Iliac Vein Compression: May-Thurner Syndrome

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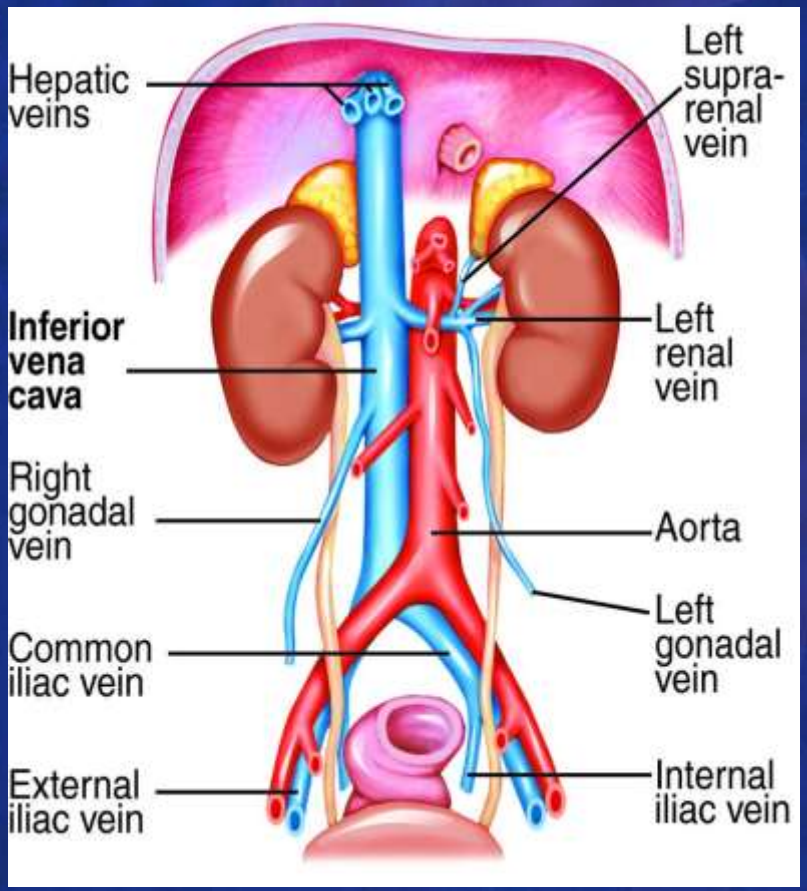
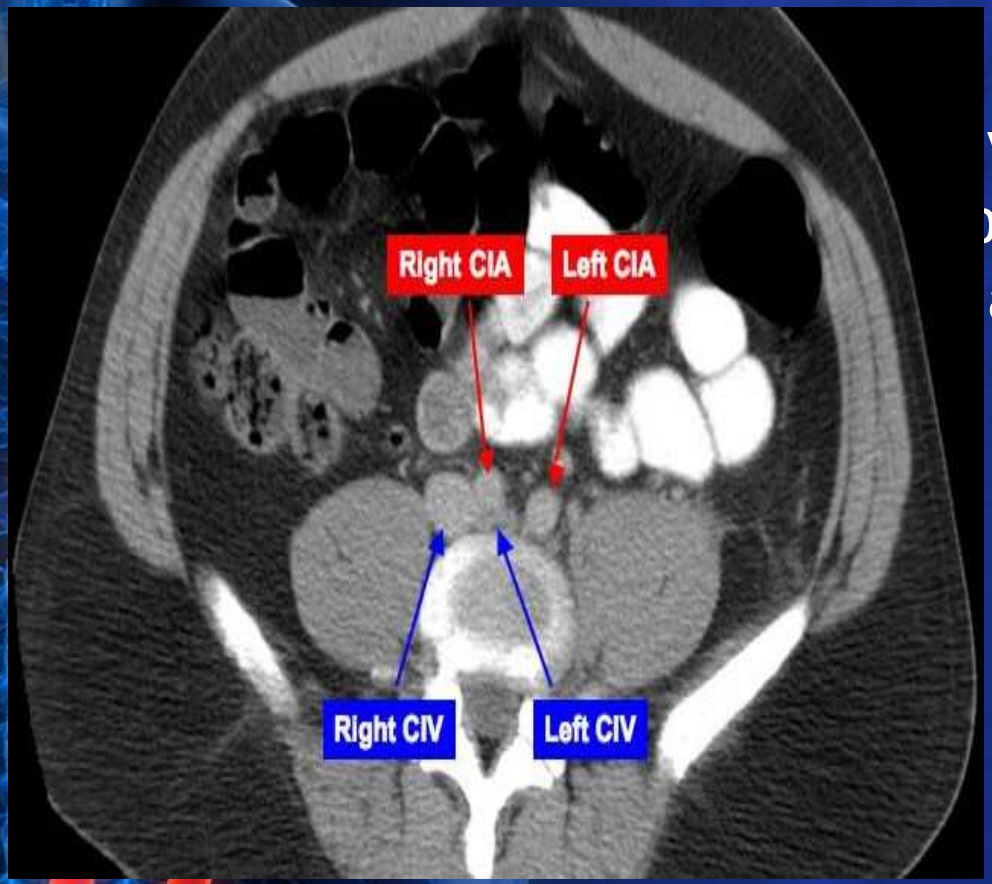
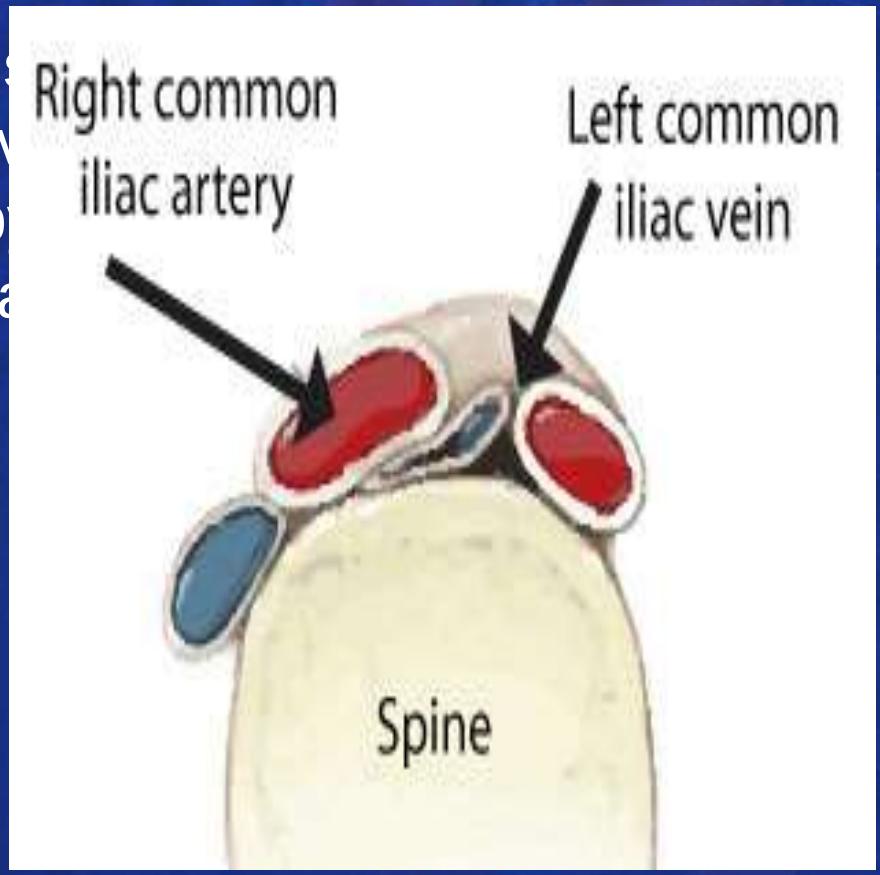
Anatomy of the IVC Bifurcation

- In contrast to the right common iliac vein, which ascends almost vertically to the IVC, the left common iliac vein has a more horizontal course and underlies the right common iliac artery

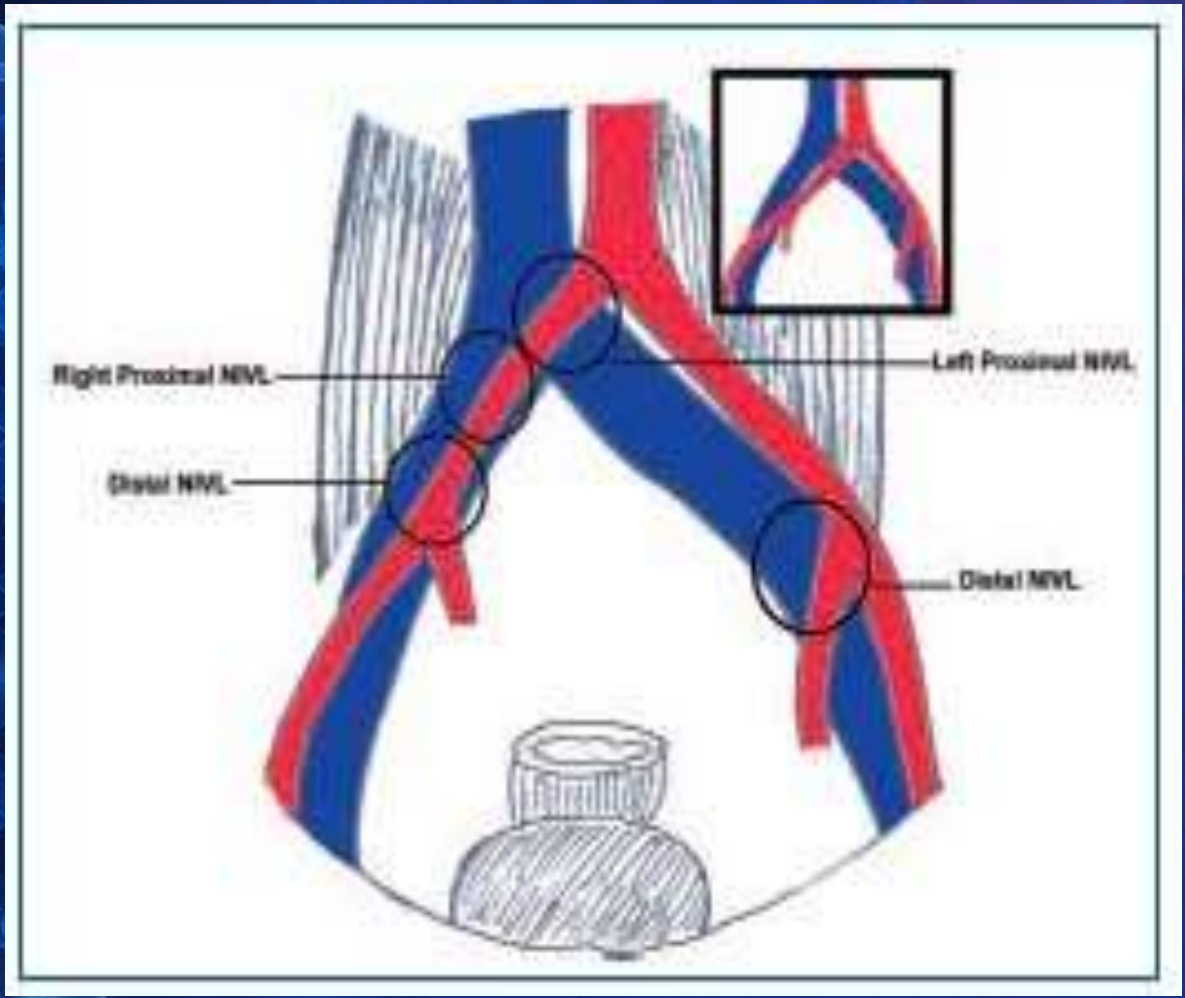


Anatomic Definition





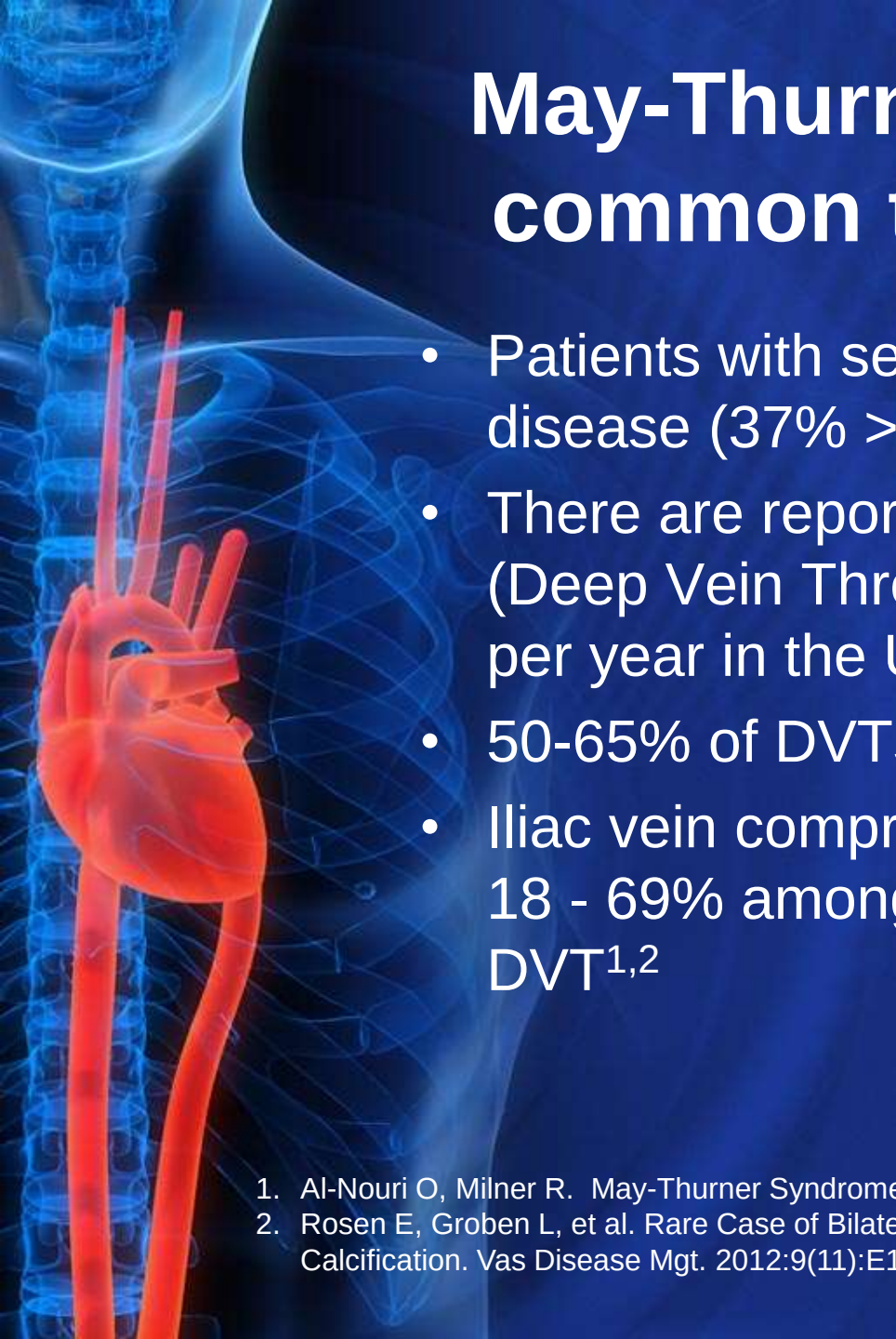
Anatomic Variants



Prevalence

- True prevalence of May–Thurner syndrome is unknown
- 20% people may have asymptomatic compression: “Permissive anomaly”
- Old data suggests that women between ages 30-50 years are primarily affected
- New data indicates that its prevalence is more significant than we thought before.

1. Al-Nouri O, Milner R. May-Thurner Syndrome. Vas Disease Mgt. 2011;3:53-56.



May-Thurner is likely more common than we thought

- Patients with severe chronic venous disease (37% >50% stenosis)[1]
- There are reported to be 600,000 DVT (Deep Vein Thrombosis) hospitalizations per year in the US[1]
- 50-65% of DVTs occur in the left leg
- Iliac vein compression is thought to occur 18 - 69% among patients lower extremity DVT[1,2]

1. Al-Nouri O, Milner R. May-Thurner Syndrome. Vas Disease Mgt. 2011;3:53-56.
2. Rosen E, Groben L, et al. Rare Case of Bilateral Common Iliac Vein Compression by Arterial Stents and Calcification. Vas Disease Mgt. 2012:9(11):E172-E174.

Stages and Development of Symptoms

- Stage 1: Iliac vein compression without structural vein changes. Asymptomatic.
- Stage 2: Venous spur formation which are fibrous shelves eventually developing in the vein, restricting blood flow and increasing risk for edema and DVT. Asymptomatic.
- Stage 3: Symptomatic obstruction: DVT, edema and the formation of varicose veins.

Symptoms

- Dull aching, heaviness, or cramping in legs
- Pain that gets worse when standing
- Pain that gets better when legs are raised
- Redness of the legs and ankles
- Skin color changes around the ankles
- Varicose veins on the surface (superficial)
- Thickening & hardening of the skin on the legs & ankles
- Ulcers on the legs and ankles
- DVT

Physical Examination

CEAP

- Clinical, Etiology, Anatomic, Pathophysiology.
- **CEAP- Universal Classification & Scoring of Venous Disease.**
- C0 – No Disease
- C1 – Spider veins
- C2 – Varicose Veins
- **C3 – Edema**
- **C4 – Pigmentation, Eczema**
- **C5 – Healed Venous Ulcer**
- **C6 – Active Venous Ulcer**

Pelvic Vein Compression: May-Thurner Syndrome

Current Diagnosis

- Venous Duplex Ultrasound: Poor sensitivity and specificity [1]
- CT Venography and MRI Venography: > 95% sensitivity and specificity but require adequate technical protocols for imaging acquisition [2,3]

1.Forauer AR, Gemmete JJ, Dasika NL, Cho KJ, Williams DM. Intravascular ultrasound in the diagnosis and treatment of iliac vein compression (May-Thurner) syndrome. J Vasc Interv Radiol 2002; 13:523–527.

2. Chung JW, Yoon CJ, Jung SI, et al. Acute iliofemoral deep vein thrombosis: evalu- ation of underlying anatomic abnormali- ties by spiral CT venography. J Vasc Interv Radiol 2004; 15:249–256.

3. Wolpert LM, Rahmani O, Stein B, Gallagher JJ, Drezner AD. Magnetic reso- nance venography in the diagnosis and management of May-Thurner syndrome. Vasc Endovascular Surg 2002; 36:51–57.

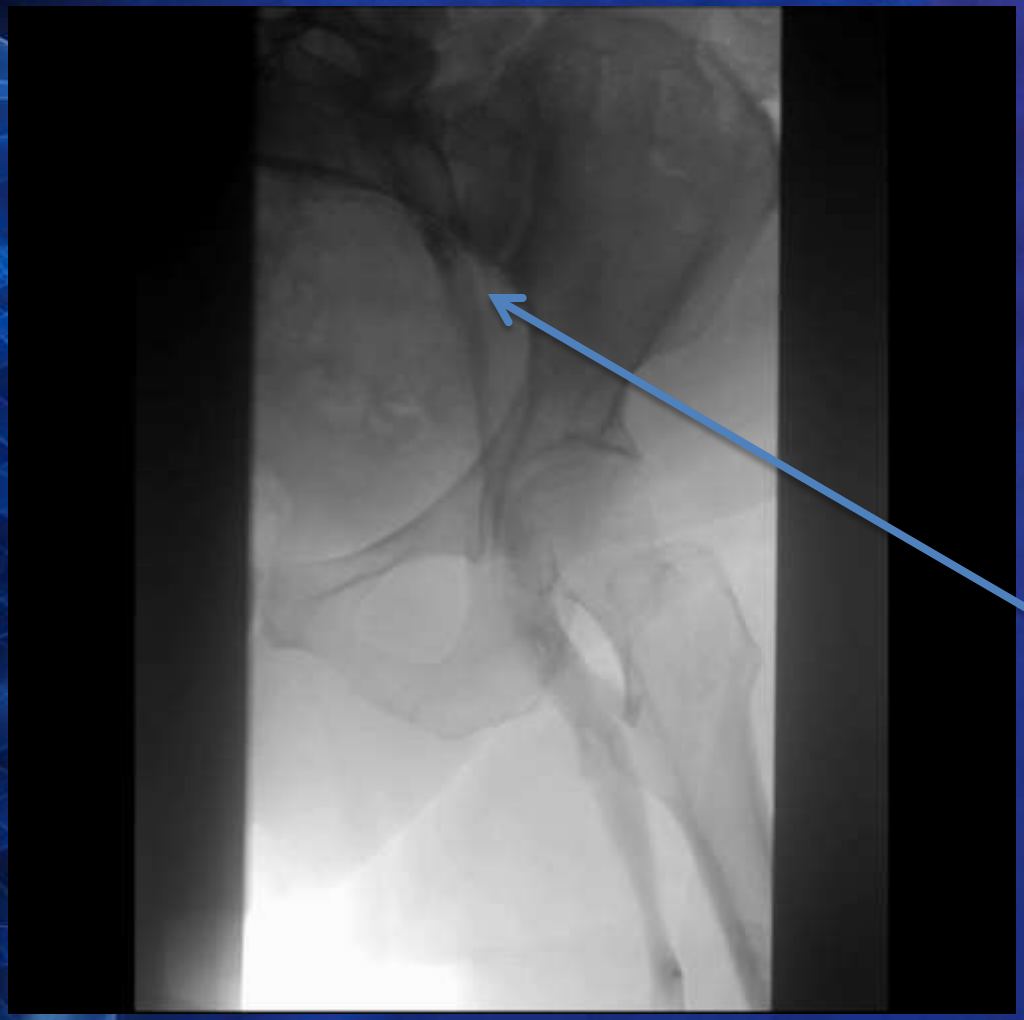
Current Diagnosis

- Single-Plane Venography

"Single-plane venography may be *relatively insensitive* in the detection of iliocaval compression *compared with IVUS…* venography has been demonstrated to have a sensitivity of only 45% for the detection of chronic iliac obstruction"

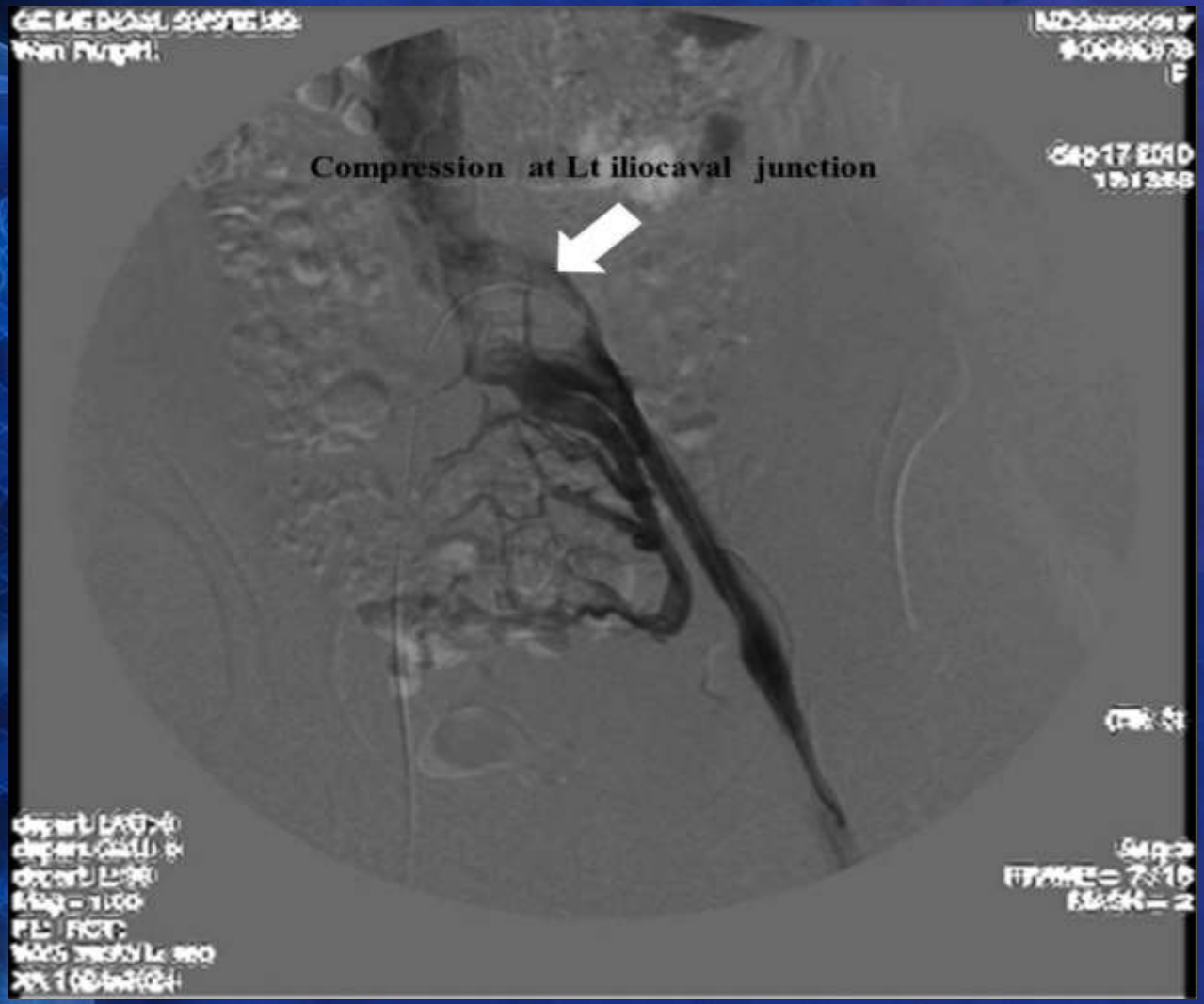
Meissner M, Gloviczki P, et al. Early thrombus removal strategies for acute deep venous thrombosis: Clinical Practice Guidelines of the Society for Vascular Surgery and the American Venous Forum. J Vas Surg. 55:5. May 2012. pp. 1449-1462.

Venography



Clue: Thinning of dye where Artery crosses the vein

Venography

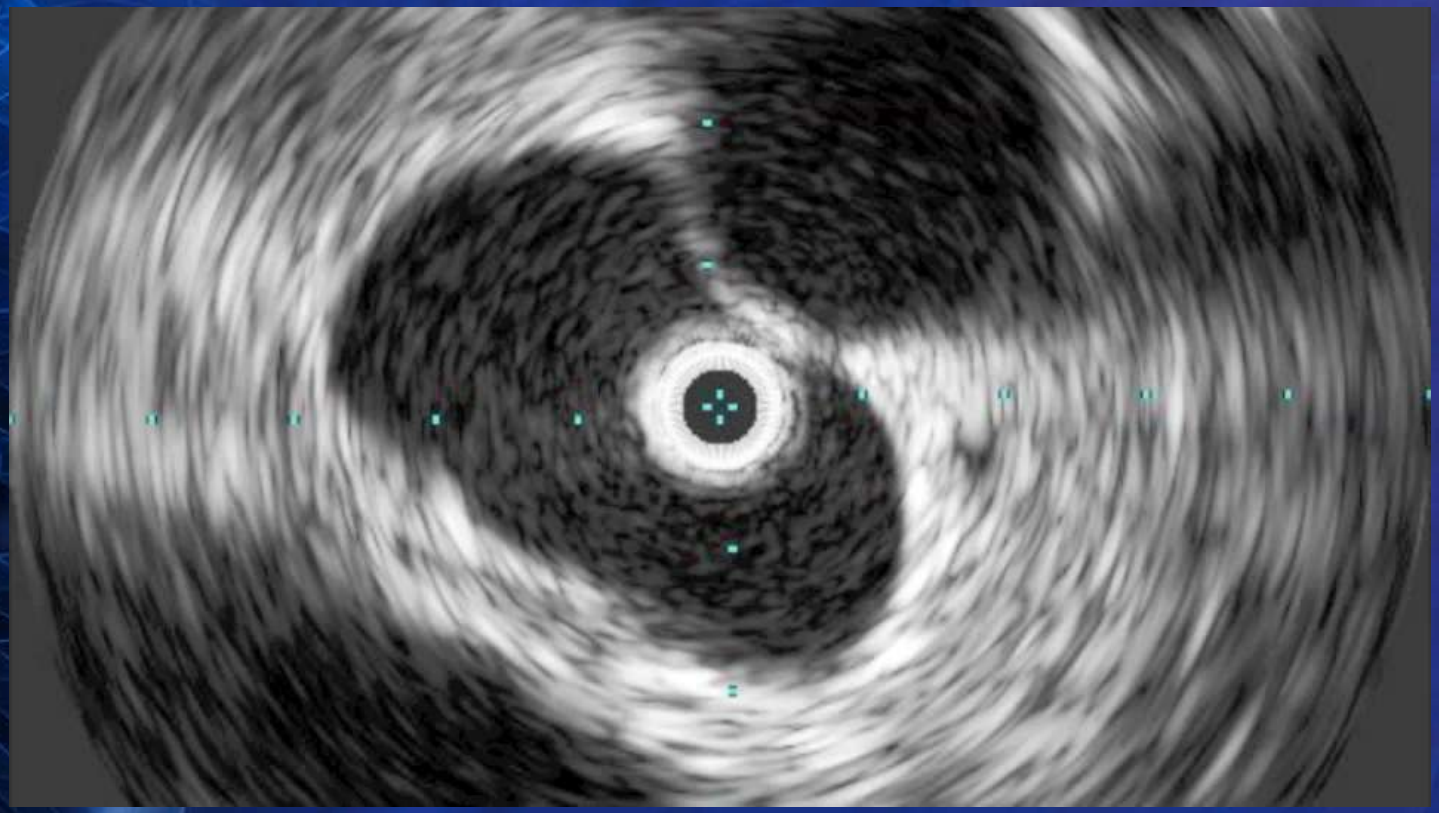


How does IVUS compare to single plane venography?

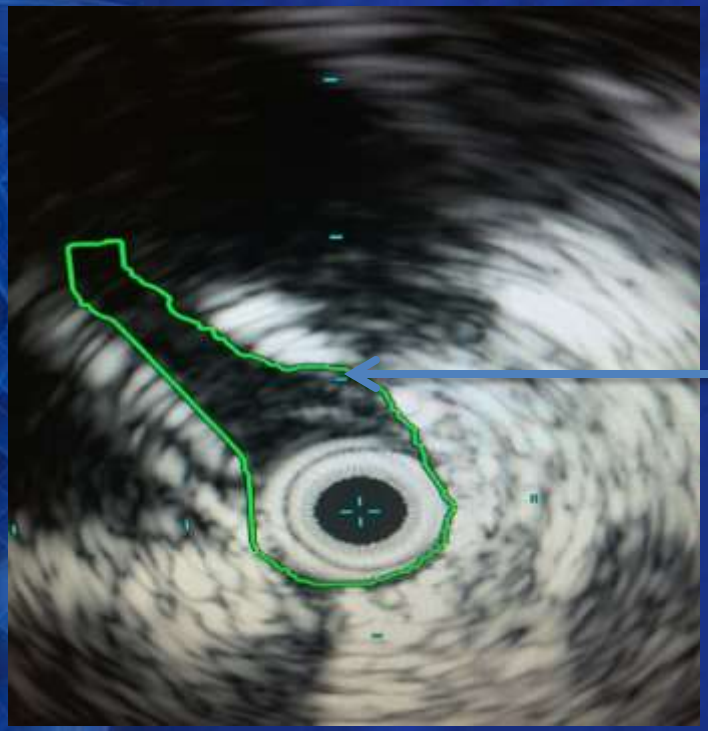
- 304 consecutive limbs before and after stenting
- Used IVUS as a standard, venography single plane had a poor sensitivity 45% in detecting area stenosis >70%.
- Actual **area** demonstrated higher degrees of stenosis when measured directly with IVUS as opposed to calculation of diameter (non-circular geometry of stenosis)

Neglén P, Raju S. Intravascular ultrasound scan evaluation of the obstructed vein. J Vasc Surg. 2002;35:694-700.

IVUS: ILIAC VEIN COMPRESSION

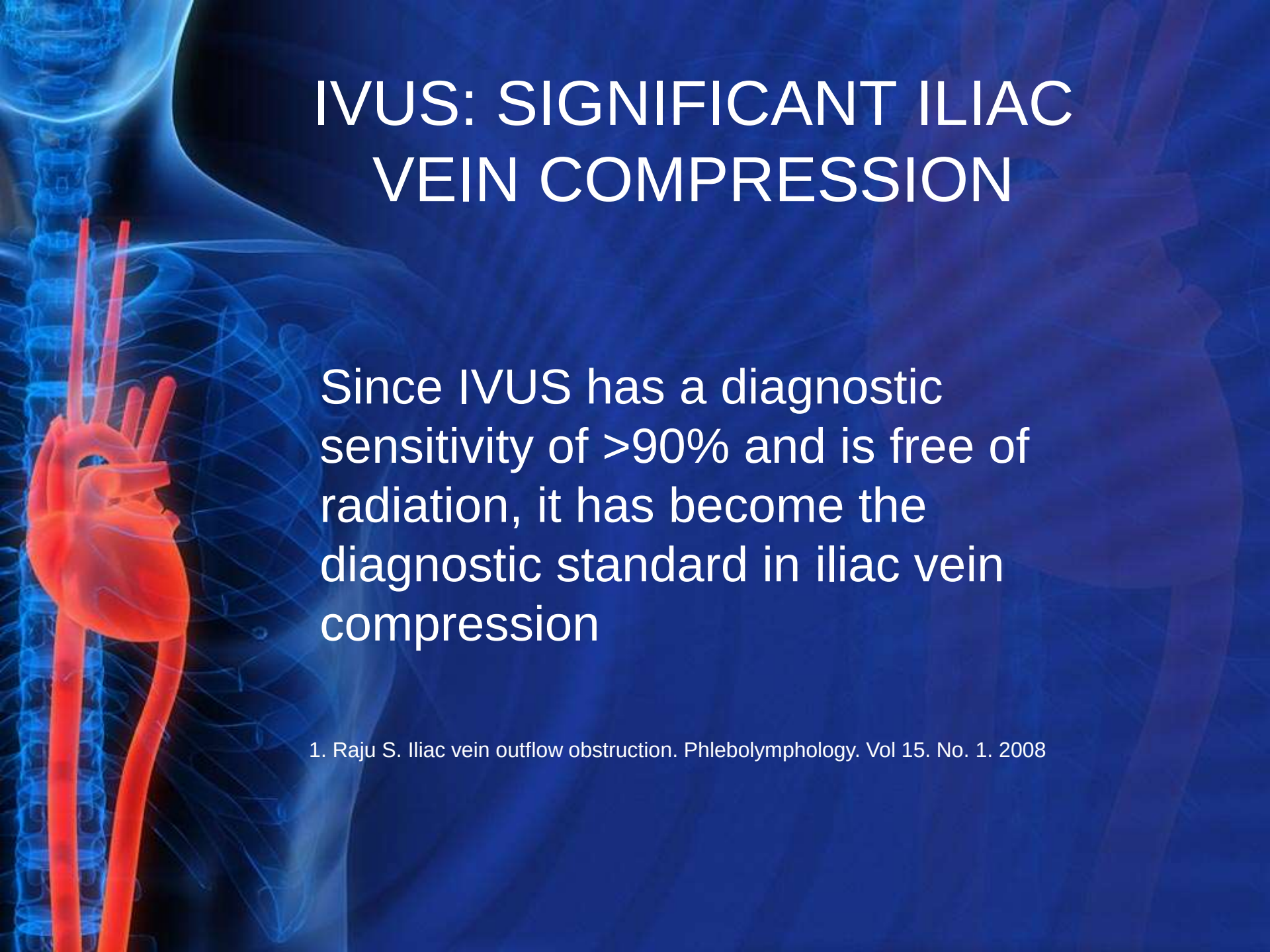


IVUS: SIGNIFICANT ILIAC VEIN COMPRESSION



≥ 50% reduction in intraluminal area

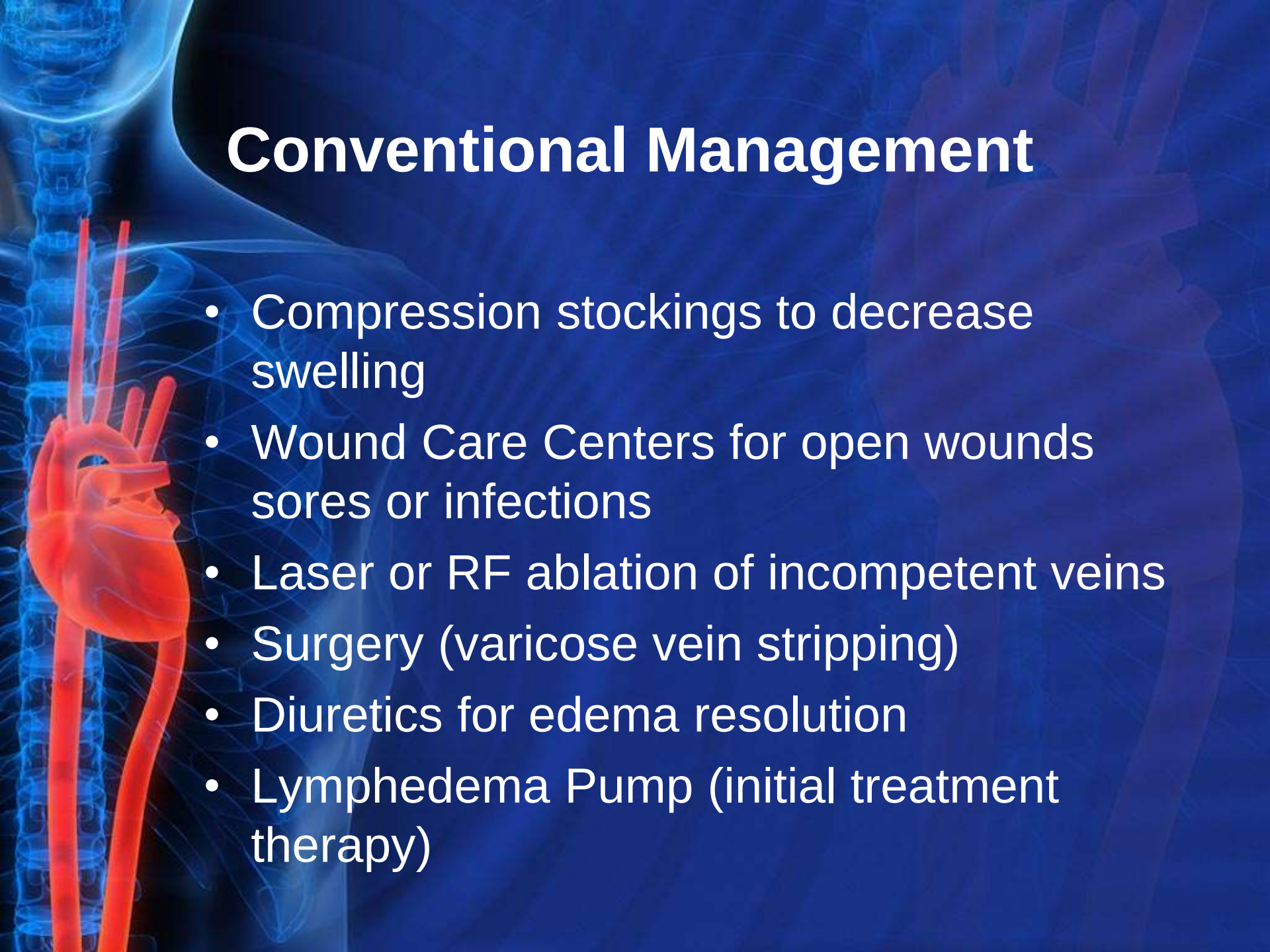
1. Neglén P, Raju S. Intravascular ultrasound scan evaluation of the obstructed vein. J Vasc Surg. 2002;35:694-700.
2. Neglén P, Raju S. Balloon dilatation and stenting of chronic iliac vein obstruction: technical aspects and early clinical outcome. J Endovasc Ther 2000;7:79-91.
3. Neglén P, Berry MA, Raju S. Endovascular surgery in the treatment of chronic primary and postthrombotic iliac vein obstruction. Eur J Vasc Endovasc Surg 2000;20:560-71.



IVUS: SIGNIFICANT ILIAC VEIN COMPRESSION

Since IVUS has a diagnostic sensitivity of >90% and is free of radiation, it has become the diagnostic standard in iliac vein compression

1. Raju S. Iliac vein outflow obstruction. Phlebolymphology. Vol 15. No. 1. 2008



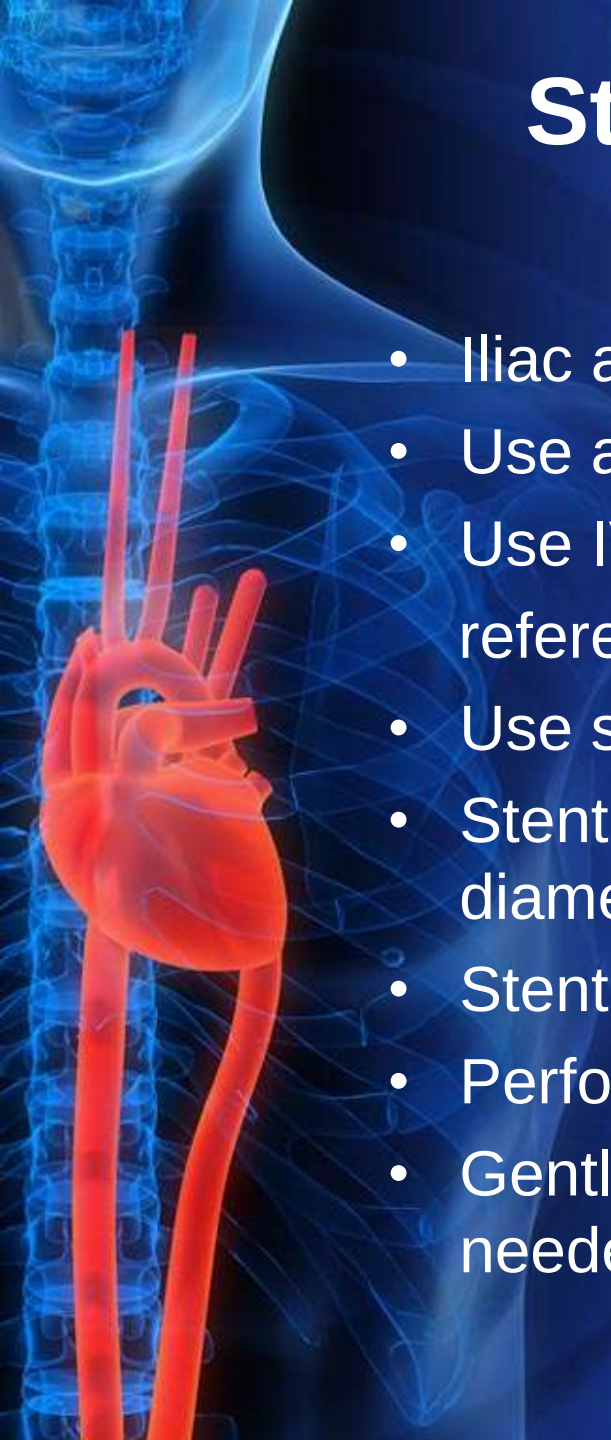
Conventional Management

- Compression stockings to decrease swelling
- Wound Care Centers for open wounds sores or infections
- Laser or RF ablation of incompetent veins
- Surgery (varicose vein stripping)
- Diuretics for edema resolution
- Lymphedema Pump (initial treatment therapy)

Invasive Management

- Localized venous obstruction is a major cause of symptoms[1,2]
  - Greater than 90% of post-thrombotic CVI cases have obstruction[3]
  - Collateral flow only partially prevents symptoms associated with venous disease
- Stenting is “method of choice” for chronic venous obstruction[2,4]

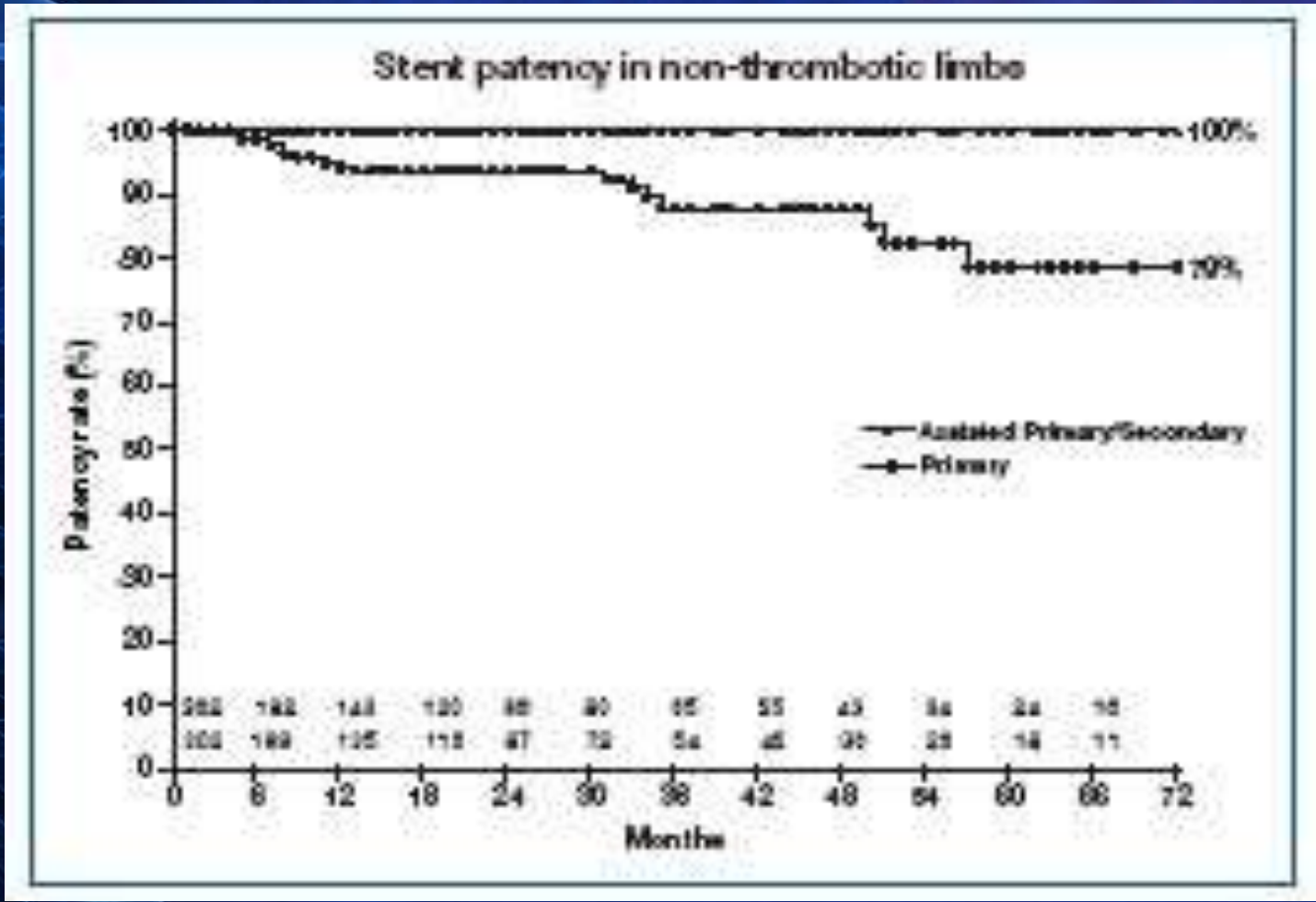
1. Neglen P, Thrasher TL, Raju S. Venous outflow obstruction: an underestimated contributor to chronic venous disease J Vasc Surg 2003;38:879-85.
2. Neglen, P. Chronic Venous Obstruction: Diagnostic Considerations and Therapeutic Role of Percutaneous Iliac Stenting . Vascular. 2007;15(5):273-280.
3. Raju, S. Venous stenting in CVD- Tips and Tricks, VEITH 2008.
4. Gillespie. D. Stent placement after DVT thrombolysis or mechanical thrombectomy. Endovascular Today, July 2009.



Stenting: Technical Considerations

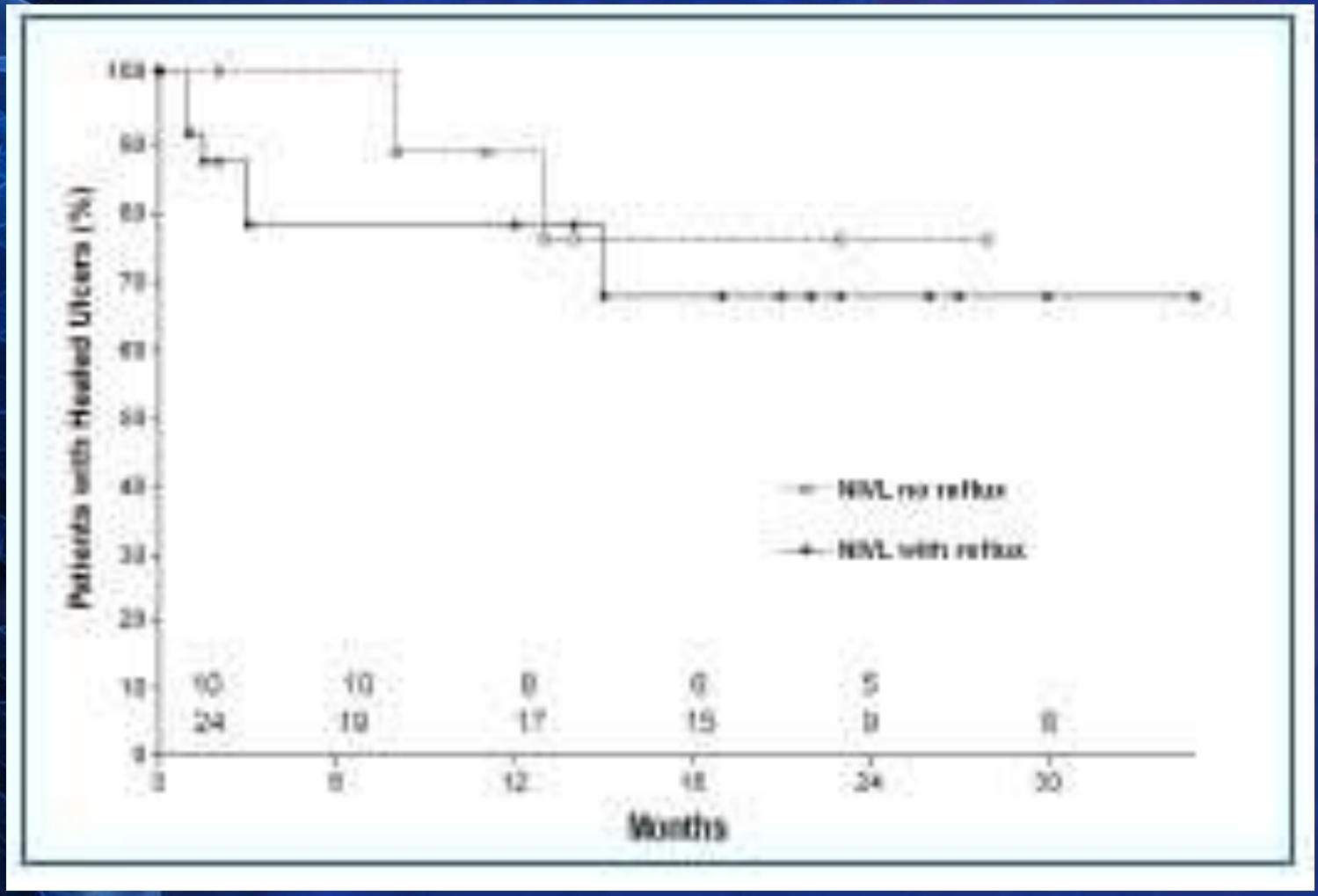
- Iliac and inferior vena cava angiography
- Use a stiff wire for optimal support
- Use IVUS to determine proximal and distal reference diameters and stent length
- Use self expanding stents
- Stent size: 1-2 mm > proximal reference diameter to avoid stent migration
- Stent may be placed 4-5 mm into the IVC
- Perform post-stent IVUS examination
- Gentle 1:1 post-stent balloon dilatation as needed

Stent Patency



J Vasc Surg. 2006;44:136-144.

Healed Ulcers



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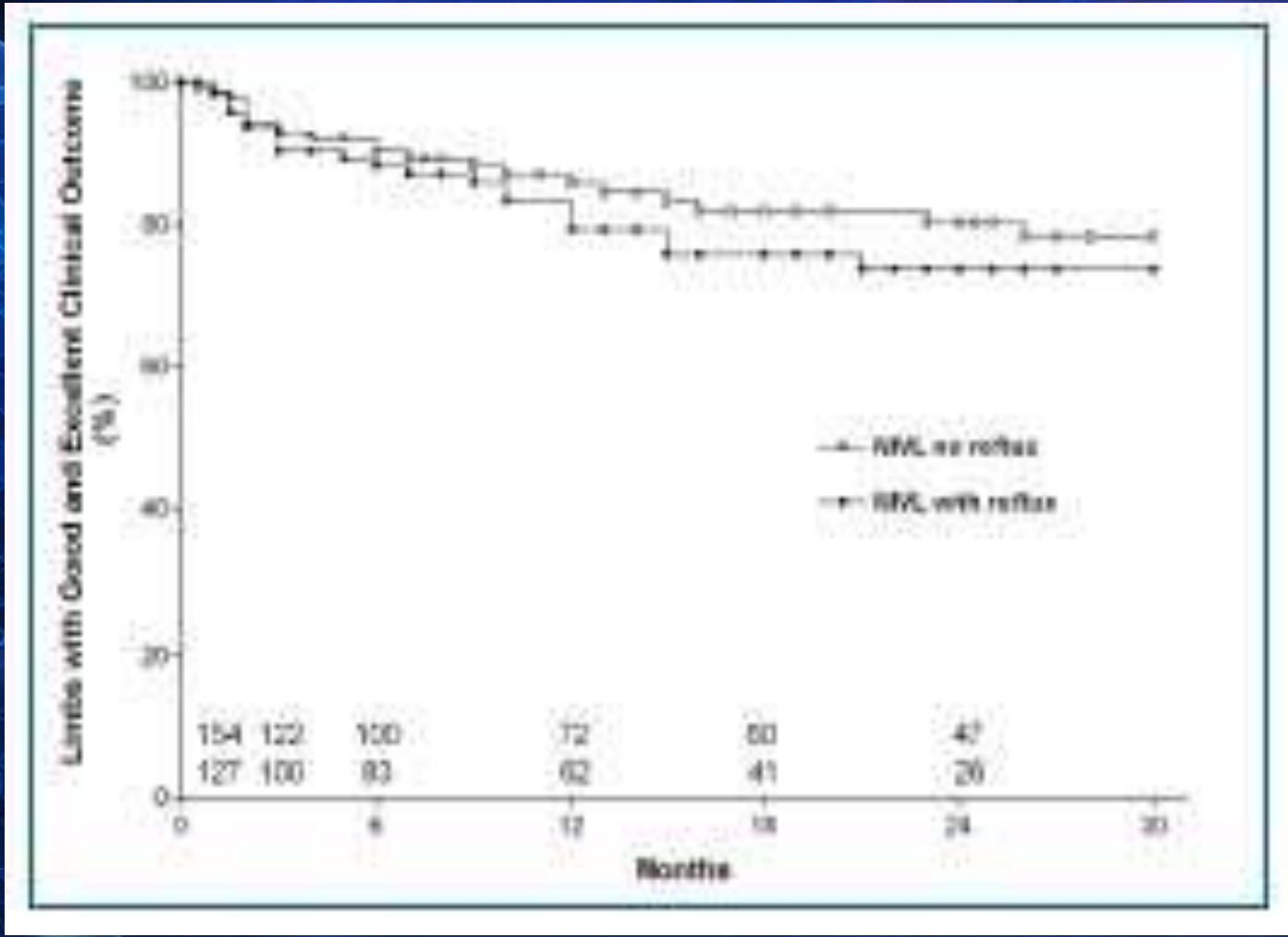
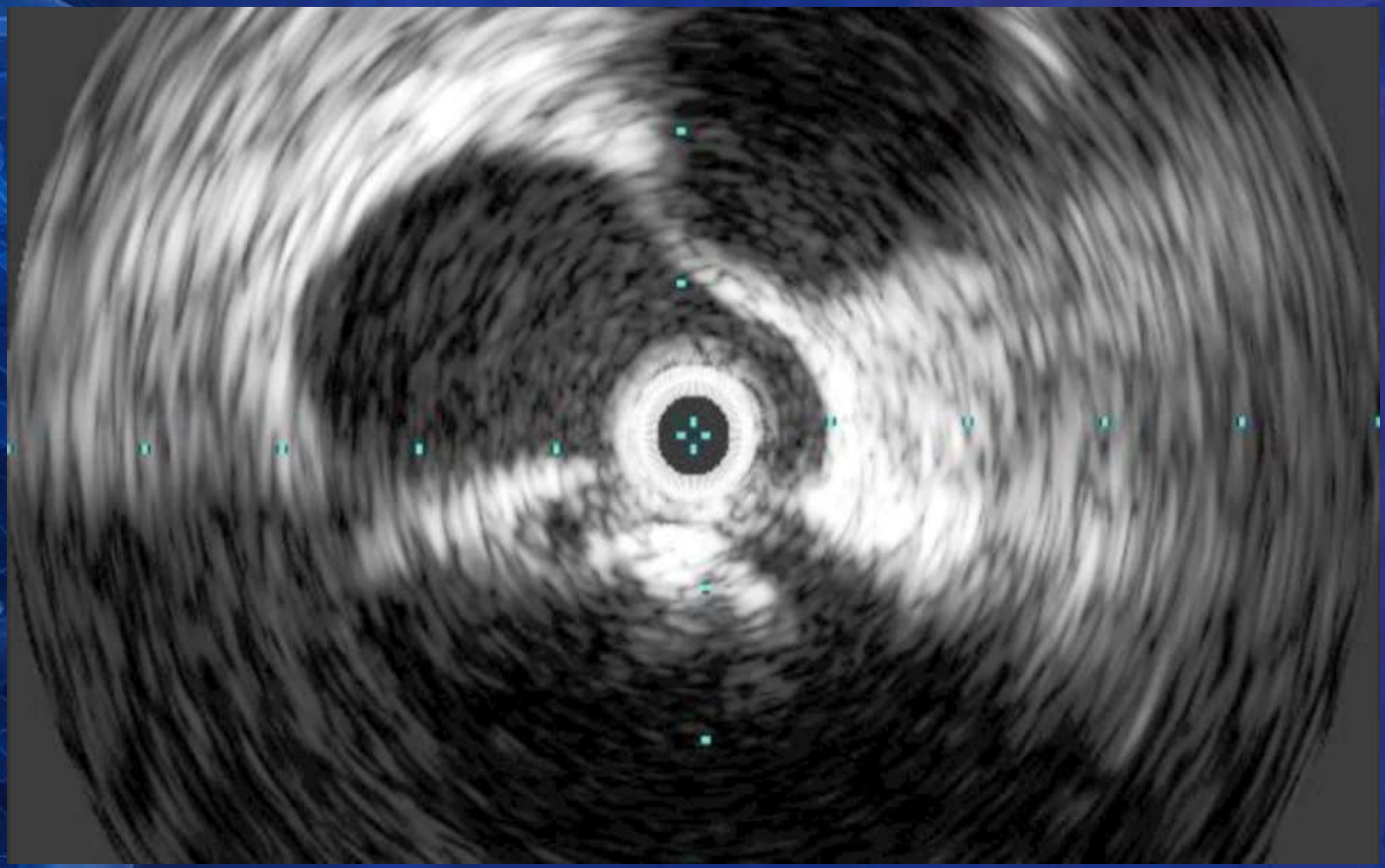
Symptomatic Relief



J Vasc Surg. 2006;44:136-144.

POST-STENT IVUS



POST-STENT VENOGRAM

TAKE HOME MESSAGE

May-Thurner syndrome: a not so uncommon cause of a common condition

This anatomic finding has been shown to be present in over 20% of the population; however, it is rarely considered in the differential diagnosis of leg edema, DVT, and chronic venous disease particularly in patients with other risk factors.

Systemic anticoagulation, compression therapy, and venous ablation are ineffective or insufficient treatment, and a more aggressive approach is necessary to prevent complications.


Thank You