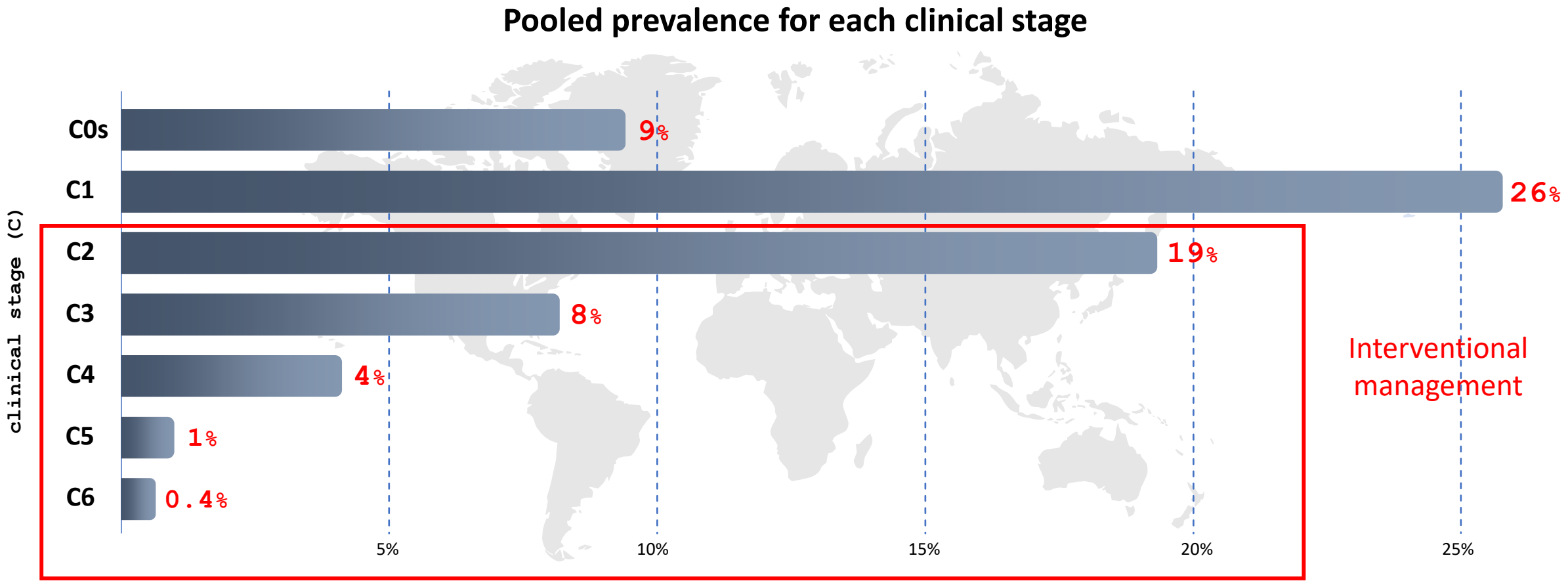


Adapted from: Salim S, et al. Ann Surg. 2021;274(6):971–976.

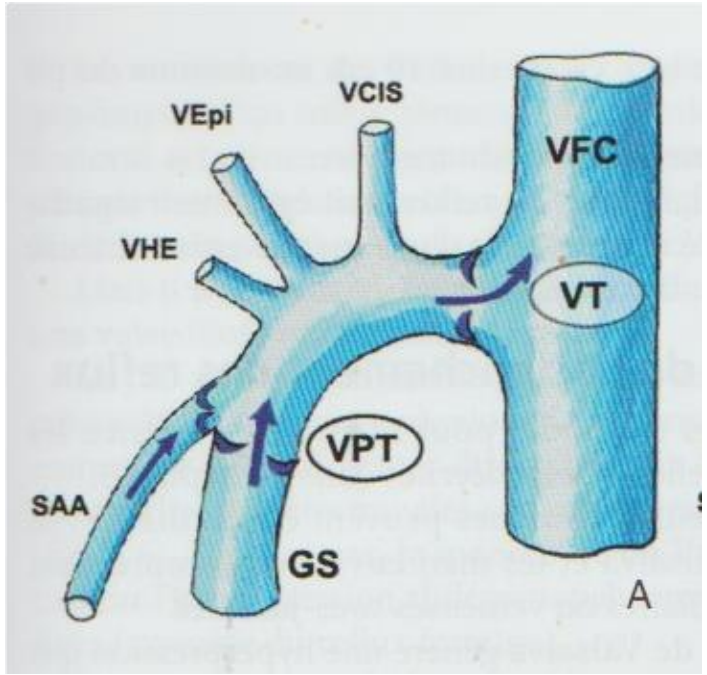
Introduction

- Varicose veins = 10 – 40% of Western populations
- 20– 35% of the population in France.
- Saphenous veins involved in 30 – 50% of cases.
- 25% trophic disorders (GSV).
- Conservative and/or radical treatment→ Removal of varicose veins (saphenous vein)
- Crossectomy– Stripping (CS) / High Ligation + Stripping (HLS): Reference surgical TRT.

Updates

Surgical excision of the SFJ questioned → Minimally invasive surgery = Stripping with respect to the junction (ligation at the level of the preterminal valve)

- Between these 2 valves we define the intervalvular segment, which is a true hemodynamic airlock.
- Drains anti-gravity flows at the time of muscle systole, which go from bottom to top (GSV trunk & AAST).
- Drains gravitational flows during muscle diastole (from top to bottom), the 2 abdominal afferents and 1 genital afference.



Updates

Therapeutic alternatives by endovenous techniques→ saphenous vein occlusion.

Ultrasound Guid Foam Sclerotherapy (UGFS)

Glue = Medical Glue (Cyanoacrylate)

} **Chemical**

Thermal ablation of the saphenous veins by radio frequency (RF) or laser (EVLA).

Steam

Microwave

} **Thermal**

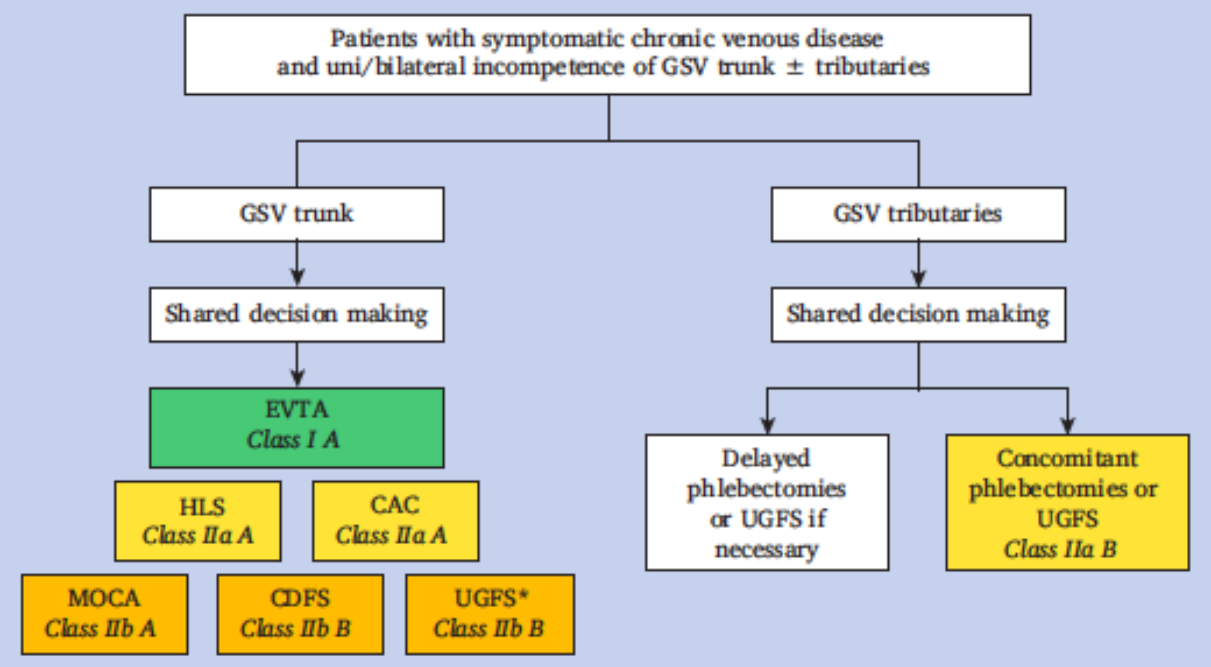
Procédures échoguidées

MOCA

LAFOS

} **Combined techniques (EVTT/ Mechanical + foam)**

Méthodes de traitement des varices



- **Thermiques – Tumescentes**
  - LEV &RF
  - Vapeur
  - Micro-ondes
- **Non thermiques +/- tumescentes:**
  - Chirurgie
- **Non thermiques - non tumescentes:**
  - Echosclérose mousse
  - MOCA
  - Cyanoacrylate

Updates

Illustrative summary of techniques available for treating saphenous trunk incompetence

Technique	Published follow up	Reflux abolition	Quality of life improvement	Tumescence needed	Risk of nerve injury below mid-calf*
EVTA	≥ 5 y	+++	+++	Yes	Yes
HLS	≥ 5 y	+++	+++	Yes†	Yes
CAC	3–5 y	+++	+++	No	No
UGFS	≥ 5 y	+/++‡	++/+++‡	No	No
CDFS	1 y	++	++	Yes/no	No
MOCA	3 y	++	+++	No	No

EVTA = endovenous thermal ablation; HLS = high ligation and stripping; CAC = cyanoacrylate adhesive closure; UGFS = ultrasound guided foam sclerotherapy; CDFS = catheter directed foam sclerotherapy; MOCA = mechanochemical ablation. +++ = very good effect; ++ = good effect; + = some effect (see details in subsection 4.1 – 4.3).

* For other complications: see details in subsections 4.1 – 4.3.

† Or alternative anaesthesia technique.

‡ Truncal diameter < 6 mm.

Ablation thermique

EndoVenous Thermal Ablation: EVLA – RF

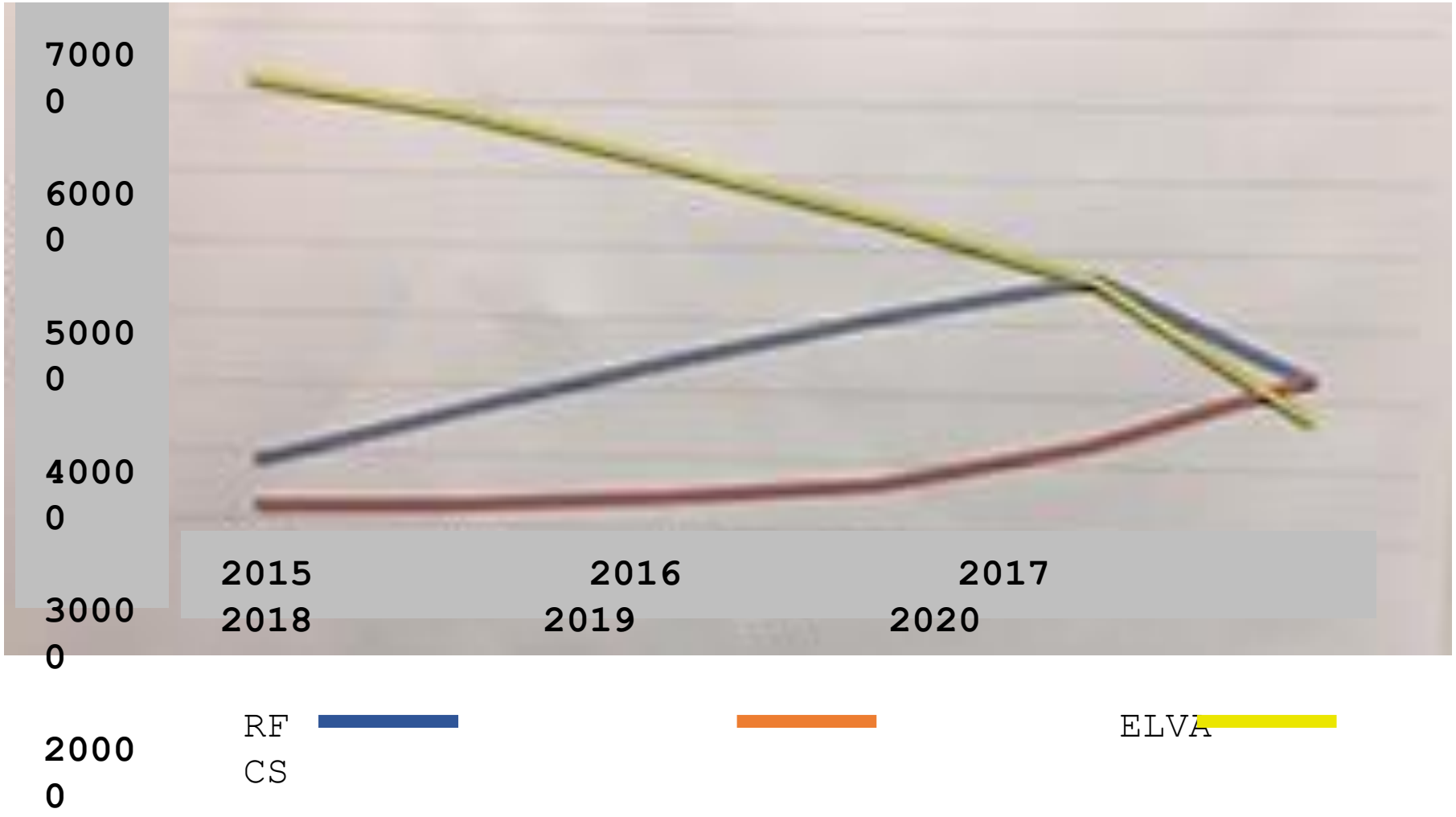
1st intention trt since 2018 .

Thermal ablation of GVS supplants surgery.

Benefits / Surgery

- **Dedicated room outside the operating room**
- **No anesthesia, No premedication**
- **Fewer Ilary effects**
- **Immediate release**
- **No W Stop**
- **Identical Qol (even if different anatomical result)**
- **Equivalence of recidivism**

Evolution of varicose vein surgery in France between 2015 and 2020



Indications according to the Ø of the incontinence saphenous vein

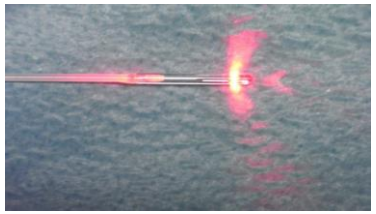
UGFS optimale ≤ 6mm

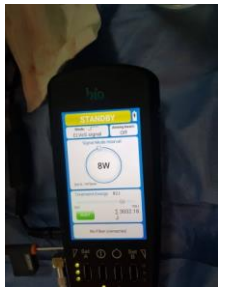
≤ 5mm	5 à 10 mm	10 à Xmm

Foam	Foam or EVTA	EVTA

EndoVenous Laser Ablation (EVLA)

Thermal Energy Applicator = Occlusion at > 60J/cm

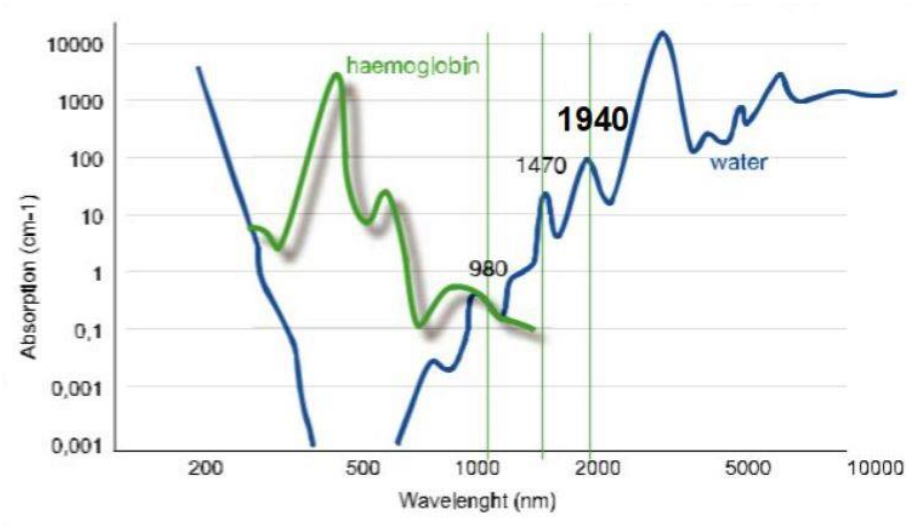


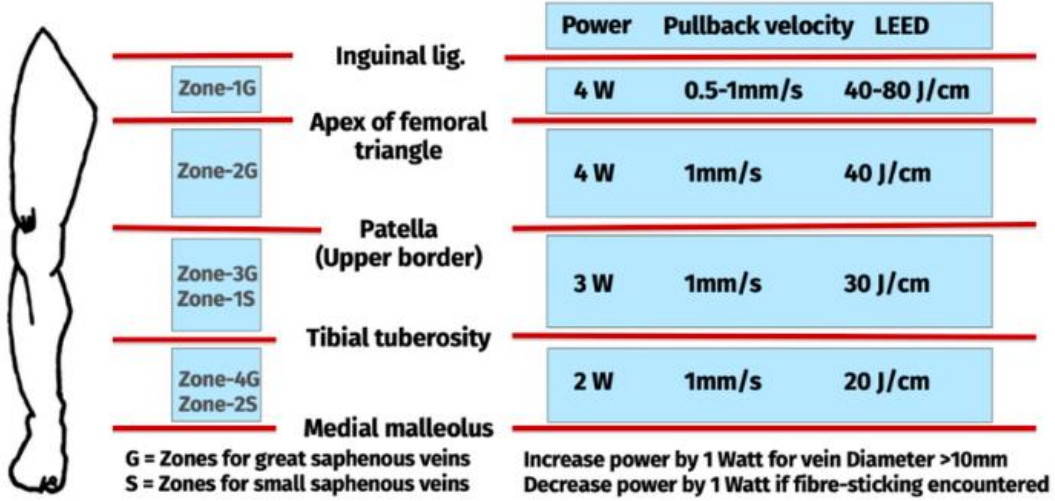


- ***Radial or double radial fibers***
- ***Wavelength = 1470 nm***
- ***Configurable energy: 7 W< Power < 10 W . Energy > 60J/cm***
- ***Continuous shrinkage per cm***
- ***Small diameter and flexible***
- ***No thermal inertia = ON/OFF effect***
- ***Direct destruction of the venous wall: charring of the tunics, collagen synthesis by fibroblasts and then fibrous retraction***

SAMEV

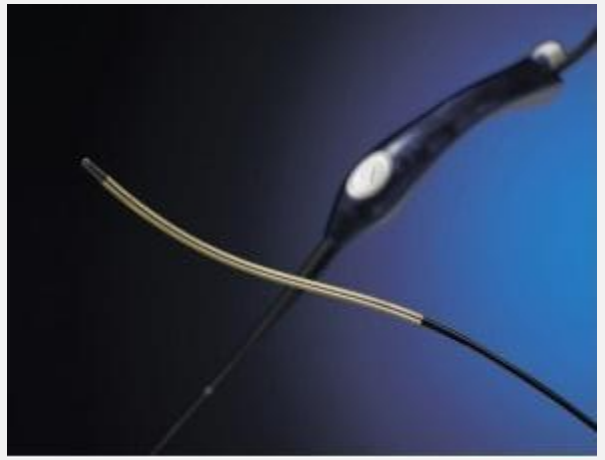
Laser endoveineux: 1940 nm





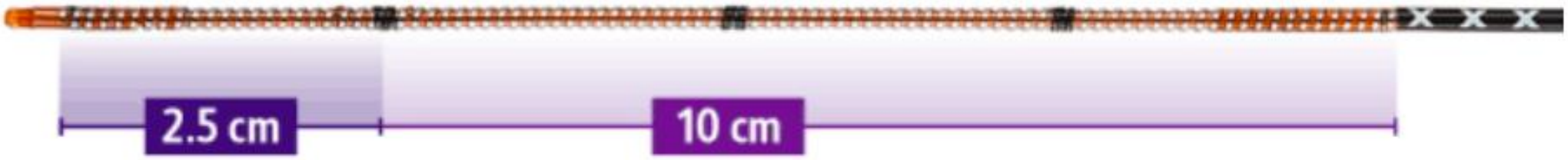
Radio-Fréquence (RF)

- Closure Fast : Extrémité de sonde de 7 et 3cm
- Retrait de segment en segment
- Cycles de 20s
- Sonde peu souple



- Inertie thermique = Risque de brûlure ++ (PVS)
- Destruction immédiat intima puis épaississement media et adventice , nécrose des FML , rétraction la parois d'où occlusion , transformation fibreuse en 6 mois

Radiofréquence: Venclose

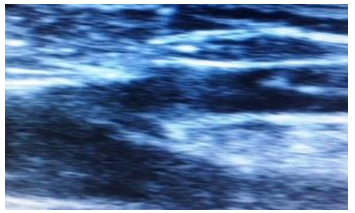


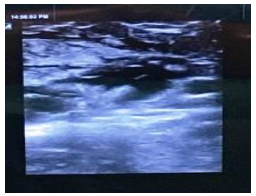
Procedure EVTA – SFMV – SFP

- **Ultrasound-guided percutaneous puncture of the vein with a straight needle**
- **Installation of a metal guide**
- **Installation of an introducer thanks to the metal guide**
- **Inserting the Thermal Applicator ... the Introducer**
- **Positioning the tip of t... ...tor**
- **Tumescence a...**
- **Energy Ap...**
- **Ultrasound Efficacy Verification**





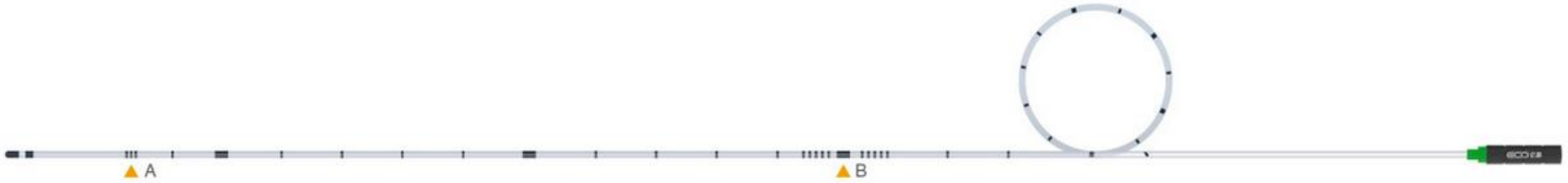





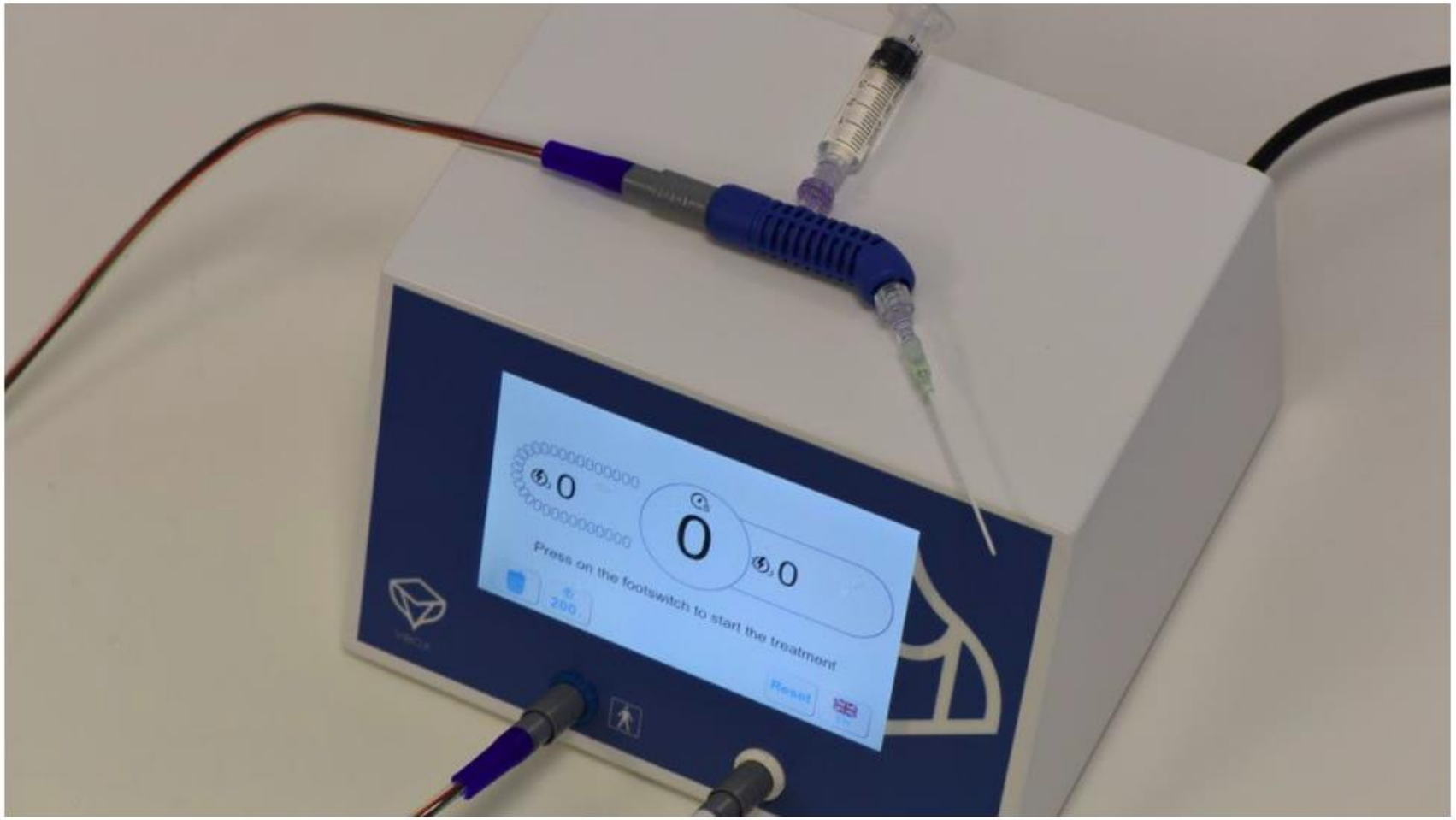
Ultrasound-guided procedure = Safety

ECO Microwaves

- Cathéter 6 Fr
- Action d’échauffement des molécules d’eau des cellules de la paroi veineuse
- Pas d’exsanguination
- 85°



Vapeur: Miravas



Ablation chimique : Cyanoacrylate

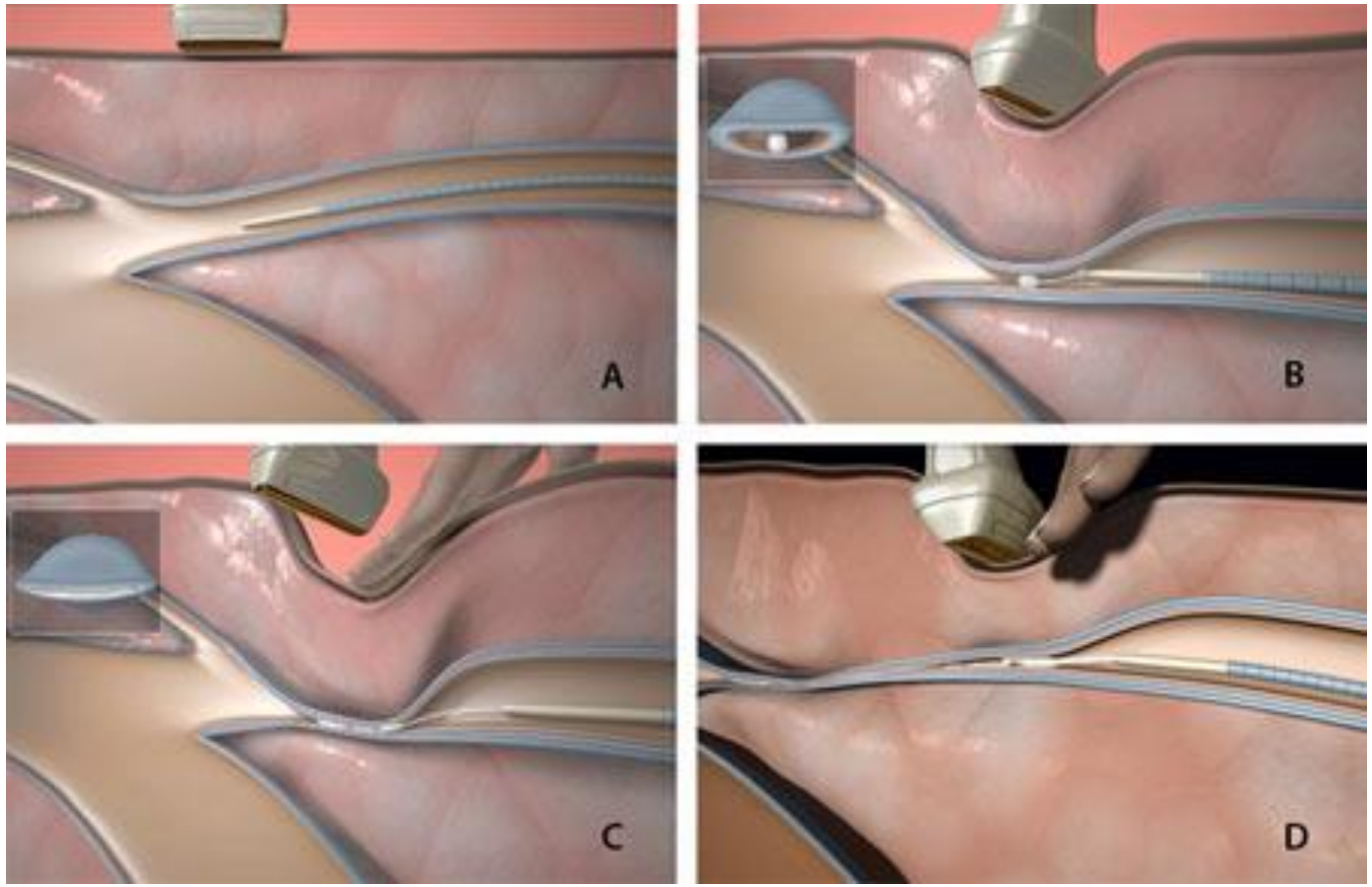
Medtronic

VariClose
Vein Sealing Systems
by biolas

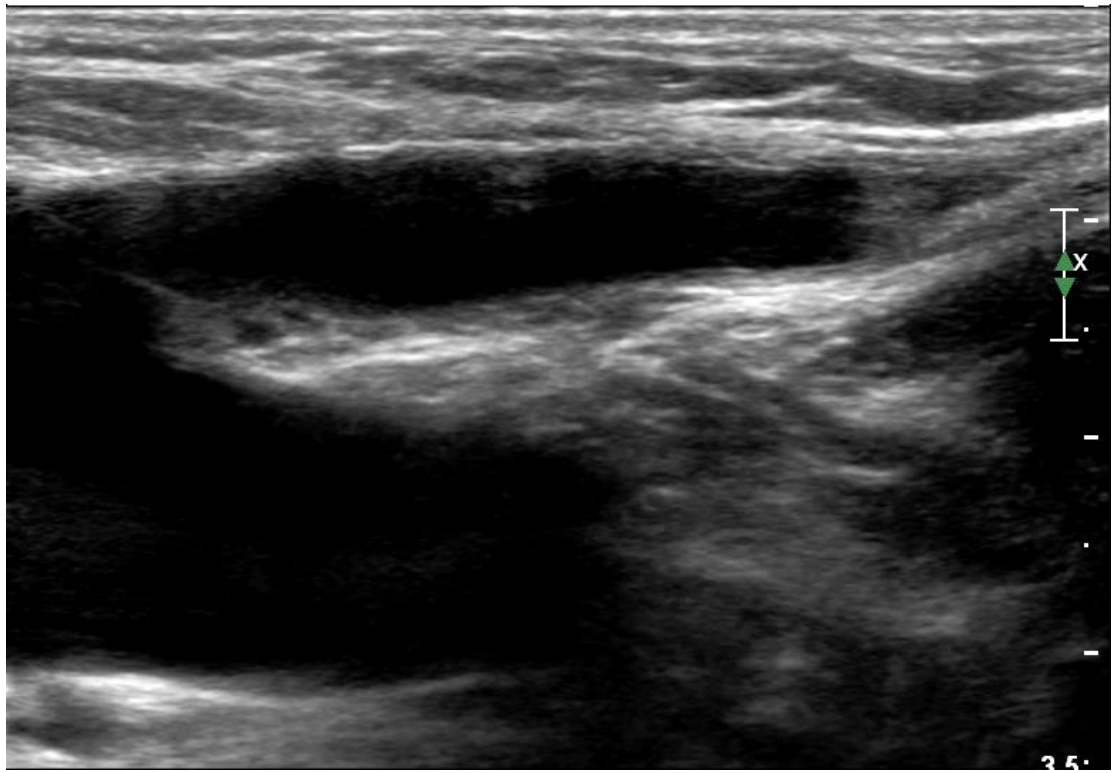
- Venous occlusion with glue, same effectiveness as EVTA

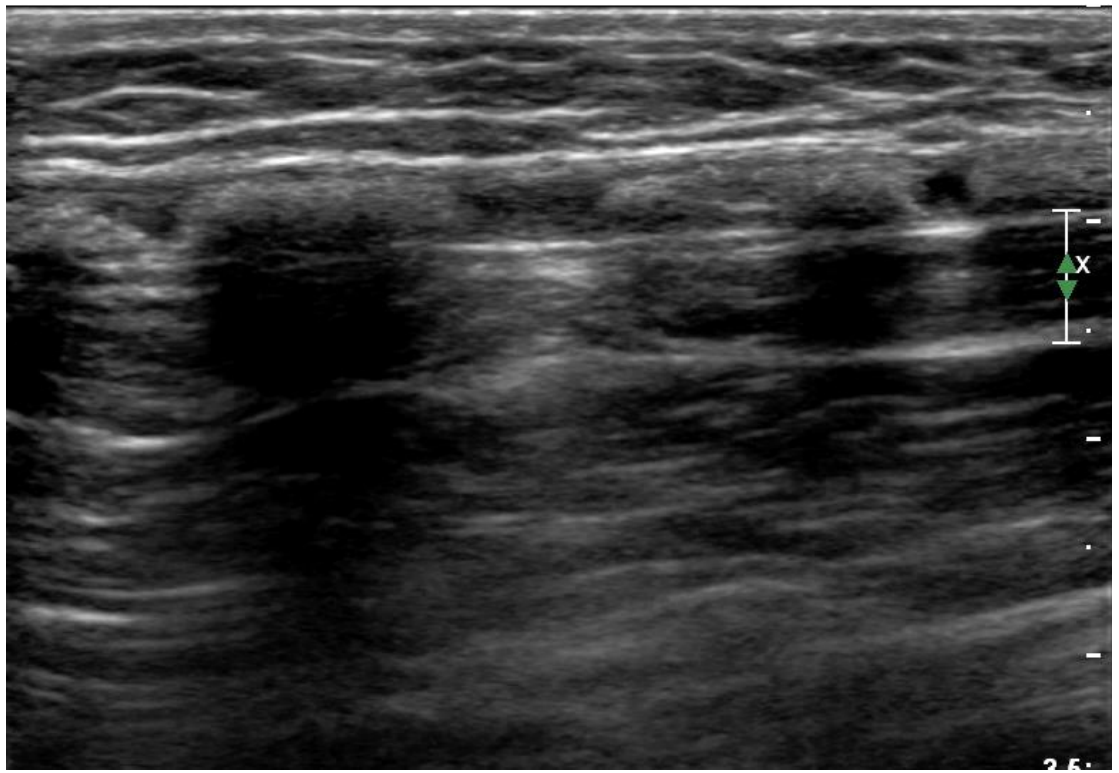
- No limitation related to the diameter of the vein.

- It induces an instantaneous occlusion of the vein by polymerizing when it comes into contact with the blood, forming a mold made of blood and adhesive.



J8





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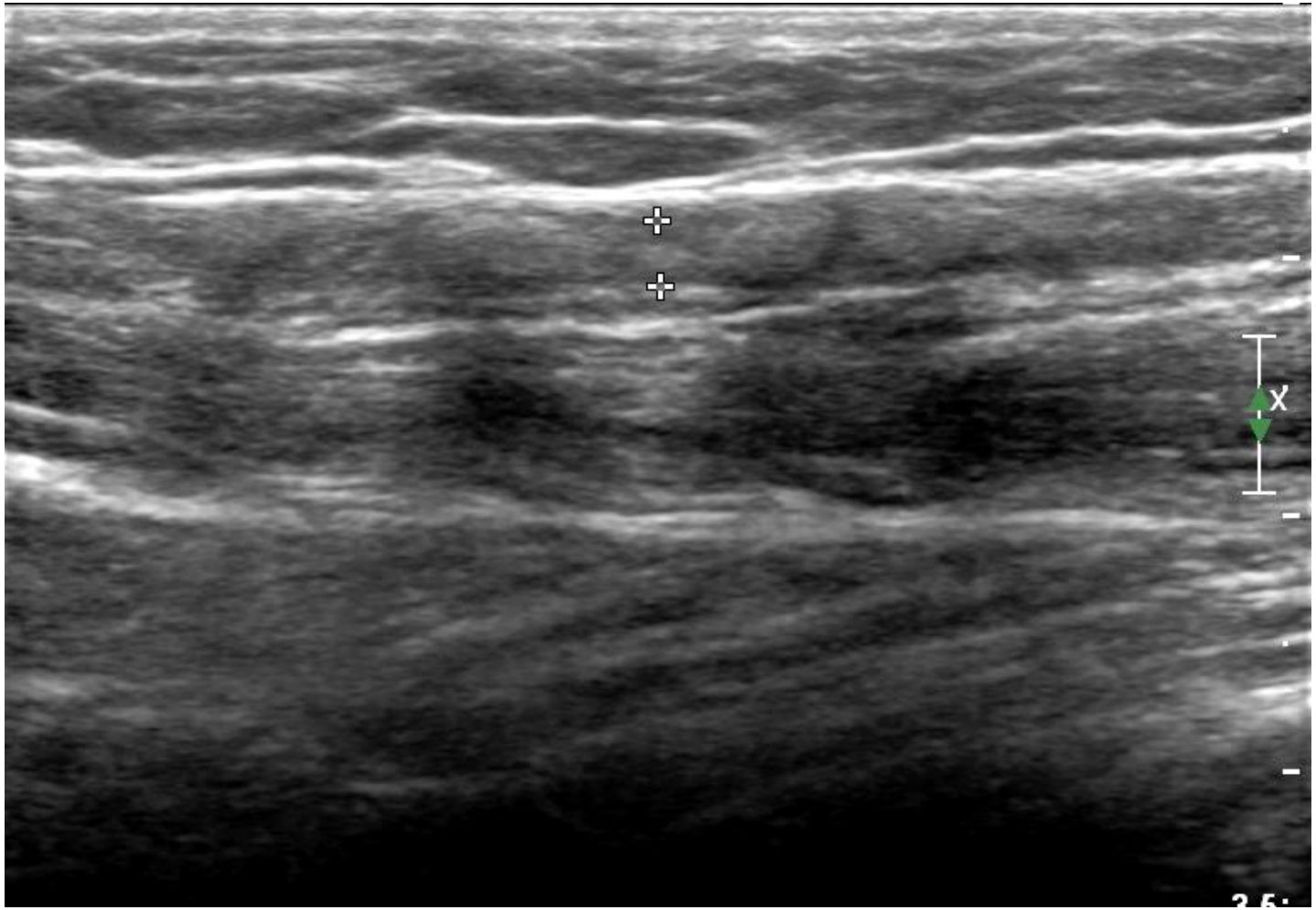


Etude Européenne

- 7 centres
- 70 VGS chez 70 patients
- Suivi 1 an

  - 5 recanalisations partielles
  - Extension thrombotique JSF: 1.4%
  - Réaction inflammatoire: 11.4%
  - Douleurs: 8.6%

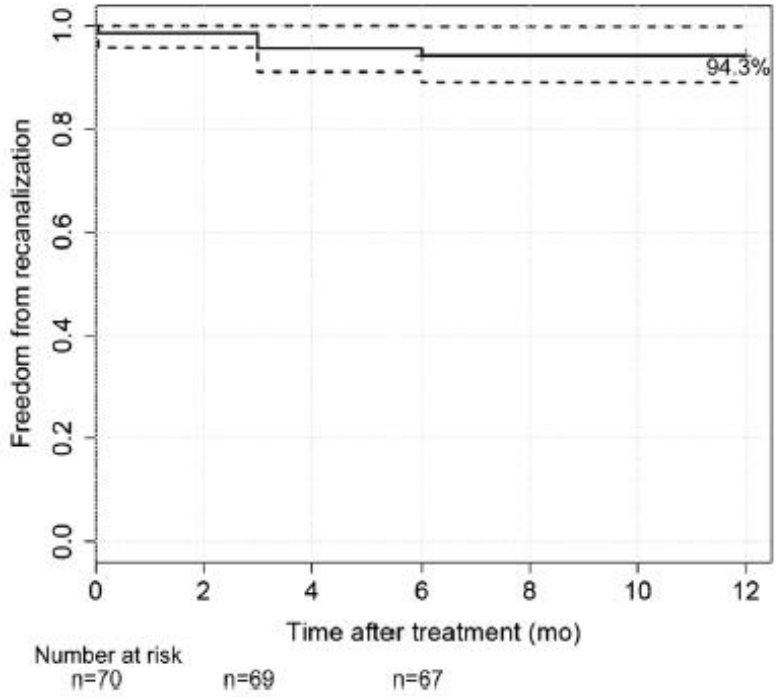


Fig 1. Survival free from recanalization of the target vein.

Proestle T et al. The European multicenter cohort study on cyanoacrylate embolization of refluxing great saphenous veins. J Vasc Surg: Venous and Lym Dis 2015

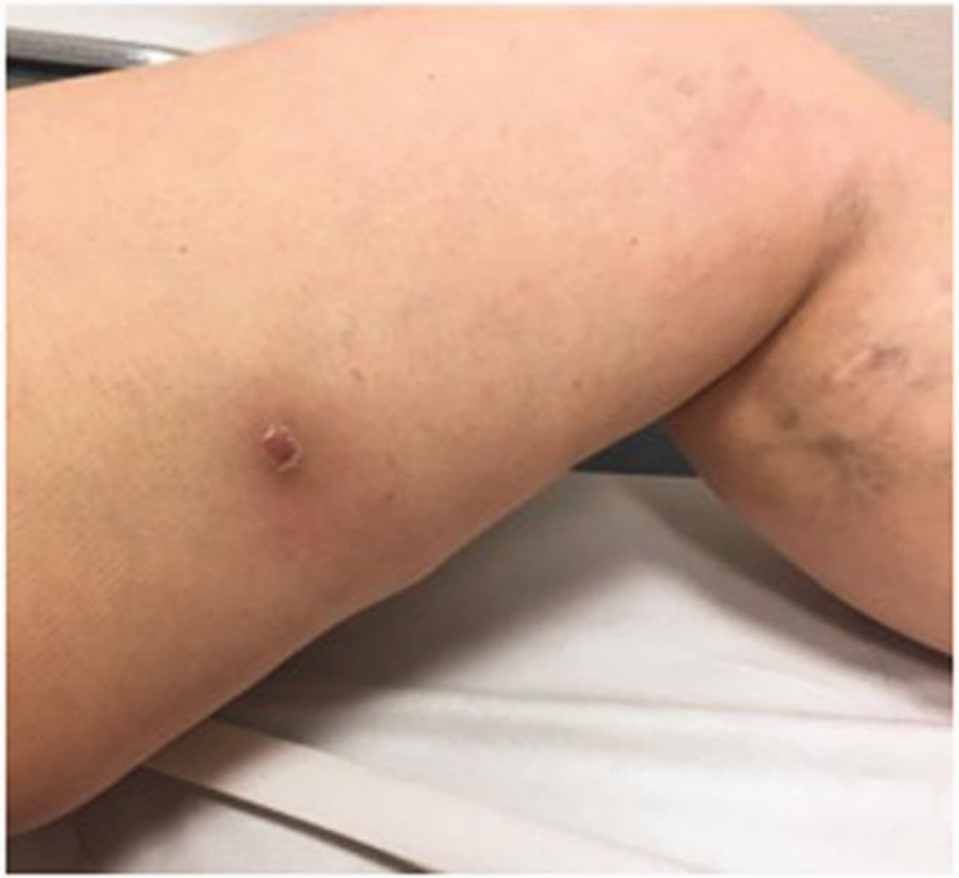
CA versus RF

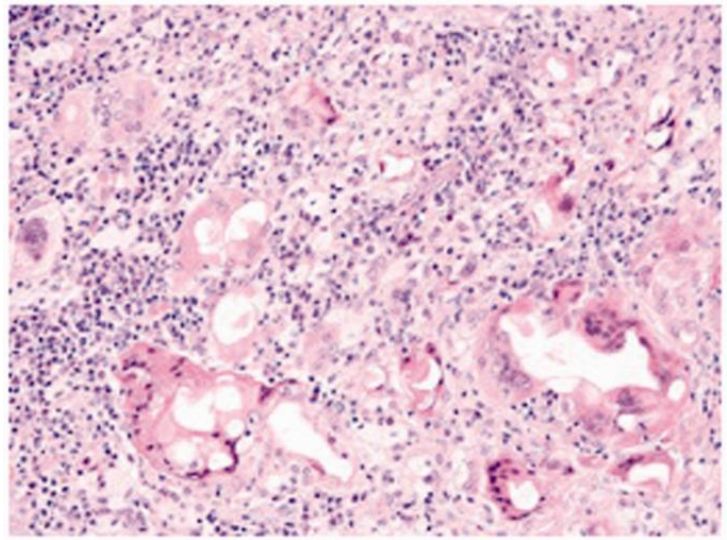
- Etude de non infériorité
- 222 VGS:
  - CA= 108,
  - RF=114
- Suivi 3 mois
- Diamètre 3 - 12 mm

Table VI. Adverse events

	VenaSeal, No. (%)	*RFA, No. (%)*	P *value*[a]
No. of adverse events per subject			
0	74 (69)	85 (75)	.37
1	28 (26)	22 (19)	
2	6 (6)	6 (5)	
3	0 (0.0)	0 (0.0)	
4	0 (0.0)	1 (1)	
Event severity			
Mild	26 (24)	30 (26)	.35[c]
Moderate	12 (11)	7 (6)	
Severe	2 (2)	1 (1)	
Procedure-related adverse events[b]	27 (25)	31 (27)	.76
Device-related adverse events[b]	13 (12)	7 (6)	.16
Reported adverse events			
Phlebitis, any zone	22 (20)	16 (14)	.36
Phlebitis in treatment zone	11 (10)	10 (9)	.82
Phlebitis not in treatment zone	8 (7)	4 (4)	.24
Phlebitis in both treatment zone and nontreatment zone	1 (1)	1 (1)	1.0
Paresthesia in treatment zone	3 (3)	3 (3)	1.0
Stocking irritation	2 (2)	3 (3)	1.0
Access site infection	1 (1)	1 (1)	1.0
Superficial thrombophlebitis	4 (4)	3. (3)	.72
Access site burn	0 (0)	1 (1)	1.0
Paresthesia not in treatment zone	0 (0)	1 (1)	1.0
Other adverse events[d]	10 (9)	11 (10)	1.0

Morrison N et al. Randomized trial comparing cyanoacrylate embolization and radiofréquency for incompetent great saphenous veins (VeClose) J Vasc Surg: Venous and Lym Dis 2015





Langridge B. Cyanoacrylate glue embolization for varicose veins – A new complication. Phlebology 2020

Cyanoacrylate Butyl

Our Trial Sept 2023 – May 2024

Glue procedure

- ✓ Ultrasound-guided percutaneous puncture of the vein with a straight needle
- ✓ Setting up a metal guide
- ✓ Setting up an introducer thanks to the metal guide
- ✓ Insertion of the catheter via the introducer
- ✓ Positioning of the tip of the catheter 3cm from the junction
- ✓ *No tumescence anesthesia*
- ✓ Compress the junction to block venous flow avoiding cranial extension of polymerization
- ✓ Injection of the glue by removing the catheter
- ✓ Maintain a compression of the saphenous vein for 1 minute
- ✓ Ultrasound Verification of Effectiveness

SAMEV

51 Incompetent saphenous

- 46 Adult patients
- 18 GSV– 28 SSV– 5 AASV
- Sex Ratio = 0.77 (20 M – 26 W)
- Ø of saphenous veins: 4 – 9 mm
- Glue Quantity : < 1ml - SSV, < 2ml GSV
- Technical constraints: Fast curing: Catheter capping: GSV++
- Inflammatory reactions: 5 cases: Superficial saphenous → Topical corticosteroids +/- oral
- Occlusion in 49/50 cases at 9 months follow-up
- Easier to do in case of SSV

Avantages glue / EVTA

- No tumescence
- No risk of nerve damage
- No risk of thermal damage
- No ecchymosis and no haematoma
- No hyperpigmentation
- No EHIT
- Shorter procedure time
- Rare allergic reactions

Cyanoacrylate?

Plutôt OUI

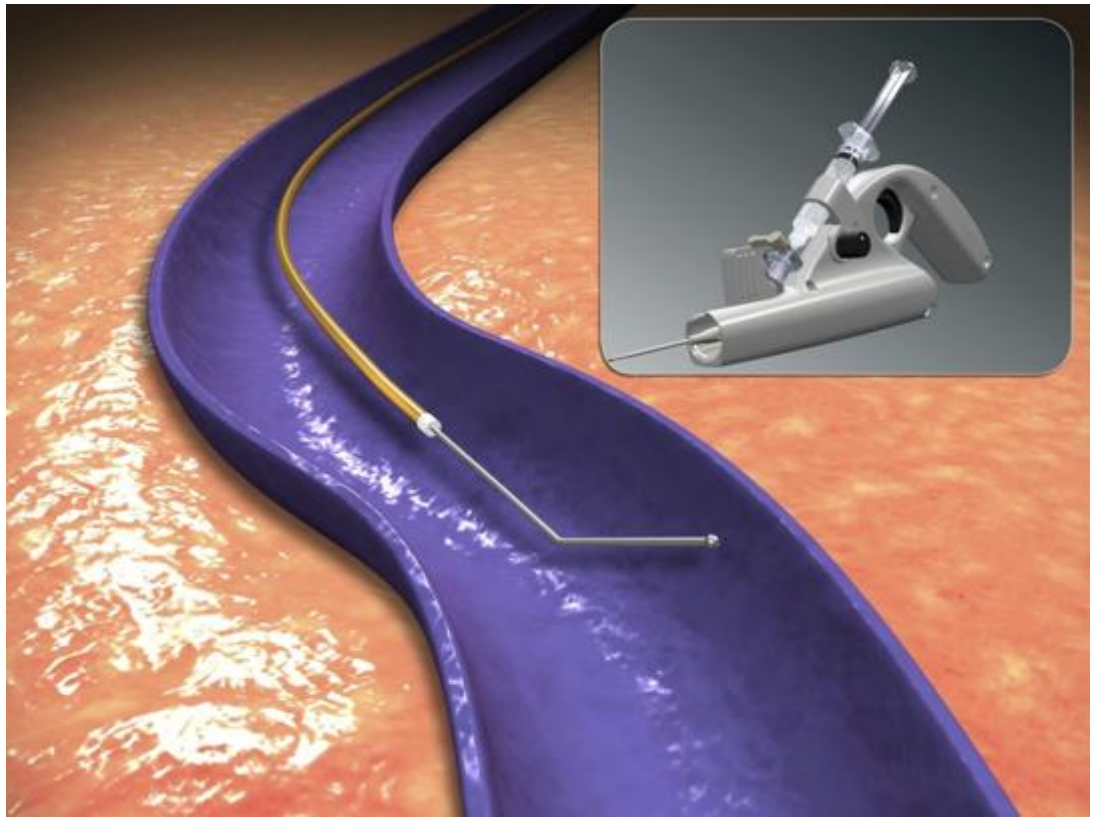
- Patients âgés
- Obèses
- Allergie lidocaïne
- Phobie des aiguilles
- *Risque neurologique*

Plutôt NON

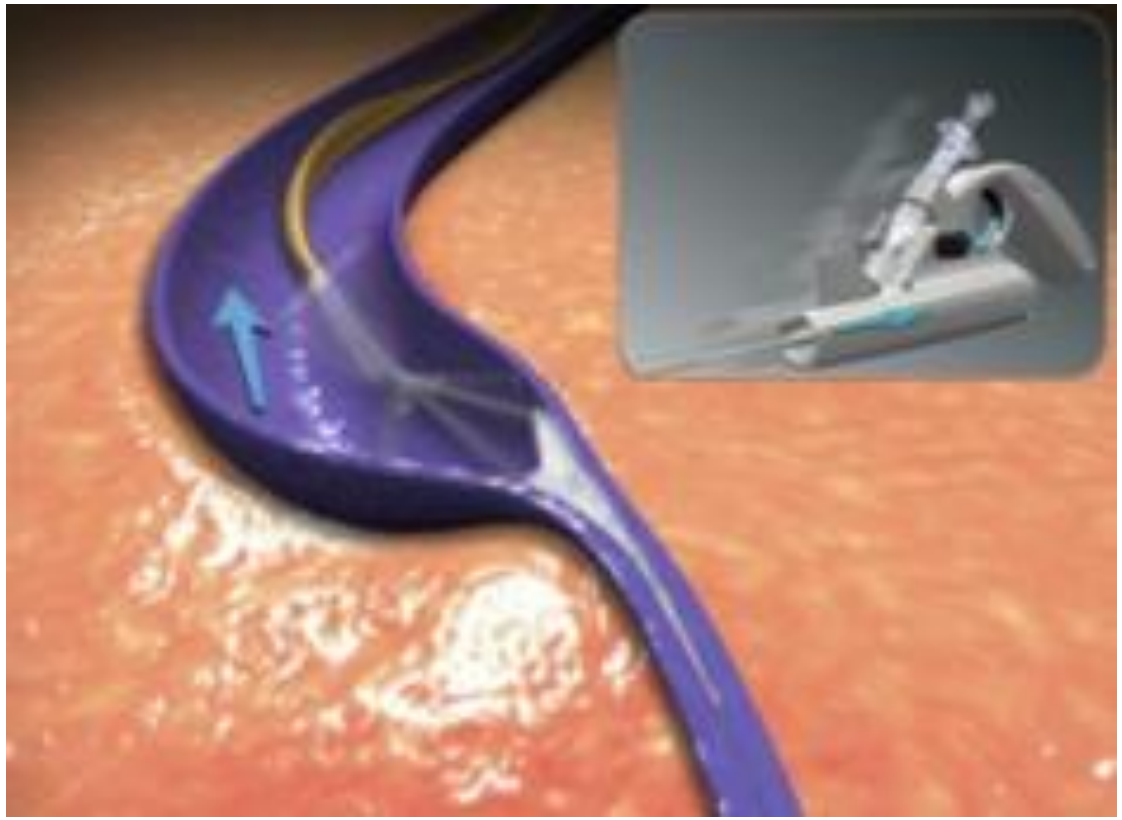
- Sujets jeunes
- Terrain allergique
- Dysimmunité

MOCA

Mecanochemical ablation



Clarivein



Méthodologie

- Intro 4F
- 0.5 cm sous l'abouchement de la v épigastrique
- Rotation seule pendant 3-10 sec
- Retrait à 6-7 cm/sec
- + infusion de sclérosant
- Polidocanol 2% ou tétradécyl sulfate 1%
- Veines < 12 mm

MOCA?

Plutôt OUI

- PVS
- GVS jambière

Plutôt NON

- Grosses veines (> 6mm)
- Limitations d'utilisation des agents sclérosants
  - Allergies
  - FOP symptomatique
  - …

MOCA

Mecanochemical ablation

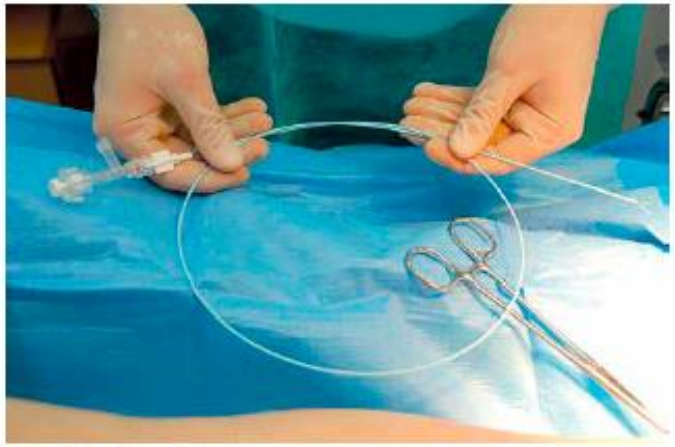


Fig. 1. Phlebogriffe

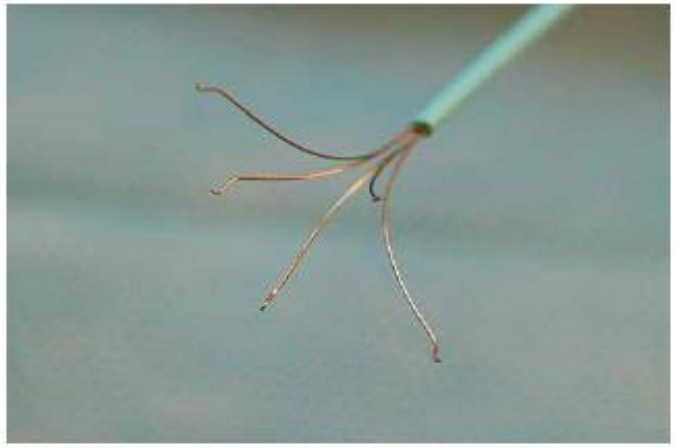


Fig. 2. Phlebogriffe – sharply terminated metal claws

Phlebogriffe

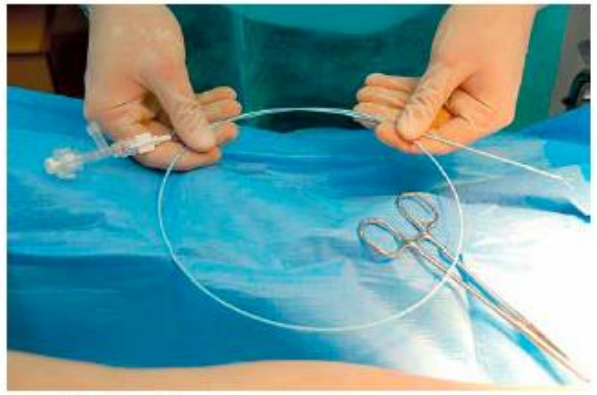


Fig. 1. Phlebogriffe

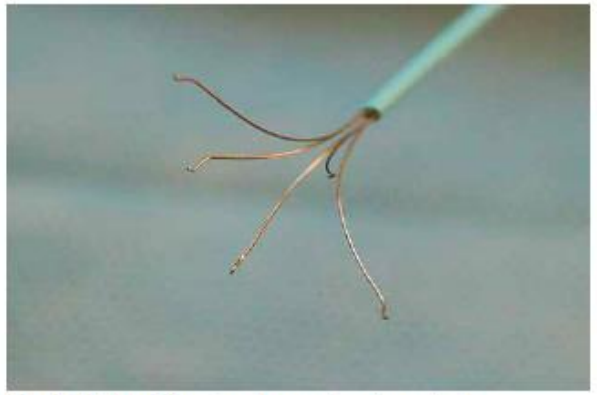


Fig. 2. Phlebogriffe – sharply terminated metal claws

Fig. 3. Prototype of intravenous catheter in the lumen of a removed great saphenous vein. Visible damaged vein wall, macroscopic view

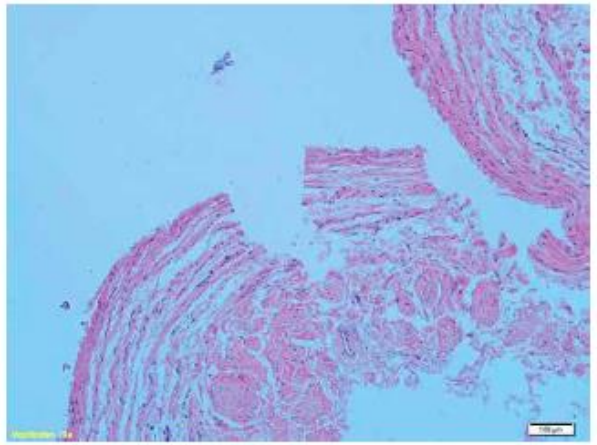


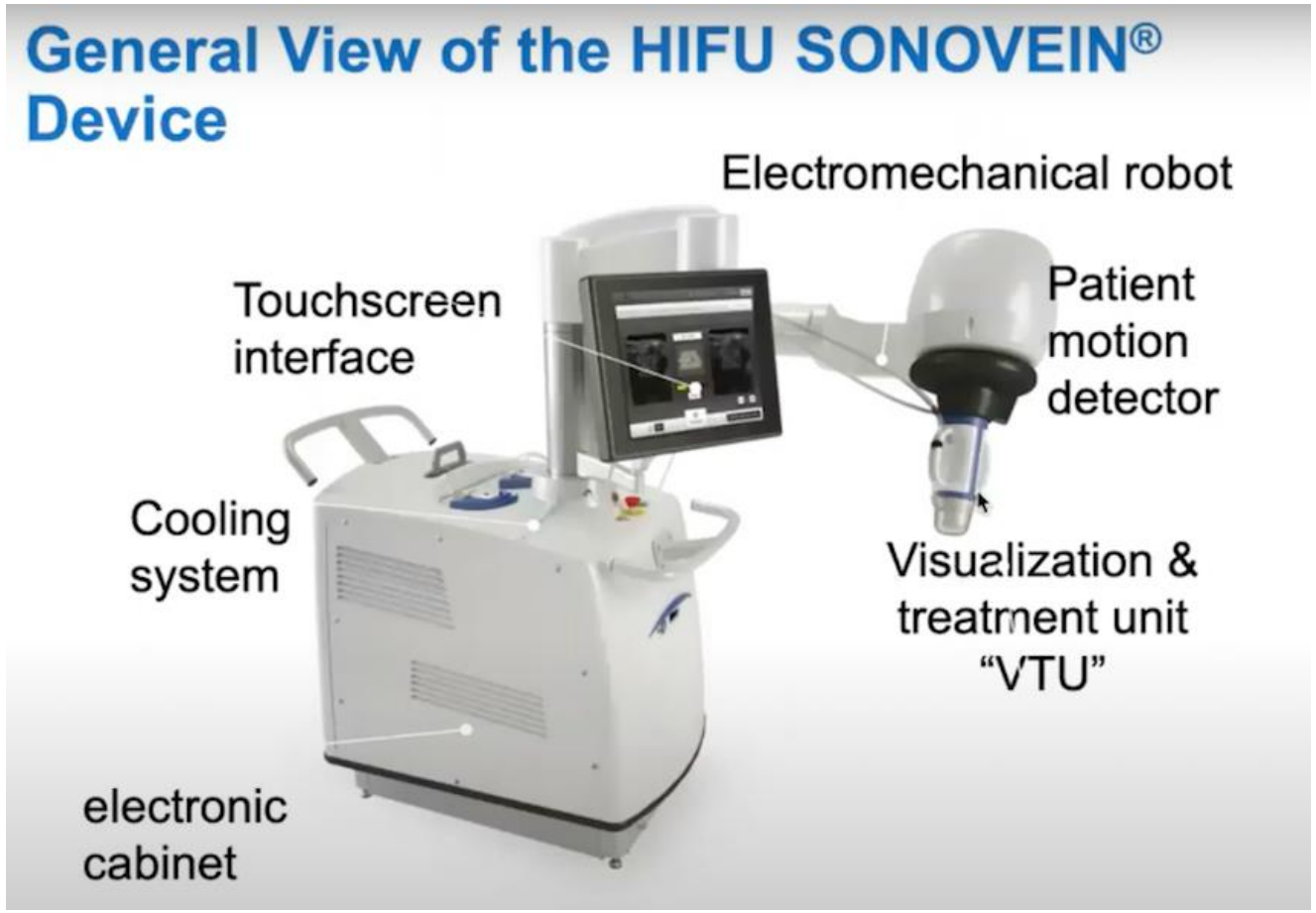
Fig. 4. Microscopic image of damaged internal wall of the great saphenous vein

High Intensity Focused Ultrasound = HIFU

Ultrasons focalisés de haute Intensité

- 20 ans : Trt des cancers de la prostate , Fibromes utérins , Nodules thyroïdiens bénins.
- Procédure d'blation thermique assez longue pour une GVS souvent associée à une tumescence.
- Recul de 3-4 ans
- Avenir : Préservation des troncs saphènes: Valvuloplasties ou Manchonnage = CHIVA ou ASVAL transcutanés.

HIFU = Ablation thermique Transcutanée



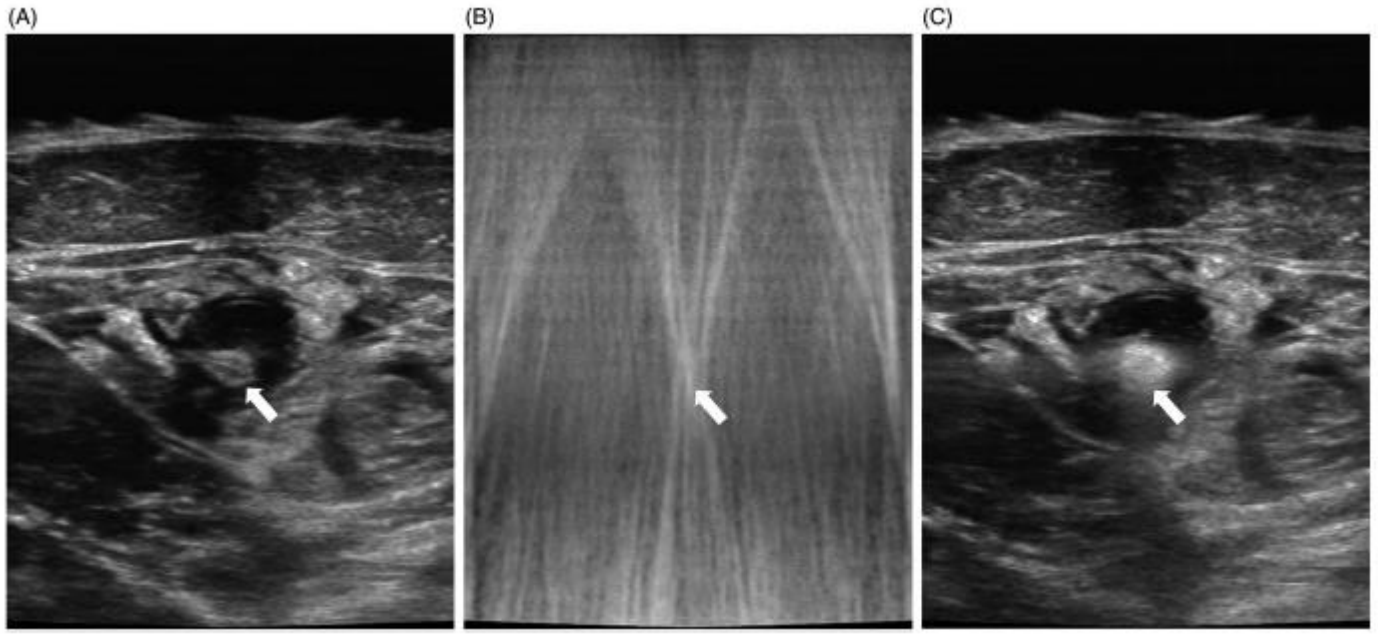
Sondes de puissance 0,5-4 Mhz

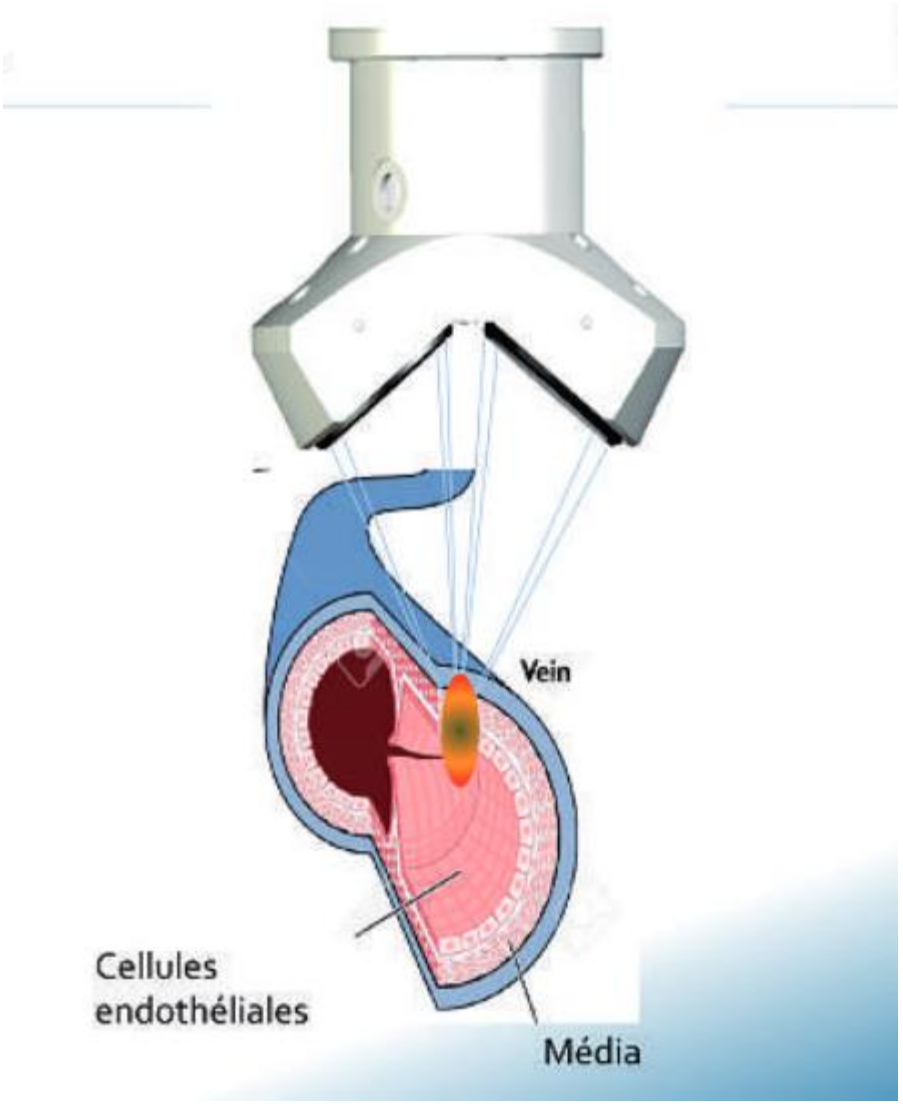
FIGURE 2 : Prototype de sonde « Veinsound ».

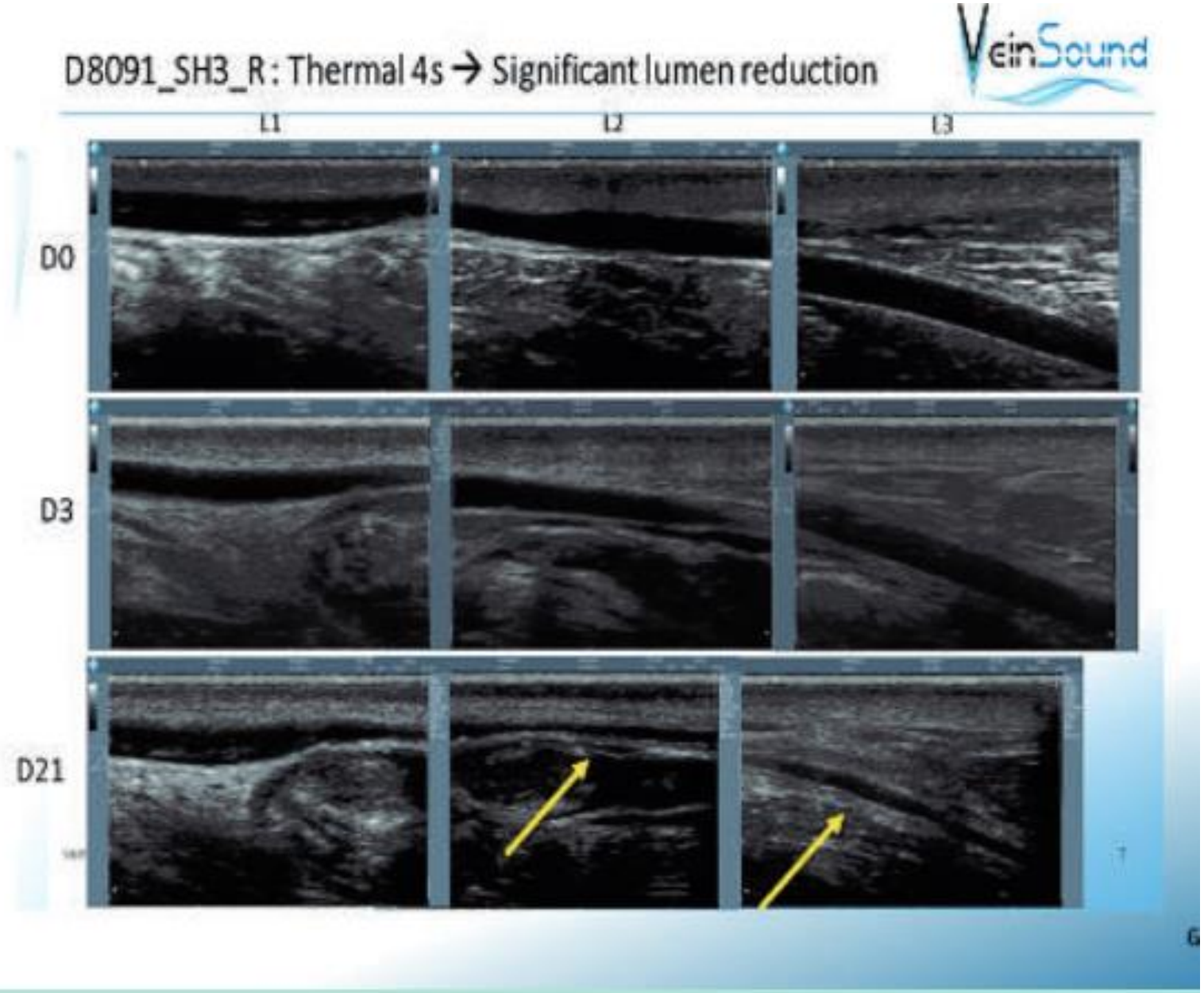
Liquide réfrigérant

Sonde d’imagerie 10Mhz

Sonovein





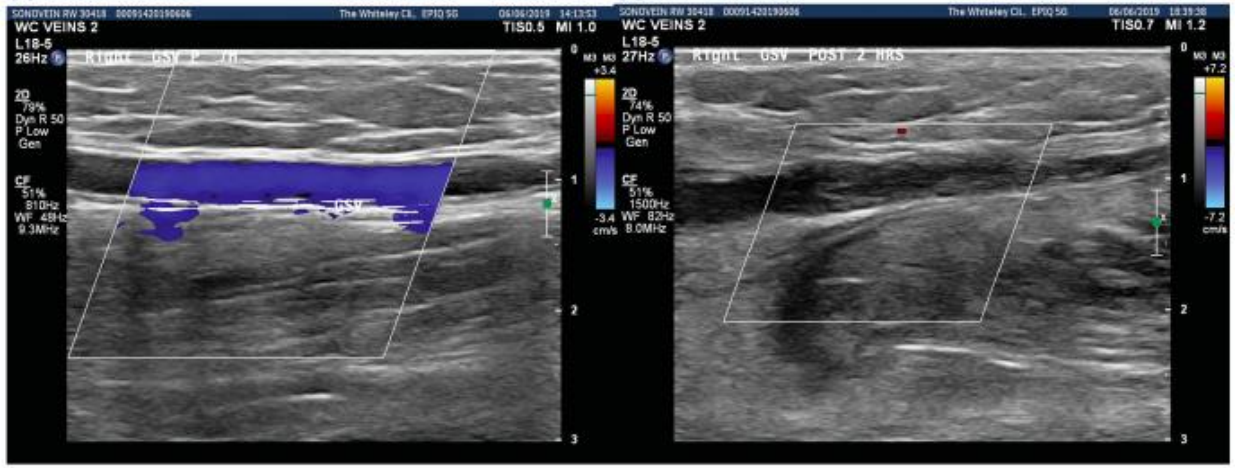


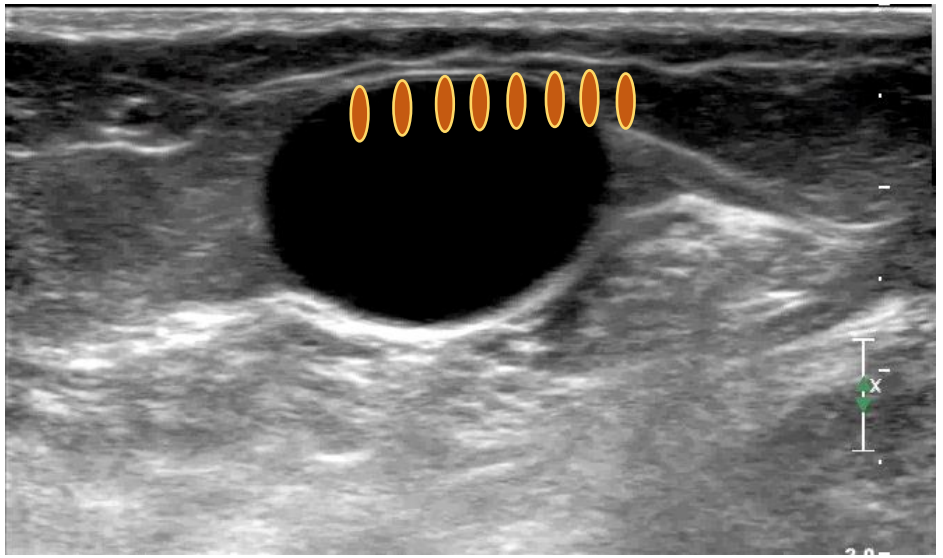
Remodelage pariétal sur une veine saphène de brebis (« Veinsound »).

Sonovein

- Avantages
  - Transcutané
  - « En cabinet »

- Inconvénients
  - Coût du matériel
  - Durée du traitement
  - Douleur: tumescence?
  - Localisation veine 9-20 mm
  - Efficacité?





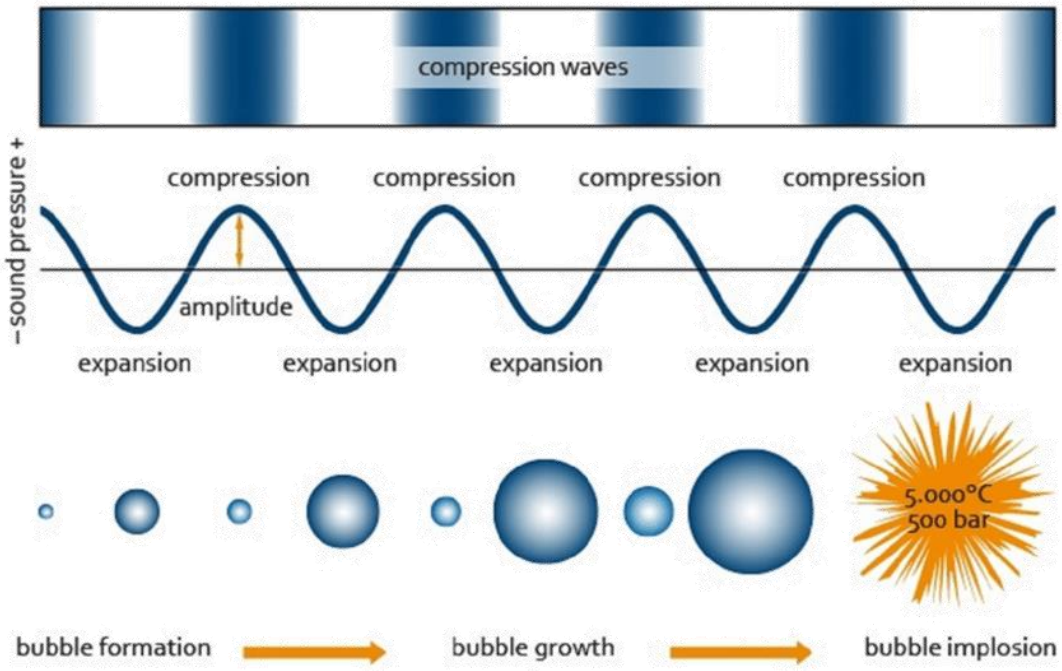
Sonovein-S

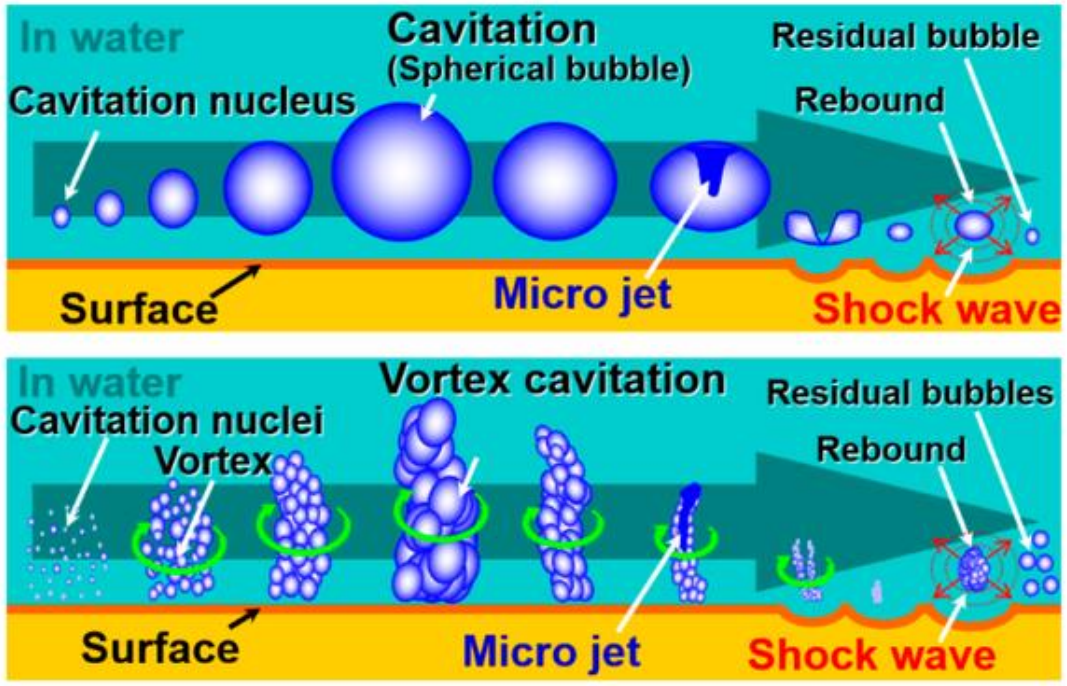
Final Thoughts: HIFU totally non-invasive Only TNT

1. Need to identify the right patient:
   - vein size – maybe less than 10mm
   - vein depth with compression – 10-20mm
   - some discomfort during tx (1 didn't tolerate)
2. Learning curve – 15 pts.
3. Treatment time - 60-75 minutes for 10-15 cm
4. GSV, SSV, neovasc, perforators, ASV

Steve Elias

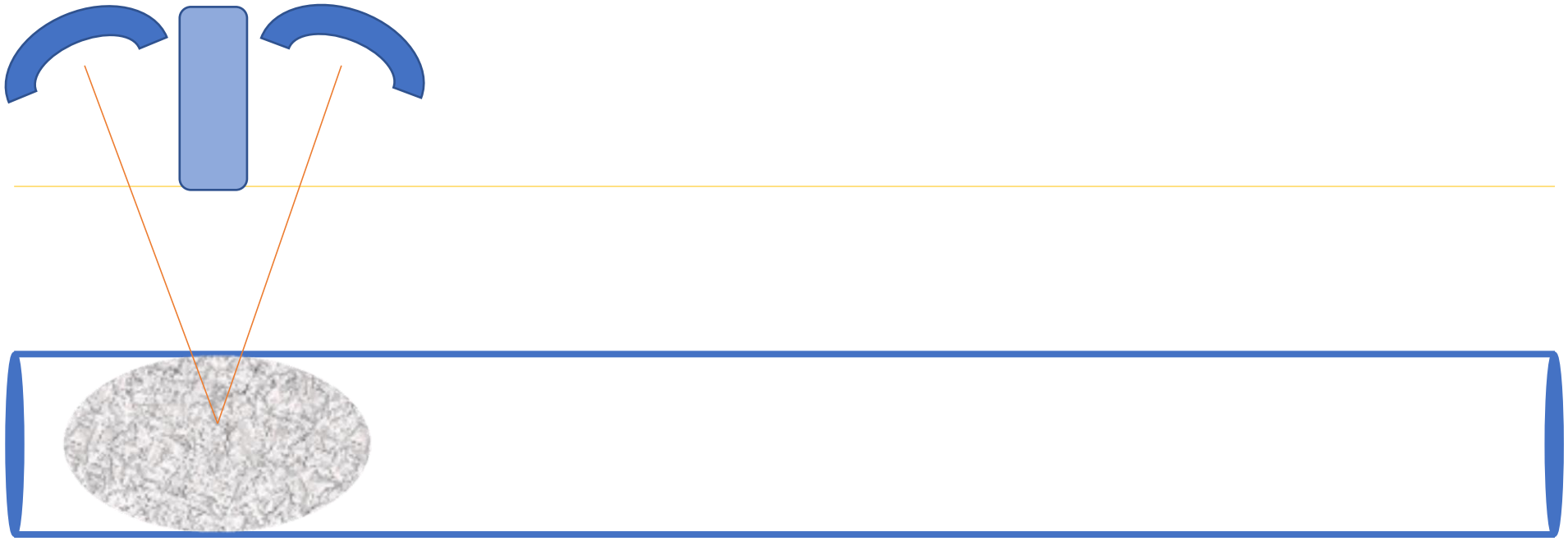
HIFU Cavitation





Cavitation Principe thérapeutique

- Erosion pariétale circonférentielle

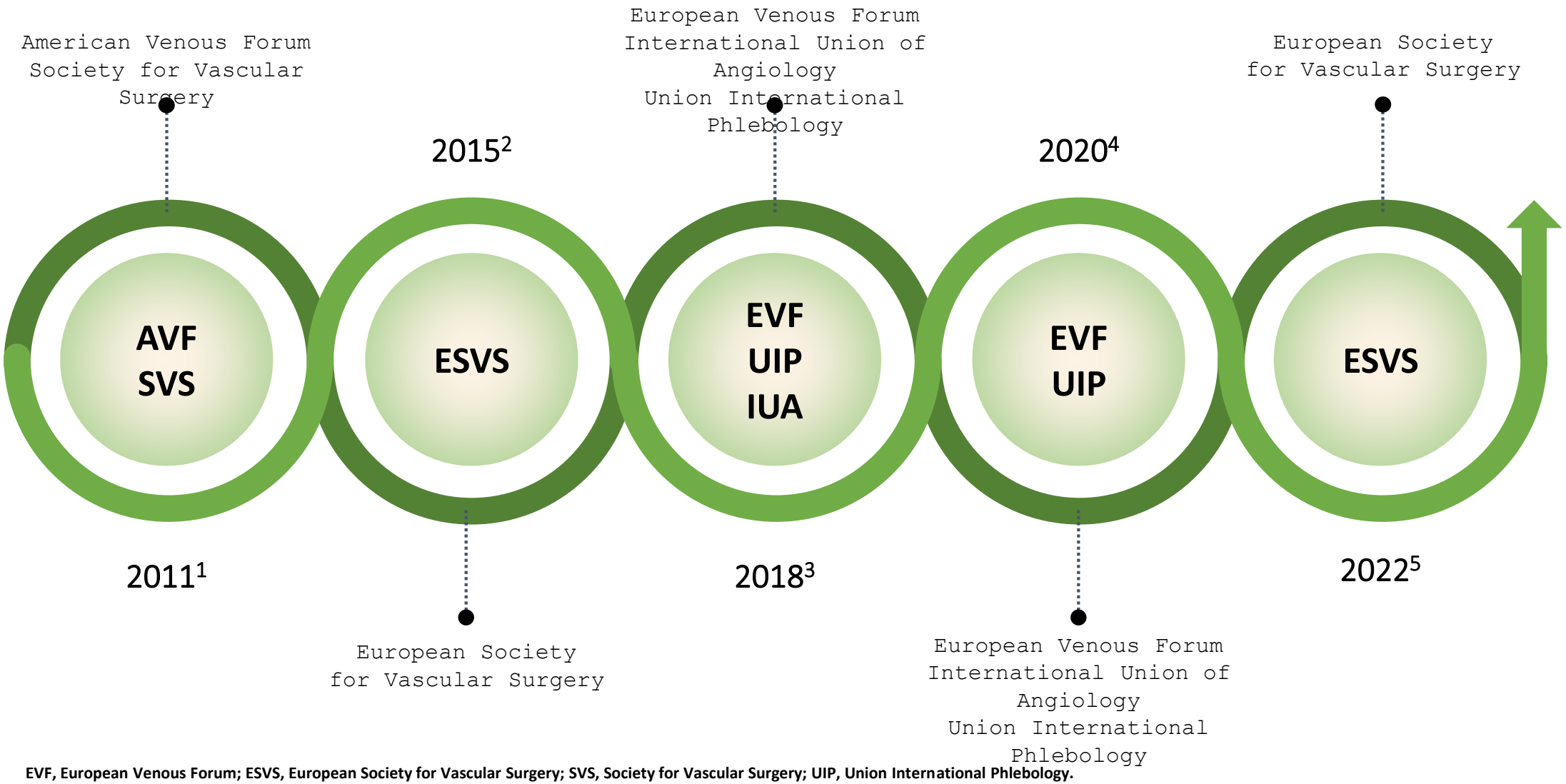


Cavitation Avantages

- Procédure transcutanée
  - Pas de tumescence
- Pas de risque de brûlure cutanée
- Procédure rapide
- Facile à répéter
- Application thérapeutique précise
- Permet de traiter des veines
  - Superficielles
  - Sinueuses
  - Perforantes

	ESM	Ablation thermique	Glue MOCA	HIFU thermique	HIFU cavitation
Hors salle dédiée	✓	non	non	±	✓
Pas de cathétérisme	✓	non	non	✓	✓
Pas d'injection IV	non	✓	non	✓	✓
Pas de tumescence	✓	non	✓	±	✓
Rapidité	✓✓	✓	✓	non	✓
Répétabilité	✓	±	±	±	✓
Précision ttt	non	✓	✓	✓	✓
Efficacité	✓	✓✓	✓✓	✓	?
Coût	€	€€	€€€	€€€	€

Recent guidelines in phlebology



EVF, European Venous Forum; ESVS, European Society for Vascular Surgery; SVS, Society for Vascular Surgery; UIP, Union International Phlebology.
Adapted from: 1. Gloviczki P, et al. J Vasc Surg 2011; 53:2S-48S; 2. Wittens C, et al. Eur J Vasc Endovasc Surg 2015; 49:678-737; 3. Nicolaides A, et al. Int Angiol 2018; 37:181-254; 4. Nicolaides A, et al. Int Angiol 2020; 39:175-240; 5. De Maeseneer MG, et al. Eur J Vasc Endovasc Surg 2022; 63:184-267..

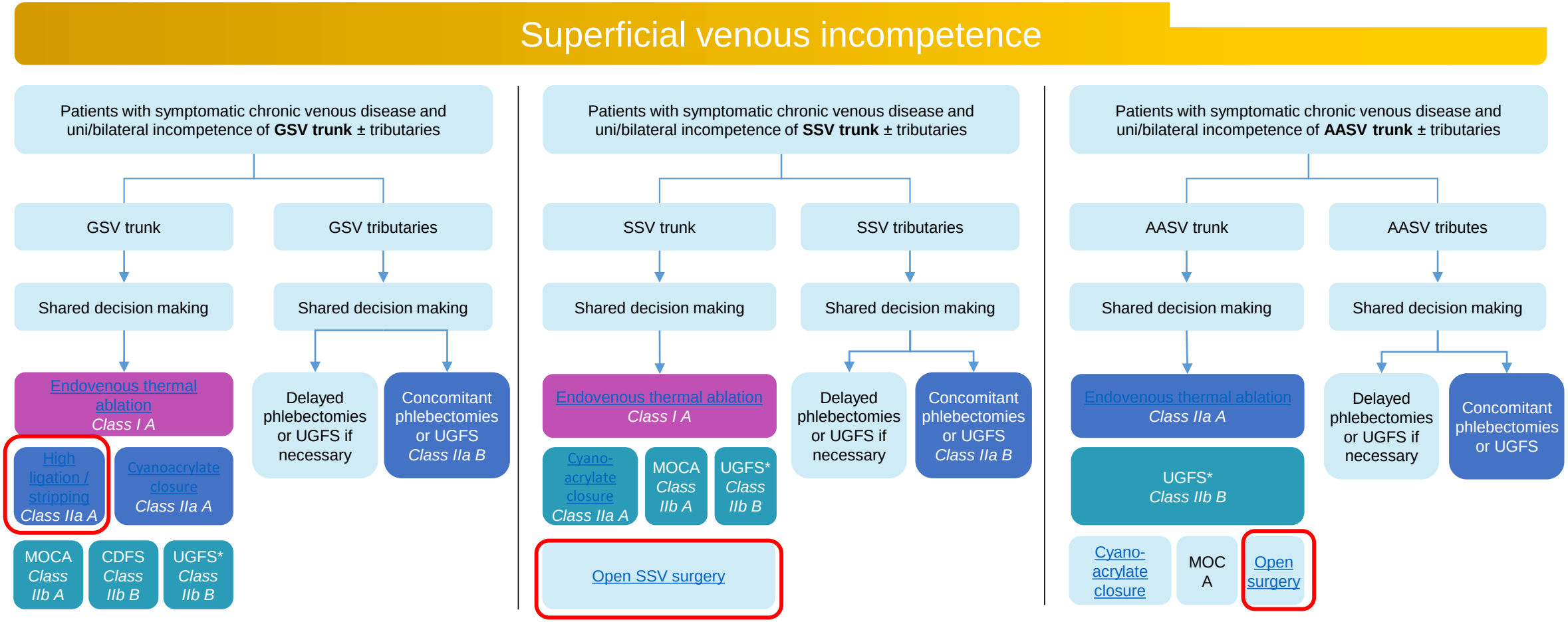
Interventional management
Superficial incompetence

		ESVS 2022 European Society for Vascular Surgery 2022	American Venous Forum Society for Vascular Surgery (SVS) 2020
1	For patients with **great saphenous vein incompetence** requiring treatment, **endovenous thermal ablation** is recommended as first choice treatment, in preference to high ligation/stripping and ultrasound guided foam sclerotherapy	**Class I Level A**	**Appropriate**
2	For patients with **great saphenous vein incompetence** requiring treatment, **high ligation /stripping** should be considered, **if endovenous thermal ablation options are not available**	**Class I Level A**	**Appropriate**
3	For patients with **small saphenous vein incompetence** requiring treatment, **endovenous thermal ablation** is recommended in preference to surgery or foam sclerotherapy	**Class I Level A**	**Appropriate**
4	For patients with incompetence of the **anterior accessory saphenous vein** requiring treatment, **endovenous thermal ablation** should be considered	**Class IIa Level C**	**Appropriate**
5	For patients with an incompetent saphenous trunk treated with endovenous thermal or non-thermal ablation, **concomitant tributary treatment** should be considered	**Class IIa Level B**	Concomitant or staged procedure **Appropriate** Referral to another health care provider **May be appropriate**
6	For patients with CVD requiring **treatment of varicose tributaries, ambulatory phlebectomy, ultrasound guided foam sclerotherapy or a combination** of both are recommended	**Class I Level B**	**Appropriate**
7	For patients presenting with reticular veins and/or telangiectasias, **significant associated incompetent veins should be treated first**, before considering treatment of smaller veins	**Class I Level C**	**Appropriate**

CVD, chronic venous disease.

Adapted from: De Maeseneer MG, et al. Eur J Vasc Endovasc Surg. 2022;63(2):184–267; Masuda E, et al. J Vasc Surg Venous Lymphat Disord. 2020;8(4):505–525.e4.

Invasive treatment for chronic venous disease



Alternative preservational strategies have not been included. *UGFS only if GSV (or SSV or AASV respectively) diameter is <6 mm.
AASV, anterior accessory saphenous vein; CDFS, catheter-directed foam sclerotherapy; CHIVA, ambulatory conservative haemodynamic treatment of venous incompetence in outpatients; GSV, great saphenous vein; HLS, high ligation/stripping; MOCA, mechanochemical ablation; SSV, small saphenous vein; UGFS, ultrasound guided foam sclerotherapy.
Adapted from: De Maeseneer MG, et al. Eur J Vasc Endovasc Surg. 2022;63(2):184–267.