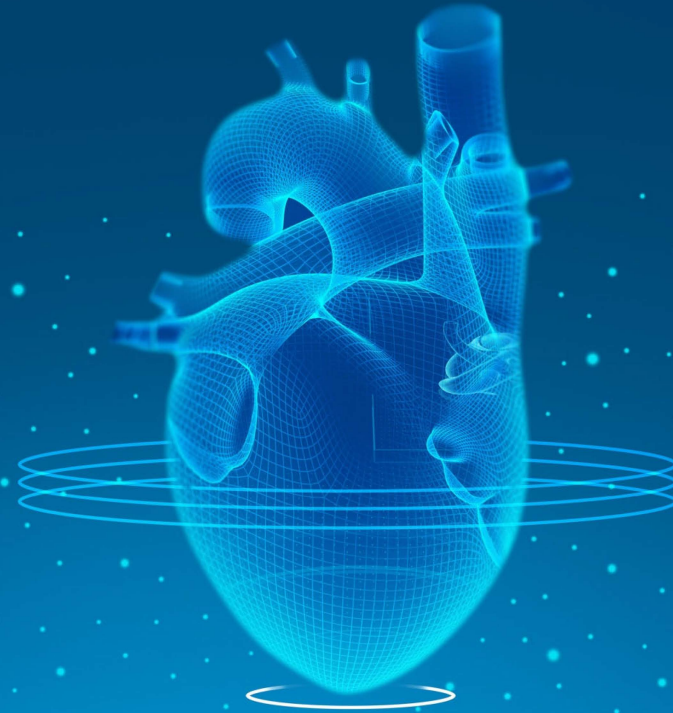




GRAND ROUNDS




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Management of Superficial Venous Disease

Elliot St D, FACS



Happy Pi Day


1

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Disclosures

- I have no financial disclosures
- I would like to acknowledge Drs. Alden, Alexander and Skeik for assistance with presentation



2

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Introduction

- Terminology/anatomy
- Pathophysiology
- Epidemiology
- Management
 - Non operative
 - Procedural
- Results




3

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Terminology and Classifications

- Varicose veins
 - Palpable dilated superficial vein >3 mm in diameter
- Reticular veins
 - 1-3 mm
- Telangectasias (spider veins)
 - Less than 1 mm

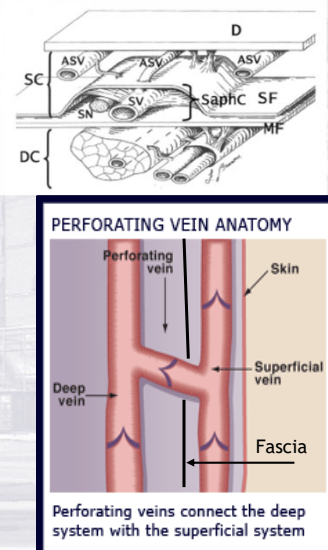


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Deep vs Superficial veins

- Deep venous system is deep to fascia of the muscle
- Superficial veins are superficial to the fascia
- Perforating veins form connections between two systems travelling through the fascia



The top diagram shows a cross-section of the leg with layers labeled: D (dermis), SC (subcutaneous tissue), SN (superficial nerve), SV (superficial vein), SaphC (saphenous vein), SF (superficial fascia), and MF (muscle fascia). The bottom diagram, titled 'PERFORATING VEIN ANATOMY', shows a 'Perforating vein' connecting a 'Deep vein' (located below the 'Fascia') to a 'Superficial vein' (located above the 'Fascia') through the 'Skin'.

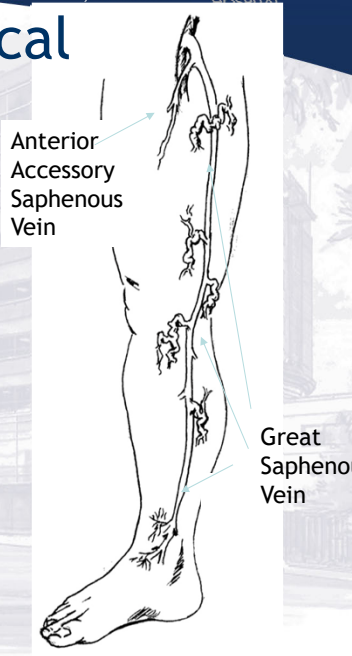
Perforating veins connect the deep system with the superficial system

5

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Lower Extremity Truncal Veins

- Greater Saphenous vein (GSV)
- Runs from ankle to groin
- Drains into common femoral vein at saphenofemoral junction (SFJ)
- Illustrated with varicose veins
- Anterior accessory saphenous vein comes off SFJ



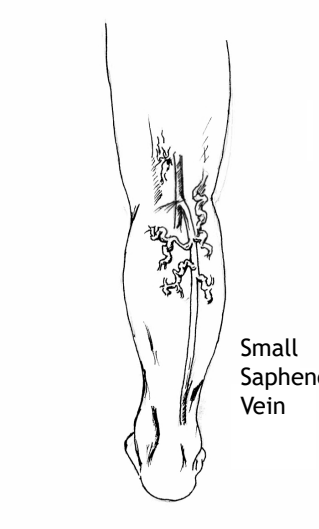
The diagram shows the lower extremity with the 'Great Saphenous Vein' running from the ankle up to the groin. An 'Anterior Accessory Saphenous Vein' is shown branching off from the main vein. The saphenofemoral junction (SFJ) is indicated at the point where the vein enters the femoral vein system.

6

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Lower Extremity Truncal Veins

- Small Saphenous Vein (SSV)
- Runs from ankle to knee
- Drains into popliteal vein at saphenopopliteal junction (SPJ)
- Illustrated with varicose veins



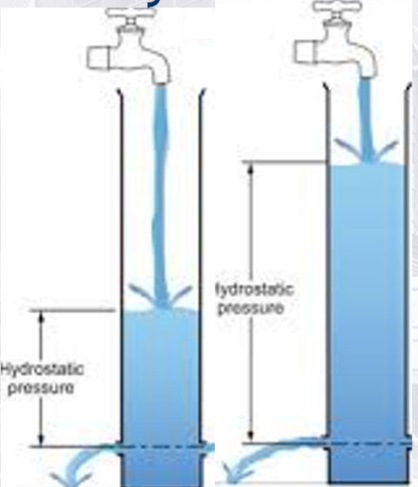
Small Saphenous Vein

7

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Venous physiology/hemodynamics

- Normal flow should be unidirectional
- Gravity is biggest source of increased pressure (weight of column of blood)
- Counteracted by presence of valves (makes large column into smaller columns)



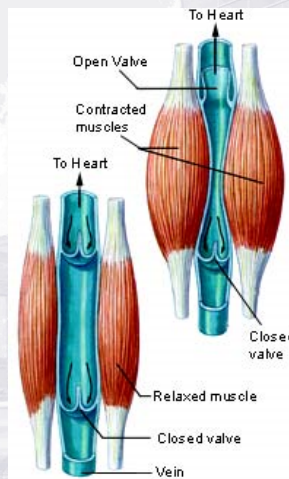
8

Causes of venous hypertension

- Venous obstruction
 - DVT, SVT, venous compression, venous injury
- Venous incompetence
 - Failure of valves
- Pump failure
 - Immobility, paralysis

9

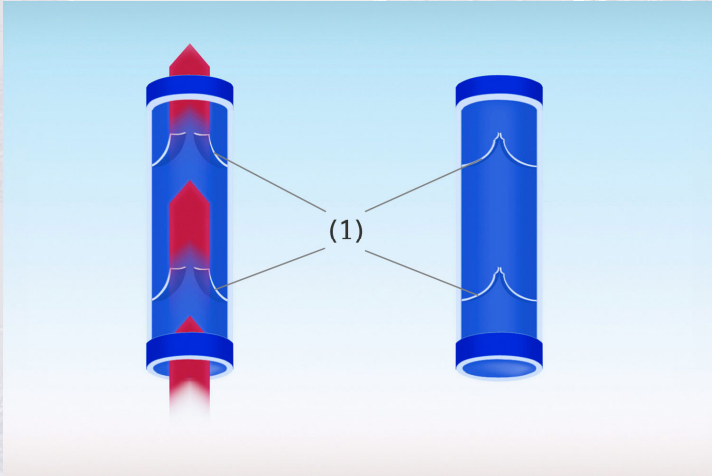
Calf muscle pump



10

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Venous valves

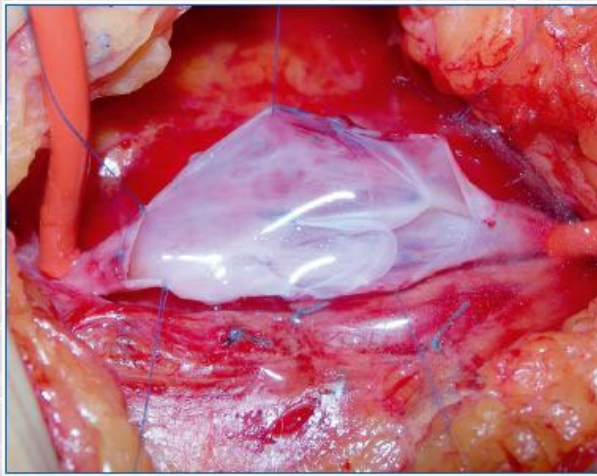


The diagram illustrates the function of venous valves. On the left, a vertical blue tube represents a vein with red arrows indicating forward flow. Two white, crescent-shaped valves are positioned inside the tube, with their concave sides facing the direction of flow. On the right, the same tube is shown with a white arrow pointing downwards, indicating backward flow. The valves are closed, preventing the backflow of blood. A central label '(1)' is connected to both valve structures by thin lines.

11


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Venous valves




This is an intraoperative photograph showing a surgical view of a venous valve. The valve is a large, white, translucent structure with a distinct, somewhat triangular shape, situated within a network of red and yellowish tissue. Surgical instruments and sutures are visible around the valve, indicating it is being examined or manipulated during a procedure.

12



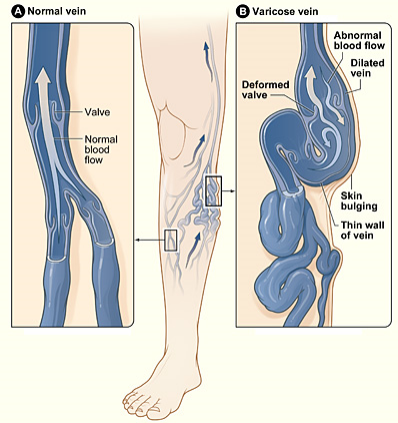
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Pathophysiology


- Normal flow should be unidirectional
- Incompetent veins lead to increased venous pressures and potentially bidirectional flow



13



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Pathophysiology

- Venous hypertension leads to inflammation
- Inflammation leads to skin changes
- Skin changes can lead to ulceration
- What can start out as a vein problem can become a skin/wound problem

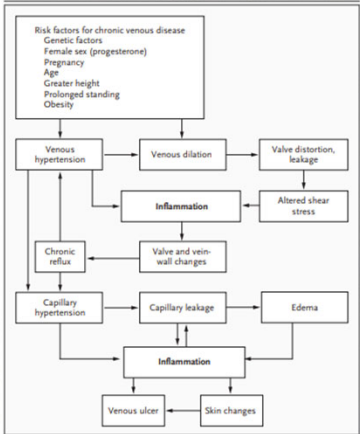


Figure 5. Venous Hypertension as the Hypothetical Cause of the Clinical Manifestations of Chronic Venous Disease, Emphasizing the Importance of Inflammation.
 Some steps are speculative, and to enhance clarity, not all possible interconnections are shown.

N Engl J Med 355;5 August 3, 2006

14

Epidemiology

- Edinburgh vein study (1566 subjects examined)
- Varicose veins
 - 40% men
 - 32% women

15

Epidemiology

- San Diego study
- Overall incidence:
 - Varicose Veins 24%
 - Telangectasias 51%
 - Skin changes 6.3%
- Increasing incidence with age
- Ethnicity
 - White 25%
 - Hispanic 27%
 - African American 21%
 - Asian 19%

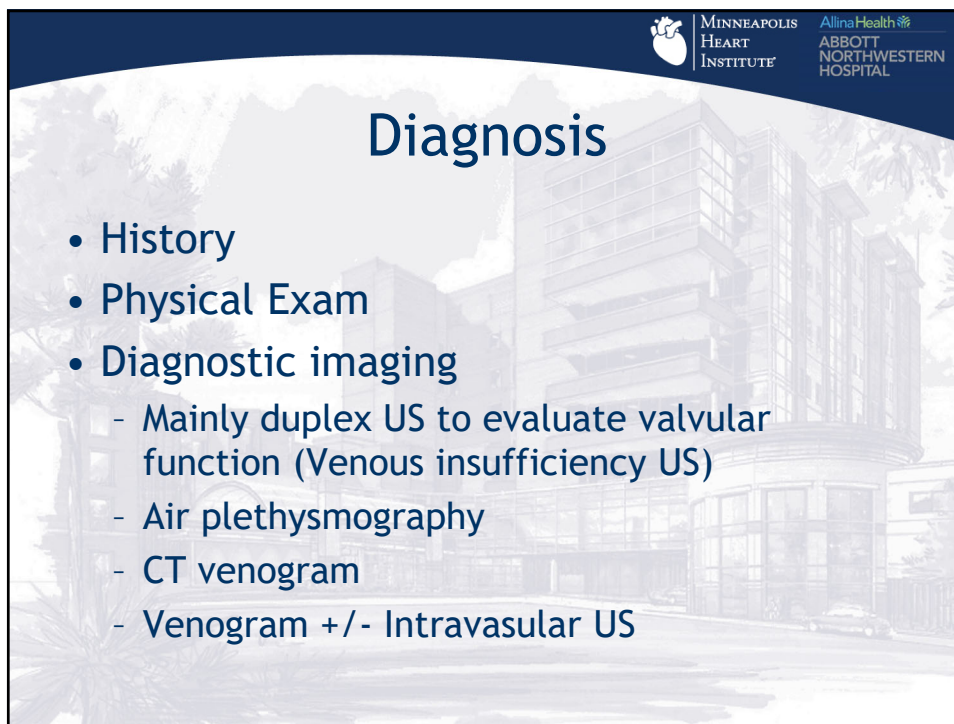
1048 Kaplan et al JOURNAL OF VASCULAR SURGERY May 2003

Table I. Demographic characteristics of study cohort

	Study cohort		Visible disease				Functional disease		
	n	%	NL	TSP	VV	PCS	NL	SVT	DVD
All subjects	2404	100.0	18.2	51.3	24.2	6.3	70.9	19.4	9.7
Sex									
Men	824	34.3	33.1	48.1	15.9	7.9	74.4	13.6	12.0
Women	1580	65.7	18.4	55.6	28.5	5.4	69.1	23.5	8.5
Age (y)									
<50	603	25.1	30.4	48.0	18.4	2.3	80.6	11.8	7.6
50-59	650	27.0	21.7	52.9	21.2	4.2	76.8	15.1	8.2
60-69	596	24.8	12.3	52.0	27.2	8.6	64.9	24.2	10.9
≥70	555	23.1	7.2	51.4	30.8	10.6	59.8	27.8	12.4
Ethnicity									
NHW	1436	59.7	13.6	54.2	25.3	7.0	68.3	20.5	11.2
Hispanic	353	14.7	18.7	49.6	27.2	4.5	70.5	23.2	6.2
African American	323	13.4	27.2	45.8	29.7	6.2	74.8	16.4	6.8
Asian	292	12.2	30.1	45.6	19.2	5.1	77.4	13.0	9.6

NL, Normal; TSP, telangectasias, spider veins; VV, varicose veins; PCS, trophic changes; SVT, superficial venous disease; DVD, deep vein disease; NHW, non-Hispanic white.

16

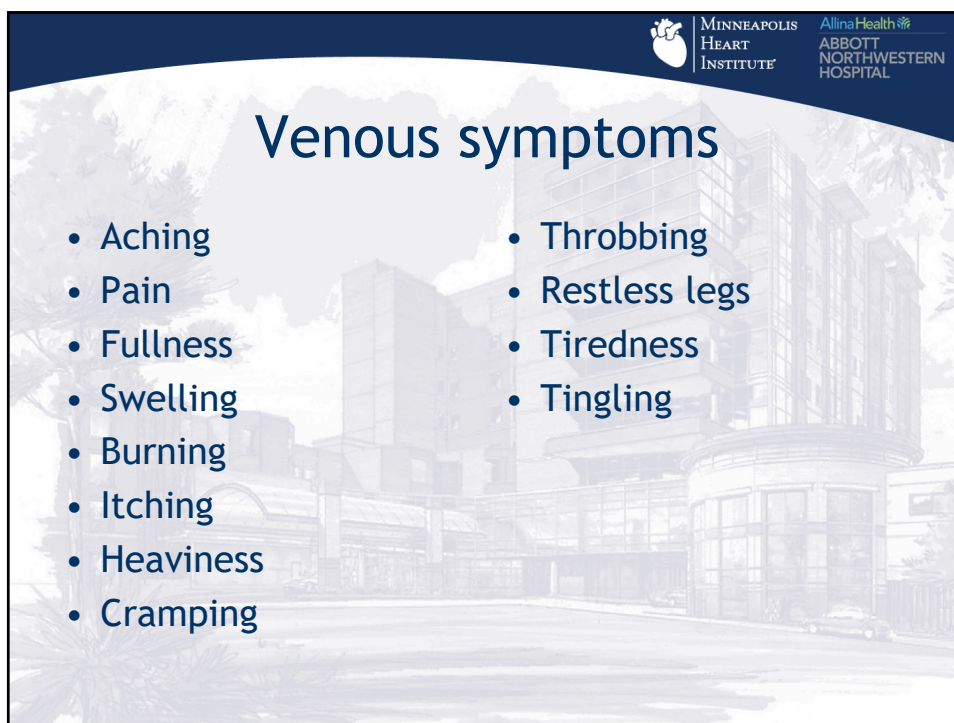


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Diagnosis

- History
- Physical Exam
- Diagnostic imaging
 - Mainly duplex US to evaluate valvular function (Venous insufficiency US)
 - Air plethysmography
 - CT venogram
 - Venogram +/- Intravasular US

17



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Venous symptoms

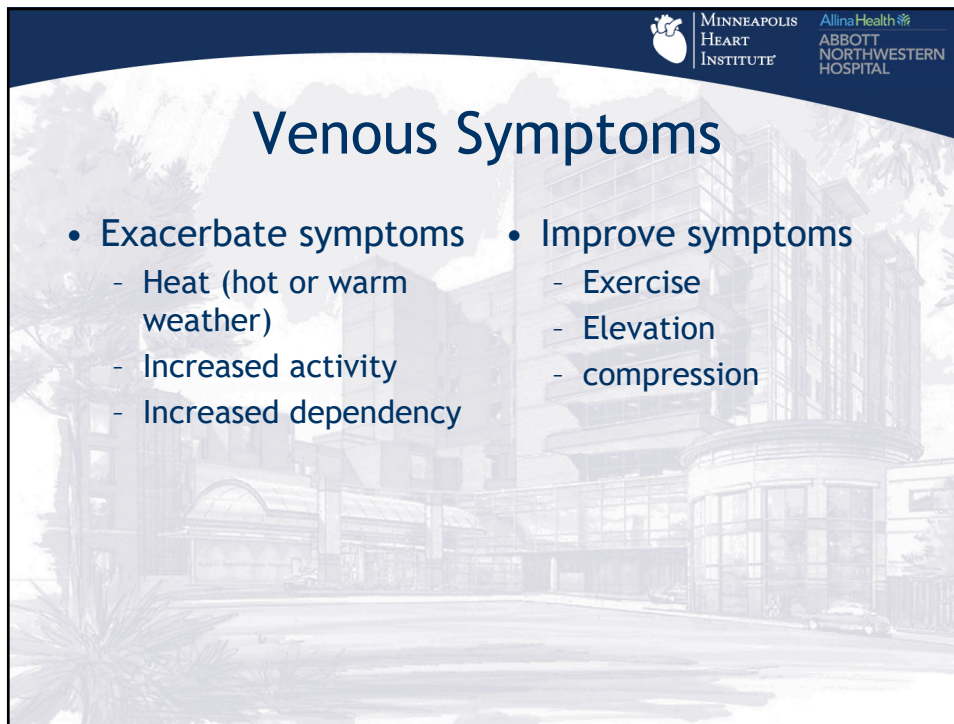
- Aching
- Pain
- Fullness
- Swelling
- Burning
- Itching
- Heaviness
- Cramping
- Throbbing
- Restless legs
- Tiredness
- Tingling

18

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Venous Symptoms

- Exacerbate symptoms
 - Heat (hot or warm weather)
 - Increased activity
 - Increased dependency
- Improve symptoms
 - Exercise
 - Elevation
 - compression



19

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CEAP scores

Reporting standards in venous disease:
An update

John M. Porter, MD,* Gregory L. Moneta, MD, and An International Consensus Committee on Chronic Venous Disease†

JOURNAL OF VASCULAR SURGERY
April 1996



					
Class 1: Telangiectasia.	Class 2: Varicose vein.	Class 3: Edema.	Class 4: Pigmentation / Eczema.	Class 5: Healed Ulcer.	Class 6: Venous Ulcer.

20

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CEAP Classification system for chronic venous disease


- **C: Clinical Classification**
 - C0: no disease
 - C1: telangectasias or reticular veins
 - C2: Varicose Veins
 - C3: Edema
 - C4: skin changes
 - C5: healed ulcer
 - C6 Active ulcer
- **E: Etiology**
 - Congenital, primary or secondary
- **A: Anatomic**
 - superficial, perforator or deep veins
- **P: pathophysiology**
 - Reflux, obstructive, or combined

21


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CEAP C4


- **C4a**
 - Pigmentation
 - eczema
- **C4b**
 - Lipodermatosclerosis
 - Atrophic blanche




C_{4a}: Pigmentation



C_{4a}: Eczema



C_{4b}: Atrophie blanche




C_{4b}: Lipodermatosclerosis

22

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Venous ulcers

- Typically on distal lower leg (more common medial, but can be lateral)
- Full thickness
- Painful
- Slow to non healing



23

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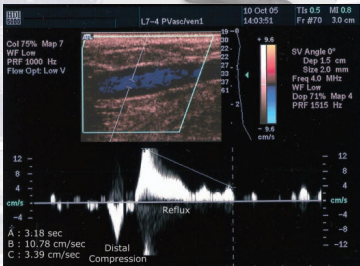

US

- Best initial test
- Majority of Venous disease is primary, superficial and reflux
- If concern for obstruction or proximal (pelvic source) CT venography and venography often useful

24

Venous Insufficiency US


- Uses a pressure cuff to inflate distal
- This causes blood to be pushed centrally
- Retrograde flow (back toward the foot) is measured



25

CT Venogram

- Allows imaging of central deep veins, evaluate for pelvic varicosities, large gonadal veins
- May Thurner anatomy (compression of left common iliac vein between right common iliac artery and vertebral body)
- Prior DVTs
- Venous anomalies (IVC atresia)



26

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Treatment

- Conservative measures
 - Compression
 - Elevation
 - Exercise
 - Weight Loss
 - Horse Chestnut extract
 - NSAIDs
- Procedural interventions

27

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Compression

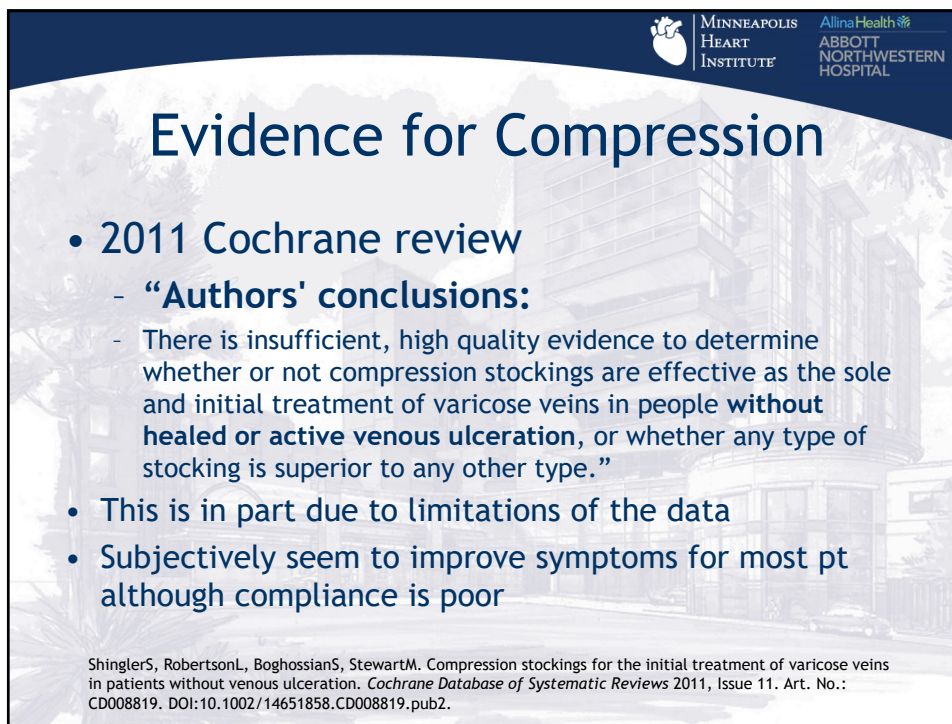
- Graduated compression stockings (although other types)
 - Multiple options for compression and size
 - Provide external compression (when worn)
 - Good evidence for improved wound healing
 - Some evidence for preventing Ulcer recurrence
 - Weak evidence for other use...

Without stockings

- Improved lymphatic flow
- Increased volume and rate of venous blood flow owing to improved efficiency of skeletal-muscle pump and reduced vein diameter
- Reduced venous reflux owing to improved valve function
- Reduced edema and inflammation
- Improved microcirculation and cutaneous oxygenation
- Reduced risk of thromboembolism

With stockings

28



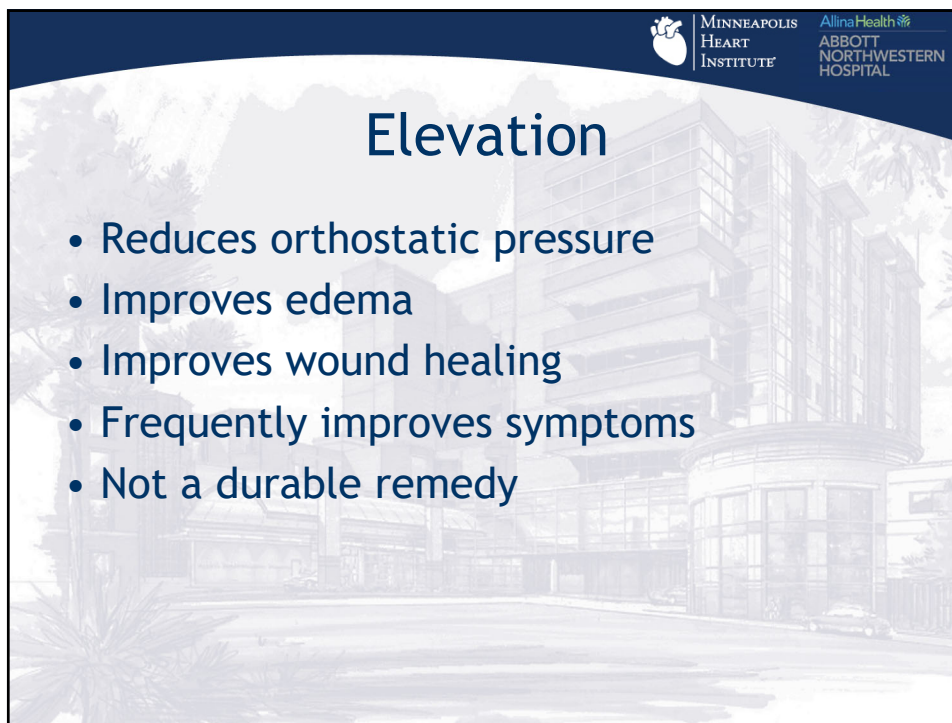
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Evidence for Compression

- 2011 Cochrane review
 - **“Authors' conclusions:**
 - There is insufficient, high quality evidence to determine whether or not compression stockings are effective as the sole and initial treatment of varicose veins in people **without healed or active venous ulceration**, or whether any type of stocking is superior to any other type.”
- This is in part due to limitations of the data
- Subjectively seem to improve symptoms for most pt although compliance is poor

ShinglerS, RobertsonL, BoghossianS, StewartM. Compression stockings for the initial treatment of varicose veins in patients without venous ulceration. *Cochrane Database of Systematic Reviews* 2011, Issue 11. Art. No.: CD008819. DOI:10.1002/14651858.CD008819.pub2.

29



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Elevation

- Reduces orthostatic pressure
- Improves edema
- Improves wound healing
- Frequently improves symptoms
- Not a durable remedy

30

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Exercise

- Walking (calf activation) promotes venous return, lowers venous pressures
- Improves wound healing in conjunction with compression
- Frequently limited by comorbidities or by pain from ulcers

The graph plots Foot-Vein Pressure (mm Hg) on the y-axis (0 to 100) against time in Seconds on the x-axis (0 to 40). It compares two conditions: 'Limb with incompetent venous valves' and 'Normal limb'. Both conditions start at a pressure of approximately 90 mm Hg while standing. At 10 seconds, walking begins. In the 'Normal limb', the pressure drops sharply to about 10 mm Hg during walking and then gradually returns to 90 mm Hg. In the 'Limb with incompetent venous valves', the pressure also drops during walking but remains significantly higher, around 60-70 mm Hg, and takes longer to return to the standing level. The x-axis is labeled 'Seconds' and includes markers for 'Standing' (0-10s) and 'Walking' (10-40s). A citation 'N Engl J Med 2006;355:488-98.' is present at the bottom right of the graph.


31

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Weight Loss

- No good evidence
- Poor compliance
- Weight loss can make varicose veins more prominent due to loss of surrounding subcutaneous tissue

32



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Horse chestnut seed extract

- Phlebotonics
 - Multiple available as dietary supplements
 - Not well studied
 - No long term safety studies
- May improve venous tone, capillary hyperpermeability
- Similar results to compression in short term studies 2-16 weeks

Analysis 2.1. Comparison 2 HCSE versus compression, Outcome 1 Reduction of lower leg volume (ml).

Study or subgroup	HCSE		compression		Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
	N	Mean(SD)	N	Mean(SD)			
Diehm 1996a	95	43.8 (111.1)	99	46.7 (81.6)		49.43%	-2.9 [-30.42, 24.62]
Diehm 2000	143	18 (75)	142	89 (122)		50.57%	-71 [-94.53, -47.47]
Total***	238		241			100%	-37.34 [-54.07, -20.39]

Heterogeneity: Tau²=148.14, Chi²=13.59, I²=92.64%
 Test for overall effect: Z=1.1 (P=0.27)

Favours compression Favours HCSE

Analysis 2.2. Comparison 2 HCSE versus compression, Outcome 2 Improvement of symptom score (40 point scale).

Study or subgroup	HCSE		compression		Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
	N	Mean(SD)	N	Mean(SD)		
Diehm 2000	143	4.9 (6.8)	142	4.6 (5.8)		0.36 [-1.09, 1.85]

Favours compression Favours HCSE

33



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Insurance Approval

- Most insurance companies require at least 3 months of failure of conservative measures
- Insurance approval is frequently the biggest barrier for intervention on varicose veins

34



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Interventions

- Surgical
 - Stripping
 - Phlebectomy
- Endovenous Thermal Ablation
 - Laser
 - Radiofrequency ablation
- Chemical ablation
 - Sclerotherapy
 - Adhesive sealing
 - pharmacomechanical

35




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Surgical treatment

- Main goal is to remove source of varicose veins
- Frequently incompetent truncal veins or incompetent perforating veins
- Secondary goal is to remove or ablate symptomatic veins

36




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Vein Stripping

- Gold standard, although mainly historic
- Requires general anesthesia, two incisions
- More painful, longer recovery
- Recurrence from neo vascularization




Source: ACS Summary © 2004 Wolters Kluwer

37



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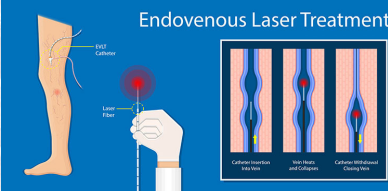
Endovenous thermal ablation

- Less invasive than stripping
- Can be done with only local and tumescent anesthetic
- Two energy sources
 - RadioFrequency Ablation (RFA)
 - Laser (EVLT)
- Similar outcomes have been reported
- I prefer RFA (less pain, more consistent measurable energy delivery, similar outcomes)



Key Procedure Steps

<p style="font-size: 8px; margin: 0;">1. Catheter tip positioned at the ostium of the superficial epigastric vein. Tumescent infiltration is administered.</p>	<p style="font-size: 8px; margin: 0;">3. Catheter shaft markings allow fast and accurate catheter re-positioning between treatment cycles. No energy is delivered during re-positioning.</p>
<p style="font-size: 8px; margin: 0;">2. 2 cm vein segment treated all at once during 20-second treatment cycle. Additional vein segments treated serially.</p>	<p style="font-size: 8px; margin: 0;">4. Treatment of 45 cm vein length takes 3 to 5 minutes (seven treatment segments).</p>

Endovenous Laser Treatment

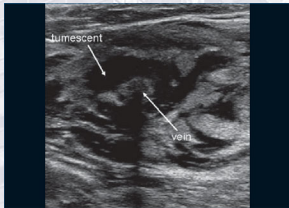
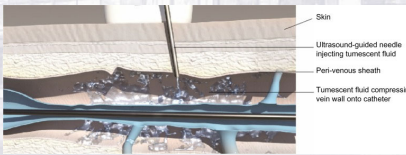


38






Tumescent anesthetic

- Mixture of Normal saline, lidocaine, epinephrine and sodium bicarbonate
- Typical to administer at least a few hundred mls
- Tumescent anesthetic:
 - Provides anesthesia
 - Causes vasospasm
 - Creates a heat sink around vein to protect surrounding tissues
- Injected under US guidance around the vein

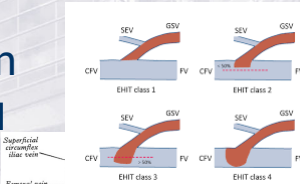
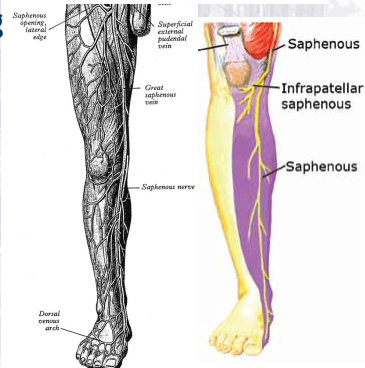



39

Endovenous Thermal Ablation

- Risks of thermal ablation
 - Endovenous heat induced thrombosis EHIT
 - 4 Types of EHIT depending on extent
 - Type 4 is DVT
 - Nerve injury
 - Recanalization
 - Recurrence

40

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Non Thermal (non tumescent)

- 3 approved for treatment of truncal veins
 - Mechanochemical Ablation (MOCA)
 - Chemical adhesive with cyanoacrylate
 - Polidocanol Endovenous Microfoam (PEM)
- Advantages no thermal energy delivery so less risk of injuring surrounding tissue
- Less invasive as do not need injection

41

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Adhesive ablation

- Single access
- No tumescent anesthetic
- Risk of allergic reaction to glue
- Glue is permanent implant
- Risk of glue extension/thrombosis similar to EVLT and RFA

PROCEDURE

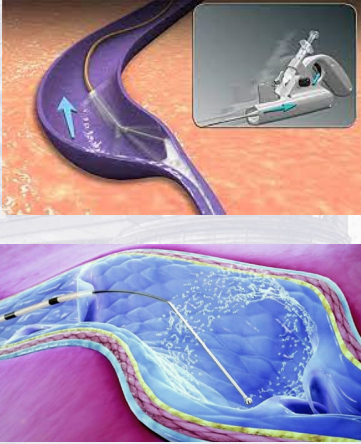
Closure System | Access GSV using catheter technique
Position catheter 5 cm from SFJ | Compress cephalad to catheter
Inject 0.10 cc adhesive into the vein, pull back 1 cm, inject 0.10 cc pull back 1 cm | Compress 3 minutes
Inject 0.10 cc, pull back 3 cm, compress for 30 seconds | Repeat process throughout vein

42

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MOCA

- Mechanicochemical Ablation
- Uses a spinning wire to to disperse sclerosant (polidocanol or sodium tetradecyl) and mechanically injure vein endothelium and induce vasospasm



The diagram illustrates the MOCA procedure in two parts. The top part shows a cross-section of a vein with a catheter inserted. A spinning wire is used to disperse sclerosant (polidocanol or sodium tetradecyl) and mechanically injure the vein endothelium, leading to vasospasm. The bottom part shows a cross-section of a vein with a catheter inserted, illustrating the mechanical injury to the vein endothelium and the resulting vasospasm.

43

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Polidocanol Endovenous Microfoam

- Uses foam sclerosant to ablate truncal veins
- Commercially available

ENDOVENOUS FOAM TREATMENT



The diagram illustrates the Endovenous Foam Treatment process in four stages: 1. Varicose vein: A cross-section of a vein showing a bulge. 2. Catheter is inserted in vein: A catheter is inserted into the vein. 3. Foam infused causing vein to contract: Foam is infused into the vein, causing it to contract. 4. Closed vein following treatment: The vein is closed and the foam is absorbed. Below the diagram is a photograph of a white, porous foam sclerosant being injected into a vein.

44

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Treatment of varicose veins


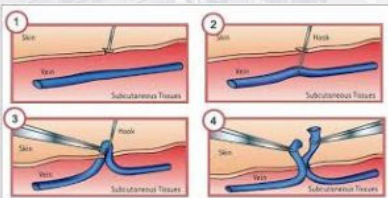
- Surgical Phlebectomy (I prefer for larger veins)
- Duplex guided sclerotherapy (preferable for smaller veins)
- For telangectasias surface laser or visual sclerotherapy

45

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Phlebectomies

- Multiple names (stab, micro)
- Tumescant anesthesia
- 16 or 18 gauge needle used to make incision in the skin
- Vein removed through blunt dissection




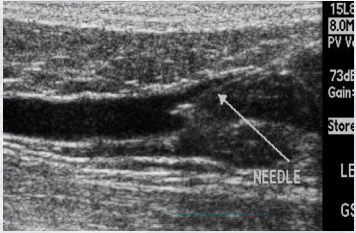
The diagram illustrates the four steps of a phlebectomy: 1. A needle is used to make a small incision in the skin. 2. A hook is used to lift the vein through the incision. 3. The vein is further lifted and exposed. 4. The vein is removed through the incision. The clinical photograph shows a hand using a hook to lift a vein through a small skin incision.

46

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Sclerotherapy

- Historically hypertonic saline used
- Now mainly sodium tetradecyl or polidocanol
- Liquid but frequently mixed with air to make foam
- Air bubbles of foam can be observed during injection on US

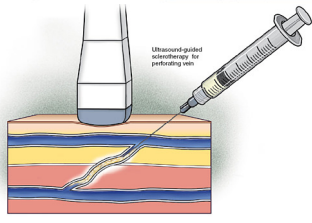
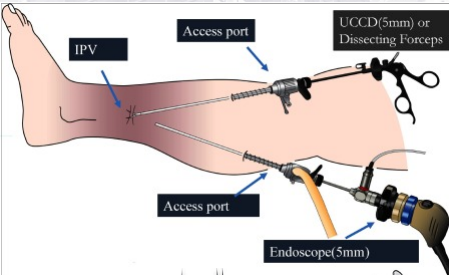


47


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Perforator Veins

- Historically ligation was method of treatment
- Subfascial Endoscopic Perforator Surgery (SEPS)
- My approach is Duplex guided sclerotherapy
- EVLT and RFA devices are available



48




Comparison of Techniques

	Treated vein	Technique	Adverse Reactions
RFA	GSV, SSV, AASV, IPV	Thermal ablation	EHIT
	Non-tortuous veins	Tumescence	Nerve injury
EVLT	GSV, SSV, AASV, IPV	Thermal ablation	EHIT
	Non-tortuous veins	Tumescence	Nerve injury and skin burns
Cyanoacrylate Glue	GSV, SSV, AASV (<10 mm)	Glue (foreign body)	Phlebitis
	Non-tortuous veins	No tumescence	Hypersensitivity to glue
		Compression may not be needed	
MOCA	Veins <12 mm	Sclero may diffuse in branches	Sclero related
PEM (1% polidocanol)	Non-tortuous veins	No tumescence	
	Veins < 10mm	Sclero may diffuse into branches	Sclero related Skin discoloration
	Tortuous and partially thrombosed veins	No tumescence	Thrombophlebitis

Current Surgical Therapy, 13th ed, Cameron JL, Cameron AM (Eds); Elsevier, 2019

49

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- ## Indications for Treatment
- Symptomatic varicose veins not responsive to conservative measures (CEAP C2) for symptom improvement
 - Venous ulcerations CEAP C6 or healed venous ulcers CEAP C5 to prevent recurrence
 - Wound healing?
 - Venous stasis skin changes?

50

Wound Healing

- ESCHAR trial
- Randomized 500 pts to surgery (stripping) or compression
- No difference in wound healing
- Lower rate of recurrence

Figure 2: Kaplan-Meier analysis of ulcer healing for all legs

Number at risk	0	6	12
Surgery and compression	156	84	50
Compression alone	185	89	63

Figure 3: Kaplan-Meier analysis of ulcer recurrence for all legs

Number at risk	0	6	12
Surgery and compression	214	171	132
Compression alone	214	161	109

THE LANCET • Vol 363 • June 5, 2004

51

Wound healing

- EVRA trial showed benefit to early intervention (mix of treatment modalities)
- 20 centers in UK
- 450 patients randomized to early or delayed intervention
- Median time to ulcer healing
 - 56 days for early intervention
 - 82 days for delayed intervention



Variable	Early Intervention (N=224) no. (%)	Deferred Intervention* (N=226) no. (%)
Timing of endovenous treatment after randomization†		
Within 2 wk	203 (90.6)	1 (0.4)
Before ulcer healing	200 (89.3)	1 (0.4)
After ulcer healing	3 (1.3)	0
Between 2 and 4 wk	9 (4.0)	1 (0.4)
Before ulcer healing	9 (4.0)	1 (0.4)
After ulcer healing	0	0
Between 4 wk and 6 mo	6 (2.7)	101 (45.6)
Before ulcer healing	4 (1.8)	4 (1.8)
After ulcer healing	2 (0.9)	99 (43.8)
After 6 mo	0	66 (29.2)
Before ulcer healing	0	19 (8.4)
After ulcer healing	0	47 (20.8)
No treatment	6 (2.7)	55 (24.3)‡
Type of endovenous intervention		
Endothermal ablation only§	71 (31.7)	54 (23.9)
Foam sclerotherapy only¶	111 (49.6)	100 (44.2)
Mechanochemical ablation only	5 (2.3)	1 (0.4)
Endothermal ablation and foam sclerotherapy	27 (12.1)	16 (7.1)
Mechanochemical ablation and foam sclerotherapy§¶	3 (1.3)	0
Abandoned treatment	1 (0.4)	0
No treatment	6 (2.7)	55 (24.3)

Hazard ratio for ulcer healing, 1.38 (95% CI, 1.13-1.68), P=0.001

No. at Risk	0	60	120	180	240	300	360
Early intervention	223	104	51	29	23	19	14
Deferred intervention	225	131	81	50	36	28	23

N Engl J Med 2018; 378:2105-2114

52




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Summary of Pivotal Studies

Technique	Study	Endpoint	Closure Rate	Adverse Events
RFA	Probstle et al	6 months	99.6%	DVT 0%
	VeClose (vs glue)	3 months	96%	Paresthesia 3-3.2 % Phlebitis: 0.8%-3%
EVLT	Min et al	2 years	93.4%	DVT 0% Paresthesia 1.1%
Cyanoacrylate glue	VeClose (vs RFA)	3 months	99%	DVT 0% Paresthesia 3% Phlebitis 4%
MOCA	Elias et al	6 months	96.7%	No PE or CVA
PEM (1% polidocanol)	VANISH-1 and 2	8 weeks	80.4-86.2%	DVT 1.9% Phlebitis 7.7%

[J Vasc Surg](#) 2008; 47:151.
[J Vasc Surg](#) 2015; 61:985.
[J Vasc Interv Radiology](#) 2001; 12:1167.
[Eur J Vasc Endovasc Surg](#) 2015; 50:784.
[Phlebology](#) 2012; 27:97.
[Phlebology](#) 2014; 29:508.

53



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Outcome Comparison (CRT)

	Immediate occlusion %	Recanalization at 3 years %	New veins at 3 years %
EVLT	94	7	20
RFA	95	7	15
Foam	80	26	19
Stripping	96	7	20

[Br J Surg](#) 2011; 98:1079.

54




Complications Overview (Different Studies!)

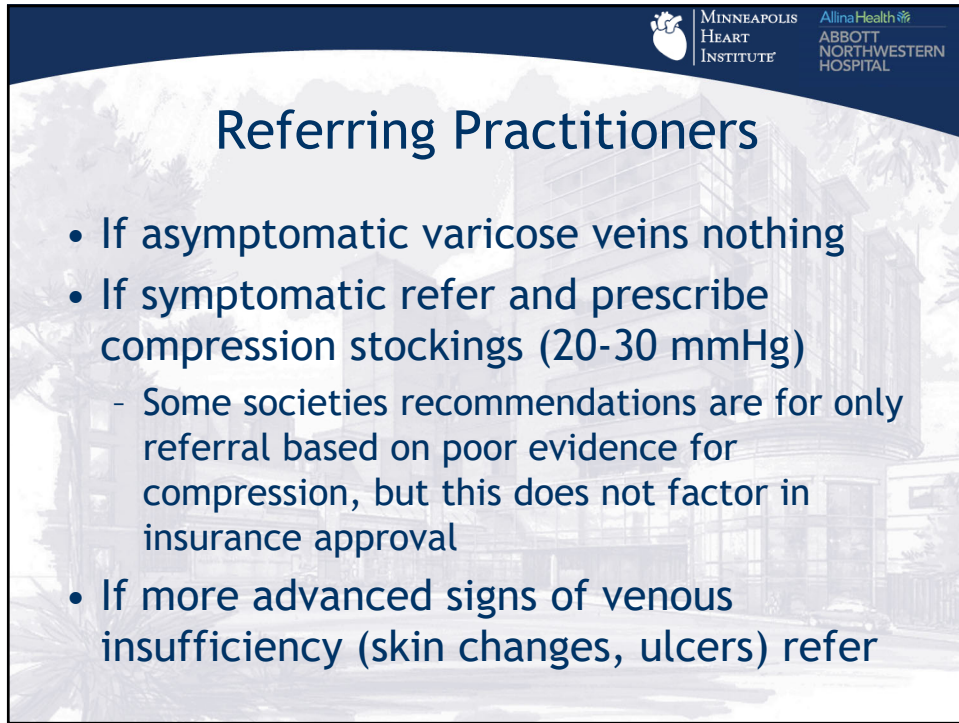
	Immediate failure %	DVT/EHIT %	Thermal burns %	Infection %	Phlebitis %
RFA	<10	<5	<1	<1	<5
EVLT	<10	<5	<1	<1	<5
Cyanoacrylate	<5	<1	0	<1	<10
MOCA	<10	<5	0	<1	<5
PEM	<20	<5	0	<1	<20

J Vasc Surg Venous Lymphat Disord 2014; 2:105.
 J Vasc Surg 2015; 61:988 (Ulcers)
 Eur J Vasc Endovasc Surg 2013; 45:299.
 J Endovasc Ther 2011; 18:328.
 J Vasc Surg 2013; 57:445 (RFA and MOCA obs stud)

55

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- ## Summary
- Variable treatment options
 - I tend to combine RFA and stab phlebectomies if large varicose veins
 - Cyanoacrylate ablation if ulcers or reason to avoid tumescent anesthesia
 - Sclerotherapy for recurrent varicose veins

56



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Referring Practitioners

- If asymptomatic varicose veins nothing
- If symptomatic refer and prescribe compression stockings (20-30 mmHg)
 - Some societies recommendations are for only referral based on poor evidence for compression, but this does not factor in insurance approval
- If more advanced signs of venous insufficiency (skin changes, ulcers) refer

57



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Questions

58