


Post-Thrombotic Syndrome



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Disclosure



Under the Oklahoma State Medical Association CME guidelines disclosure must be made regarding relevant financial relationships with commercial interests within the last 12 months.

Parker Truong, DO

I have no relevant financial relationships or affiliations with commercial interests to disclose.

Course Outline



- Define Post-Thrombotic Syndrome (PTS).
- Clinical Presentation
- Identify risk factors for PTS
- Diagnosis in clinic setting
- Rational for treatment
- Management of PTS by PCP and Specialists

Post-Thrombotic Syndrome



- Post-Thrombotic Syndrome or Post Phlebitic Syndrome is a chronic condition that develops in 20-50% of patients after deep venous thrombosis (DVT).
- A burdensome condition with negative effects on QoL, lost of productivity, and cost to healthcare dollars.
 - Estimated 2 million workdays lost annually in US as a result of leg ulcers.
 - Patients with PTS have worse QoL than other chronic diseases such as osteoarthritis, angina, and chronic lung disease.
 - Higher cost of care due to surgery, loss of workdays, and loss of employment.

Clinical Presentation



- Mechanism: DVT leads to venous obstruction, valvular reflux, venous hypertension, reduced calf muscle drainage, increased tissue permeability, and symptoms.
- Symptoms of PTS
 - May be intermittent or persistent
 - Aggravated by standing or sitting
 - Relieved with resting or leg elevation



CHRONIC VENOUS INSUFFICIENCY SYNDROME

	SIGNS
	Edema
	Peri-malleolar telangiectasiae
	Venous ectasia, varicose veins
	Hyperpigmentation
	Redness
	Dependent cyanosis
	Lipodermatosclerosis
g;	Healed or open ulcer

CEAP classification for venous disease

Clinical, Etiology, Anatomy and Pathophysiology classification: clinical categories

C1



C1
Telangiectases
or reticular
veins

C2



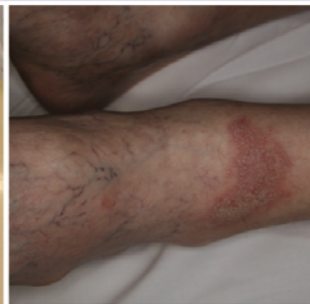
C2
Varicose
veins

C3



C3
Edema due to
venous etiology

C4



C4a.
Pigmentation
and/or eczema

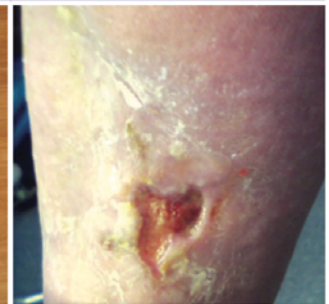
C4b.
Lipodermato-
sclerosis and/or
atrophy blanche

C5



C5
Healed
venous ulcer

C6



C6
Active
venous ulcer

C1, C2, C3, C4, and C6 images courtesy of Dr. Raghu Kolluri
C5 image courtesy of Dr. Paul Gagne

Some numbers...



- About 60% of DVT usually recover without symptoms.
- About 30% will have some degree of PTS.
- About 10% will develop PTS.
- Up to 15% of upper extremity DVT also develop PTS.

Risk Factors for PTS



- Extensive DVT (iliocaval, iliofemoral) vs. calf DVT.
- Recurrent ipsilateral DVT.
- Residual thrombus on follow up US.
- High BMI.
- Inadequate anticoagulation (>50% subtherapeutic INR in first 3 months).
- Persistent elevation of D-Dimer level.
- DVT occurring in pregnancy
- Not a RF: Age, sex, thrombophilia status, provoked or unprovoked.

Diagnosis in clinic setting



- ❑ Post-Thrombotic Syndrome is diagnosed clinically.
- ❑ This is no gold standard labs, imaging, or functional test.
- ❑ Villalta PTS Score - adopted by ISTH to assess severity of PTS in clinical trials.
- ❑ Symptoms of PTS usually occur within 3-6 months after DVT, but can occur after 2 years.

TABLE 2: VILLALTA PTS SCALE

CRITERIA USED TO DIAGNOSE PTS

- 5 symptoms (pain, cramps, heaviness, pruritus, paresthesia)
- 6 signs (edema, skin induration, hyperpigmentation, venous ectasia, redness, pain during calf compression)
- Each symptom and sign rated as 0 (absent), 1 (mild), 2 (moderate) or 3 (severe)
- Points are summed to yield total score:
 - 0–4: No PTS
 - 5–9: Mild PTS
 - 10–14: Moderate PTS
 - 15 or more, or presence of ulcer: Severe PTS

Management of PTS in Primary Care Setting



- The best way to prevent PTS is to prevent DVT.
- Appropriate anticoagulation therapy and duration.
- Compression therapy - to **prevent** PTS.
 - Elastic (ECS) - conflicting data, not routinely recommended.
 - Two small open labeled trials - effective.
 - One large multicenter placebo-controlled (Sox) trial* - not effective.
 - Inelastic - used with MLD therapy for intractable swelling.
 - Pneumatic devices - home use after MLD therapy
 - Venoactive drugs - not effective.
- Early referral to specialists for interventions.

**Sox Trial (Kahn 2014)*



Management of PTS in Speciality Setting



- Thrombolysis - for acute DVT.
 - Effective in large proximal DVT.
 - Recent onset, low bleeding risk, life expectancy.
- Thrombectomy - for acute DVT.
 - Effective with recent thrombus (up to 4 weeks).
 - Multiple new “nonlytic devices” available now.
- Chronic venous intervention:
 - Effective for thrombus > 4 weeks to years...
 - Requires venous intervention expertise.

Rational for treatment of DVT

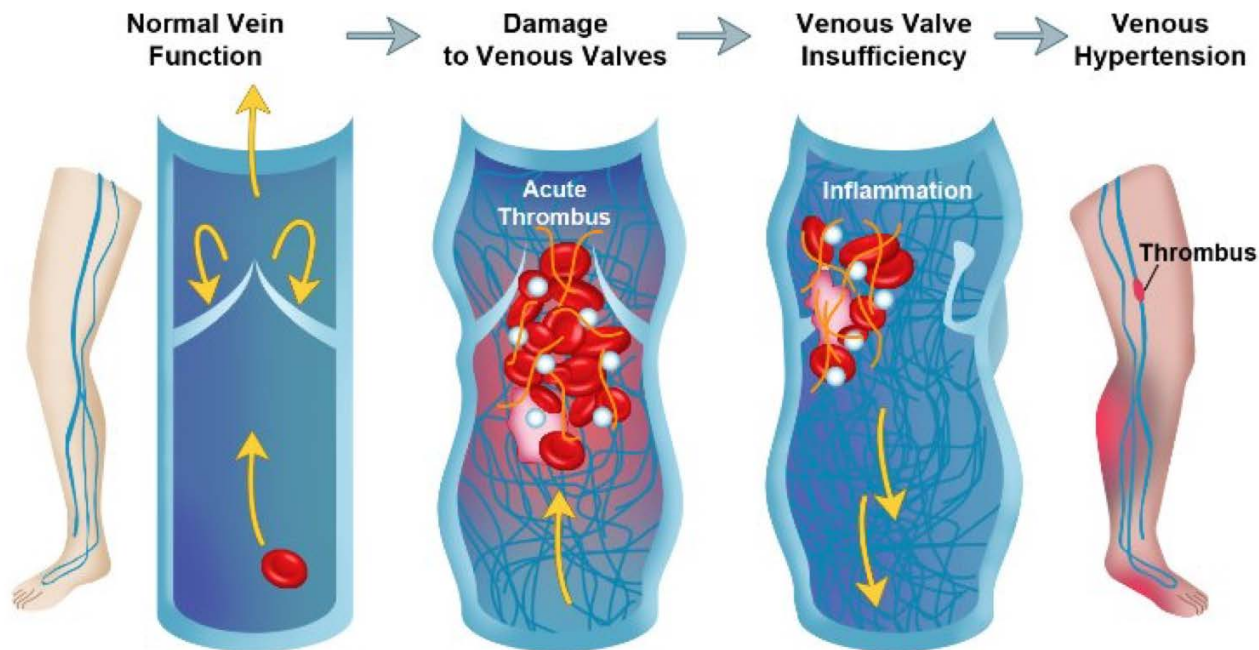
“Proactive Endovascular Treatment”



- “Open Vein Hypothesis”
- Early elimination of thrombus.
- Early treatment increases the probability of
 - Maintaining normal valve function.
 - Maintaining vein function.
- Decrease risk of Post-Thrombotic Syndrome.
- Reduces Quality-of-Life impairing symptoms.

Open Vein Hypothesis

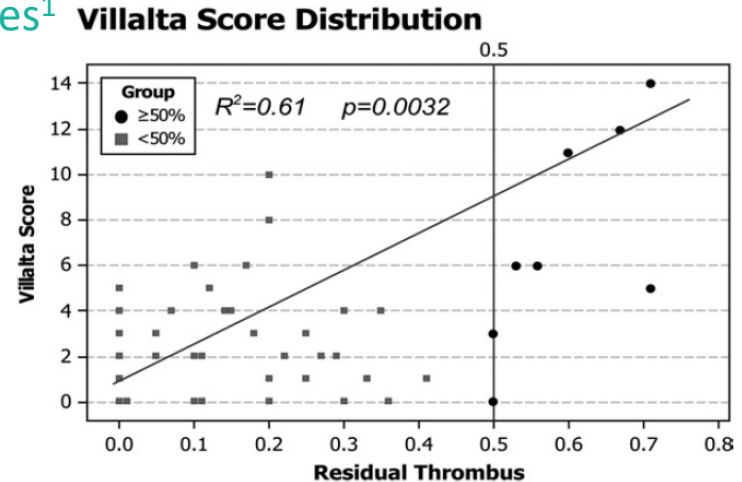
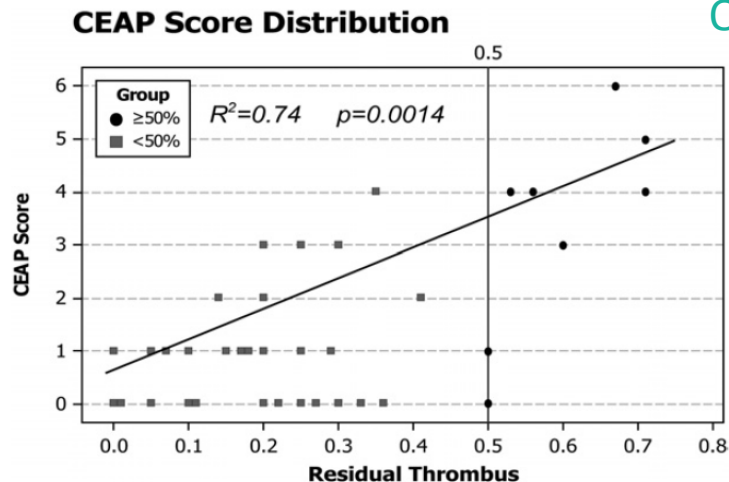
Open-vein Hypothesis: A concept suggesting that early, active removal of a venous thrombus can improve flow through the occluded vein and reduce venous reflux, which can reduce the risk of PTS.



Adapted from Vazquez SR, et al. *Ann Pharmacother.* 2009;43:1824-1835.

Postthrombotic morbidity correlates with residual thrombus following catheter-directed thrombolysis for iliofemoral deep vein thrombosis

Correlation between Residual Thrombus Scores and Outcomes¹




Study of 71 consecutive patients with iliofemoral DVT treated with CDT and/or pharmacomechanical thrombolysis. Outcome scores from last encounter, mean follow-up duration 18.9 months.

Thrombolysis Therapy Summary



- Thrombolysis - Dissolving clots.
- Catheter directed thrombolysis (CDT)
 - Catheters with side holes to infuse tPA (lytic agents).
 - US assisted catheter (EKOS)
 - Requires ICU monitor
 - I used this for Pulmonary Embolism, mainly.
- CaVenT, CAVA, ATTRACT trials
 - Beneficial with bleeding risk (from lytic therapy).

Thrombectomy Treatment Summary



- Thrombectomy - Removing clots.
- Pharmaco-Mechanical thrombectomy devices
 - *Zelante, Trellis*
- Mechanical thrombectomy devices
 - *JETi, Penumbra, Inari*
- Effective, single session treatment, no ICU stay, can go home same day, low bleeding risk, access site complications.

Chronic Venous Intervention

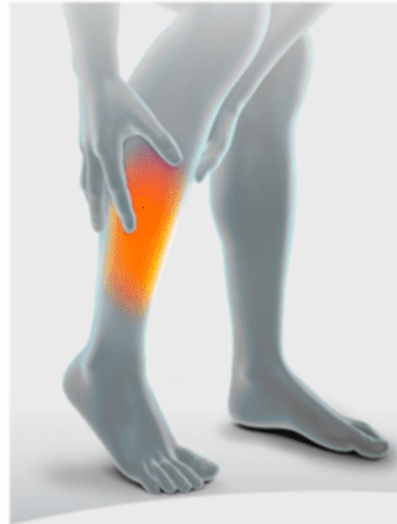
- Patient with occlusive DVT for a year.
- Severe left leg pain, swelling from PTS.
- Successful chronic venous intervention.



Current PTS Trial

Studying Treatments to Improve Leg Symptoms and Quality of Life after Blood Clots

*Chronic Venous Thrombosis:
Relief with Adjunctive Catheter-Directed Therapy (C-TRACT)*



C-TRACT
CHRONIC VENOUS THROMBOSIS
RELIEF WITH ADJUNCTIVE CATHETER-DIRECTED THERAPY

The C-TRACT study is seeking 374 volunteers with moderate to severe Post Thrombotic Syndrome (PTS).

1. Are you ≥ 18 years of age or older?
2. Have you been diagnosed with a blood clot (Deep Vein Thrombosis/DVT) in your leg in the past (more than 3 months ago)?
3. Do you now have leg heaviness, fatigue, swelling, aching, or pain?

If you answered "YES" to all three questions, then you might be a perfect fit for the study.

 Call 1 (866) 974-CI.OT

 email: CTRACT@wustl.edu

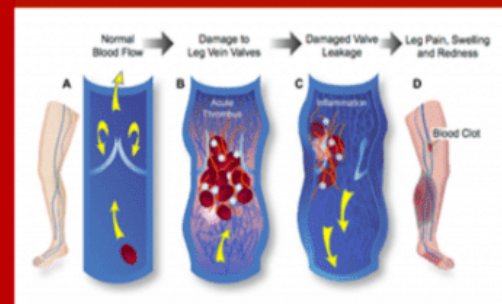
 <https://bloodclotstudy.wustl.edu>

C-TRACT is a large, well-designed study that is examining new treatments for vein damage caused by blood clots (DVT). All study patients will receive modern, active treatment for their leg problem and will be monitored closely, and some patients will also be treated with new image-guided procedures. This NIH-sponsored multicenter randomized clinical trial aims to understand which treatment strategy is most effective in improving patients' symptoms and quality of life.

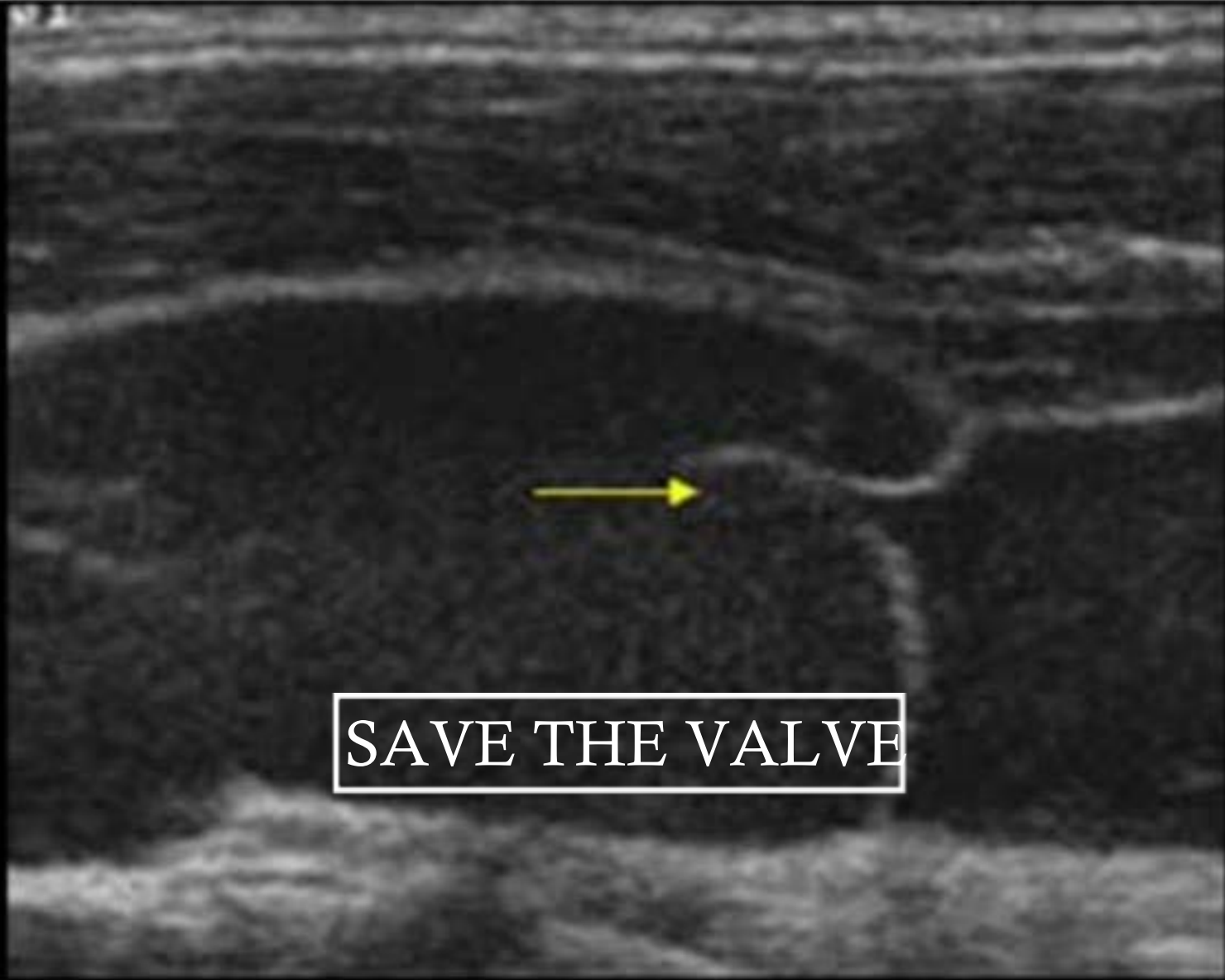
Blood clots can cause long term leg problems in this way:

- A. Valves in the leg veins help blood flow in the right direction.
- B. The blood clot and inflammation (the body's response to the clot) damage leg vein valves.
- C. Valve leakiness and vein blockage from a clot allow pressure to build up in the leg veins.
- D. The leg becomes heavy, swollen and painful and may develop skin change or open sores - a complication called Post-Thrombotic Syndrome (PTS).

Despite treatment, 25-50% of patients with a first episode of blood clot go on to develop PTS



Venous Valve Restoration



SAVE THE VALVE

FDA
des

The Bl
solution



Thank you!!!