



**YONSEI  
UNIVERSITY**

# **Varicose vein**

**Tae-hoon Kim, M.D.**

**Aorta & Vascular Center  
Gangnam Severance Hospital  
Yonsei University College of Medicine**



# Disclosures

**I have nothing to  
disclose**

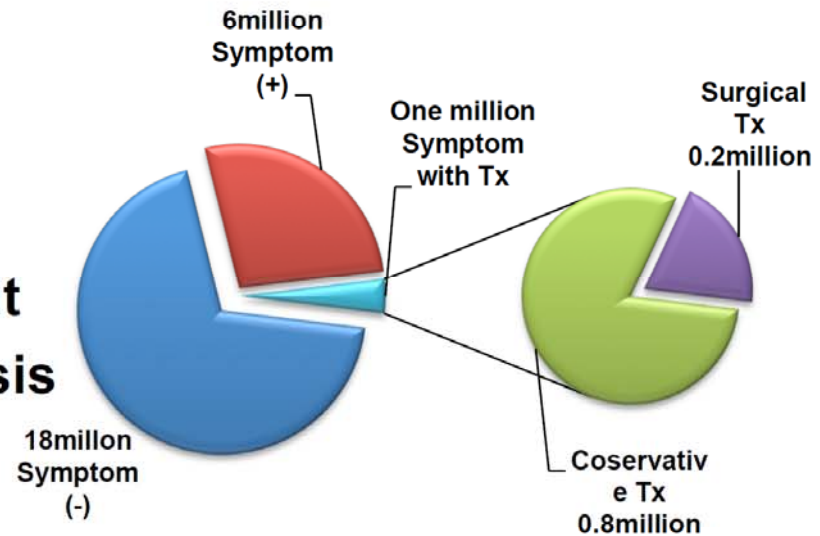
# Definitions

- **Varicose vein**
  - **Abnormally dilated saccular or cylindrical superficial veins, which can be circumscribed or segmental (WHO)**
- **Venous insufficiency**
  - **Any abnormality of the peripheral venous system that reduces or impedes venous return.**
- **Chronic venous disorder**
  - **Full spectrum of morphological and functional abnormalities of the venous system**
- **Chronic venous insufficiency**
  - **Functional abnormality of the venous system and is usually reserved for patients with more advanced disease including edema(C3), skin change(C4), or venous ulcers (C5-C6)**

# Incidence & Risk Factors

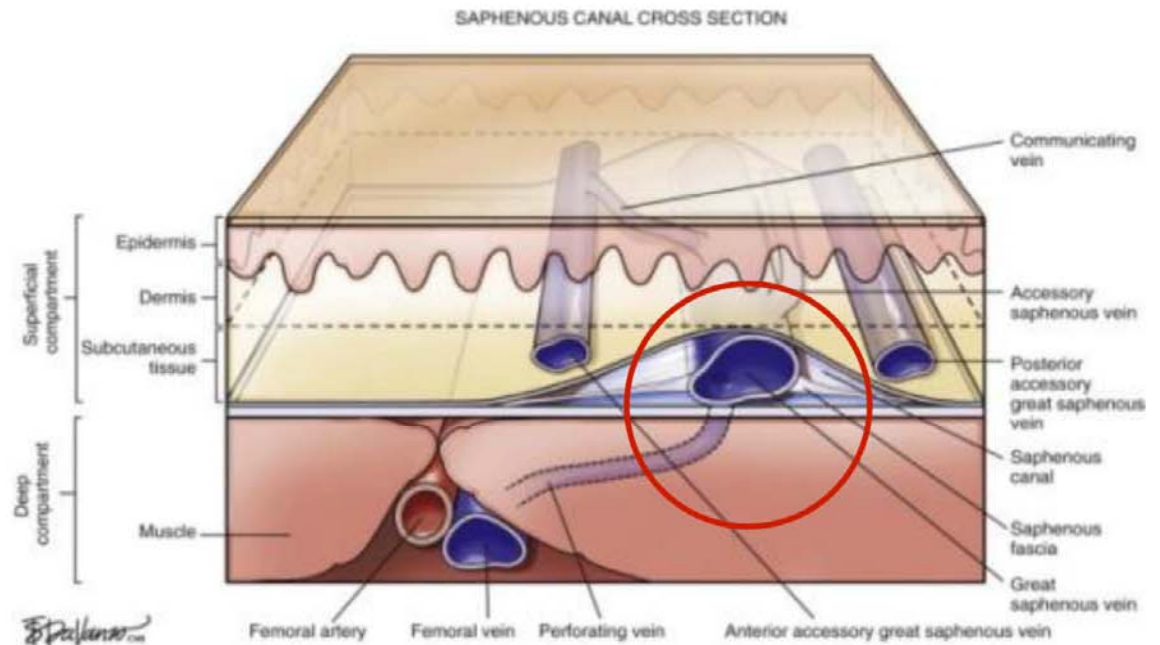
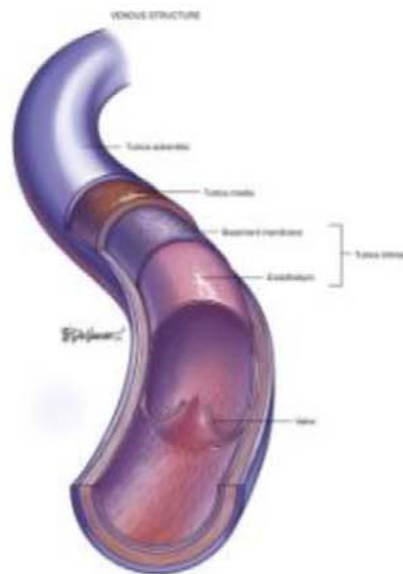
## ● Incidence (50%)

- 25~40%      minor VV
- 10~20%      significant VV
- 10~15%      medically significant
- 0.5%        chronic venous stasis  
ulceration

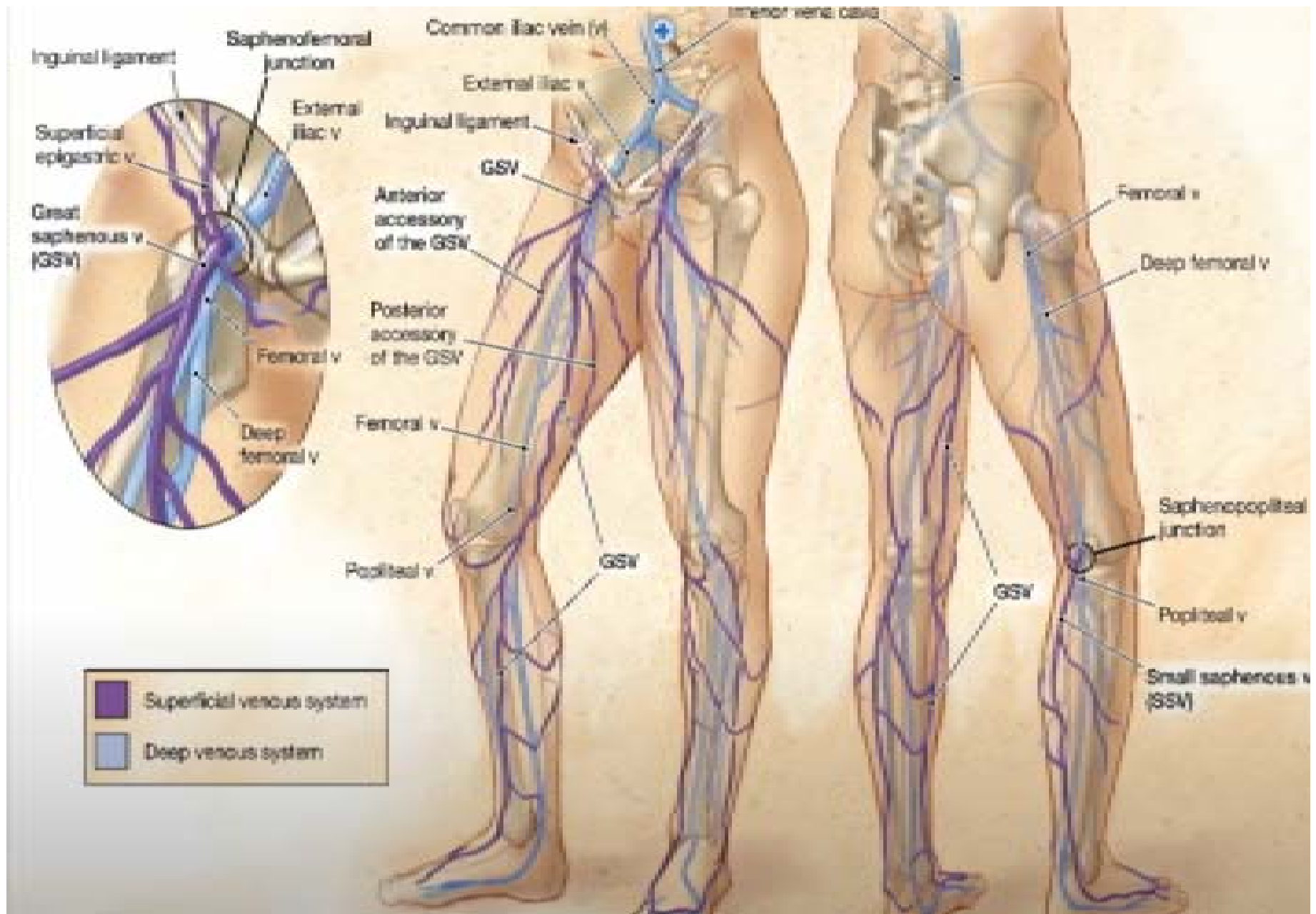


## ● Risk factors

- Age > 50 years
- Heredity
- Hormone
- Gravitational hydrostatic force
- Hydrodynamic force due to muscle contraction
- Occupation
- Female gender
- Pregnancy
- Obesity



*Spallanzo.com*



# C-E-A-P♪

- **C-E-A-P?**

**C : Clinical signs ♪**

**E : Etiology**

**A : Anatomy**

**P : Pathophysiology**

- **Etiologic classification**

**Ec: congenital**

**Ep: primary**

**Es: secondary (post-thrombotic)**

**En: no venous cause identified**

- **Anatomic classification**

**As: superficial veins**

**Ap: perforator veins**

**Ad: deep veins**

**An: no venous location identified**

- **Pathophysiologic classification**

**Pr: reflux**

**Po: obstruction**

**Pr,o: reflux and obstruction**

**Pn: no venous pathophysiology identifiable**

**Table 3. The 2020 update of the CEAP (Clinical Etiological Anatomical Pathophysiological)**

Class	Description
<i>Clinical (C) class</i>	
C0	No visible or palpable signs of venous disease
C1	Telangiectasia or reticular veins
C2	Varicose veins
C2r	Recurrent varicose veins
C3	Oedema
C4	Changes in skin and subcutaneous tissue secondary to CVD
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis or atrophie blanche
C4c	Corona phlebectatica
C5	Healed ulcer
C6	Active venous ulcer
C6r	Recurrent venous ulceration
Symptomatic or not: subscript 'S' or subscript 'A'	S: symptomatic, including ache, pain, tightness, skin irritation, heaviness, cramps, and other complaints attributable to venous dysfunction A: asymptomatic
<i>Etiological (E) class</i>	
Ep	Primary
Es	Secondary
Esi	Secondary – intravenous
Ese	Secondary – extravenous
Ec	Congenital
En	None identified
<i>Anatomical (A) class</i>	
As	Superficial
Ad	Deep
Ap	Perforators
An	No identifiable venous location
<i>Pathophysiological (P) class*</i>	
Pr	Reflux
Po	Obstruction
Pr,o	Reflux and obstruction
Pn	No pathophysiology identified





# Diagnosis

Recommendation 3

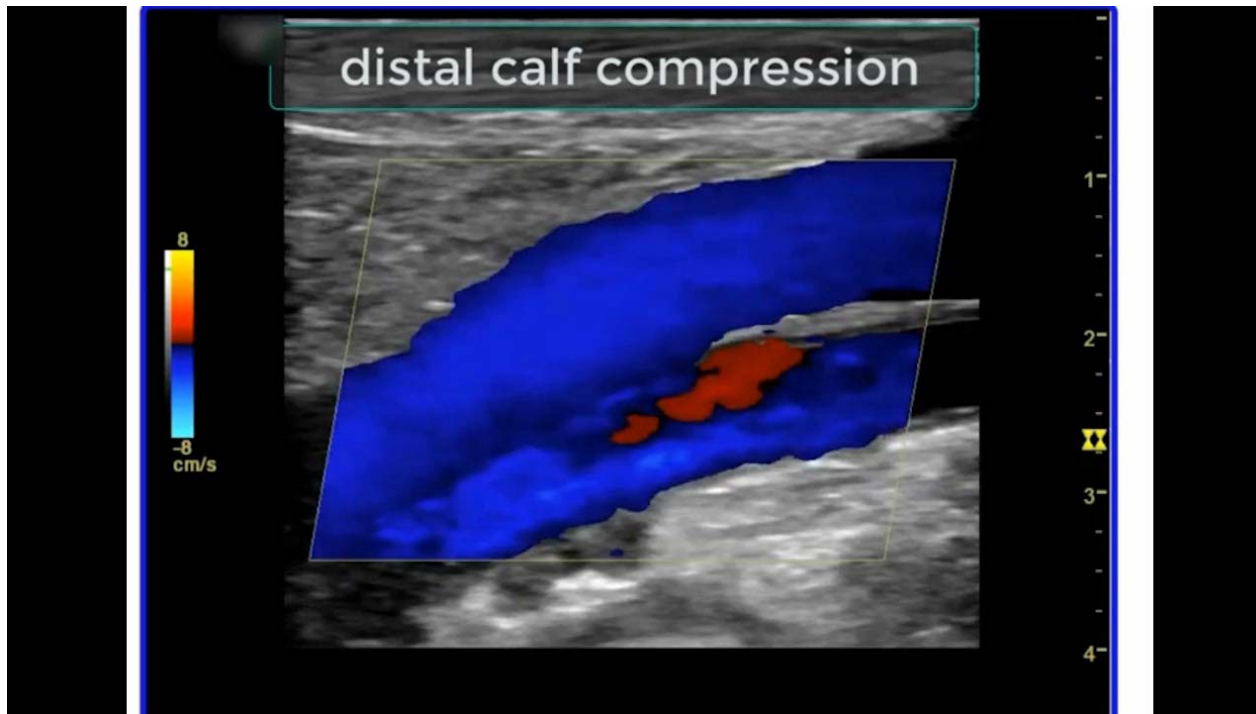
Unchanged



For diagnosis and treatment planning in patients with suspected or clinically evident chronic venous disease, full lower limb venous duplex ultrasound is recommended as the primary imaging modality.

Class	Level	References	ToE
I	B	Blomgren <i>et al.</i> (2011) <sup>43</sup>	

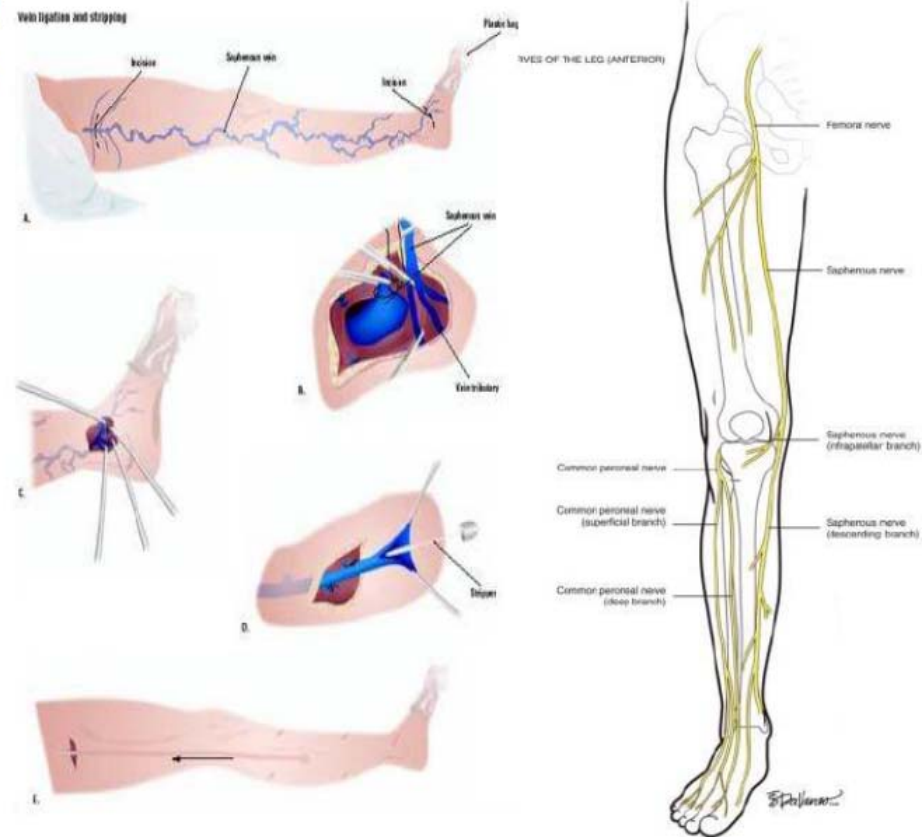
- Deep vein : >1s
- Superficial and perforating vein : >0.5s



# Treatment

## High Ligation & Stripping

- High ligation & stripping
    - Basic surgical treatment
    - Surgical complications
      - \* pain
      - \* nerve injury
- partial vs. Complete stripping  
(7% vs. 39%)



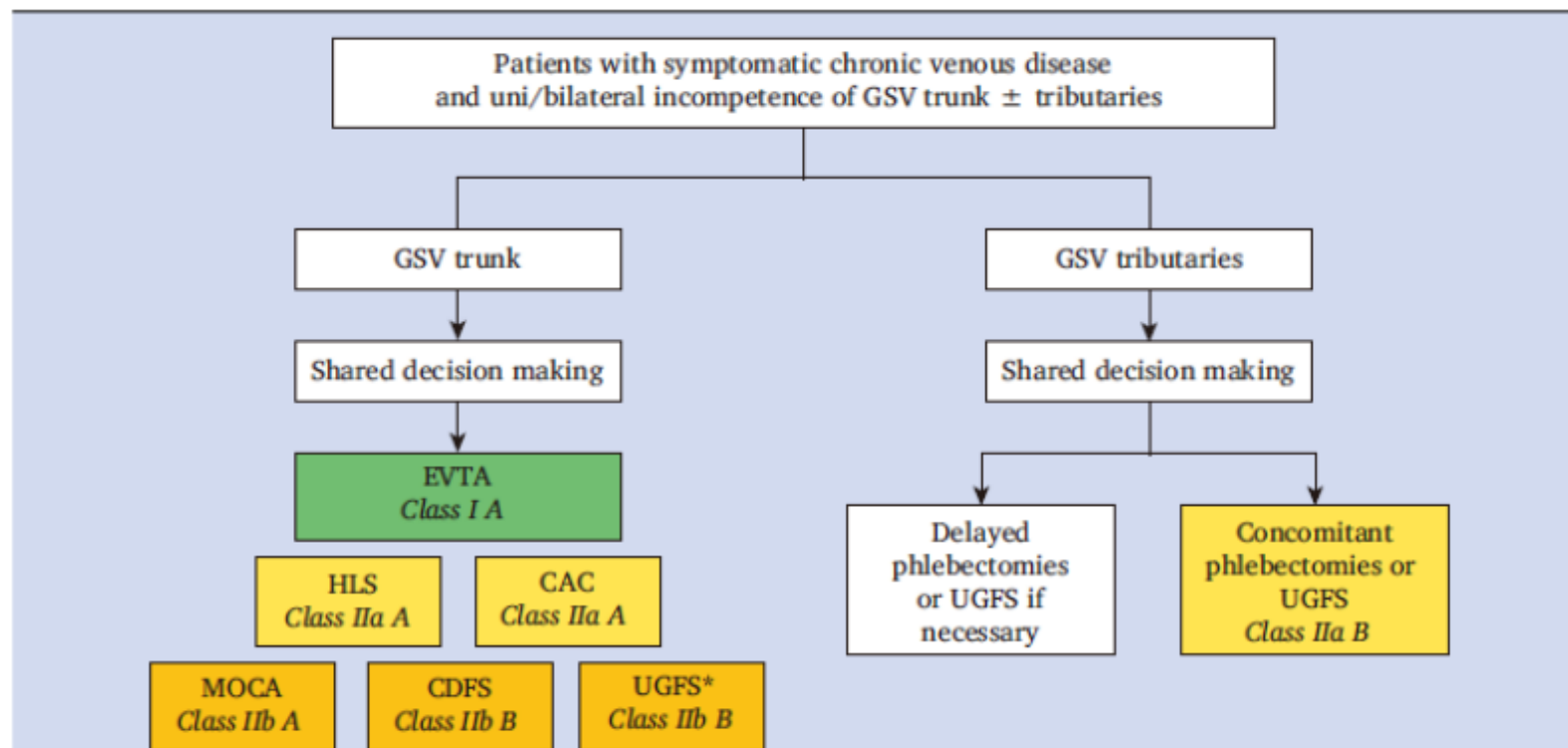
# Endovenous Thermal Ablation

- **Catheter based technology**
- **Mechanisms**
  - Endothelial damage
  - Collagen vein wall contraction
  - Thrombus formation
  - Scar formation
- **Advantages**
  - Low morbidity / quick recovery times
  - 90 % success in nearly all mid-term case series
- **Disadvantages**
  - Expensive
  - Alone will not provide complete treatment and patient satisfaction
- **Laser, radiofrequency, cryoablation**

# Cyanoacrylate closure (CAC)

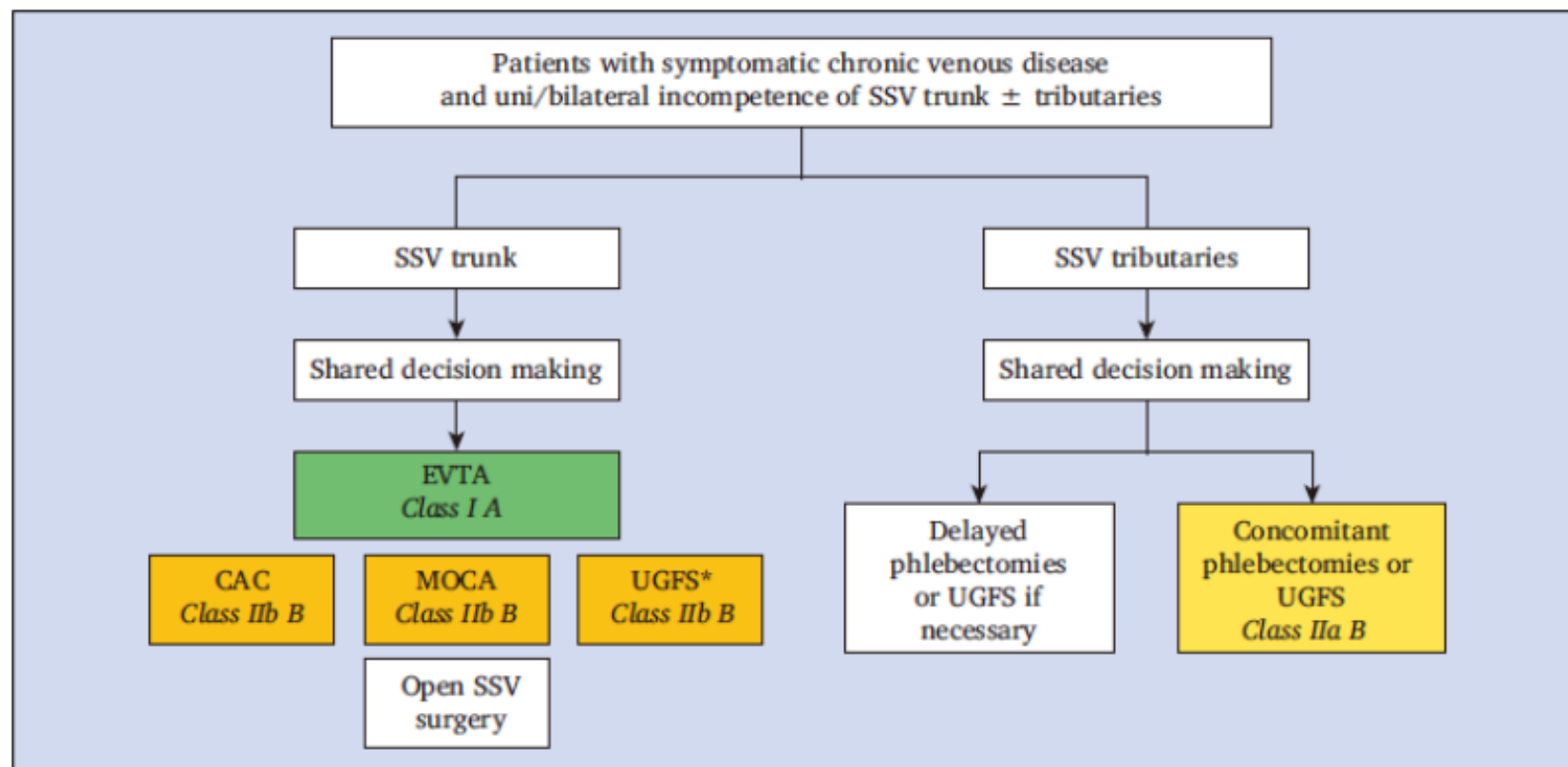


# Treatment



**Figure 7.** Interventional treatment options for patients with symptomatic great saphenous vein (GSV) incompetence. Alternative strategies, with preservation of the GSV trunk (CHIVA, ASVAL), have not been included in this flowchart. \*Ultrasound-guided foam sclerotherapy (UGFS) only if GSV diameter is <6 mm. EVTA = endovenous thermal ablation; HLS = high ligation/stripping; CAC = cyanoacrylate closure; MOCA = mechanochemical ablation; CDFS = catheter-directed foam sclerotherapy; UGFS = ultrasound-guided foam sclerotherapy; CHIVA = ambulatory conservative haemodynamic treatment of venous incompetence in outpatients; ASVAL = ambulatory selective varices ablation under local anaesthesia.

# Treatment



**Figure 8.** Interventional treatment options for patients with symptomatic small saphenous vein (SSV) incompetence. Alternative strategies, with preservation of the SSV trunk (CHIVA, ASVAL), have not been included in this flowchart. \*Ultrasound-guided foam sclerotherapy (UGFS) only if SSV diameter is <6 mm. EVTA = endovenous thermal ablation; CAC = cyanoacrylate closure; MOCA = mechanochemical ablation; CHIVA = ambulatory conservative haemodynamic treatment of venous incompetence in outpatients; ASVAL = ambulatory selective varices ablation under local anaesthesia.

## Editor's Choice – European Society for Vascular Surgery (ESVS) 2022 Clinical Practice Guidelines on the Management of Chronic Venous Disease of the Lower Limbs<sup>☆</sup>

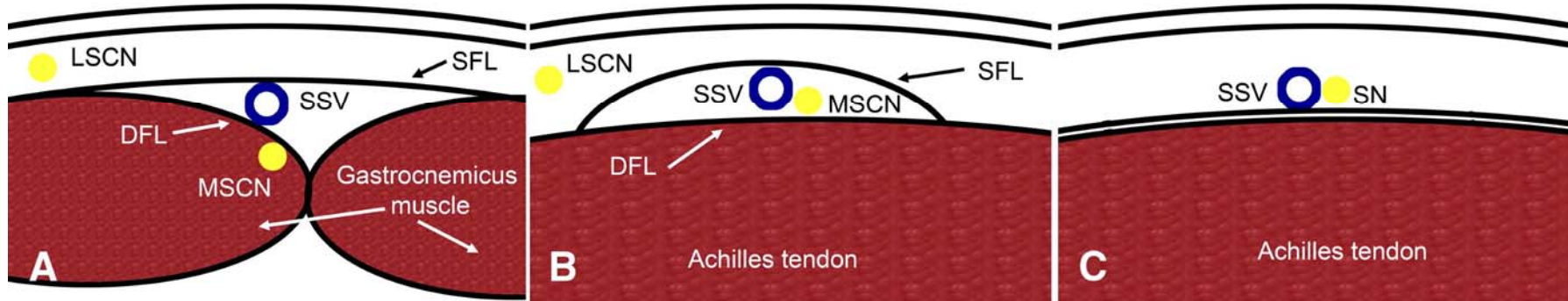
**Table 2. Classes of recommendations according to ESC (European Society of Cardiology)**

Class of recommendation	Definition
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful and effective
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure
Class IIa	<i>Weight of evidence/opinion is in favour of usefulness/efficacy</i>
Class IIb	<i>Usefulness/efficacy is less well established by evidence/opinion</i>
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful

**Table 1. Levels of evidence according to ESC (European Society of Cardiology)**

Level of evidence A	Data derived from multiple randomised clinical trials or meta-analyses
Level of evidence B	Data derived from a single randomised clinical trial or large non-randomised studies
Level of evidence C	Consensus of experts opinion and/or small studies, retrospective studies, and registries

- 11. Below knee ECS in patients with CVD clinical class C4b
- 15. Interventional treatment for CVD patients with symptomatic VVs (C2)
- 17. Interventional treatment for CVD patients with skin changes (C4-C6)
- 18. Procedures for superficial venous incompetence in the outpatient setting
- 19. Ultrasound guided tumescent anaesthesia for EVTA
- 24. Duration of post-operative compression after superficial interventions to be decided on an individual basis
- 25. Risk assessment for VTE in patients undergoing superficial venous intervention
- 29. Selection of EVTA device left to the discretion of the treating physician
- 32. Foam sclerotherapy under ultrasound guidance
- 38. DUS of lower extremity veins in patients presenting with reticular veins and/or telangiectasias (C1)
- 39. In patients with C1 disease, treat larger incompetent veins before treating smaller veins
- 40. Sclerotherapy as first choice for reticular veins
- 41. Care taking not to injure the sural nerve, when cannulating the SSV below midcalf
- 62. DUS surveillance after endovascular or surgical reconstruction for iliac vein outflow obstruction



- 93. Elastic compression in pregnant women with symptoms/signs of CVD



- 49. No treatment of lower leg incompetent PVs in patients with VVs without skin changes
- 61. No endovascular or surgical treatment of iliac vein outflow obstruction in patients without severe symptoms
- 72. No sustained compression for VLU, if ankle pressure < 60 mmHg, toe pressure < 30 mmHg or ABI < 0.6
- 87. No pelvic vein embolisation in patients with VVs of pelvic origin without pelvic symptoms
- 94. No interruption of anticoagulation to undergo EVTA

### 5. Appropriateness criteria for perforator veins

No.	Procedure	Appropriateness category
5.1	Perforator vein treatment of veins with high outward flow and large diameter directed toward affected area in a symptomatic patient with skin or subcutaneous changes, healed or active ulcers (CEAP classes 4-6)	Appropriate (see Section 5 discussion)
5.2	Perforator vein treatment of veins with high outward flow and large diameter directed toward affected area in a symptomatic patient with edema due to venous disease (CEAP class 3), provided careful clinical judgment is exercised because of the potential for a wide range of coexisting nonvenous causes of edema	May be appropriate (see Section 5 discussion)
5.3	Perforator vein treatment of veins with high outward flow and large diameter directed toward affected area in a symptomatic patient with telangiectasia or varicose veins (CEAP classes 1-2)	Rarely appropriate
5.4	Perforator vein treatment in an asymptomatic patient with visible telangiectasia or varicose veins (CEAP classes 1-2)	Never appropriate

CEAP, Clinical, Etiology, Anatomy, and Pathophysiology.

### 7. Appropriateness criteria for duplex ultrasound for chronic venous disease

No.	Procedure	Appropriateness category
7.1	Duplex ultrasound scanning for chronic venous disease in the upright position if technically feasible and safe, eliciting reflux by distal compression and release, and documenting duration of reflux	Appropriate
7.2	Examining the patient in the steep reverse Trendelenburg position, particularly if testing in the standing position is not technically feasible or safe	May be appropriate
7.3	Eliciting reflux using the Valsalva maneuver, particularly for interrogation of the common femoral vein or saphenofemoral junction	May be appropriate
7.4	The technique of creating nonphysiologic "flash" reflux with proximal compression during duplex ultrasound scanning	Rarely appropriate
7.5	Incentivize sonographers based on test results	Never appropriate

# *Severance*

With the Love of God, Free Humankind from Disease and Suffering

