



MASSACHUSETTS
GENERAL HOSPITAL

FIREMAN VASCULAR CENTER

Venous Case Presentation

Luis B. Suarez, MD, FACS, RPVI

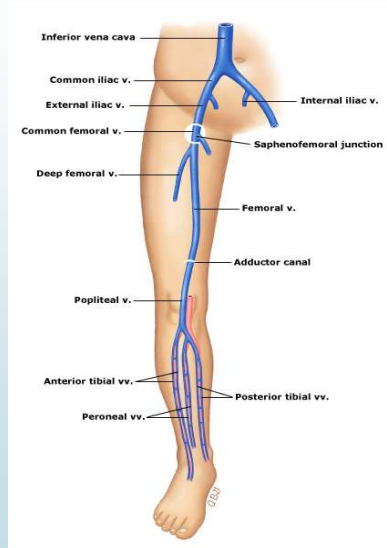
*Medical Director Vascular Diagnostic Laboratory Division of Vascular and
Endovascular Surgery, Massachusetts General Hospital*

Member of the Faculty of Surgery, Harvard Medical School

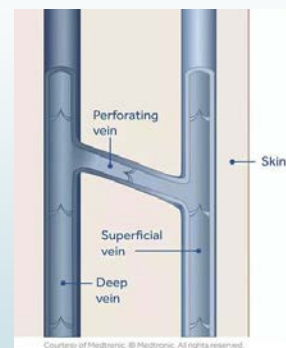
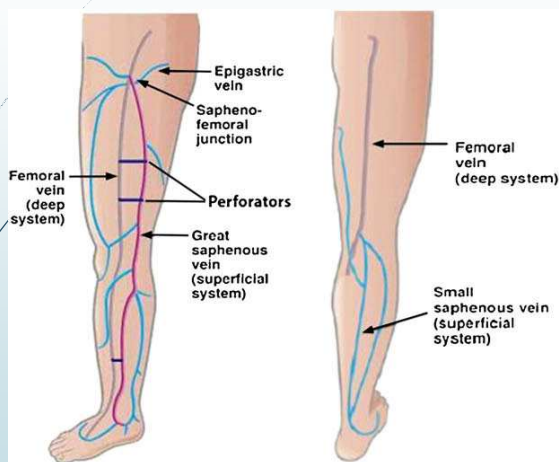


No Disclosures

Anatomy

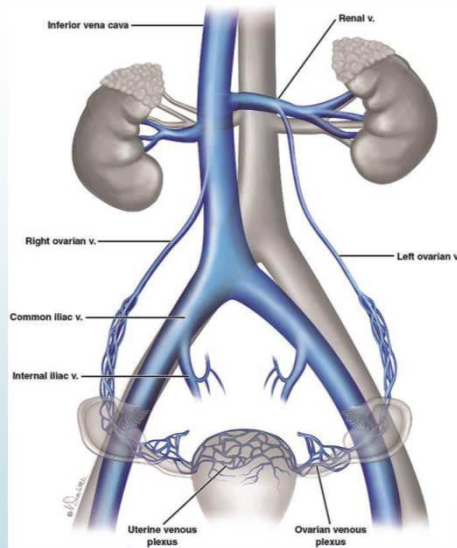


Anatomy



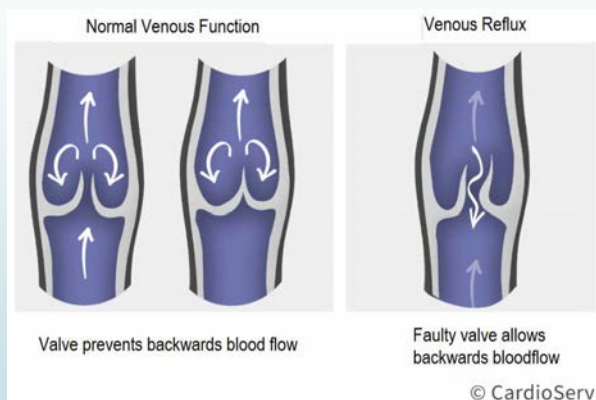
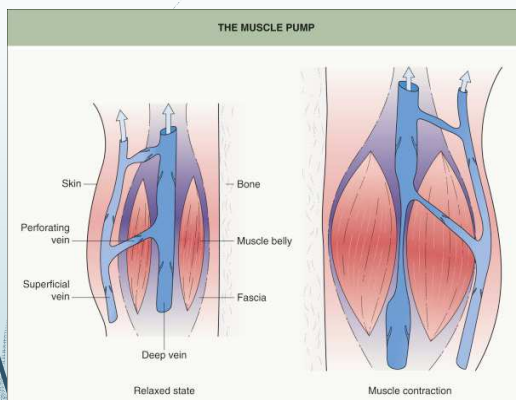
van den Bos, Renate. (2009). Minimally invasive techniques in the treatment of saphenous varicose veins. 21. 206-207.

Anatomy



AJR 2015; 204:448-458

Physiology



Adapted from Goldman MP, et al. Sclerotherapy, 5th edn. London: Mosby, 2011

CEAP Classification

- Clinical
- Etiology
- Anatomy
- Pathophysiology

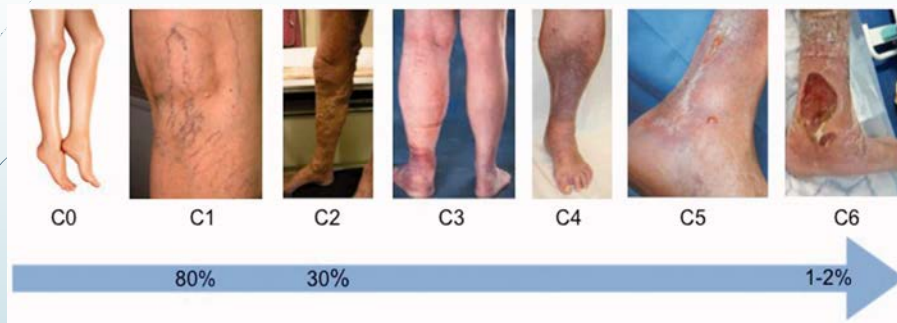
CEAP

CEAP Classification System and Reporting Standard Revision 2020

C (Clinical Manifestations), **E** (Etiology), **A** (Anatomic Distribution), **P** (Pathophysiology)

C0	No visible or palpable signs of venous disease
C1	Telangiectasias or reticular veins
C2	Varicose veins
C2r	Recurrent varicose veins
C3	Edema
C4	Changes in skin and subcutaneous tissue secondary to chronic venous disease
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis or atrophie blanche
C4c	Corona phlebectatica
C5	Healed
C6	Active venous ulcer
C6r	Recurrent active venous ulcer

Clinical



Onida S, Davies AH. Predicted burden of venous disease. *Phlebology*. 2016;31(1_suppl):74-79.

Ethiology

- Congenital
- Primary
- Secondary



Anatomy

- Superficial Veins
- Deep Veins
- Perforator veins



Pathophysiology

- Reflux
 - Deep or superficial
 - Primary or secondary
 - Ovarian Vein reflux
- Occlusive:
 - DVT
 - May Turner
 - Nutcracker syndrome

Case #1: Reflux

- 59 yo Male with painful right lower extremity varicose veins, persistent symptoms despite adequate compression, no history of DVT

Clinical: 2

Etiology: Primary

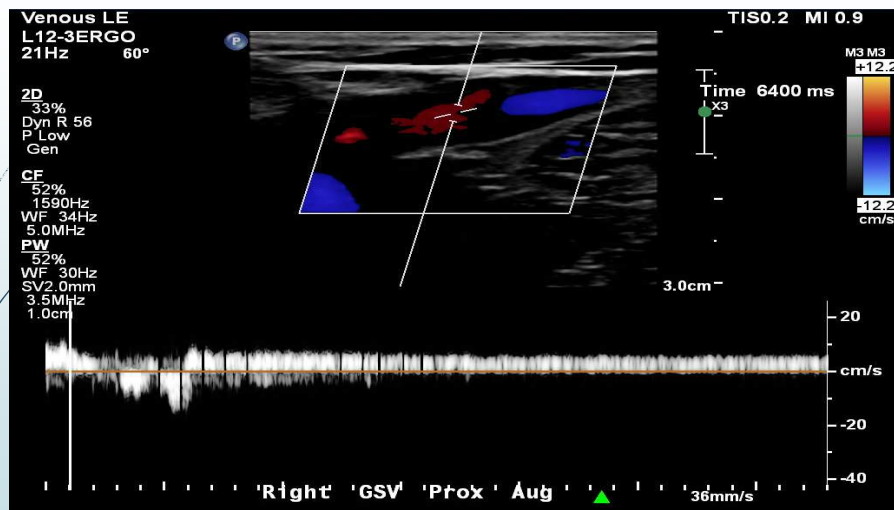
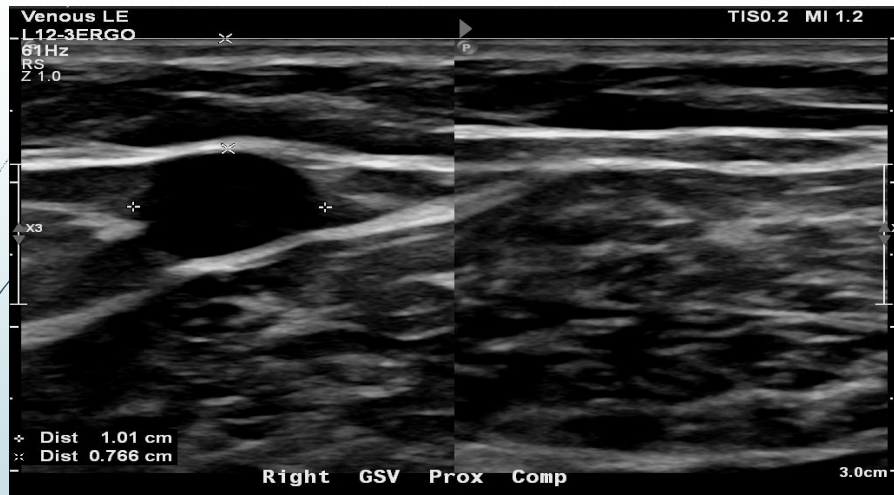
A?

P: Reflux



Reflux Study



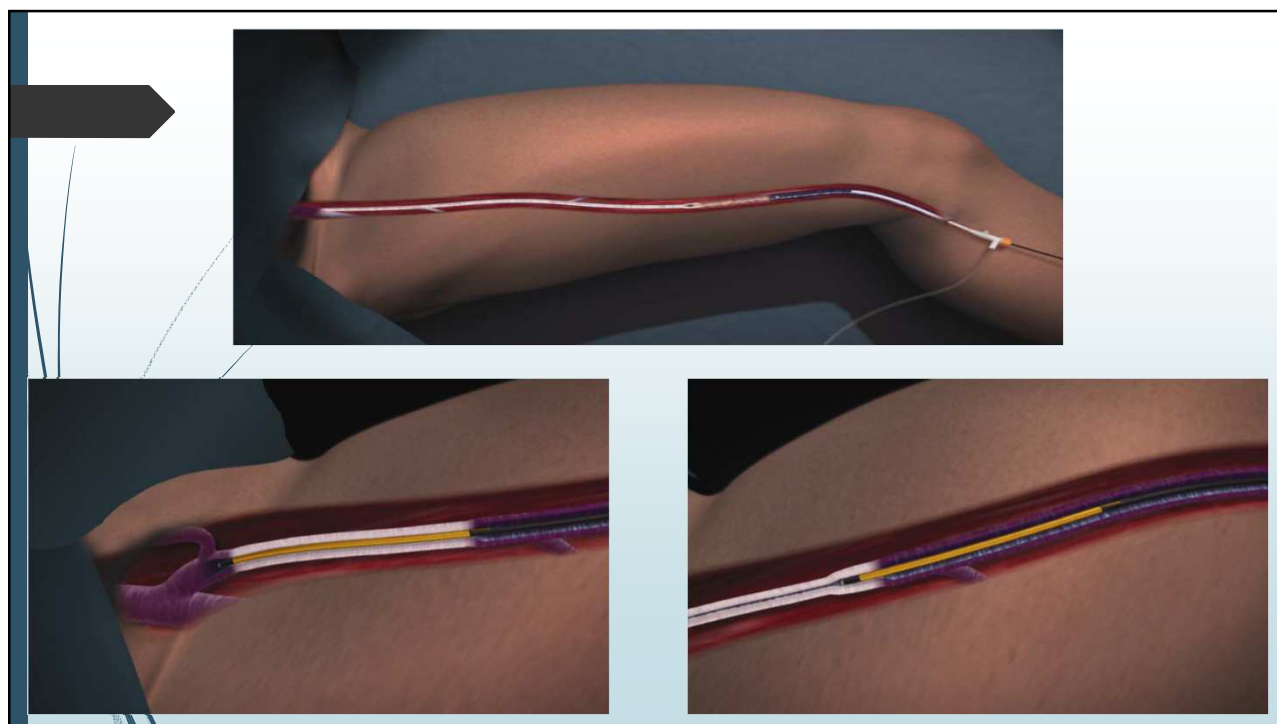


Treatment options

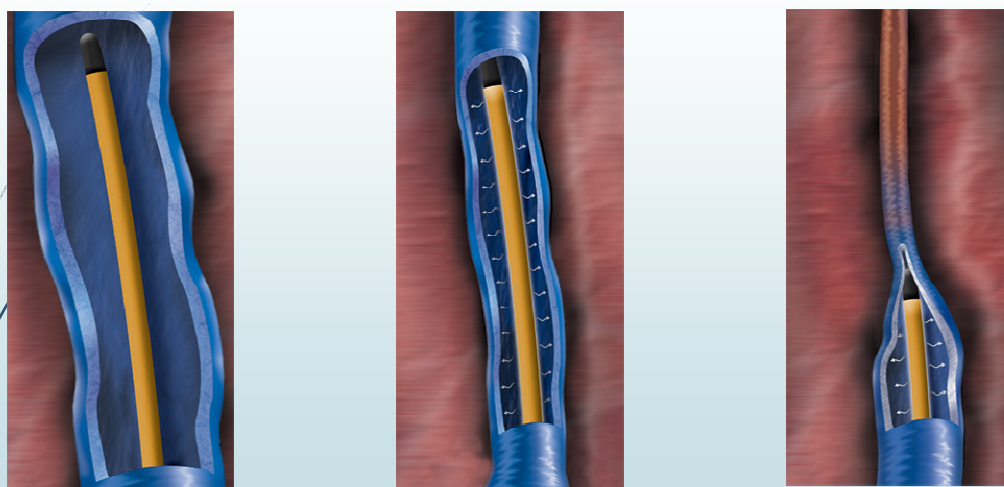
- Compression
- Surgery
 - Ligation/stripping
 - Ablation:
 - Thermal
 - Radiofrequency
 - Laser
 - Non-thermal
 - Foam Sclerotherapy
 - Cyanoacrylate
 - Mechano-chemical (MOCA)

Thermal Ablation

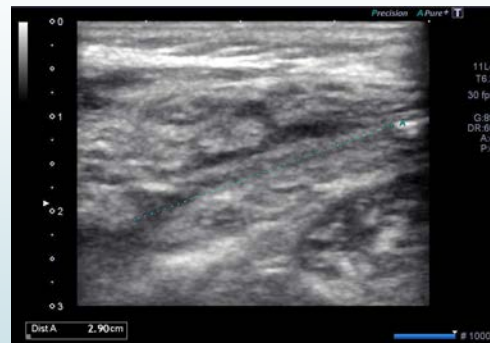




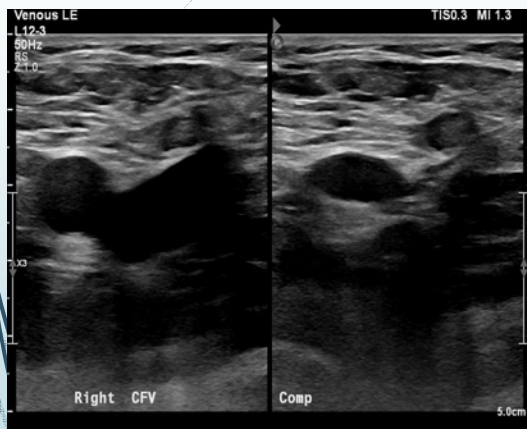
Radio Frequency Ablation



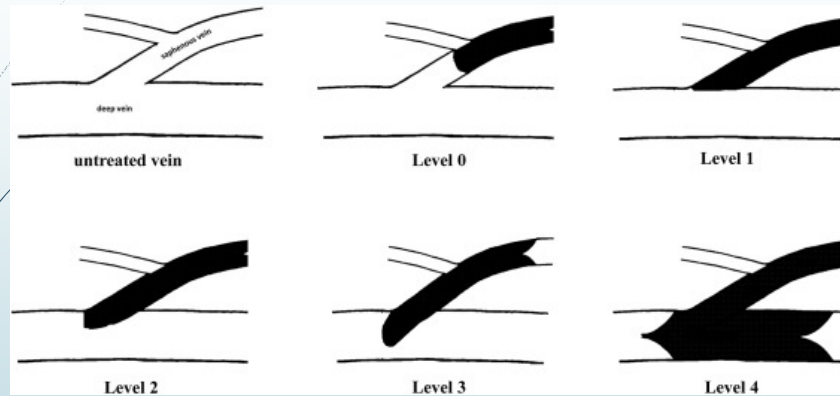
RFA



Postop



EHIT



Heiko Uthoff MD, et al. Journal of Vascular Surgery: Venous and Lymphatic Disorders, 2017-07-01, Volume 5, Issue 4, Pages 515-523.

EHIT

Classification and Treatment of Endothermal Heat Induced Thrombosis

Recommendations from the American Venous Forum (AVF) and the Society for Vascular Surgery (SVS)

AVF EHIT CLAS S	DEFINITION	TREATMENT RECOMMENDATION	STRENGTH OF RECOMMENDATION* AND LEVEL OF EVIDENCE**
I	Thrombus without propagation into deep vein a. Peripheral to superficial epigastric vein b. Central to superficial epigastric vein, up to and including the deep vein junction	No treatment or surveillance.	2C
II	Thrombus propagation into the adjacent deep vein, but comprising <50% of the deep vein lumen	No treatment, weekly surveillance until thrombus resolution. In high risk patients consider antiplatelet therapy vs. anticoagulation. Discontinue treatment following thrombus retraction or resolution	2C
III	Thrombus propagation into the adjacent deep vein but comprising >50% of the deep vein lumen	Therapeutic anticoagulation, weekly surveillance. Discontinue treatment following thrombus retraction or resolution	1B
IV	Occlusive deep vein thrombosis contiguous with the treated superficial vein	Treatment should be individualized, taking into account risks and benefits to patient. Reference may be made to CHEST guidelines for treatment of DVT.	1A

* 1=Strong, 2=Weak. ** A=High, B=Moderate, C= Low to very low

Case# 2: Reflux

■ 66 yo female, h/o bilateral LE ulcer and pain, no previous DVT.

■ Clinical: 6

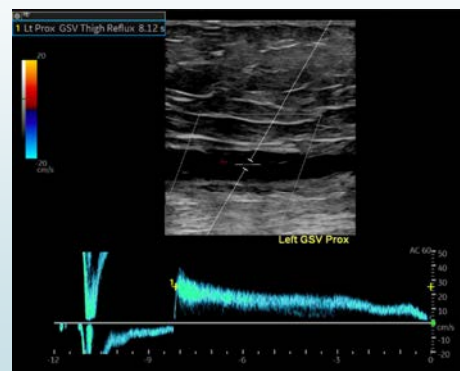
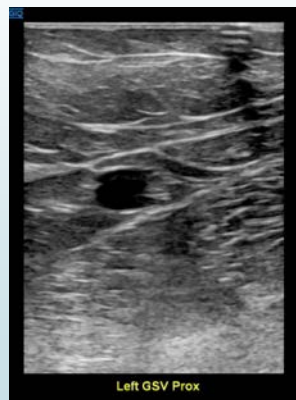
■ Etiology: Primary

■ Anatomy: ?

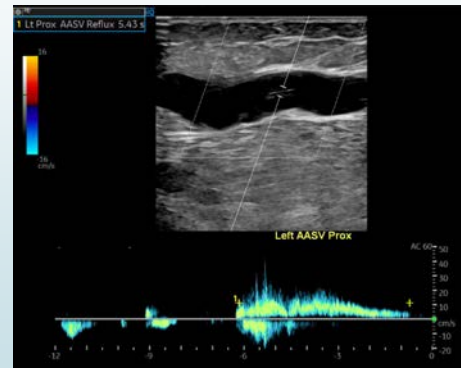
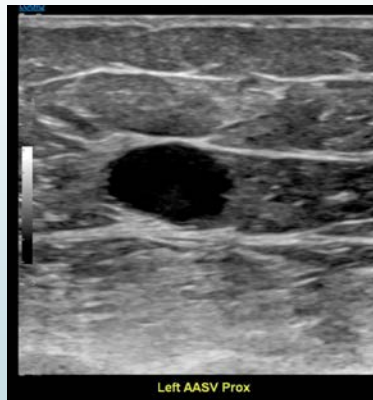
■ Pathophysiology: Reflux



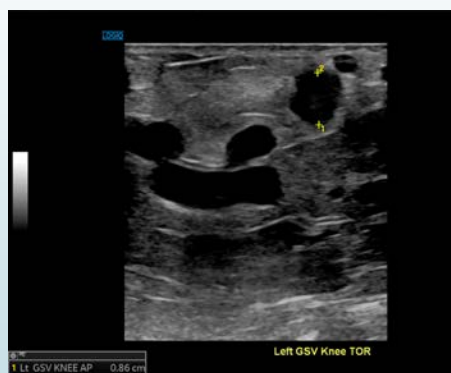
Reflux

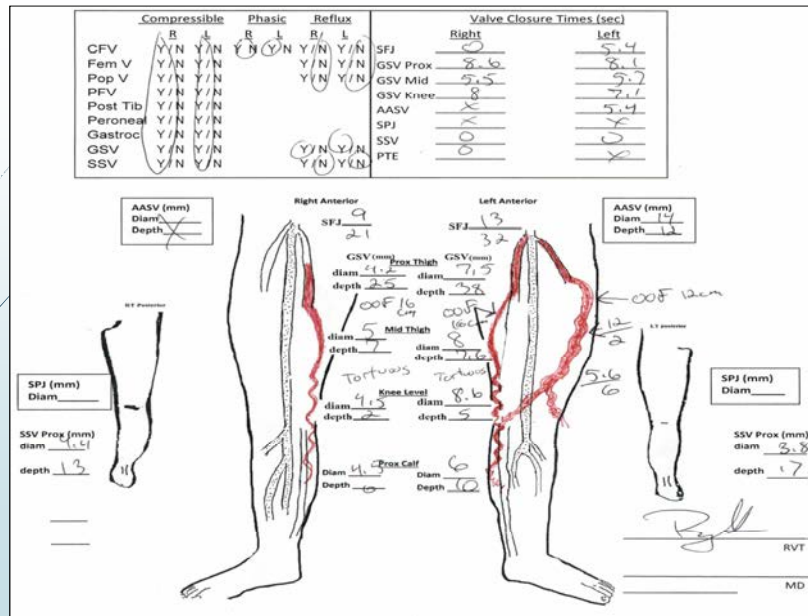


Reflux



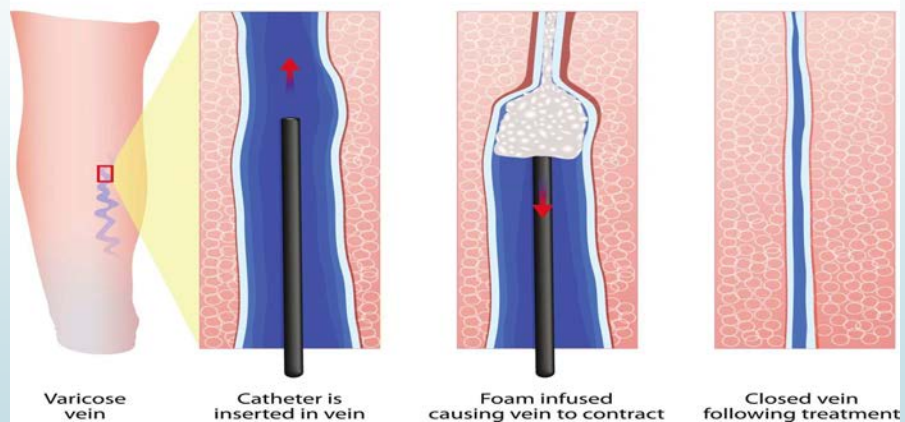
Reflux



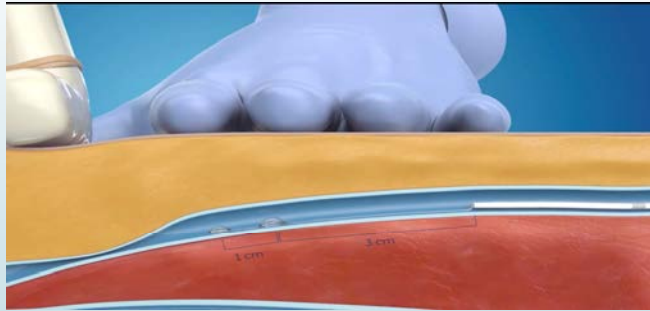


Foam Sclerotherapy

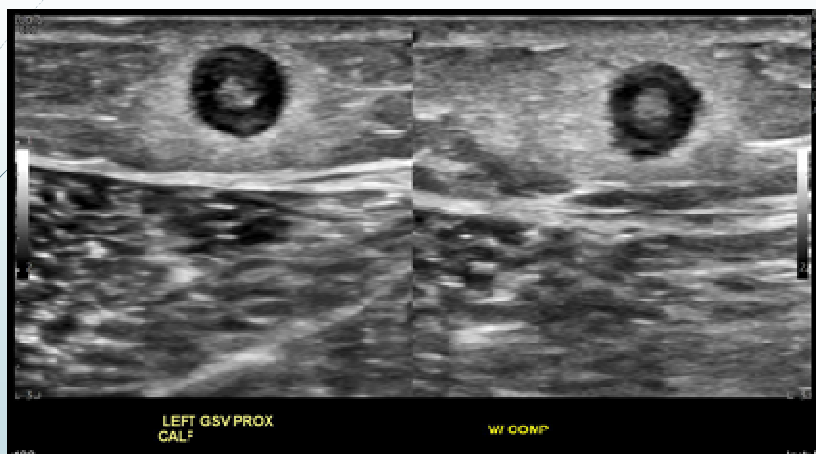
ENDOVENOUS FOAM TREATMENT



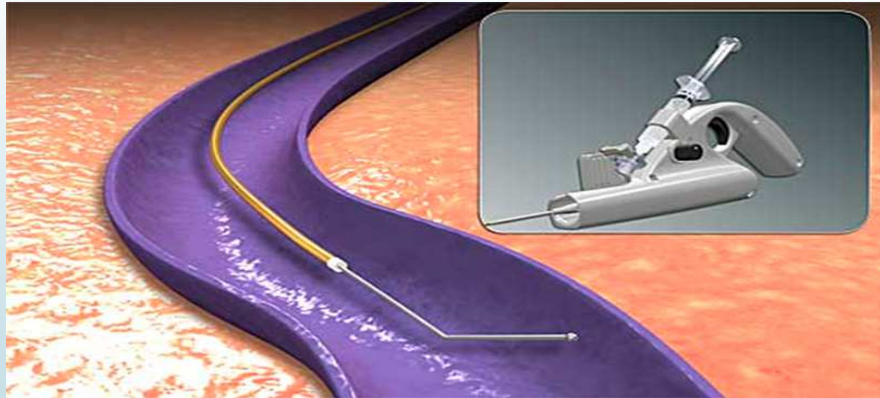
Butyl-Cyanoacrylate (Glue)



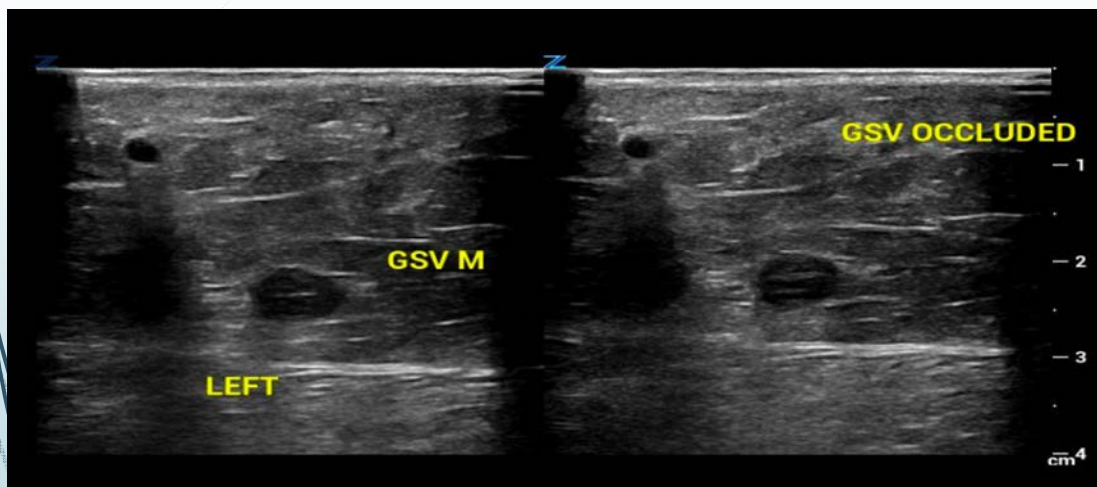
Cyanoacrylate



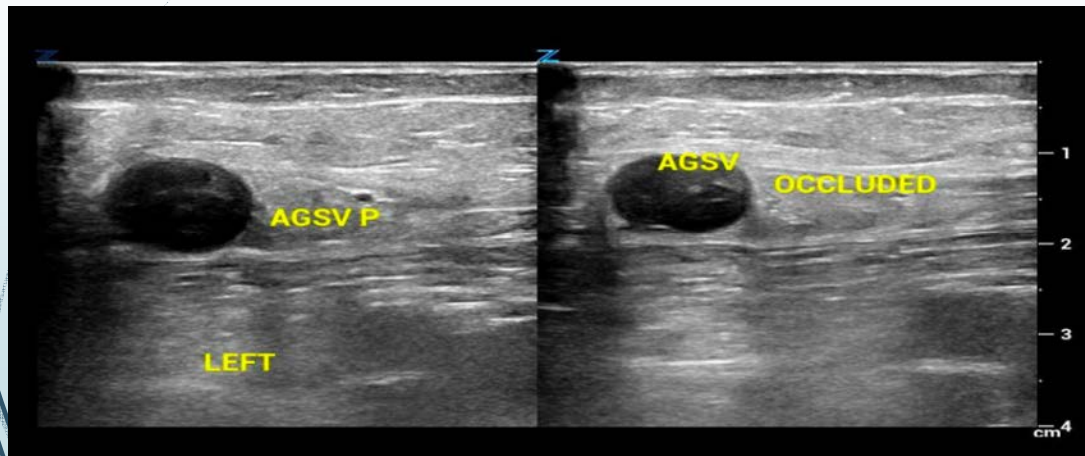
Mechano-Chemical Ablation (MOCA)



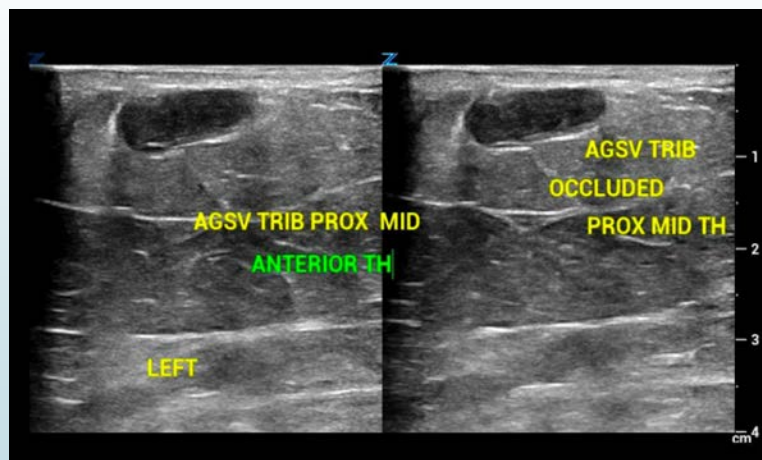
Post



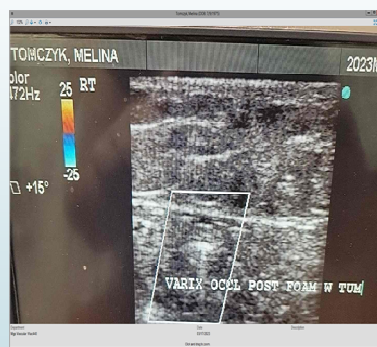
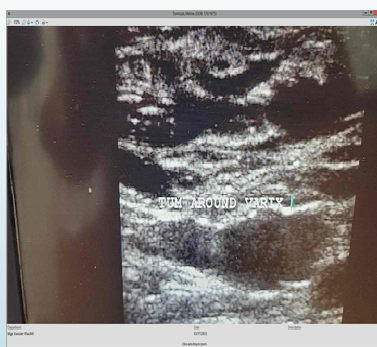
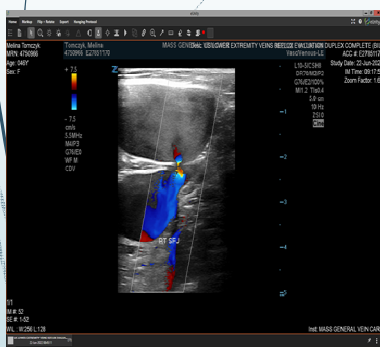
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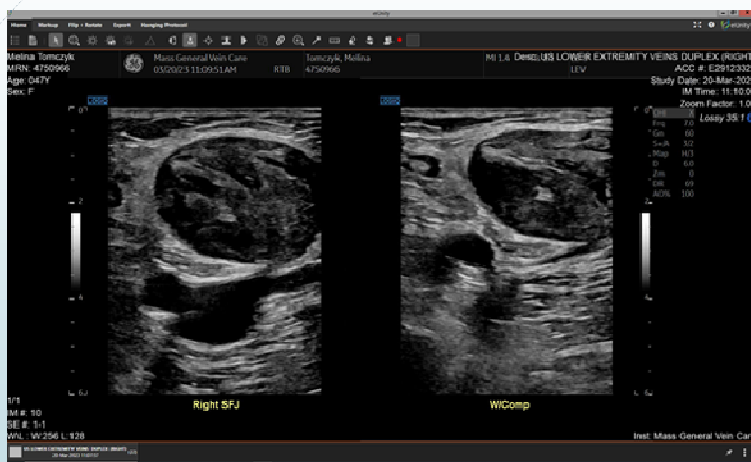
Post



Additional Example



Post



Case #3

68 yo female, previous h/o DVT
35 years ago and left iliac stent,
multiple episodes of LLE ulcers,
most recent started 6 months ago.

Clinical: 6

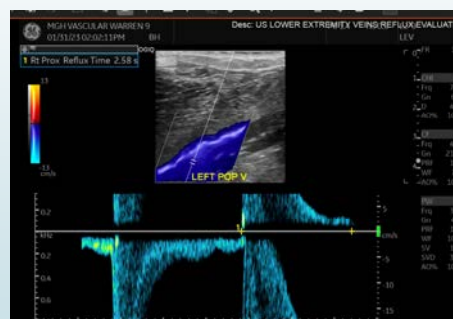
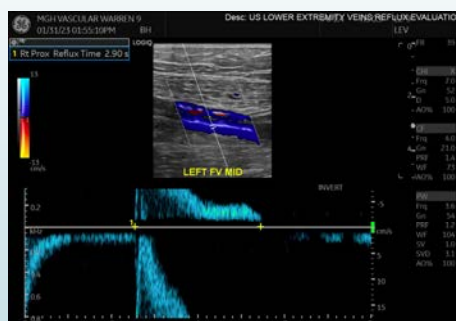
Etiology: S

Anatomy: ?

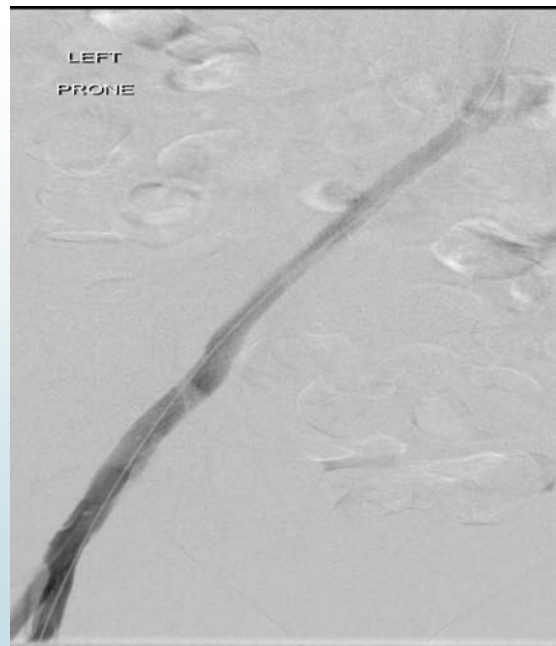
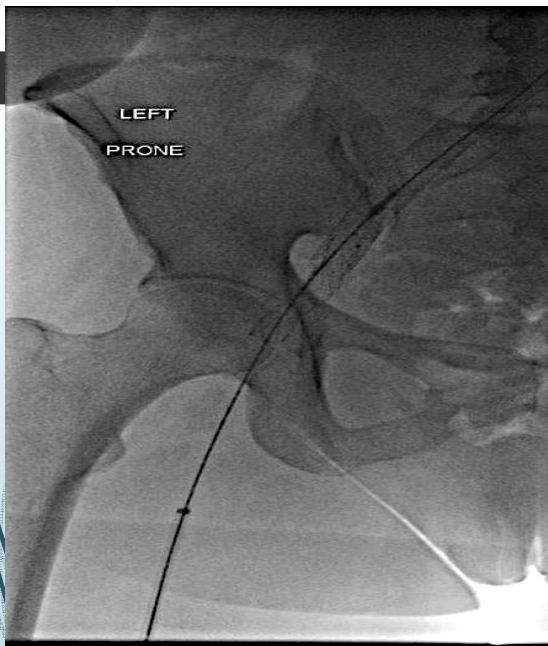
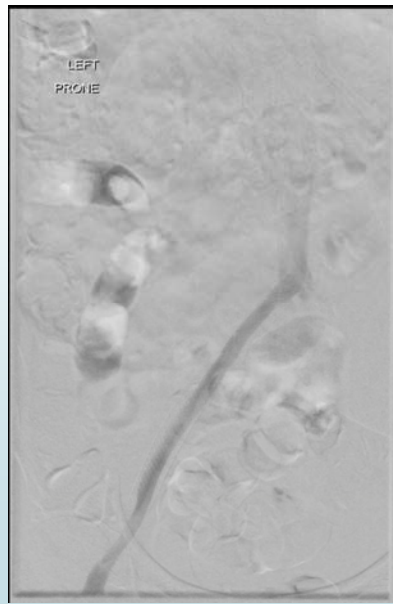
Pathology: ?



Deep Vein Reflux



Ascending Venogram



Case #4

43 yo female with h/o varicose veins s/p bilateral GSV RFA with persistent pain and edema on left lower extremity.

Clinical 3

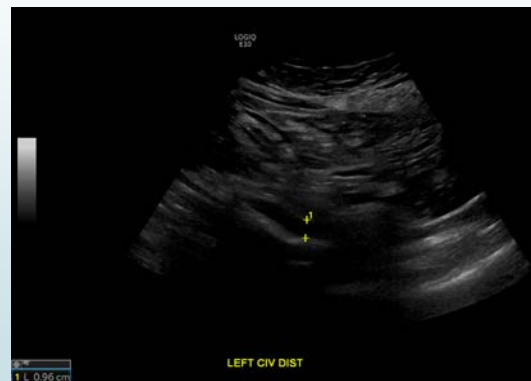
Etiology p

Anatomy d

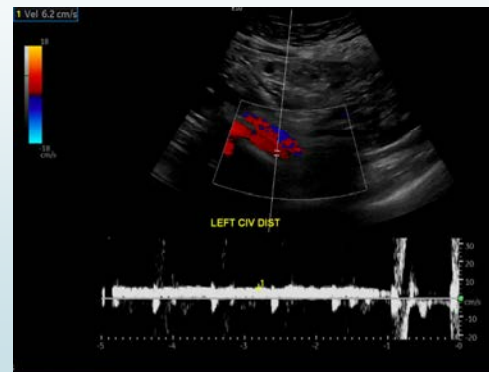
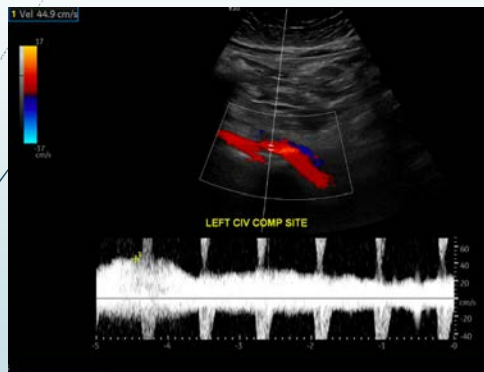
Pathology ?



PELVIC US

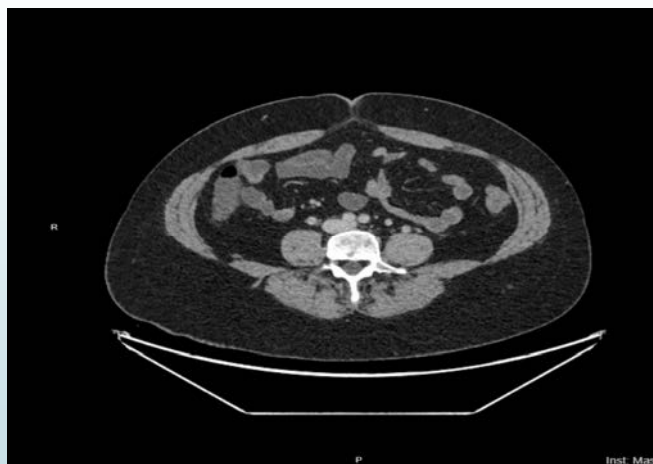


Pelvic US

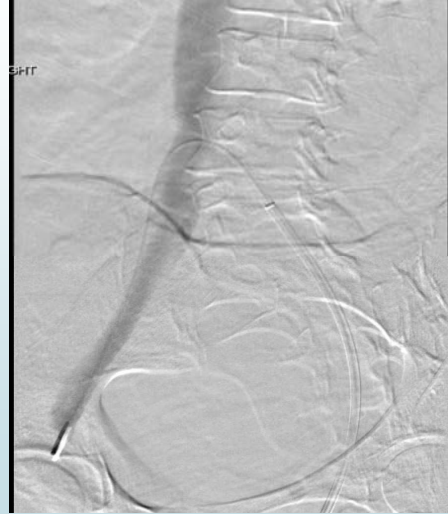
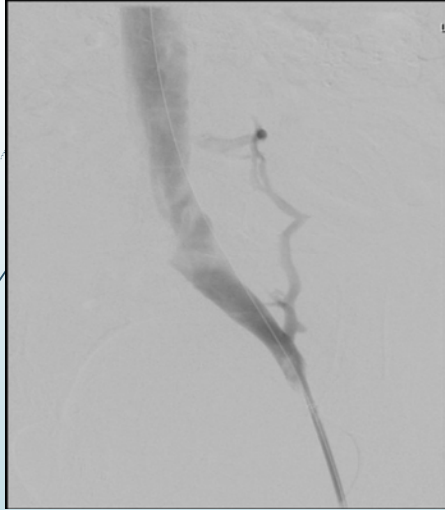


Ratio > 7 (>2.5)

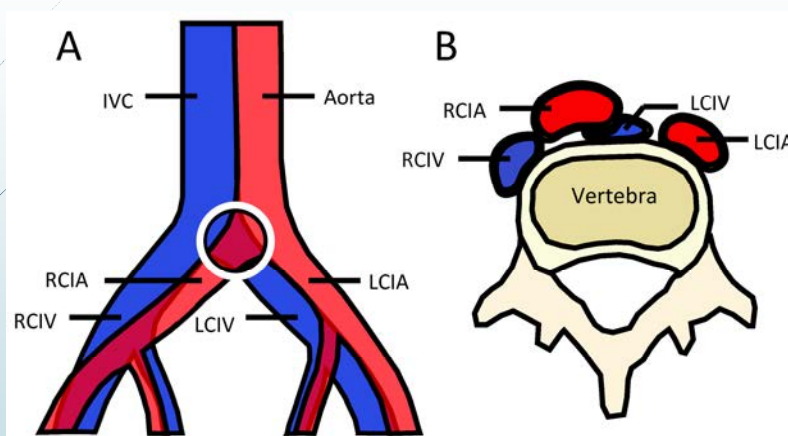
CT Scan



Venogram

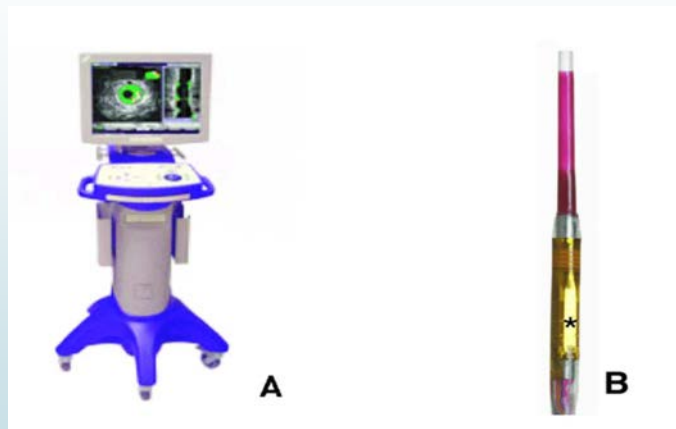


May Thurner disease

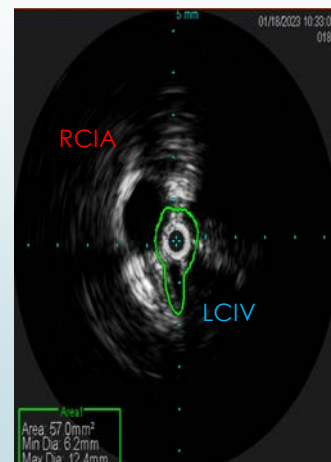
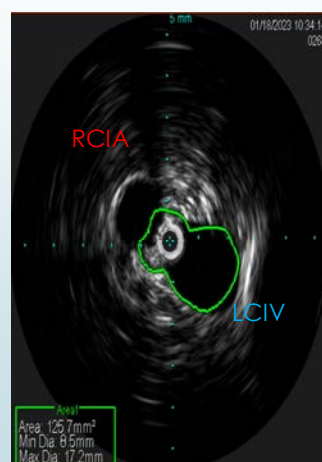
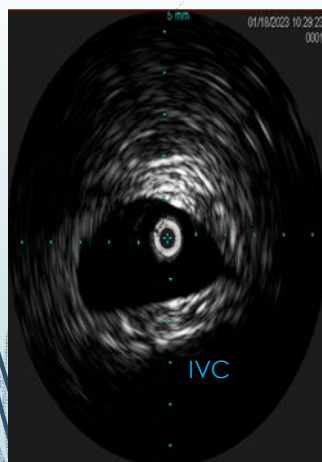


Schröfer-Poland, T.L.; et al. Management of May Thurner Syndrome in Pregnant Patients. *J. Cardiovasc. Dev. Dis.* **2022**, *9*, 410.
<https://doi.org/10.3390/jcdd9120410>

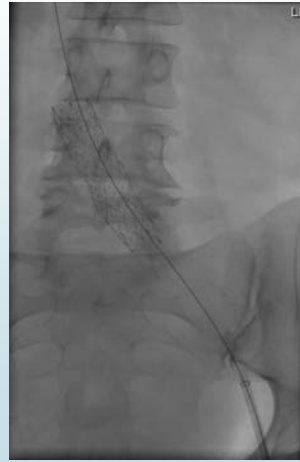
IntraVascular Ultrasound (IVUS)



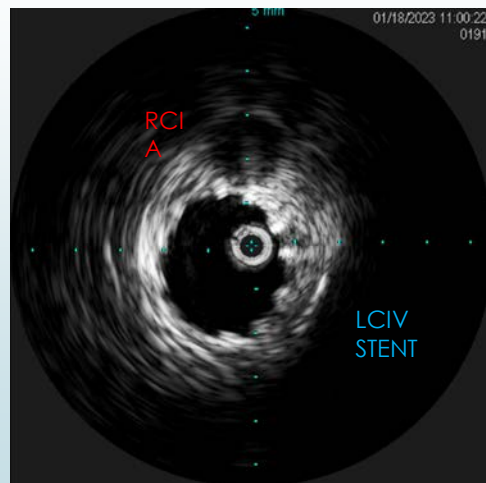
IntraVascular Ultrasound (IVUS)



Iliac Stent



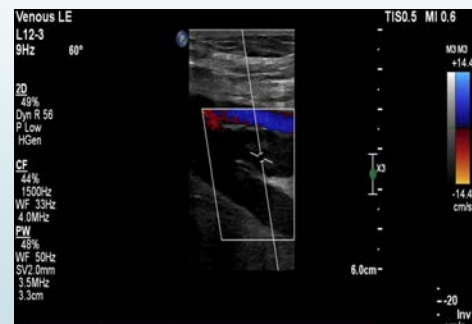
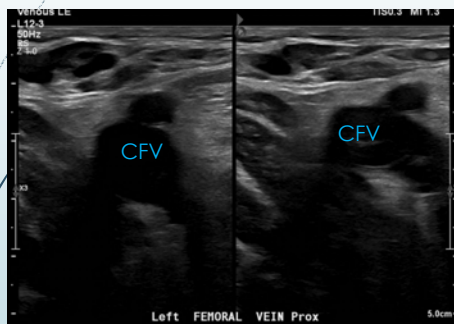
Iliac Stent



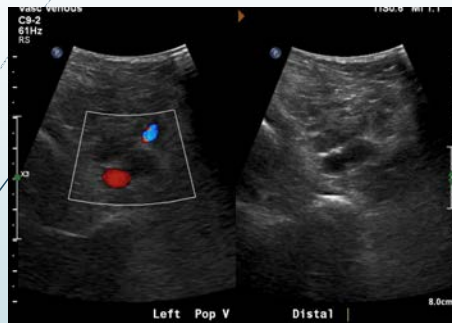
Case #4

41 yo female previous PMH IVDU, presents to ED with 2 day history of significant left lower extremity pain and edema from the ankles up to the thigh.

LLE US



LLE US



DVT

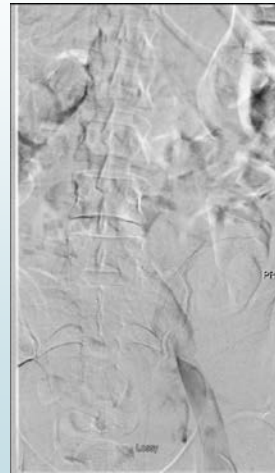
Acute:

- Grayscale Dilatation and incompressibility. Usually, hypoechoic
- Spectral Doppler waveforms absence of flow

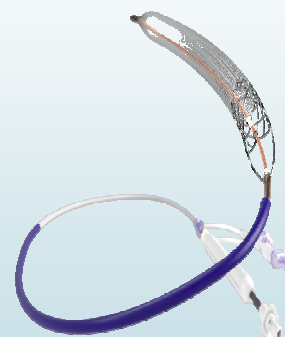
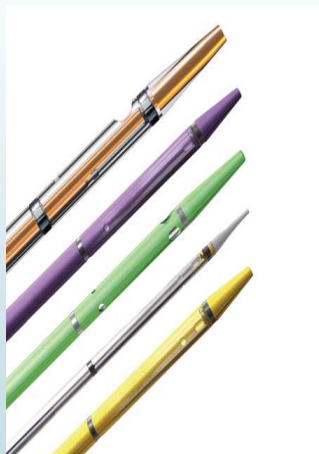
Chronic:

- Grayscale demonstrate atrophy, dense or echogenic appearance
- Spectral doppler can show absence of flow, partial recanalization and different degrees of phasic signal

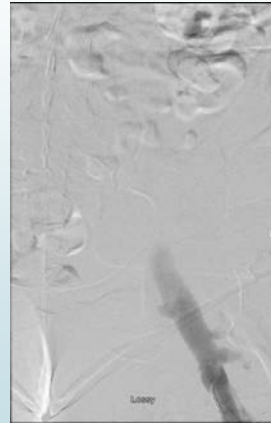
Venogram, Thrombectomy



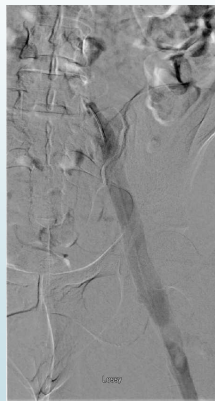
Thrombectomy Devices



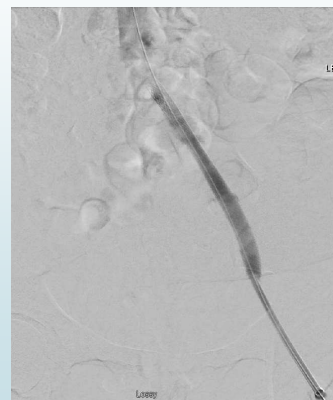
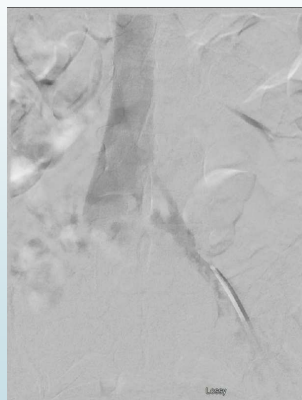
After Thrombectomy



After Thrombectomy



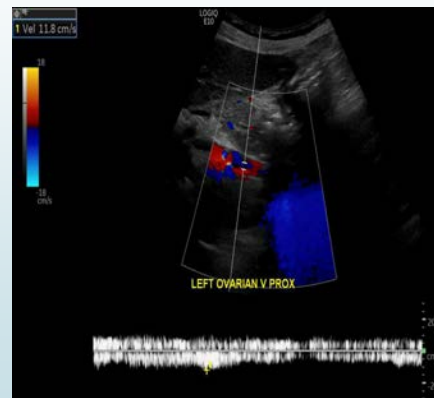
May Thurner



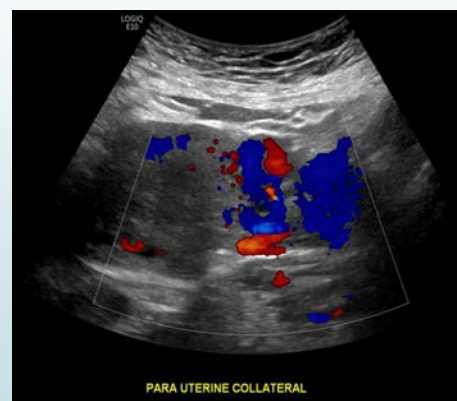
Case #5

- 47 yo female with h/o chronic suprapubic and pelvic pain, exacerbated with prolonged standing and following intercourse.
- Bilateral LE varicose veins extending to bilateral groins

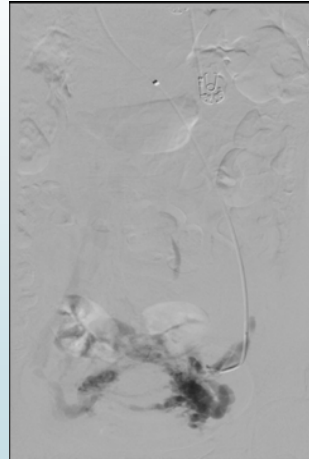
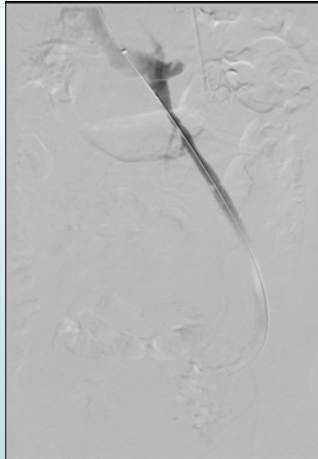
Pelvic US



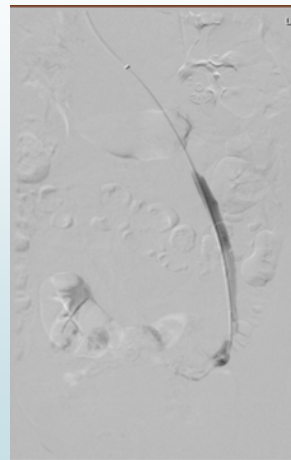
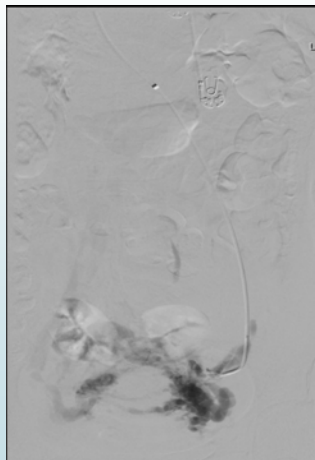
Pelvic US



Venogram



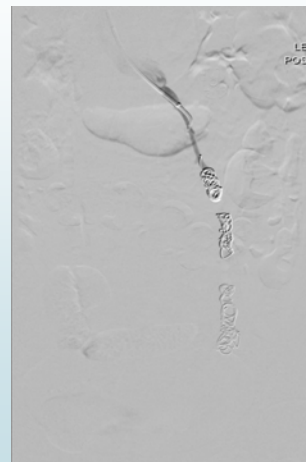
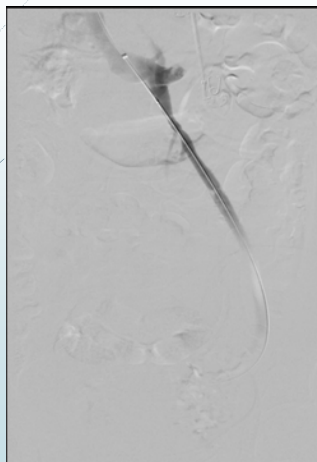
Sclerotherapy, Sotradecol (STS)



Embolization



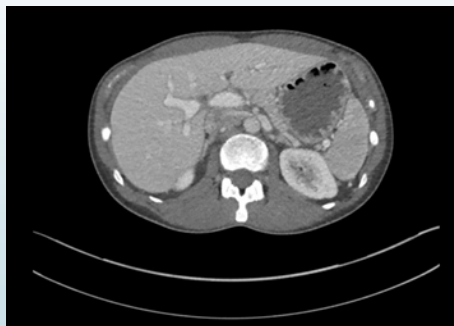
Final



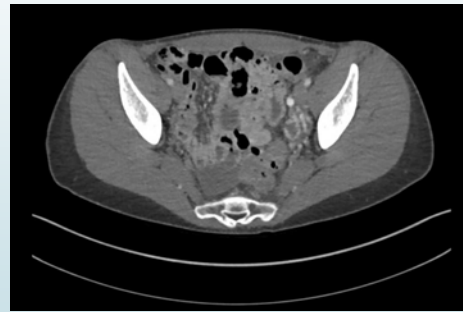
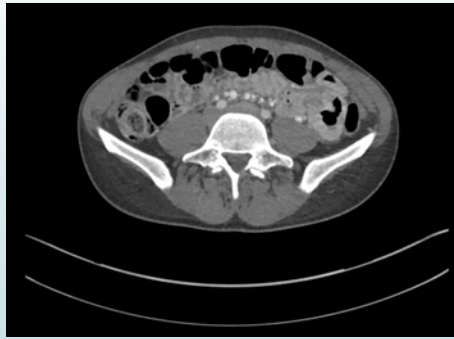
Case #5

- 37 yo female with h/o chronic pelvic pain, exacerbated during menstruation and dyspareunia with microscopic hematuria on urine analysis

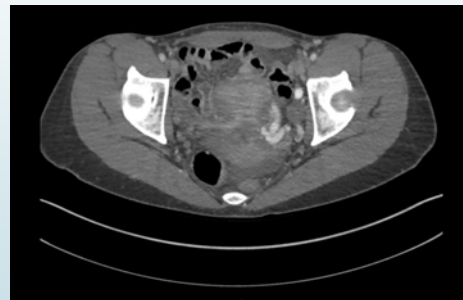
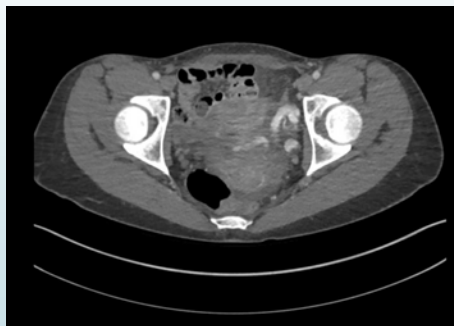
CT venogram



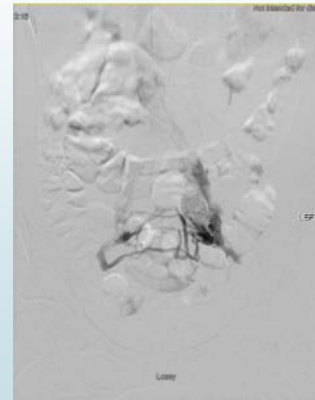
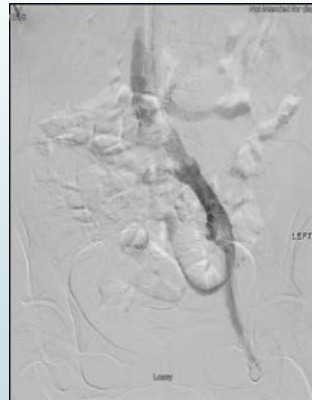
Ct Venogram



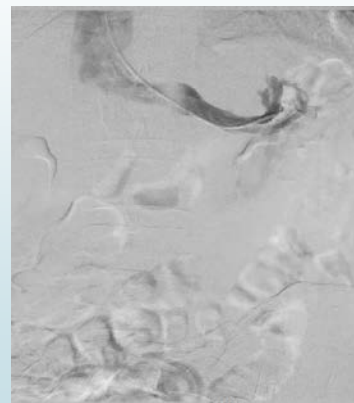
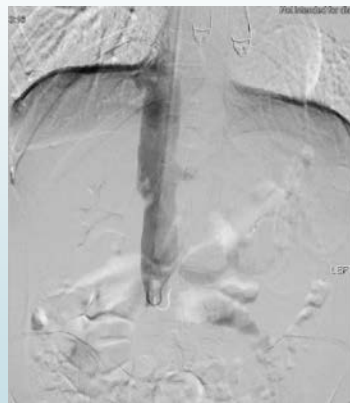
CT Venogram



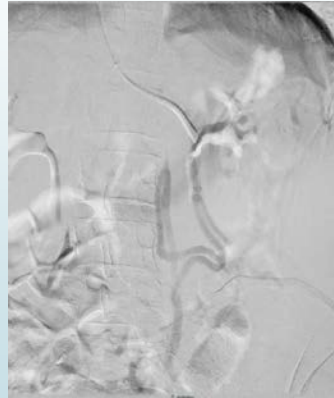
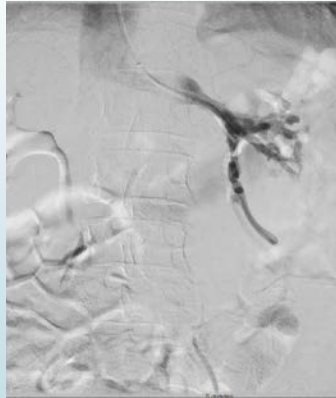
Venogram



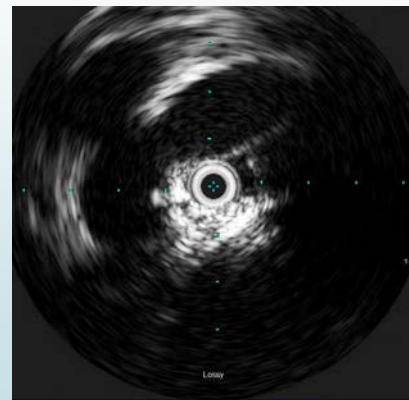
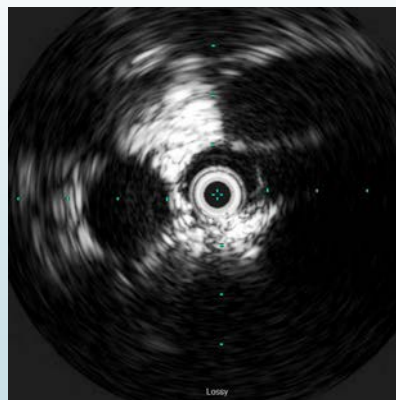
Venogram



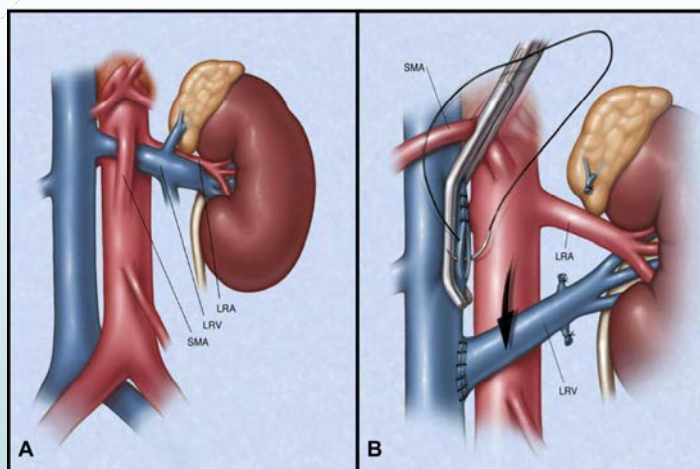
Venogram



IVUS

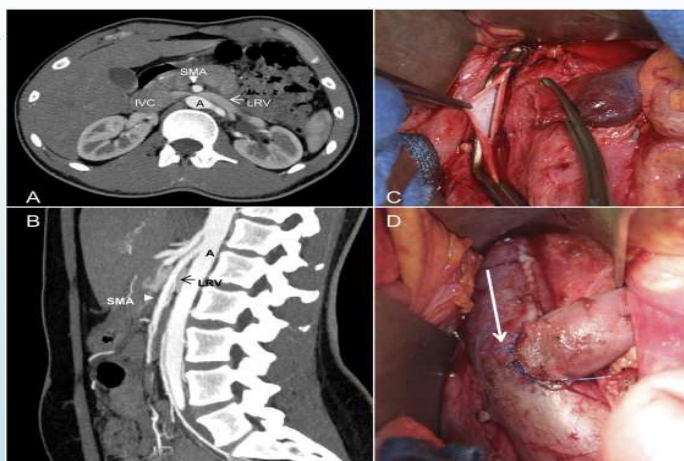


Left Renal Vein Transposition



Nanette R. Reed, et al. Left renal vein transposition for nutcracker syndrome, Journal of Vascular Surgery, volume 49, Issue 2, 2009, Pages 386-394

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Thank you

