Penn Medicine

The Physician's Guide to Venous Disease:

Diagnosing & managing superficial vein disease, VTE, & pelvic venous insufficiency

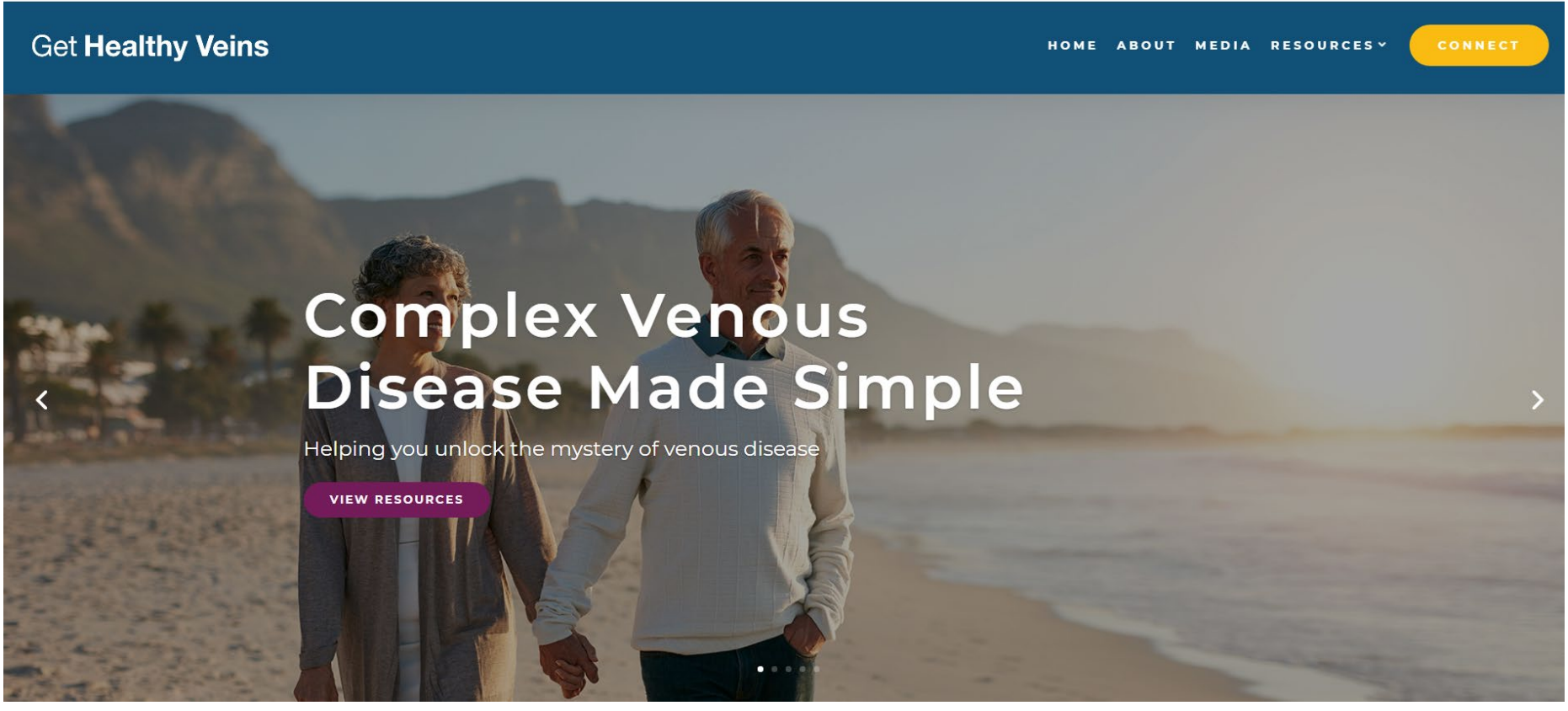
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Assistant Professor of Clinical Radiology & Surgery

June 7, 2021

Take Home Points

- Evaluate your patients for venous disease. You may be the **only** healthcare provider to ever get them the help they need.
- Prescribe compression stockings to your patients and start wearing them yourself early in your career.
- There is no chronic DVT that cannot be intervened on.
- Think 3x before placing an IVF filter. Make sure filter is removed in a timely manner.
- CPP is REAL and debilitating. Learn to recognize the vascular causes of CPP.

GetHealthyVeins.com



Objectives

- Discuss the diagnosis, imaging, and treatment of superficial venous insufficiency
- Review the indications for IVC filters, the complications associated with them, and how those complications can be managed
- Discuss the diagnosis & management of acute and chronic DVT
- Describe the causes and management of pelvic venous insufficiency

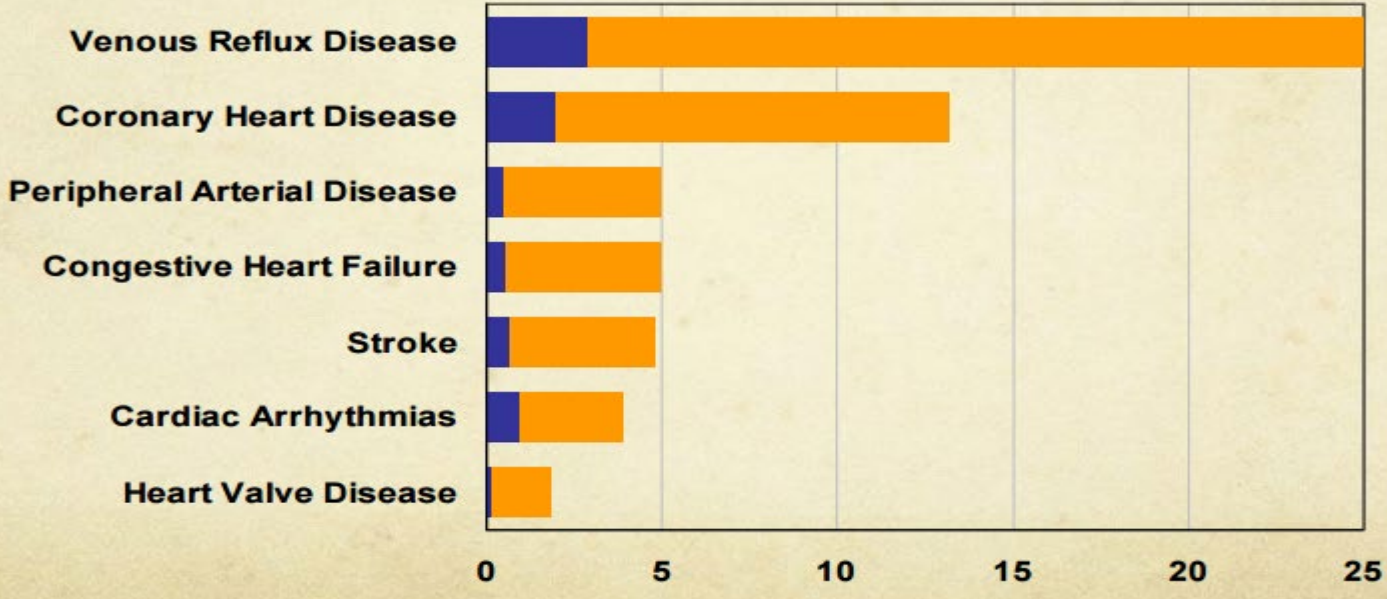
Why should a physician/institution care about venous dis?

- Prevalence of venous disease is 5x greater than arterial disease & most patients go untreated
- $15B per year spent on venous ulcers
- Tremendous opportunity for multi-disciplinary collaboration and research
- Patients are EXTREMELY happy and grateful – you will become their favorite doctor!
- **Patient satisfaction scores!!!**

Chronic Venous Insufficiency (CVI)
(aka superficial venous insufficiency)

Prevalence and Etiology of Venous Insufficiency

Venous reflux disease is 2x more prevalent than coronary heart disease (CHD) and 5x more prevalent than peripheral arterial disease (PAD)[1]



Brand FN, Dannenberg AL, Abbott RD, Kannel WB. The epidemiology of varicose veins: the Framingham Study. Am J Prev Med 1988; 4(2):96-101

Each Pregnancy Worsens Venous Disease

405 women with varicose veins

13% had one pregnancy

30% had two pregnancies

57% had three pregnancies

Brand FN, et al The epidemiology of varicose veins: the Framingham Study Am J Prev Med 1988; 4:96-101

Venous Disease is a Hereditary Disorder

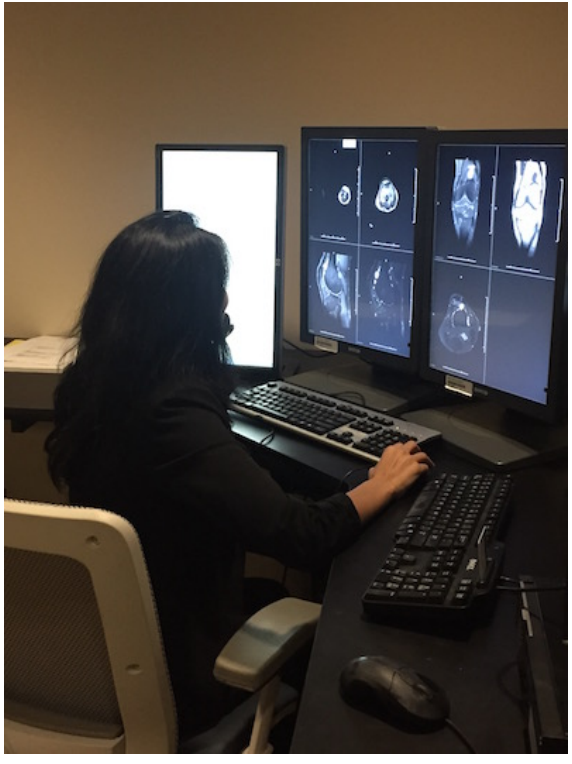
134 families were examined

Risk of developing varicose veins was:

- 89% if both parents had varicose veins
- 47% if one parent had varicose veins
- 20% if neither parent had varicose veins

Cornu-Thenard, A, J Dermatol Surg Oncol 1994 May; 20(5):318-26.

To prevent CVI, what 2 things should you NEVER do?





The Spectrum of Chronic Venous Disease













Symptoms of Chronic Venous Insufficiency

- Aching, fatigue, heaviness in legs
- Pain: throbbing, burning, stabbing
- Cramping
- Swelling (worse at the end of the day)
- Itching
- Restless legs, numbness, tingling

CEAP Classification

Clinical*

- C_0 - No clinical signs
- C_1 - Small varicose veins
- C_2 - Large varicose veins
- C_3 - Edema
- C_4 - Skin changes without ulceration
- C_5 - Skin changes with healed ulceration
- C_6 - Skin changes with active ulceration

Etiology*

- E_C - Congenital
- E_P - Primary
- E_S - Secondary
  (usually due to prior DVT)

Anatomy*

- A_S - Superficial veins
- A_D - Deep veins
- A_P - Perforating veins

Pathophysiology*

- P_R - Reflux
- P_O - Obstruction

"Early application of compression should be performed to correct swelling and progressive scarring and to initiate the healing process by improving the venous microcirculation."

Kistner R. Specific Steps to Effective Management of Venous Ulceration. Supplement to Wounds June 2010.

*Fronek HS, Bergan JJ, et al. The Fundamentals of Phlebology: Venous Disease for Clinicians. 2004. pg 151.

Clinical Classifications with examples



C_1 - telangiectasias or reticular veins



C_2 - varicose veins



C_3 - edema & corona



C_4 - lipodermato-sclerosis and eczema

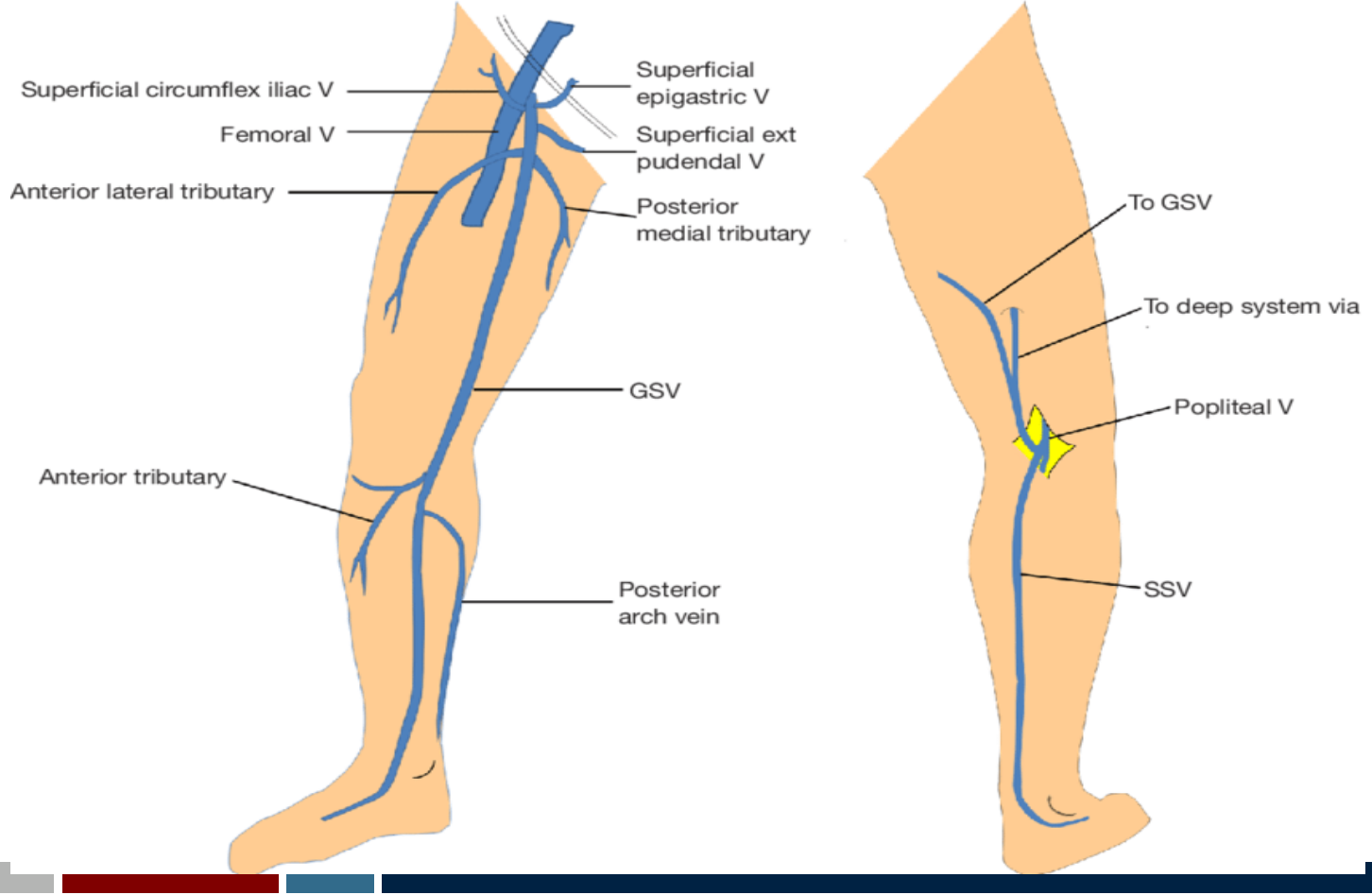


C_5 - ulcer scar



C_6 - active ulcer

Superficial venous anatomy

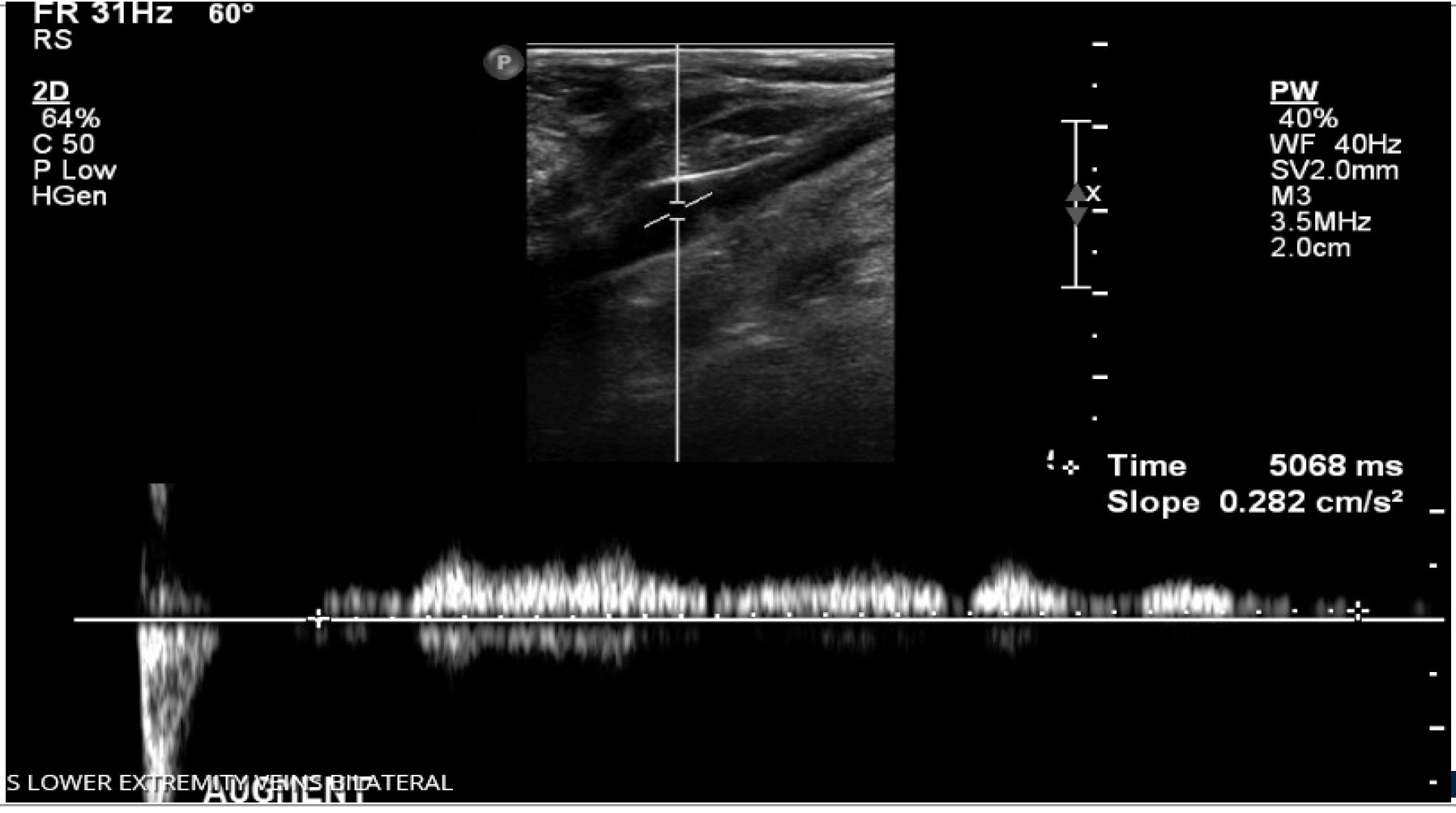


Diagnosis of CVI

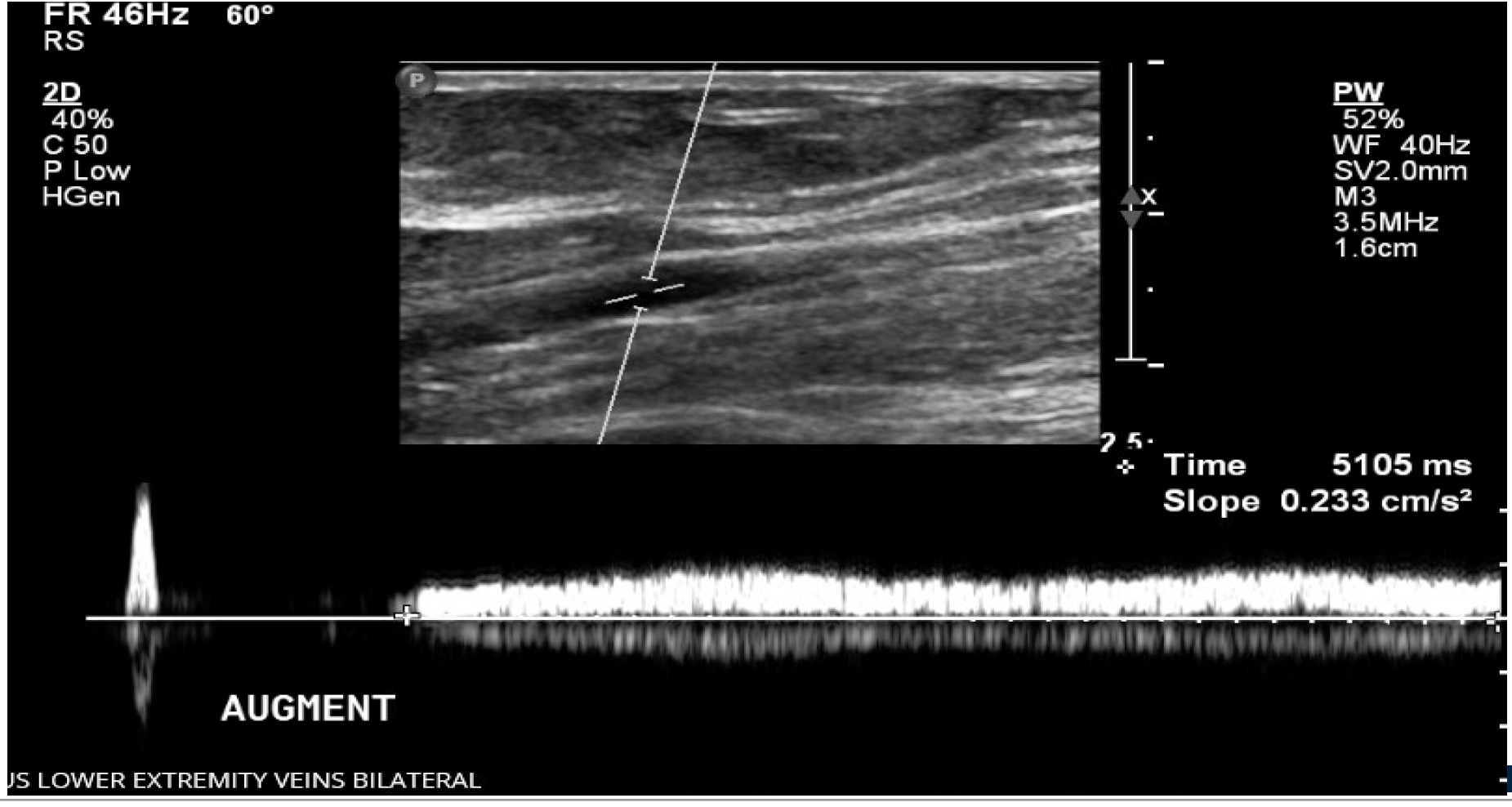
STANDING reflux US that evaluates:

- Saphenofemoral junction reflux
- Saphenopopliteal junction reflux
- Reflux in GSV, SSV, Accessory GSV, Vein of Giacomini, perforators
- Reflux > 0.5 seconds in SIGNIFICANT
- Vein diameter greater than 5 mm
- Evaluate for DVT
- 60-75 minutes but billed as DVT study

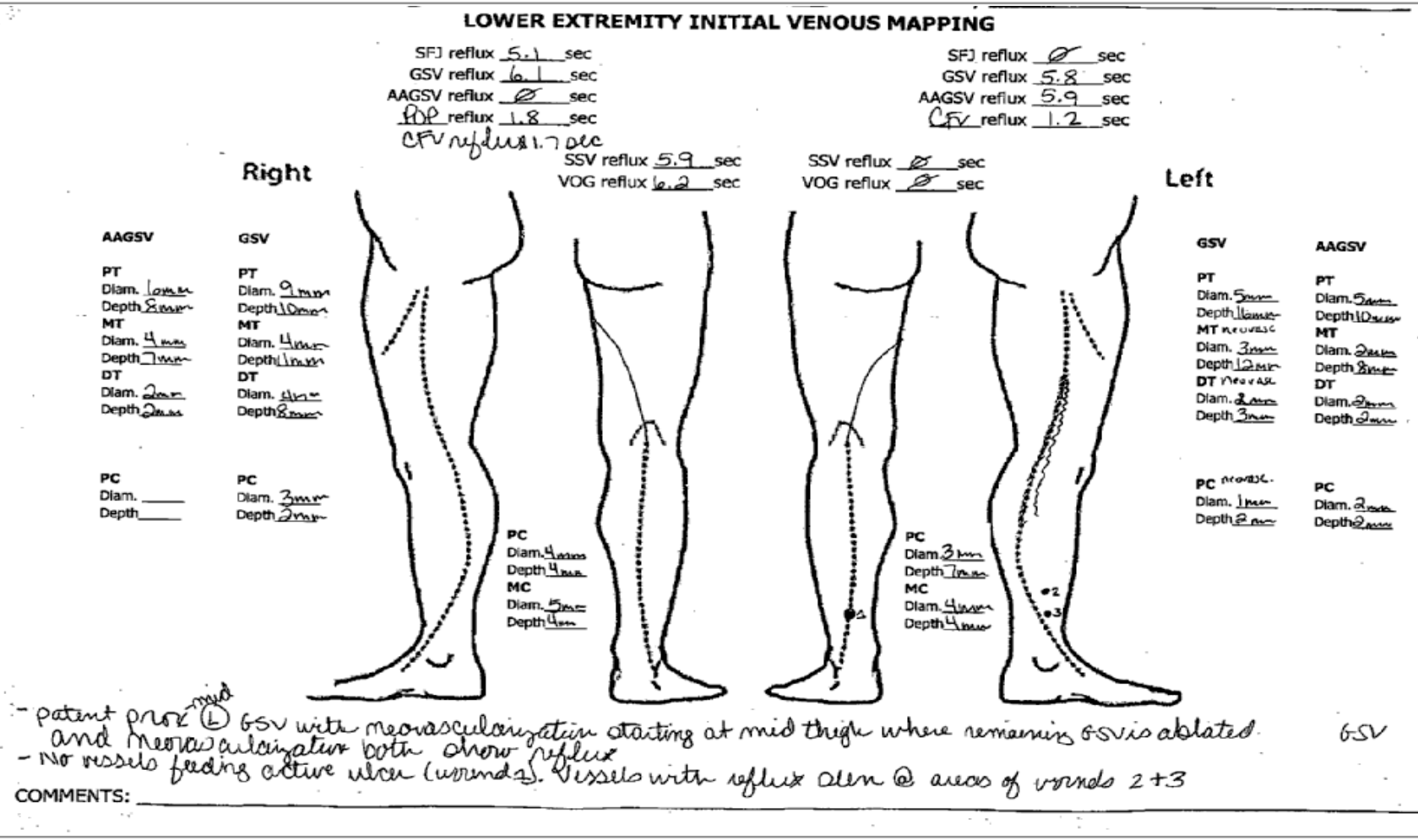
Reflux at SFJ



Reflux in GSV



Venous reflux mapping



LOWER EXTREMITY INITIAL VENOUS MAPPING

Right

SFJ reflux 5.1 sec
GSV reflux 6.1 sec
AAGSV reflux ∅ sec
PDP reflux 1.8 sec
CFV reflux 1.7 sec
SSV reflux 5.9 sec
VOG reflux 6.2 sec

AAGSV
PT
Diam. 10mm
Depth 8mm
MT
Diam. 4 mm
Depth 7mm
DT
Diam. 2mm
Depth 2mm
PC
Diam. ____
Depth ____

GSV
PT
Diam. 9mm
Depth 10mm
MT
Diam. 4mm
Depth 11mm
DT
Diam. 4mm
Depth 8mm
PC
Diam. 3mm
Depth 3mm

PC
Diam. 4mm
Depth 4mm
MC
Diam. 5mm
Depth 4mm

Left

SFJ reflux ∅ sec
GSV reflux 5.8 sec
AAGSV reflux 5.9 sec
CFV reflux 1.2 sec
SSV reflux ∅ sec
VOG reflux ∅ sec

GSV
PT
Diam. 5mm
Depth 11mm
MT NEOVASC
Diam. 3mm
Depth 12mm
DT NEOVASC
Diam. 2mm
Depth 3mm
PC NEOVASC.
Diam. 1mm
Depth 2mm

AAGSV
PT
Diam. 5mm
Depth 10mm
MT
Diam. 2mm
Depth 8mm
DT
Diam. 3mm
Depth 2mm
PC
Diam. 2mm
Depth 2mm

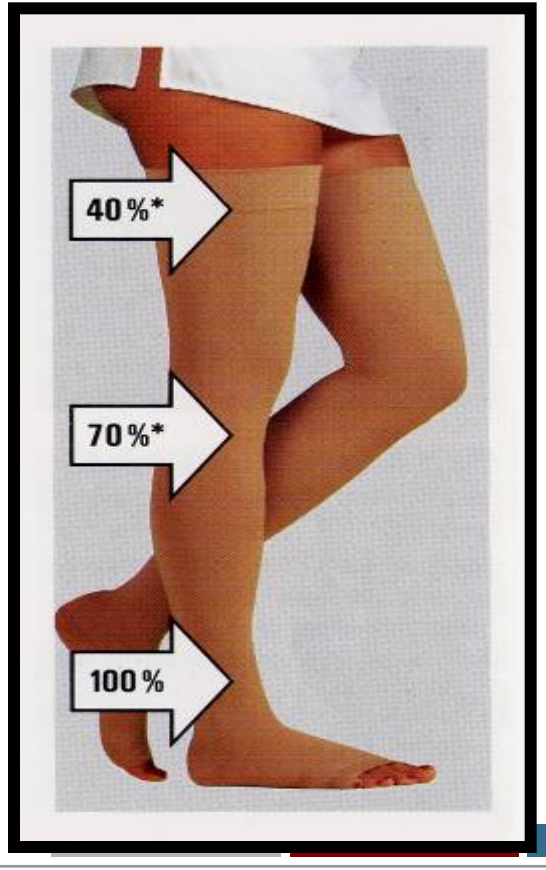
PC
Diam. 3 mm
Depth 7mm
MC
Diam. 4mm
Depth 4mm

- patent prox mid (L) GSV with neovascularization starting at mid thigh where remaining GSV is ablated and neovascularization both show reflux
- No vessels feeding active ulcer (wounds). Vessels with reflux seen @ areas of wounds 2+3

GSV

COMMENTS:

Graded Compression Stocking Therapy



- Provides a gradient of pressure, highest at the ankle, decreasing as it moves up the leg
- Reduces reflux of blood
- Improves venous outflow
- Increases velocity of blood flow to reduce the risk of blood clots

Photo courtesy of Juzo
Dr_Sudi

Vein Stripping Surgery (Old Medicine)



- Inpatient procedure requiring hospital stay
- General anesthesia
- Painful, bruising
- High chance of symptom recurrence due to neovascularity

Endovenous Laser Ablation



- Outpatient procedure approx. 60 min long
- Local anesthesia with anxiolytic only
- Closure of >93% Great Saphenous Veins at 2 yrs
- FDA-approved for RX of Great Saphenous Vein

Microphlebectomy



- Very esthetic method of removing varicose veins
- Local anesthetic with anxiolytic
- Especially useful for tributaries of GSV, SSV

Treatment Results



Male patient with untreated venous insufficiency for 20+ yrs presents to Penn IR with non-healing venous wounds. Pt receiving treatment at local wound center for >5 yrs.



Left leg BEFORE treatment



Right leg BEFORE treatment



Left leg 6 weeks after laser ablation



Right leg 6 weeks after laser ablation

Penn IR









Venogram performed for nonhealing ulcers & leg swelling. No h/o DVT.



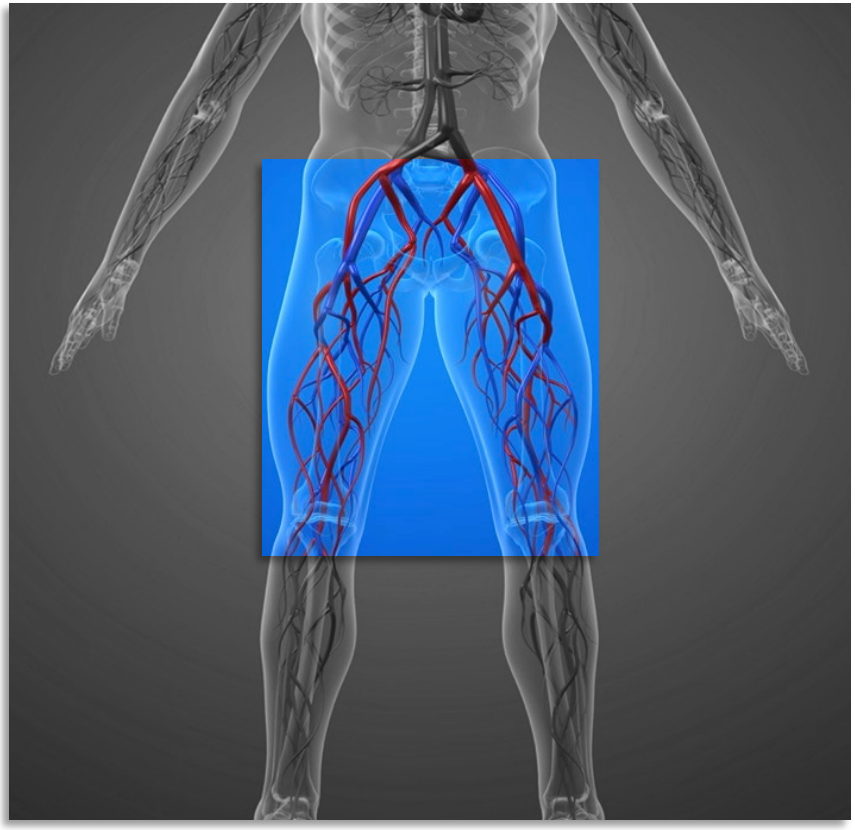
Venogram after IVUS showing compression of left CIV by large osteophyte & compression of right CIV by right iliac artery. 18mm x 9 cm Wallstents placed in bilateral iliac veins.

6 months after EVLT & iliac vein stenting



DVT

Deep Vein Thrombosis (DVT)



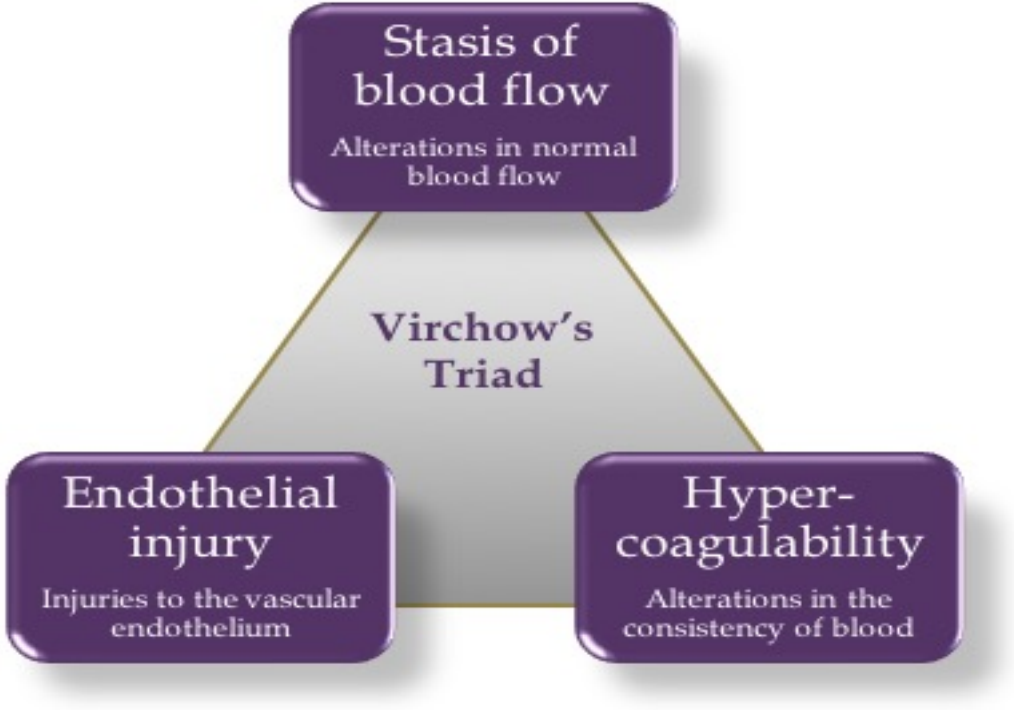
- Deep Vein Thrombosis (DVT) forms in the deep veins of the leg or arm
- Lower extremity DVT is the most common
- Approximately 600,000 documented new cases in the US each year[1]
- DVT-associated PE cases ~ 300,000 deaths annually in US
- In 25% patients with PE, presenting symptom is sudden death!!!
- #1 cause of preventable hospital death

[1] Tapson VF. Acute pulmonary embolism. *N Engl J Med*. Mar 6 2008;358(10):1037-52
[2] Geerts WH, et al. *Chest*. 2008;133:381S-453S
[3] Stein. PD, et al. Challenges in the Diagnosis Acute Pulmonary Embolism, *The American Journal of Medicine* (2008) 121

Deep Vein Thrombosis (DVT)

Precipitating Causes

- Injury/trauma
- Prolonged inactivity
- Extended plane or car travel
- Anticoagulation disorder
- Surgery
- Cancer
- Contraceptives/ estrogen therapy
- Severe infection



Schreiber, D. Deep venous thrombosis and thrombophlebitis. www.emedicine.com/emerg/topic122.htm, last updated October 2005

DVT Symptoms

- Sudden swelling in affected limb
- Limb pain/tenderness
- Pain on dorsiflexion of the foot
- Dilated superficial collateral veins
- Cyanosis or pallor
- Warm skin over area of thrombosis
- Lack of distal pulses
- Often difficult to differentiate from non-thrombotic disorders



Schreiber, D. Deep venous thrombosis and thrombophlebitis. www.emedicine.com/emerg/topic122.htm, last updated October 2005

Venous Thrombosis Complications: Post-Thrombotic Syndrome (PTS)

- Up to 47% of DVT patients develop PTS
- Symptoms / Consequences
  - Swelling
  - Pain
  - Dermatitis
  - Varicose veins
  - Ulceration fibrosis with atrophy
  - Lymphedema
  - Venous claudication



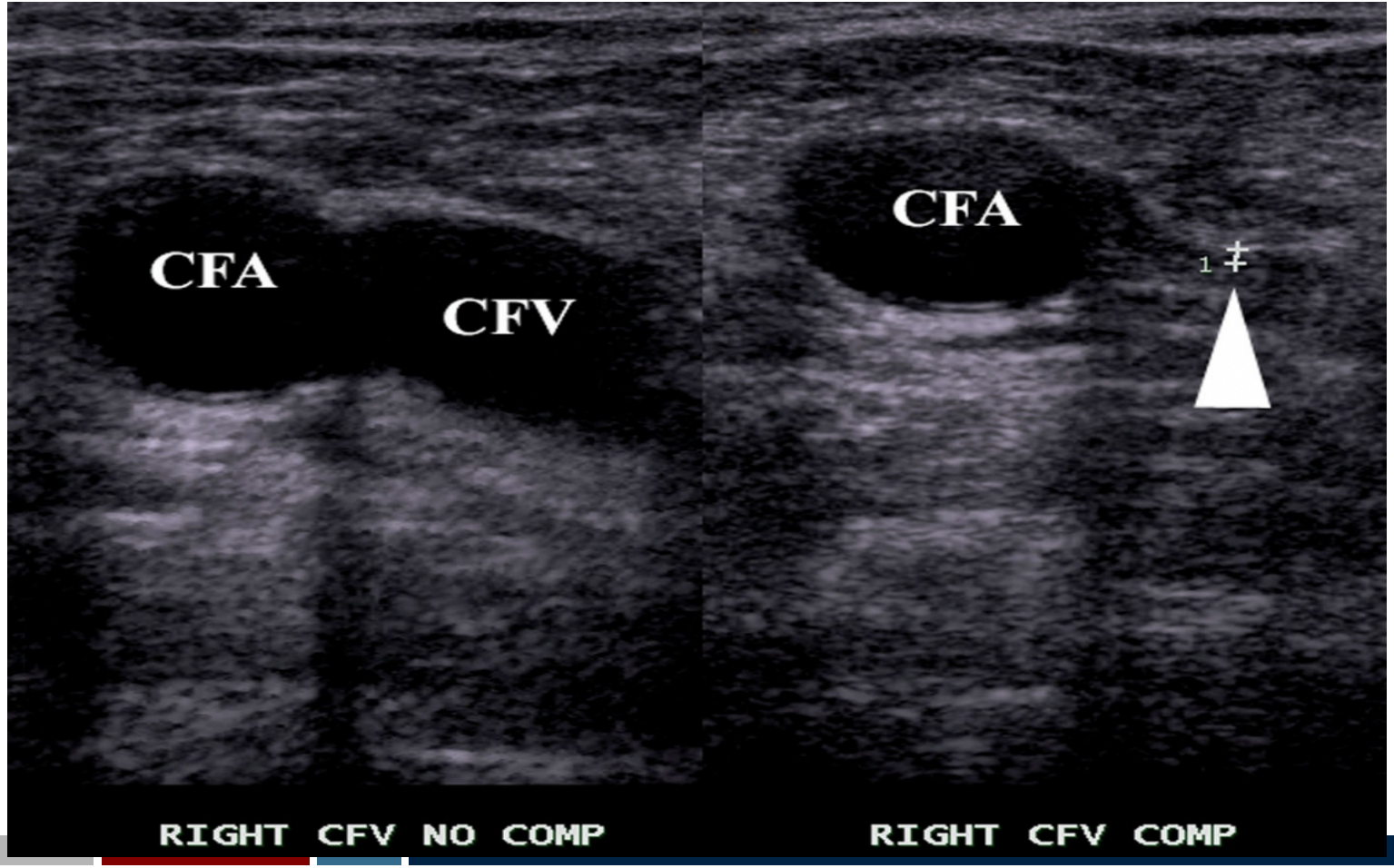
PTS symptoms that you may NOT think of

- Pain w/o swelling
- Itching
- Pelvic/abdominal varicosities
- Labial varicosities
- Pain during intercourse
- Knee/Hip pain
- Heaviness/Fatigue
- Pelvic congestion syndrome

Acute DVT Algorithm for ER

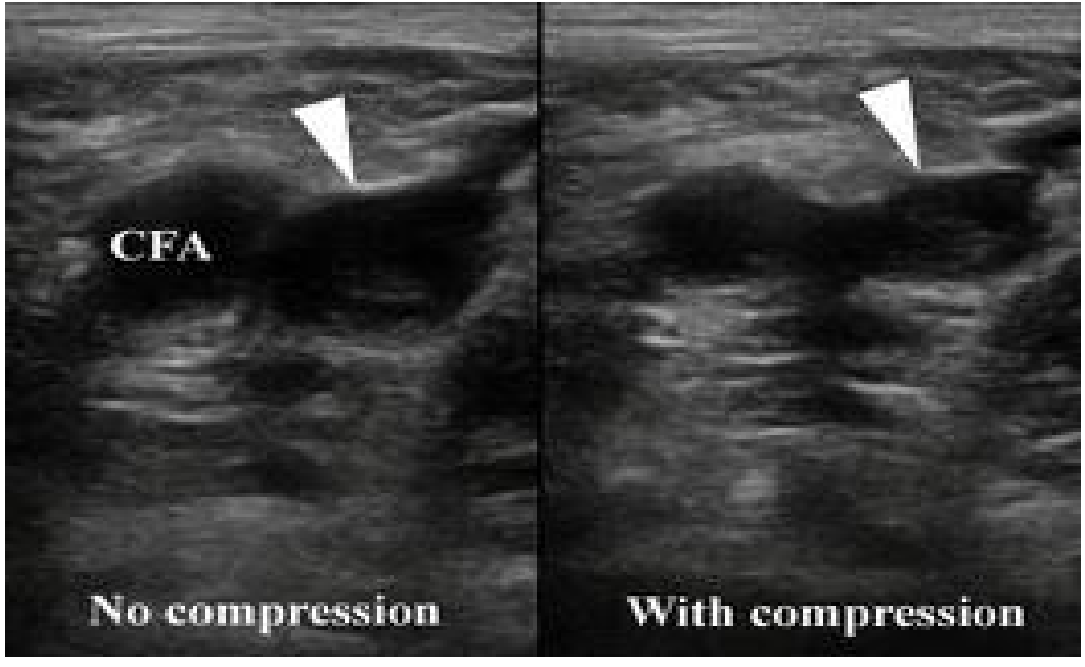
- US or CTV (if pain/swelling & negative US) in ER
- All iliofemoral & fem-pop DVT cases eval by IR
- Start anticoagulation. LMWH preferred.
- All other below knee DVT cases f/u in IR in 1 month
- IR to assess indications/contraindications for lysis
- If not lysis candidate, anticoagulation + 20-30 mmHg compression stockings (check pulses)
- F/U 1 month in IR and Penn Thrombosis Center
- Any patient with CVI/post thrombotic syndrome can f/u with IR

Duplex US - Normal



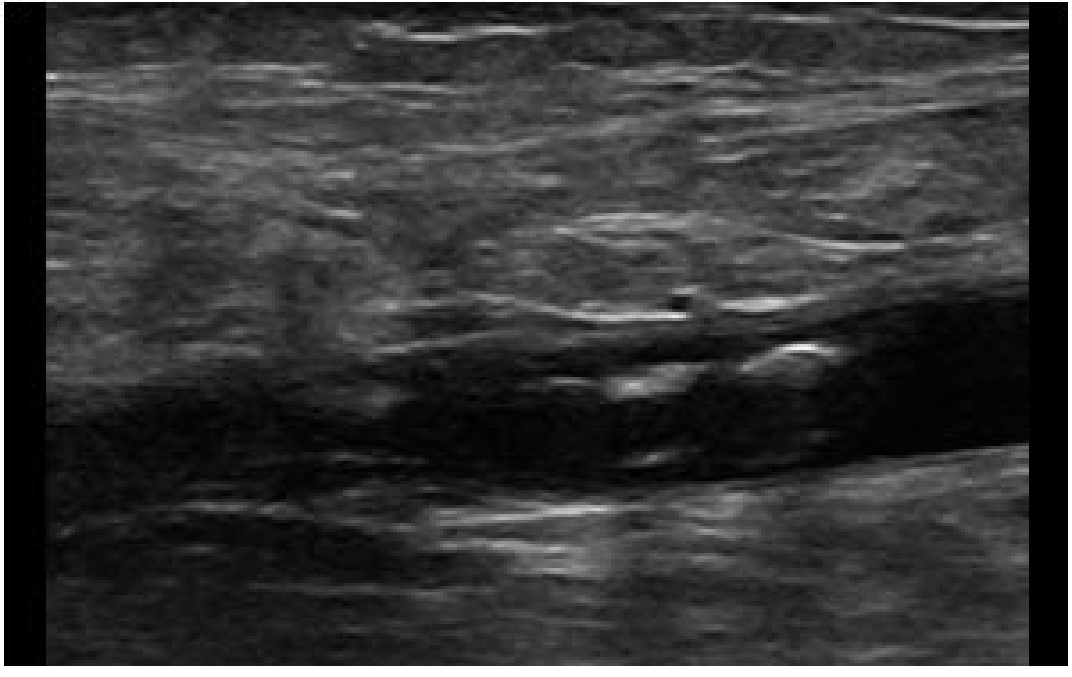
Duplex US for Acute DVT

- Hypoechoic thrombus
- Vein distention
- Loss of compression
- Free-floating thrombus
- Loss of phasicity

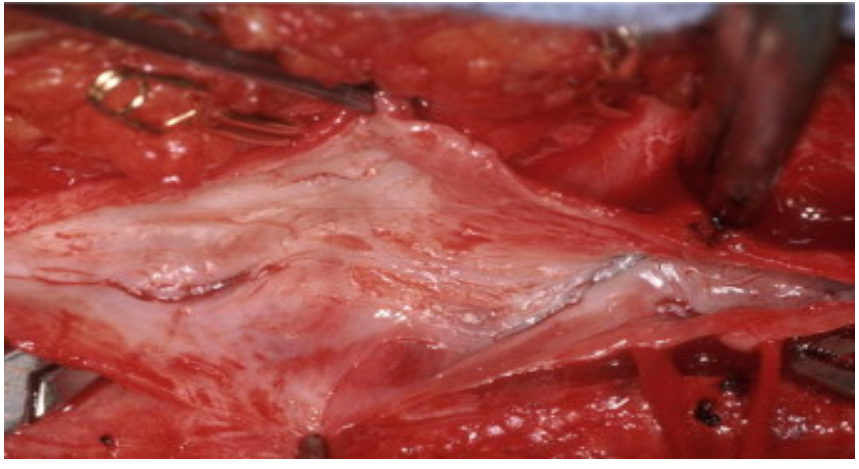


Duplex US for Chronic DVT

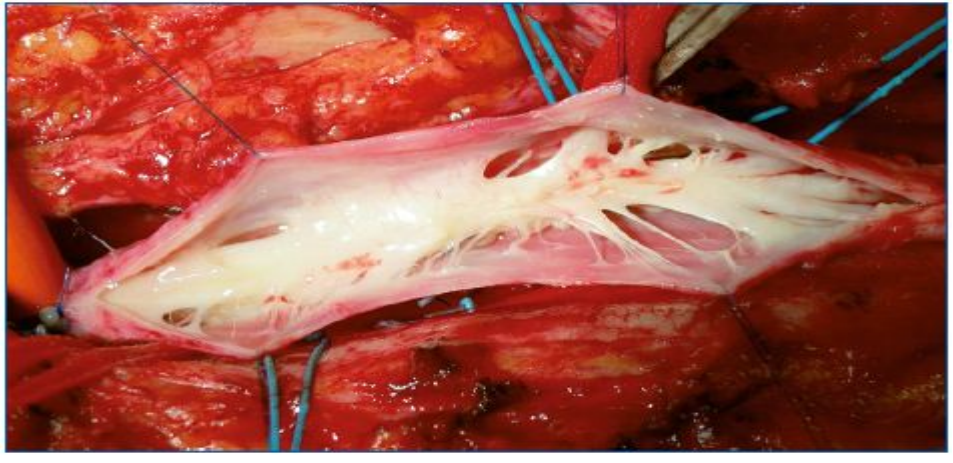
- Ecogenic thrombus
- Heterogenous
- Partially compressible
- Contracted vein
- Well attached or calcified thrombus
- Large collaterals
- Longitudinal axis shows best



What does PTS look like INSIDE the vein?



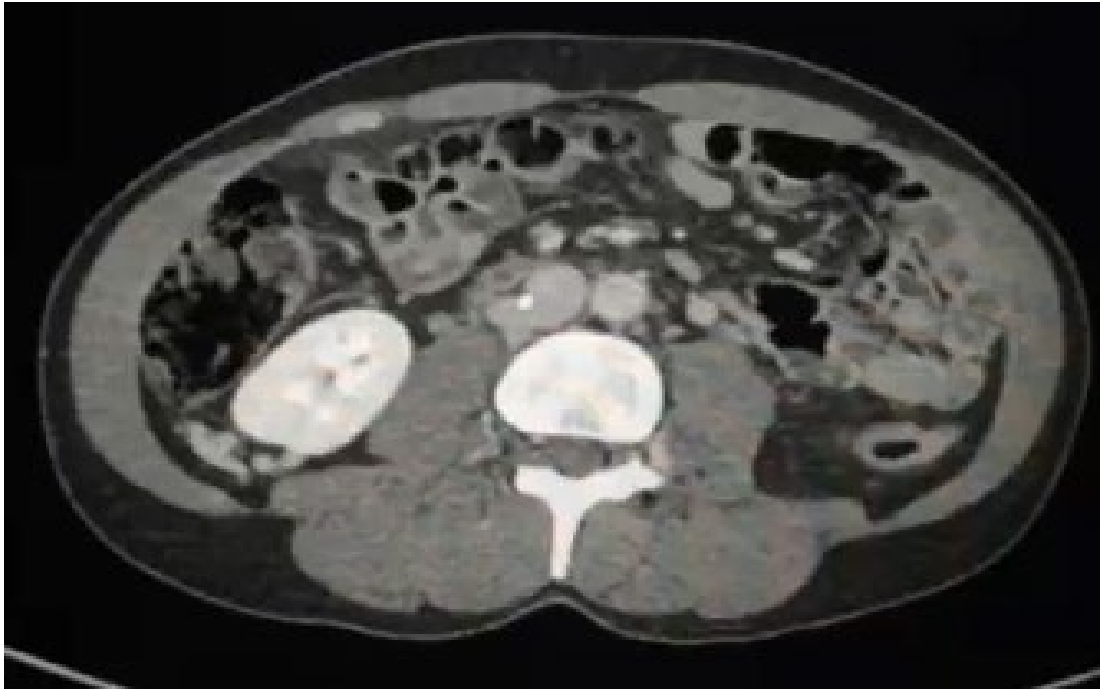
Healthy vein



Post thrombotic vein

CTV Findings

- Intraluminal thrombus
- Decreased vein caliber (compare size in both legs)
- Calcified thrombus
- Deep venous varicosities
- Iliac compression
- IVC thrombosis



Management & Treatment of DVT

Traditional Therapy (Std of Care)

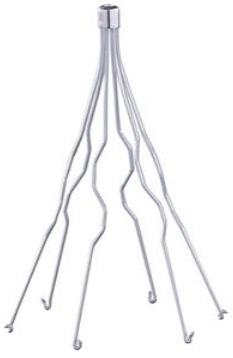
- Initial therapy of LMWH or unfractionated heparin
- Long term oral anticoagulants (3-6 months)
- Compression stockings to reduce swelling

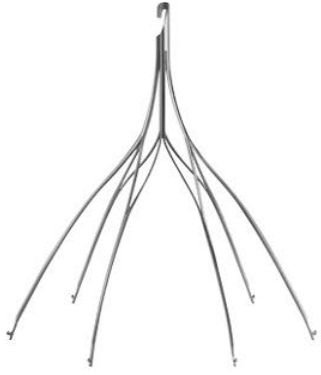




Comerota et al; “Iliofemoral Venous Thrombosis”; J Vasc Surg 2007; 46:1065-1076

Indications for IVC Filters





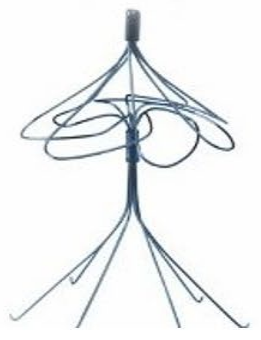


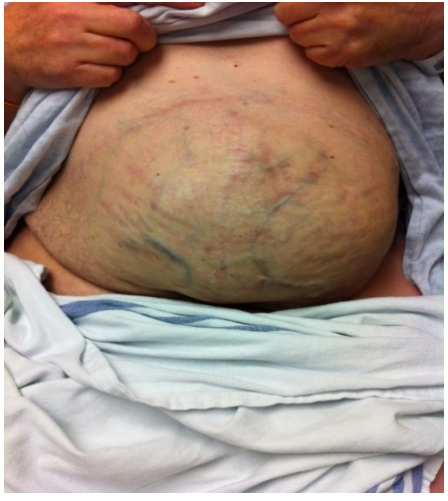


Table 1. Absolute and relative indications for inferior vena cava filter placement.[7,8]

Absolute indications	• Venous thromboembolism (VTE) and contraindications to anticoagulation • Failure of anticoagulation (recurrent VTE despite anticoagulation) • Complication of anticoagulation
Relative indications	• Unstable patients with VTE or patients with poor cardiopulmonary reserves with VTE • Massive PE treated with thrombolysis • Ileocaval deep venous thrombosis (DVT) • Floating proximal DVT • Prophylaxis in patients undergoing high risk surgeries such as bariatric surgery or neurosurgical procedures, or after major trauma

Complications of IVC filters







- Vascular injury/perforation (40-95%)
- Recurrent DVT (30-40%)
- IVC thrombosis (3-30%)
- Migration (0-18%)
- Fracture (2-10%)
- Recurrent PE (2-4%)
- Tilt

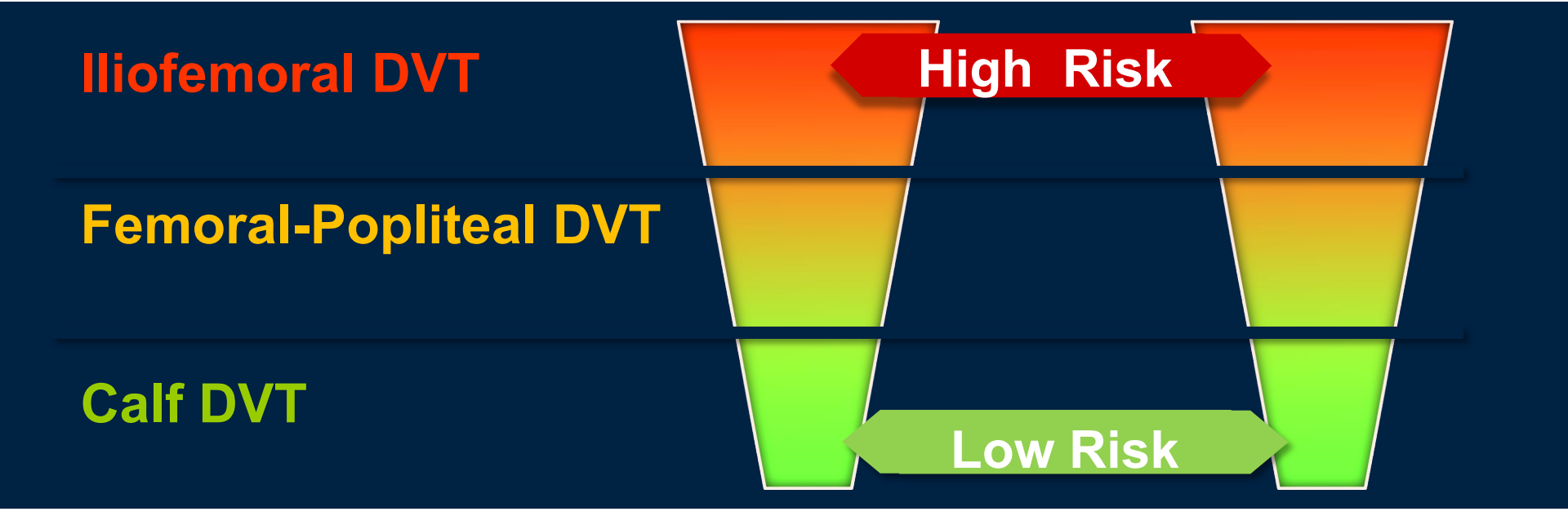
Retrieval rate of IVC filters

Table 2. Selected case studies of optional filters and their retrieval rates.

Author	Year of Publication	Patients (n)	Indications for Filter Placement	Filter Removal Attempted (%)
Antevil et al[38]	2006	161	• Contraindication to or failure of anticoagulation • High-risk patients	27
Karmy-Jones et al[23]	2007	446	• Prophylaxis (mostly trauma)	22
Mismetti et al[39]	2007	220	• Contraindication to or complication of anticoagulation • Failure of anticoagulation • Complications requiring to stop ant[illegible]agulation (surgery, trauma, etc.)	25
[illegible] et al[40]	[illegible]008	22	• T[illegible]ma patient	[illegible]0
Gaspard et al[41]	2009	298	• Tra[illegible]a • Contraindications to anticoagulation • Prophylaxis for other reasons	3.7
Helling et al[42]	2009	125	• Traumatic brain • Spinal cord injuries	32
Johnson et al[43]	2012	100	• Contraindication to anticoagulation • Prophylaxis (e.g. trauma patients)	39
Saroseik et al[33]	2013	679	• Trauma • Malignancy • Contraindication to or complication of anticoagulation	10.5

Penn IR~45%

Evaluating Patients for Endovascular Intervention



Patients with iliofemoral DVT location may have higher risk for:

- Recurrent venous thromboembolism
- Post-thrombotic syndrome
- Pulmonary embolism

Douketis JD, et al. Am J Med. 2001;110(7):515–519
Watson L, Broderick C, Armon MP. Cochrane Database Syst Rev. 2014 Jan 23;1:CD002783. oi:10.1002/14651858.CD002783.pub3

ATTRACT Trial

Acute Venous **T**hrombosis: **T**hrombus **R**emoval with **A**djunctive **C**atheter-Directed **T**hrombolysis

- Comparative effectiveness study
- NHLBI-funded, Phase III, open-label, multicenter RCT
- Objective:
  - Determine if the initial use of adjunctive Pharmacomechanical Catheter Directed Thrombolysis (PCDT) in symptomatic patients with proximal deep vein thrombosis (DVT) reduces the occurrence of Post-Thrombotic Syndrome (PTS) over 24 months follow-up
- PCDT + standard therapy vs standard therapy alone
- Study Drug is recombinant tPA (IND 103462)
- 692 patients with symptomatic, acute proximal DVT

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Pharmacomechanical Catheter-Directed Thrombolysis for Deep-Vein Thrombosis

S. Vedantham, S.Z. Goldhaber, J.A. Julian, S.R. Kahn, M.R. Jaff, D.J. Cohen, E. Magnuson, M.K. Razavi, A.J. Comerota, H.L. Gornik, T.P. Murphy, L. Lewis, J.R. Duncan, P. Nieters, M.C. Derfler, M. Filion, C.-S. Gu, S. Kee, J. Schneider, N. Saad, M. Blinder, S. Moll, D. Sacks, J. Lin, J. Rundback, M. Garcia, R. Razdan, E. VanderWoude, V. Marques, and C. Kearon, for the ATTRACT Trial Investigators*

- PCDT did not reduce the incidence of PTS as compared to AC (48% of pts at 2 yrs)
- Higher risk of bleeding as compared to AC (0.3% vs 1.7%)
- PCDT significantly lowered the severity of PTS

Case 1

- 34F with no PMH, avid runner, 3 weeks post partum presents with pain, swelling, “palpable cord” along the knee of left lower extremity on 10/20/2014
- Reported to ER in Dallas & ultrasound showed clot in the left greater saphenous vein (GSV) extending from the distal calf to just above the knee
- Dx: Superficial Thrombophlebitis (SVT)

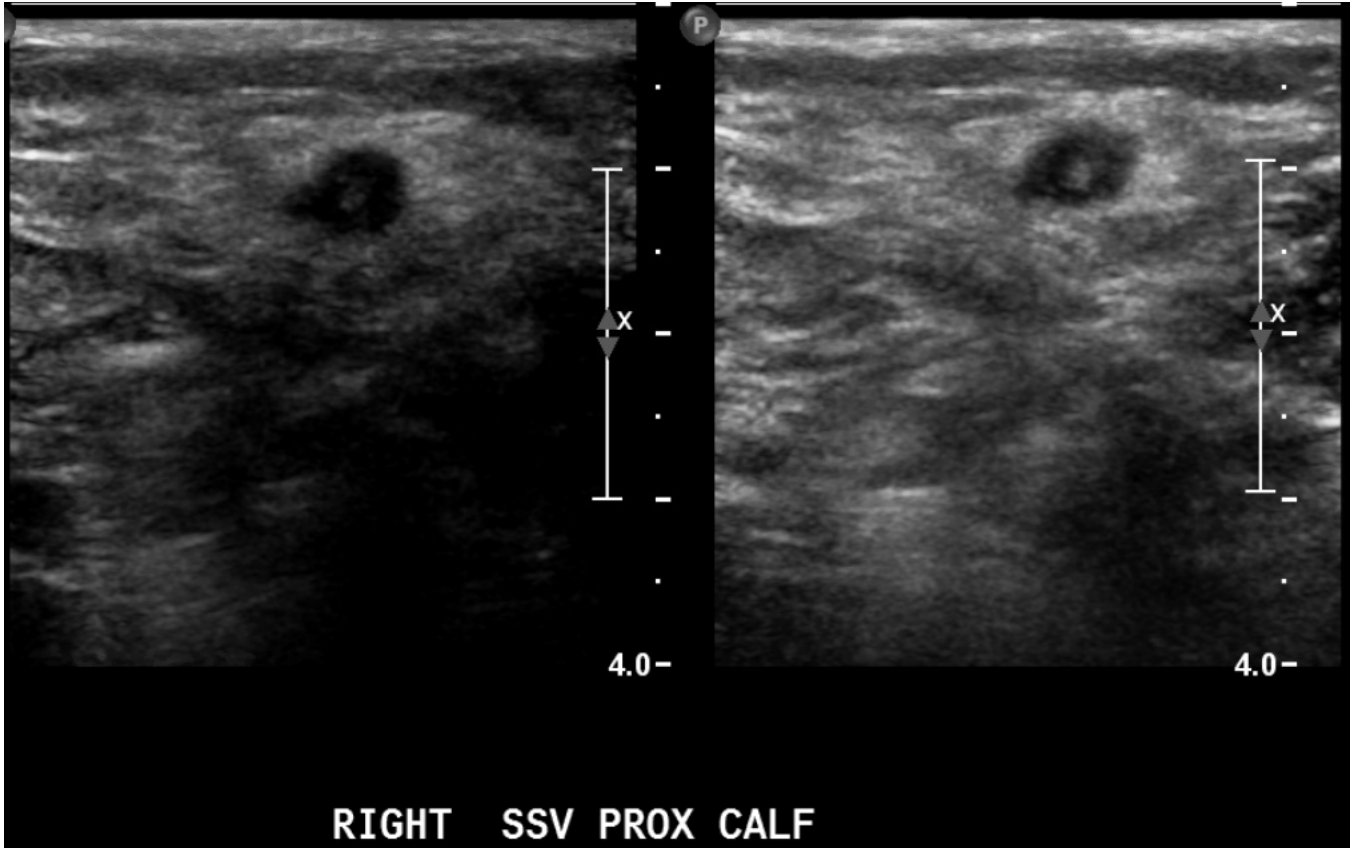
Superficial Thrombophlebitis (SVT)

- Thrombosis and inflammation of a superficial vein
- May occur anywhere in the body but leg is most common (greater saphenous vein)
- Often self-limiting
- Rarely presents with infection (septic thrombophlebitis)
- Presents as painful, erythema along the course of the vein
- Risk of DVT & pulmonary embolus***
- Treated with NSAIDS & warm compresses





Superficial thrombophlebitis or post ablation US findings?



Treatment of Superficial Thrombophlebitis



CHEST Supplement

ANTITHROMBOTIC THERAPY AND PREVENTION OF THROMBOSIS, 9TH ED: ACCP GUIDELINES

Evidence-Based Management of Anticoagulant Therapy

Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

Anne Holbrook, MD, PharmD; Sam Schulman, MD, PhD; Daniel M. Witt, PharmD, FCCP; Per Olav Vandvik, MD, PhD; Jason Fish, MD, MSHS; Michael J. Kovacs, MD; Peter J. Svensson, MD, PhD; David L. Veenstra, PharmD, PhD; Mark Crowther, MD; and Gordon H. Guyatt, MD

Management of SVT

- Obtain ultrasound if patient presents with SVT symptoms
- Anticoagulate for 4-6 weeks if:
  - SVT greater than 5 cm in length
  - SVT extends above the knee
  - SVT within 10 cm of SFJ

of low quality. The recently published Comparison of ARIXTRA™ in lower LImb Superficial Thrombophlebitis with placebo (CALISTO) study, which compared fondaparinux (2.5 mg/d for 45 days) with placebo in 3,000 patients with SVT (≥5 cm in length), has helped to clarify the role of anticoagulants for the treatment of SVT (Table 31, Table S43), and the natural history of this condition.[382]

CALISTO found that fondaparinux is very effective at reducing VTE, recurrent SVT, extension of SVT, and the need for venous surgery, and is associated with little bleeding. In the placebo group, thrombotic complications occurred more often if SVT involved the greater saphenous vein (92% of patients in the control group), extended to within 10 cm from the saphenofemoral junction (9% of patients), and involved veins above the knee (46% of patients) and if VTE (7% of patients) or SVT (12% of patients) had occurred previously.[382] Age, sex, and presence of varicose veins were not convincingly associated with the frequency of thrombotic complications, and there were too few patients with cancer in CALISTO to assess that association.

Case 1

- Discharged from ED with warm compresses and NSAID regimen
- Patient presented to ER the next day with severe left leg pain and SOB. Repeat US and PE protocol CTA obtained
  - Propagation of occlusive clot into iliac veins, CFV, SFV and calf veins
  - CT angiogram chest revealed bilateral PE
- Initiated on Lovenox and referred for lysis at Dallas hospital
  - Underwent venography and unsuccessful lysis
  - Told that nothing further can be done, running days are over, wear stockings for life, anticoagulation for life

SVT with Progression to DVT/PE







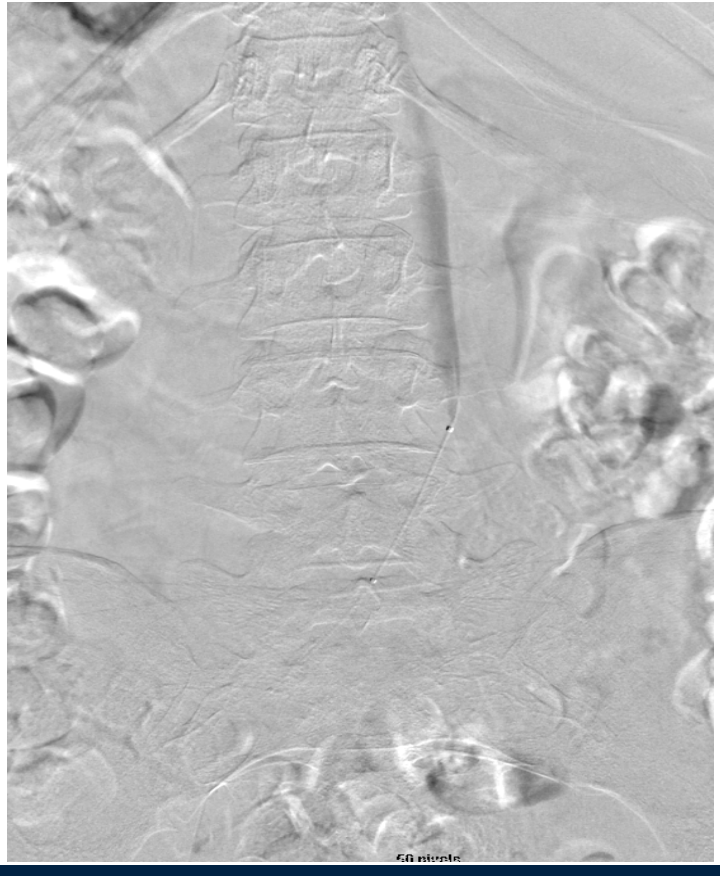
May-Thurner Syndrome



- F >> M
- MUST be considered in patient with acute ileofemoral DVT of LEFT lower extremity
- Compression of left common iliac vein by overlying right common iliac artery
- Treatment: Anticoagulation + PTA + Stent

Venography and Lysis 1/12/15





Venography and Lysis 1/12/15







May-Thurner Syndrome

- Patient had immediate improvement in left lower extremity pain
- Swelling completely resolved within 1 week
- Patient continues ASA 81 mg therapy





5 days post procedure

Candidates for Intervention

- Chronic venous outflow disease inhibiting flow => venous HTN
- PTS
- Failed conservative Rx: AC + ECS +/- wound care
- QOL Limitations

Penn IR > 90% success rate in improving PTS

Case 2: Acute on chronic iliofem DVT



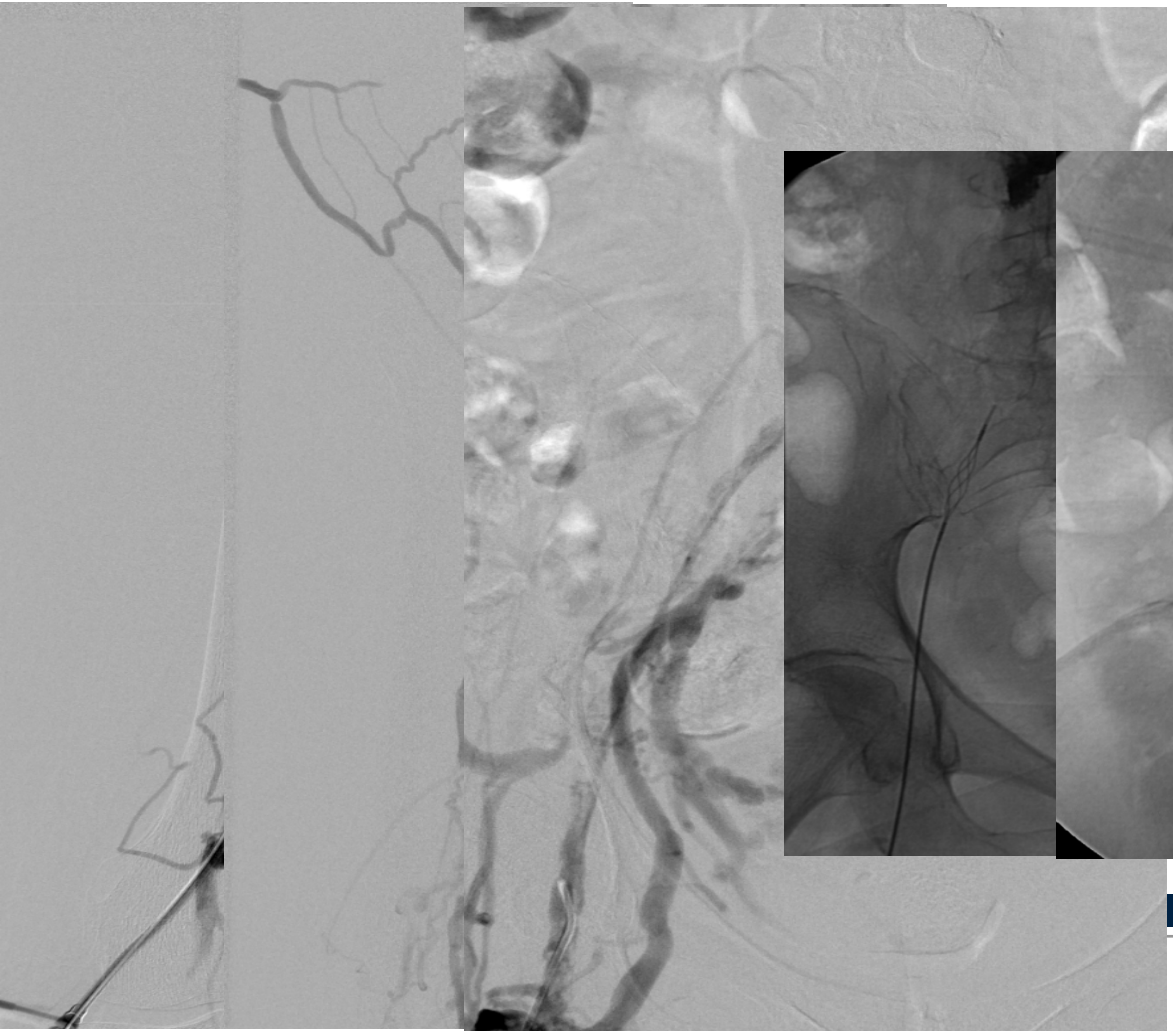
- Chronic DVT = ~~Superficial Ablation~~
- Post-thrombotic syndrome (PTS) causes significant morbidity, ⬇QOL, & economic strain to health system
- How to approach patient with CVI combined with chronic DVT?

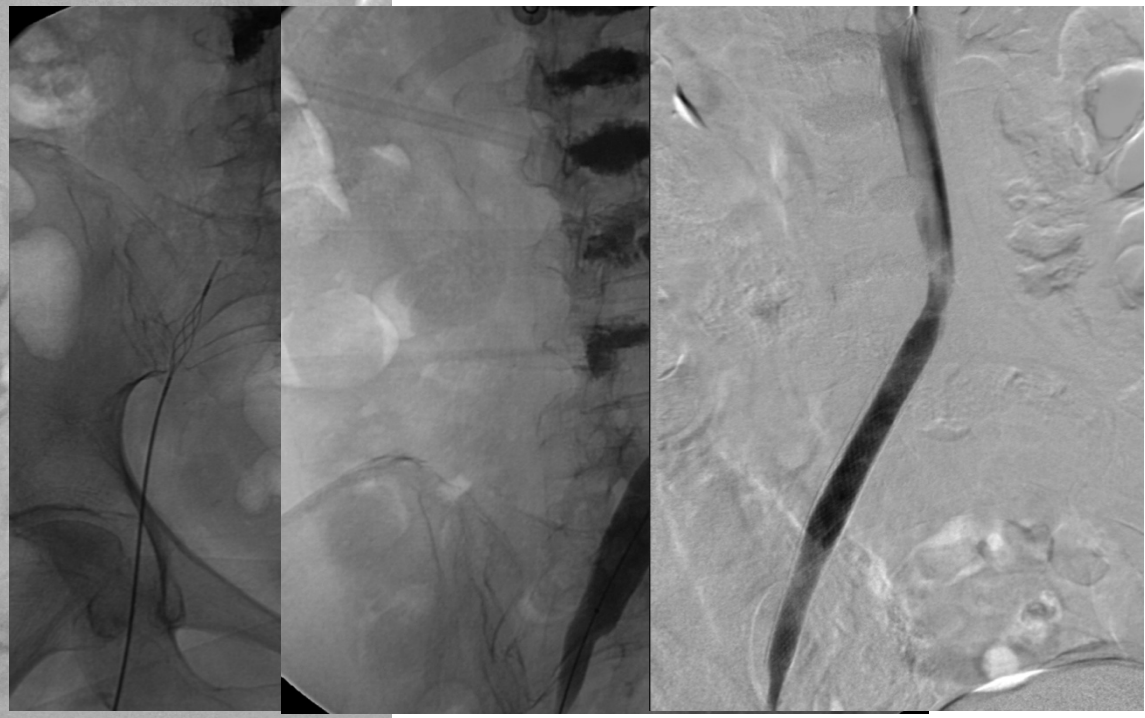
Case 2: Acute on chronic iliofem DVT





Case 2: Acute on chronic iliofem DVT

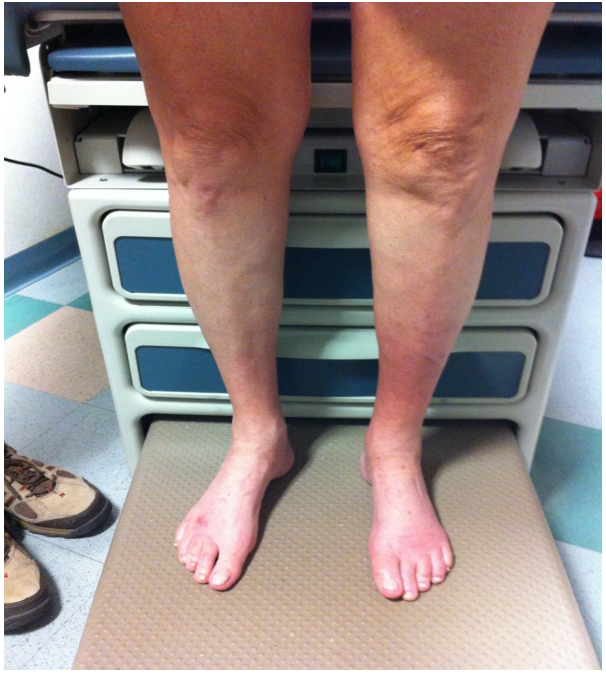




Case 2: Acute on chronic iliofem DVT



1 month



12 months



10 years

Case 3

44 yo obese M with complicated PMH presents to HUP w/ extensive lower extremity DVT and swelling.

- PMH
  - MS, Afib, Multiple PE's, bilateral DVTs s/p mechanical thrombectomy, CVA, TIA
- PSH
  - Gastric banding, Lap chole, Afib ablation (2009), DVT lysis, IVC filter placement, Renal artery embolization (9/15)
- Meds
  - Alprazolam, Cholecaliferol, Cyclobenazprine, Esomeprazole, Folic acid, Gabapentin, Metoprolol, Oxycodone, Senna, Simvastatin, Warfarin

Case 3

- September 2013 admitted to OSH with sub-massive bilateral PE's and extensive DVTs
  - IVC filter placed. Thrombectomy with Angiojet and TPA infusion overnight. 8 x 30 mm stent in the right common iliac vein
- Recurrent DVT in 2015 complicated by retroperitoneal hematoma with renal artery embolization
  - At time of embolization, AC was held leading to IVC thrombosis
- Subsequently developed massive LE edema with inability to wear compression stockings/shoes or walk long distances.

Case 3

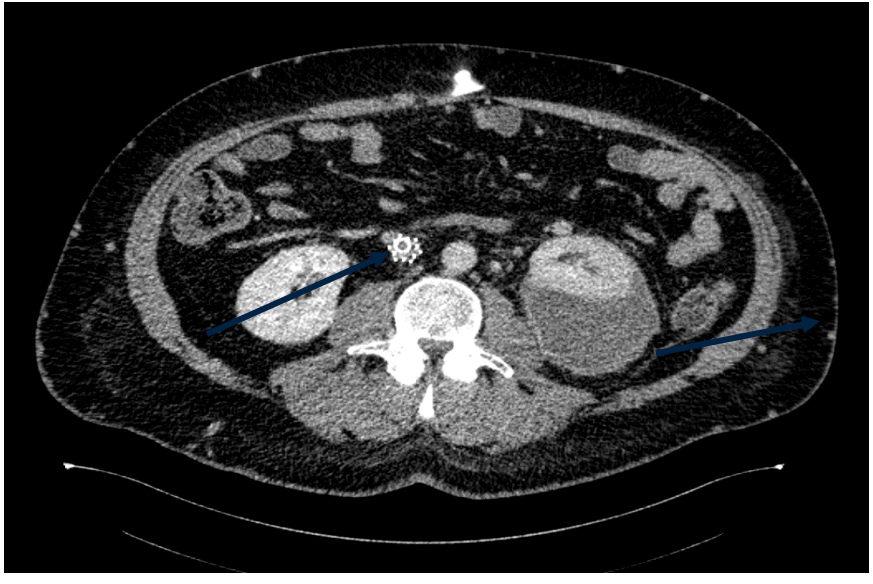
- +3 b/l LE pedal edema extending up thighs ending at level of hip. Hyperpigmentation of feet. Significant painful edema. On disability & in wheelchair.





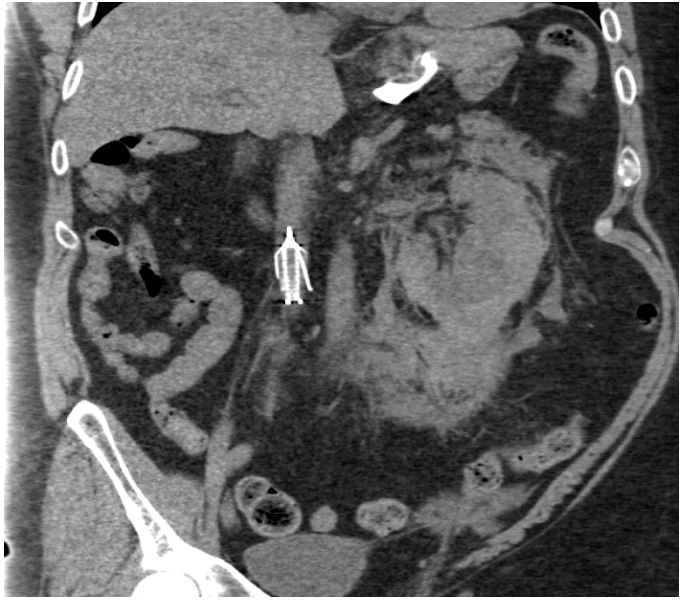
CT Venogram at HUP on 11/12/15

a.



a.) Axial images showing thrombosed IVC filter

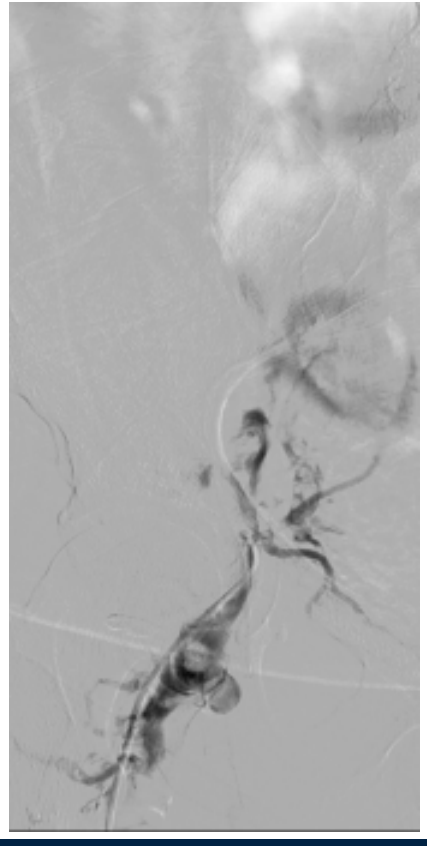
b.



b.) Coronal imaging showing similar findings

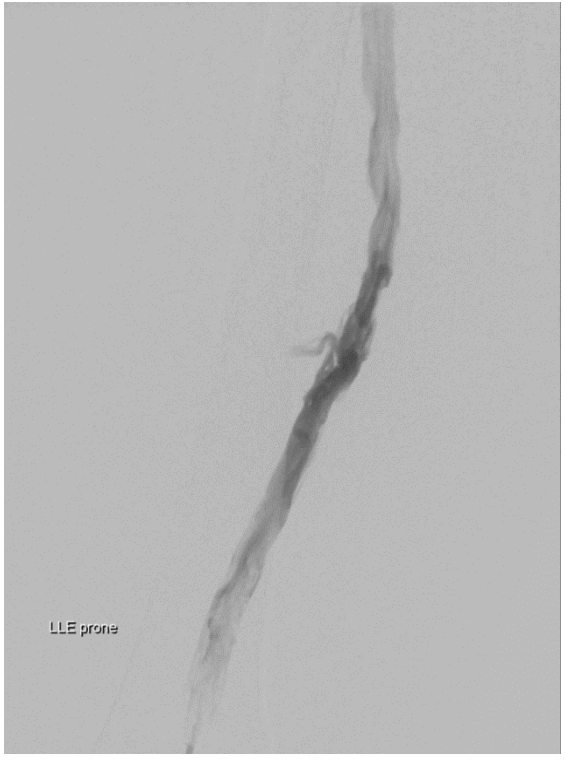
1/18/16 – Bilateral LE & IVC venogram, PTA & lysis catheter placement





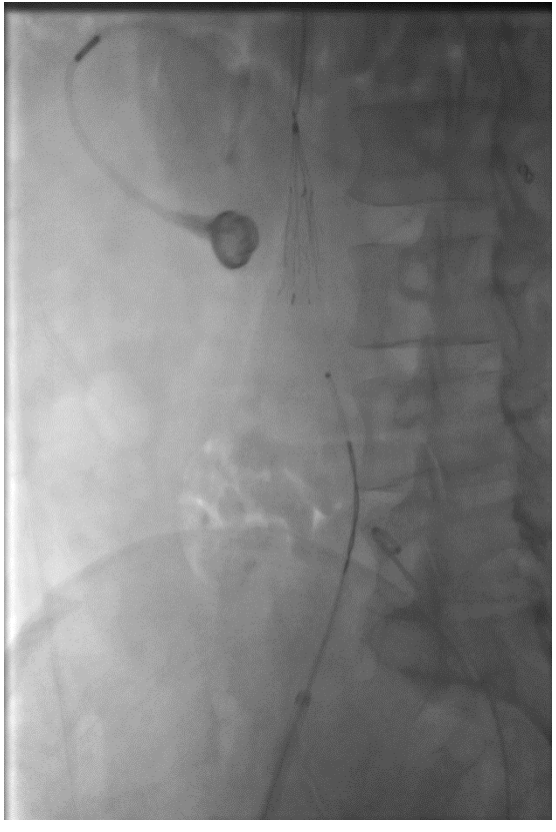
Post overnight TPA infusion & PMT

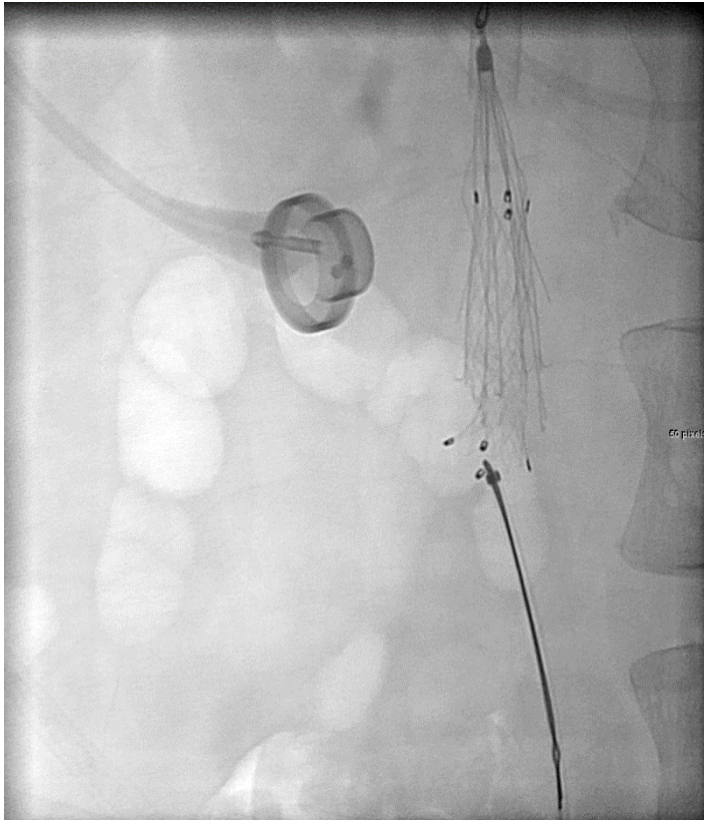


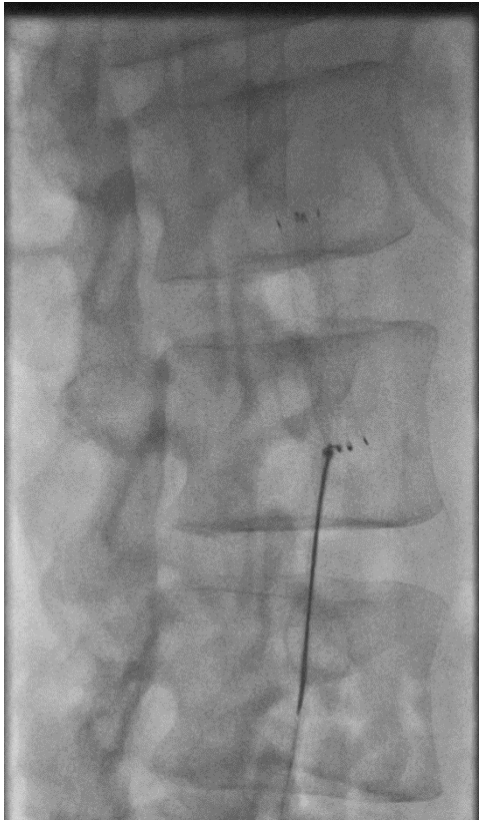




HUP IR procedure – 2/3/16







HUP IR procedure – 2/3/16







1 Month Post Treatment



Before DVT treatment

1 month after DVT treatment

- Significant improvement in painful swelling, heaviness & fatigue. Now able to wear regular shoes, work & contribute to society

Case 4: 58yo F w/Urothelial Ca & RLE Iliofemoral DVT



Case 4: 58yo F w/Urothelial Ca & RLE Iliofemoral DVT

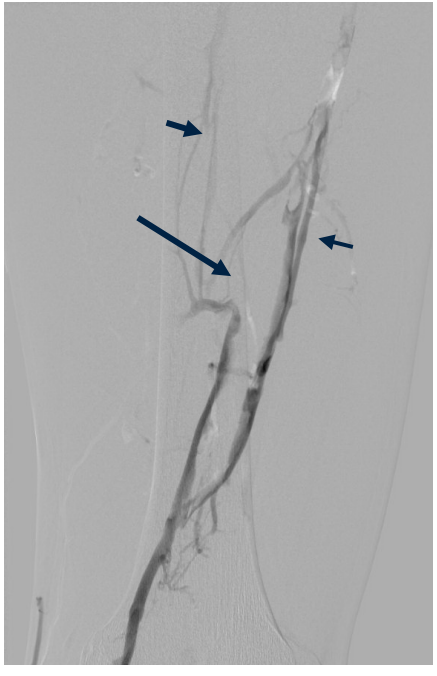


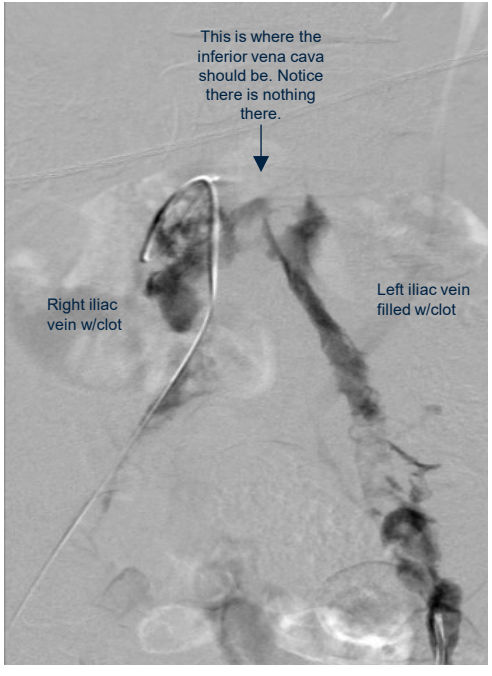
Case 4: 58yo F w/Urothelial Ca & RLE Iliofemoral DVT



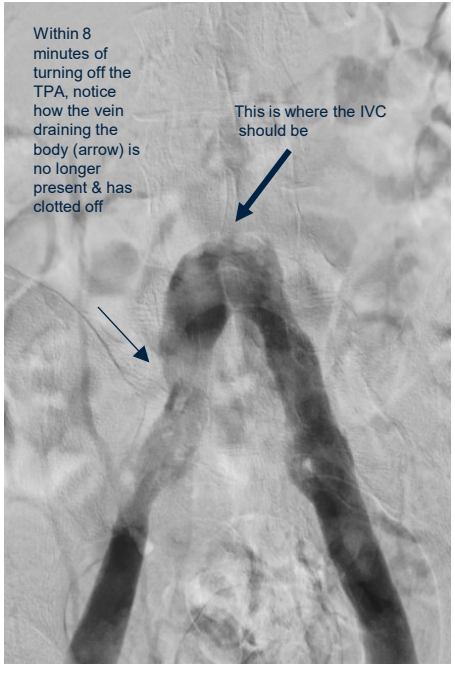
1 month post treatment

Case 5: 19 yo male presents w/acute bilateral DVT

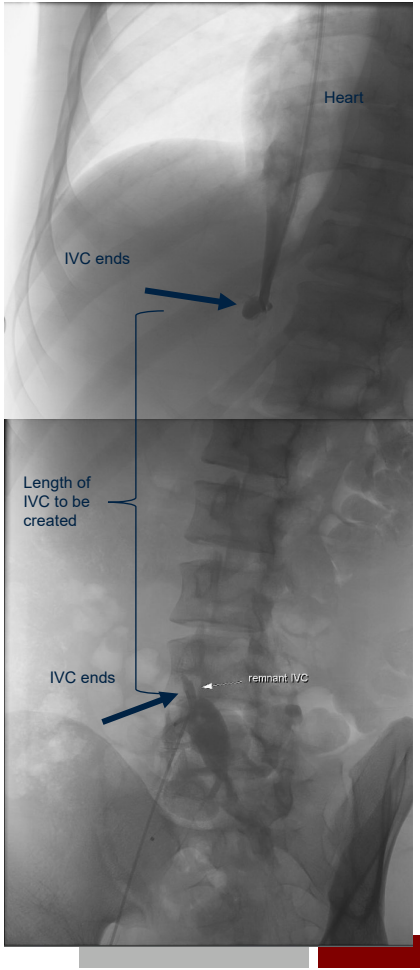


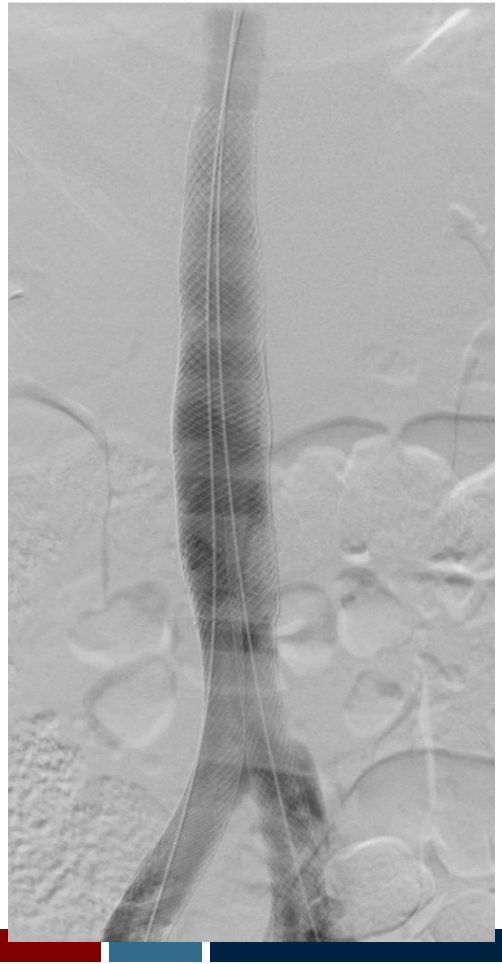


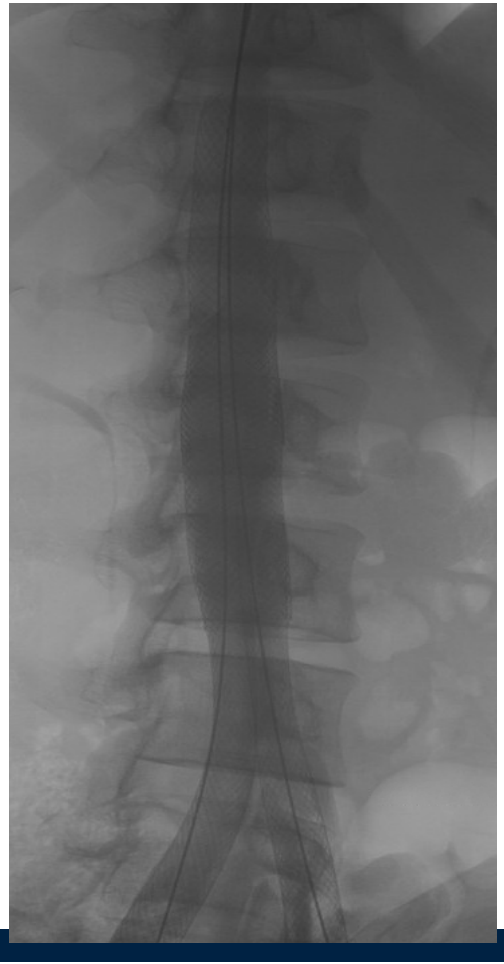




Complete IVC Reconstruction









The Inquirer
DAILY NEWS philly.com

Medical mystery: A Penn State student's massive blood clot surprised even his doctors

by Mari A. Schaefer, Updated: March 15, 2019

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Stent Patency

- Meta-analysis 37 studies
  - 2869 patients underwent stenting
    - Nonthrombotic = 1122
    - Acute thrombotic = 629
    - Chronic post thrombotic = 1118
  - At 1 year, primary & secondary patency rates
    - Nonthrombotic = 96% and 99%
    - Acute thrombotic = 87% and 89%
    - Chronic post thrombotic = 79% and 94%

Razavi Mk, Jaff MR, Miller LE. Safety and effectiveness of stent placement for iliofemoral venous outflow obstruction: systematic review and meta-analysis. Circ Cardiovasc Interv 2015; 8(10)

Chronic Pelvic Pain (CPP)

What is Chronic Pelvic Pain?

- Persistent, noncyclic pain in the pelvic regions that lasts > 6 mos
- Affects 15-20% of women ages 18-50 (true incidence likely higher)
- CPP disrupts work, physical activity, sexual relations, sleep, family life & mental health
- Many women will go > 1yr before seeking help. Many never find a cause for CPP as the vascular causes of CPP are not well known.

5 Vascular Causes of Chronic Pelvic Pain

- Pelvic venous insufficiency (aka pelvic congestion syndrome)
- Post thrombotic syndrome
- May Thurner syndrome or iliac vein compression syndromes
- Chronic venous insufficiency
- Nutcracker syndrome

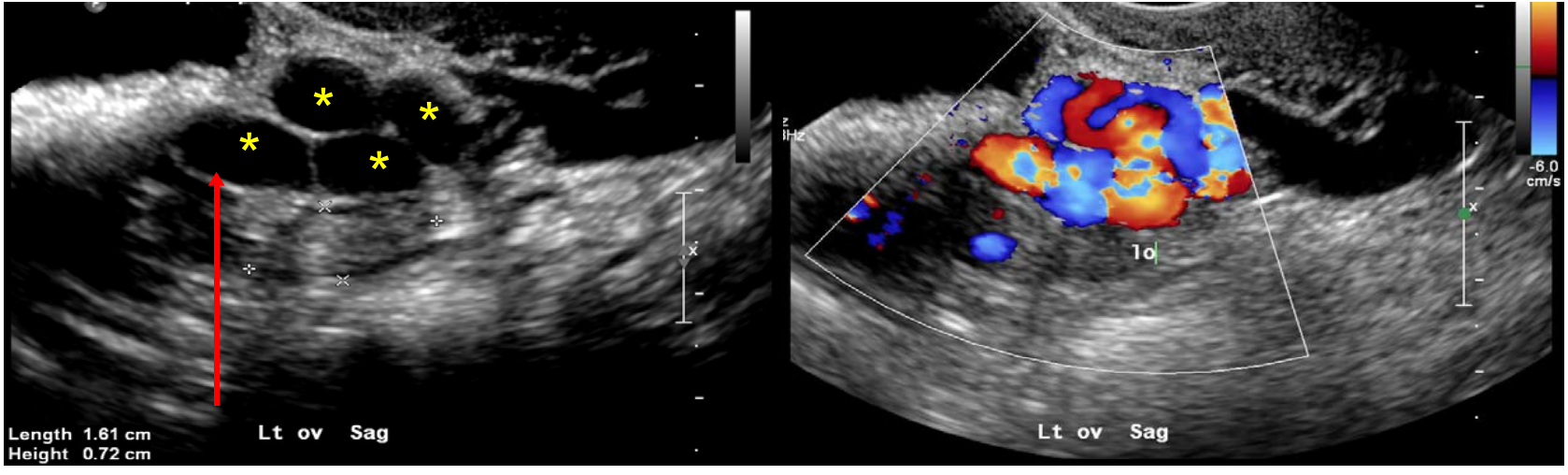
Pelvic Venous Insufficiency Overview (Pelvic Congestion Syndrome)

- Affects multiparous women of childbearing age
- Pelvic pain/pressure, dysparunia (pain w/intercourse), vulvar/thigh varicosities, increased urine frequency (UTI feeling)
- Dilated gonadal/pelvic veins with retrograde flow esp when standing
- Can cause constipation & bladder incontinence
- Delay in diagnosis

Laparoscopy and cross sectional imaging may fail to diagnose pelvic varices

- Patient is supine
- CO_2 in peritoneal cavity increases intraabdominal pressure – veins decompress
- Diagnosis is NOT considered in the differential

Imaging Modalities for PCS

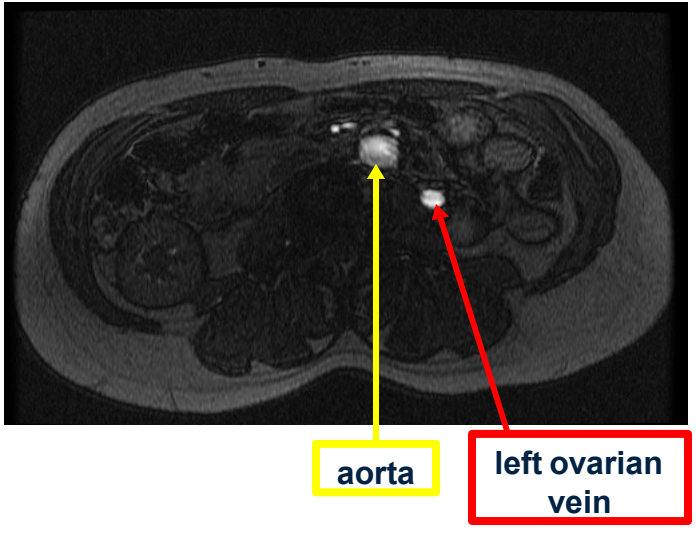


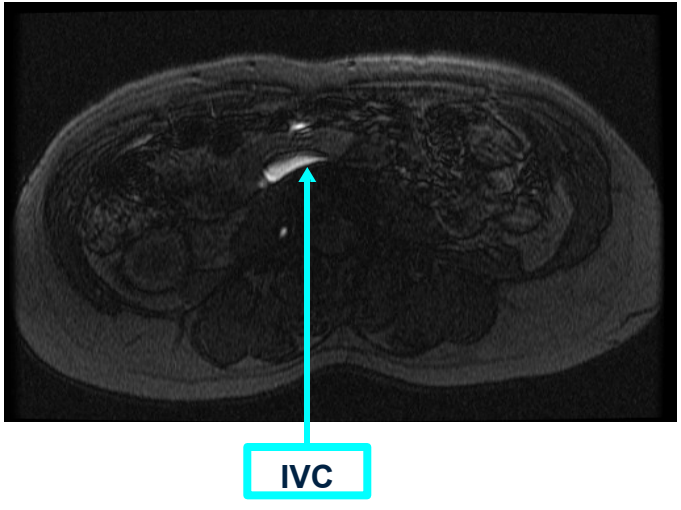
Dilated pelvic veins adjacent to ovary

Imaging Modalities for PCS



Retrograde flow in OV on time-of-flight MRI

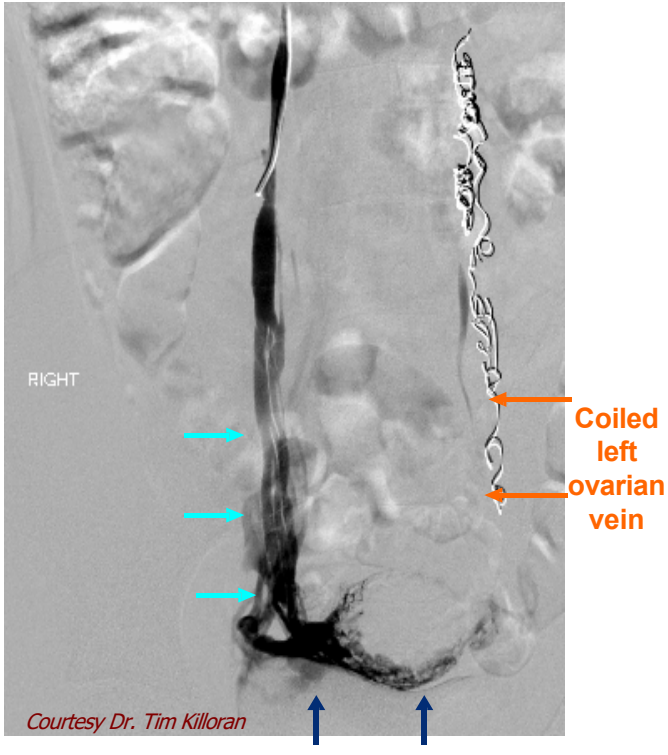




Dilated ovarian varices on venogram



Left ovarian venogram



Right ovarian venogram

PCS Review 2016 Daniels et al

Literature review

21 case series & 1 poor-quality randomized trial (total 1,308 women)

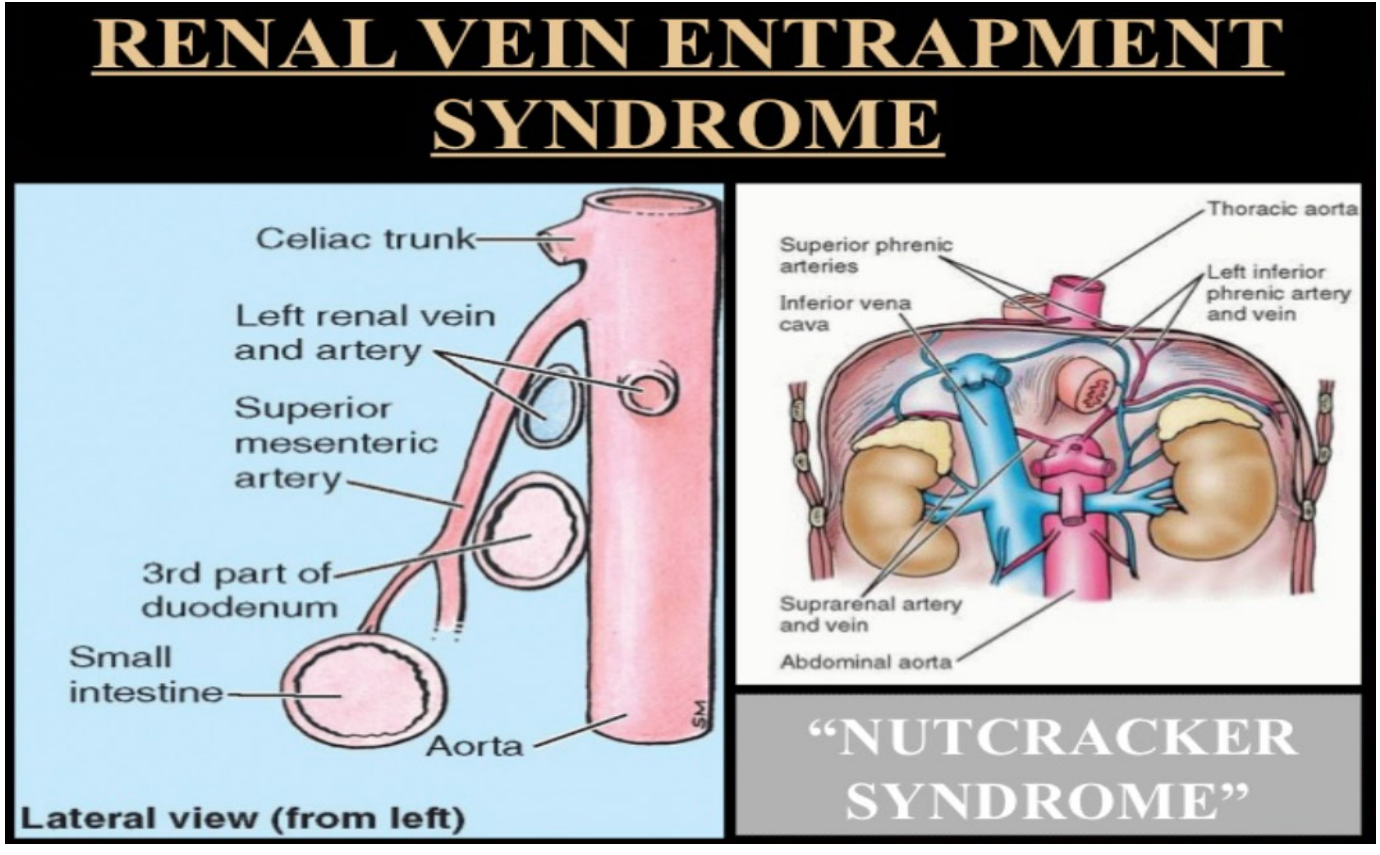
- 75% early substantial relief
- Relief increased over time, sustained
- Repeat intervention rates low
- <2% risk coil migration

Conclusion:

Embolization ‘appears’ to provide relief, it’s safe, but the quality of evidence is low

** insurance issues **

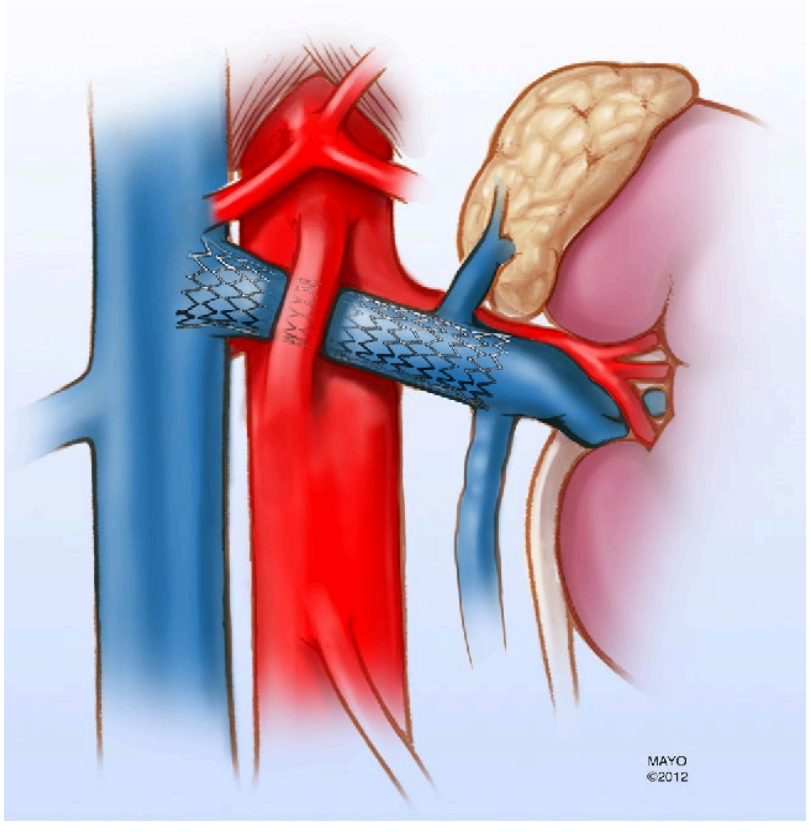
Nutcracker Syndrome



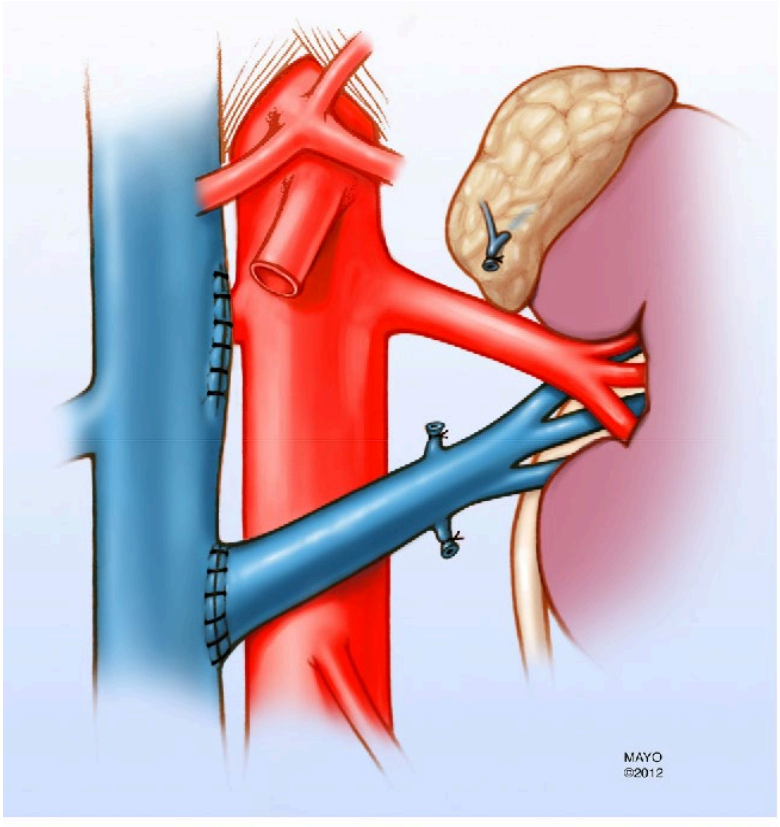
Nutcracker Syndrome



NCS Treatment

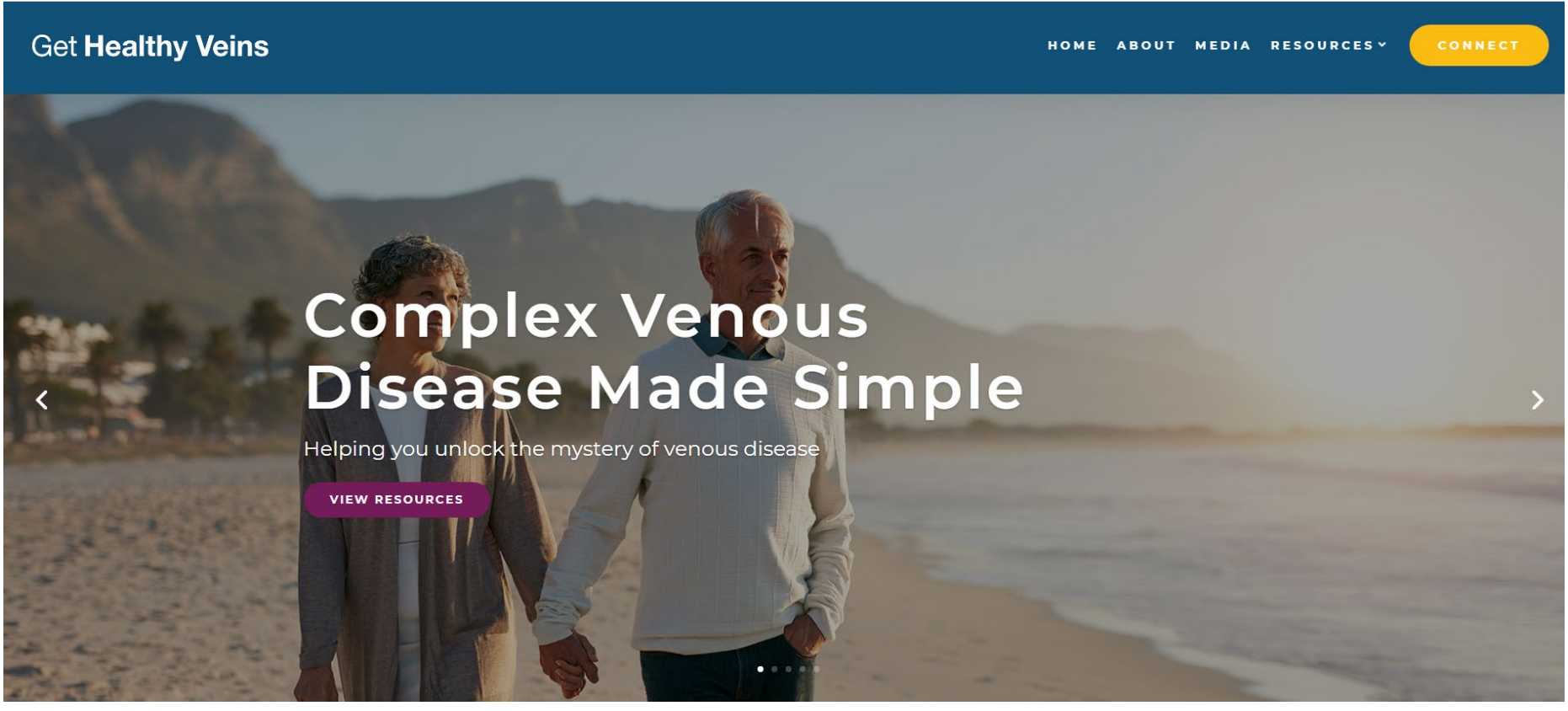


LRV Stent



LRV Transposition

GetHealthyVeins.com



Take Home Points

- Evaluate your patients for venous disease. You may be the **only** healthcare provider to ever get them the help they need.
- Prescribe compression stockings to your patients and start wearing them yourself early in your career.
- There is no chronic DVT that cannot be intervened on.
- Think 3x before placing an IVF filter. Make sure filter is removed in a timely manner.
- CPP is REAL and debilitating. Learn to recognize the vascular causes of CPP.