Venous Interventions for the Cardiologist

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Venous Interventions

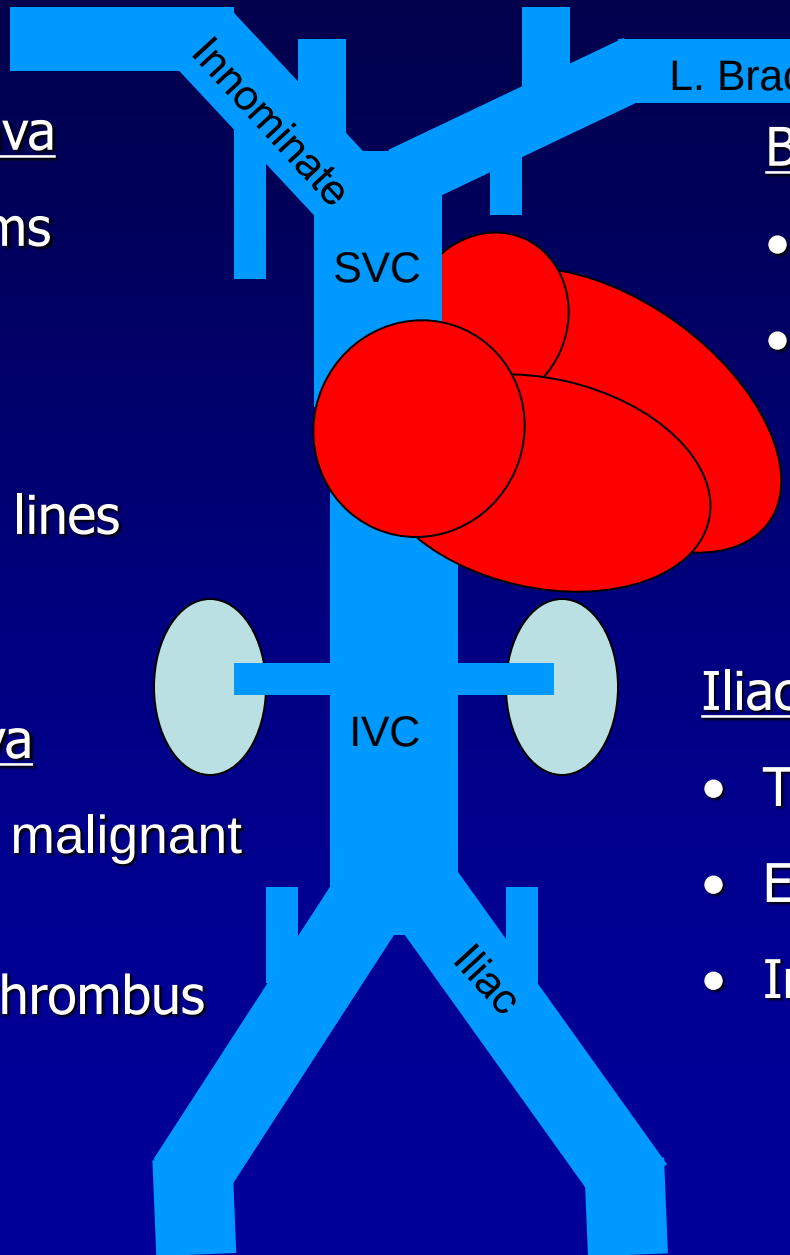
- Saphenous vein grafts for coronary bypass
- Pacemakers/ICDs
- Inferior vena cava filters
- Saphenous vein ablations
- Hemodialysis access
- Superior vena cava syndrome
- Deep venous thrombosis
- Congenital venous stenosis/occlusion

Venous Interventions

Objectives

- Central venous disease for cardiologist
- Endovascular therapies for central venous stenosis/occlusion
- Adjunctive therapies for endovascular interventions

Central Venous System



Superior Vena Cava

- Aortic aneurysms
- Tuberculosis
- Malignancies
- Chronic central lines
- Dialysis access

Inferior Vena Cava

- Supra- renal - malignant extension
- Infra-renal – thrombus

Brachiocephalic Veins

- Dialysis access
- Pacemakers and ICDs

Iliac and Femoral Veins

- Thrombus
- Extrinsic compression
- Intra-luminal obstruction

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IVC Filters

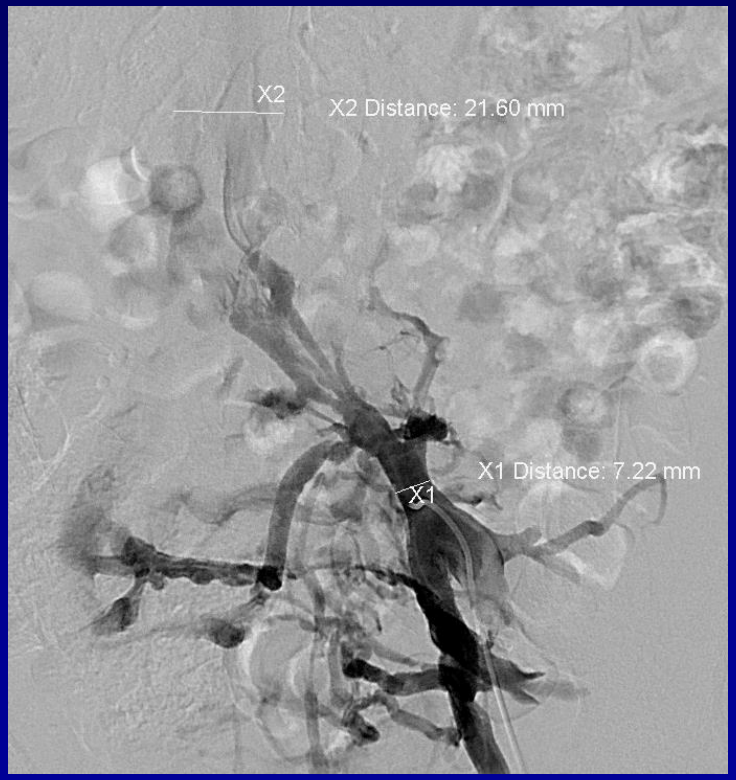
- Infra-renal position
- Greatly improved
- Low profile systems
  - 6-11 F sheaths
- Removable
- Expanded indications
  - Treatment for DVT
  - Prophylaxis for high risk surgeries
  - Iliofemoral vein procedures

Iliac and Femoral Vein Disease

- Most commonly caused by venous thrombosis
- Extrinsic compression
  - May-Thurner, abdominal aneurysm, tumors, cysts pregnancy
- Abdominal or pelvic radiation therapy
- Retroperitoneal fibrosis
- Intra-luminal obstruction by bands, webs, ridges
- Combination of the above
- Symptoms of pain, edema, ulceration, venous claudication

Iliac and Femoral Vein Disease

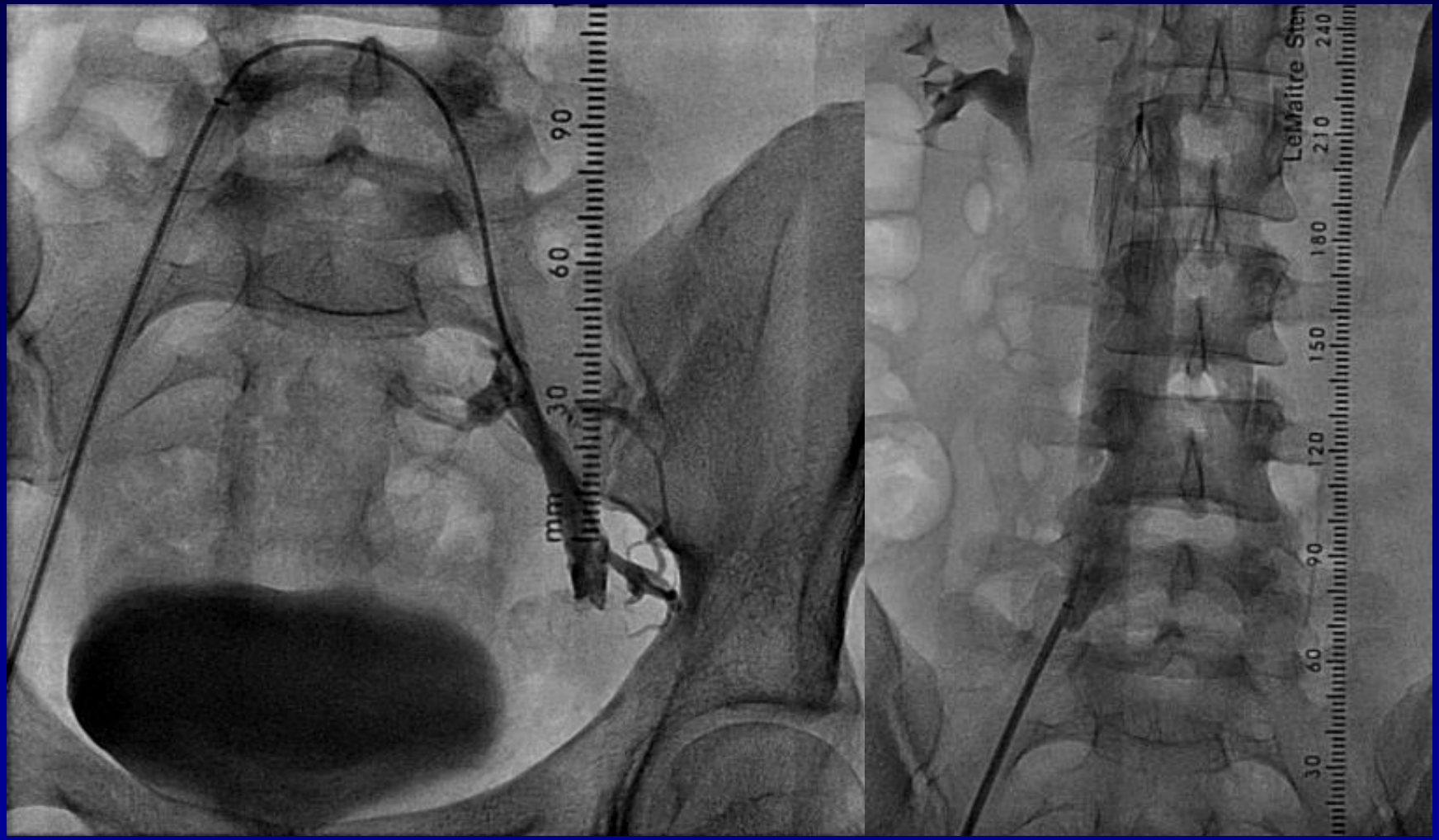
- Venography is the gold standard for diagnosis
  - Venograms are deceptive
  - Intravascular ultrasound (IVUS) useful for confirmation



Iliac and Femoral Vein Disease

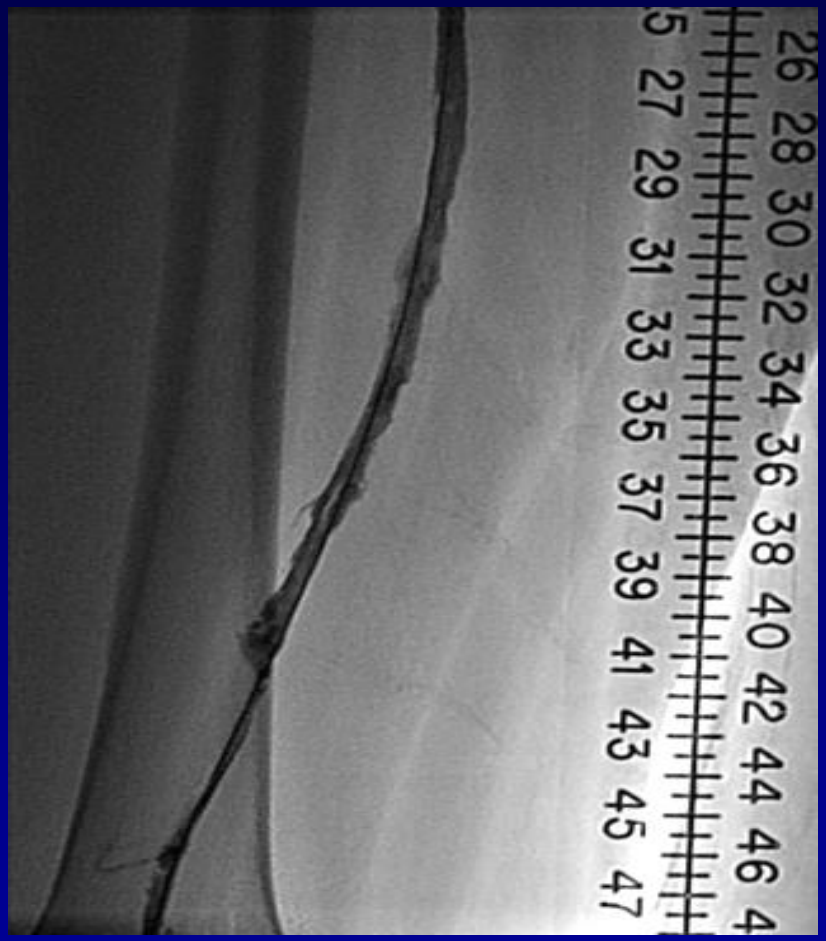
- Endovascular repair is method of choice
  - Severe vessel recoil
    - Greater vessel compliance
    - Lesser density of smooth muscle
  - High rates of early restenosis for balloon angioplasty
  - Mandatory stenting
    - "Its bigger than you think"
    - Stents 8 – 14 mm in diameter
    - Self expanding stents
    - Focal lesions may require balloon expandable stents
  - Stent patency rates reported 70-95% at 3-5 yrs

Iliac and Femoral Vein Thrombosis



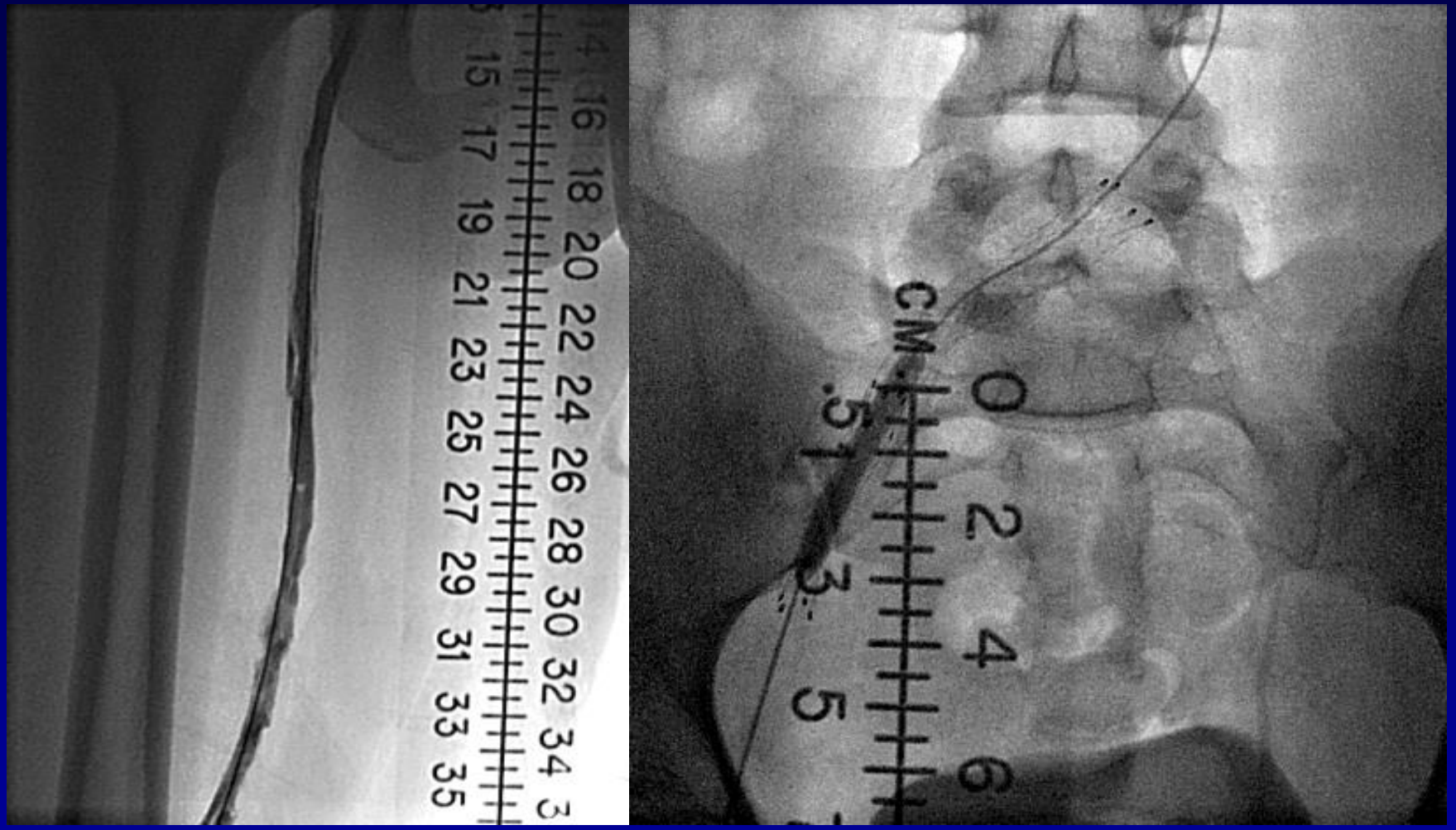
- Unable to cross via contralateral access
- IVC filter
- Ipsilateral popliteal access

Iliac and Femoral Vein Thrombosis



- Adjunctive therapy with mechanical and catheter directed thrombolysis
- Improved outcomes but increase bleeding risk

Iliac and Femoral Vein Thrombosis



- Mechanical debulking of clot with angiojet
- 24-48 hrs of rt-PA 0.5 mg/hr and heparin
- Fibrinogen monitoring

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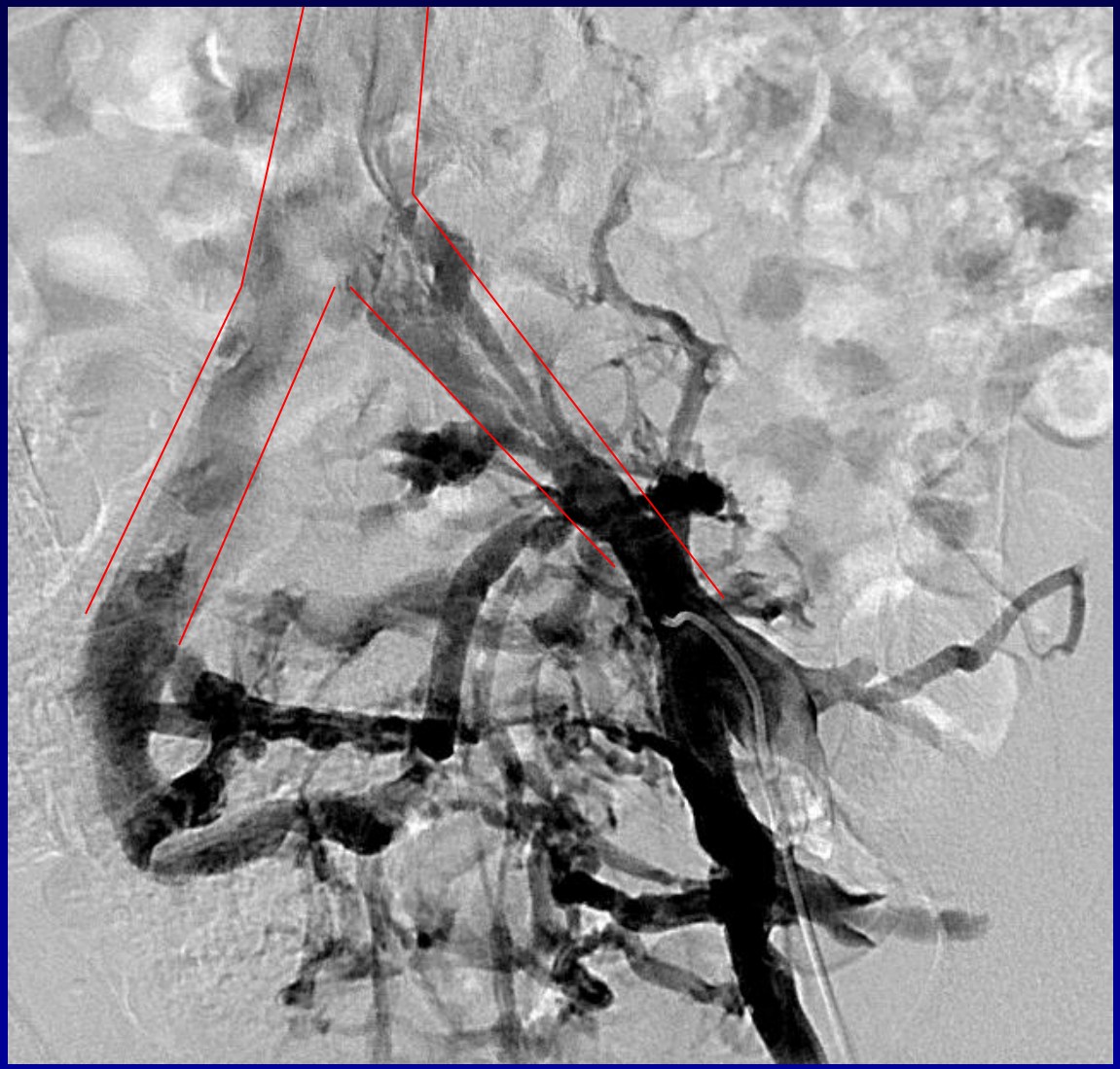
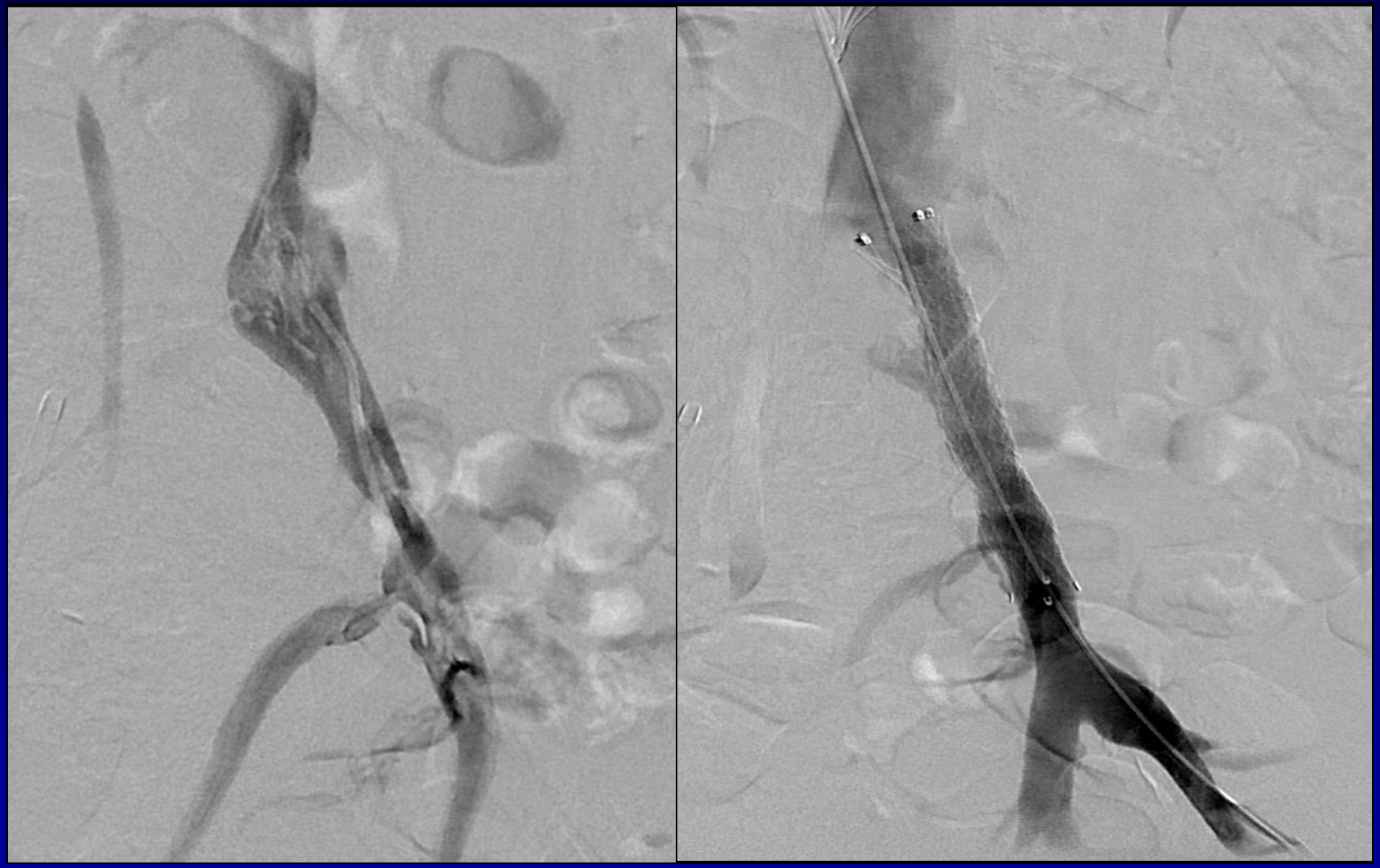
May-Thurner Syndrome

- Non-thrombotic iliac vein obstruction
  - Right common iliac artery compression of left proximal common iliac vein
  - Webs, bands, or stenosis
- Most commonly women of childbearing age
- Present with deep venous thrombosis (DVT) secondary event compounded by iliac obstruction
  - Oral contraceptive pills and estrogen replacement therapy
- Diagnosis made when symptoms do not improve with warfarin and conservative therapy.

May-Thurner Syndrome

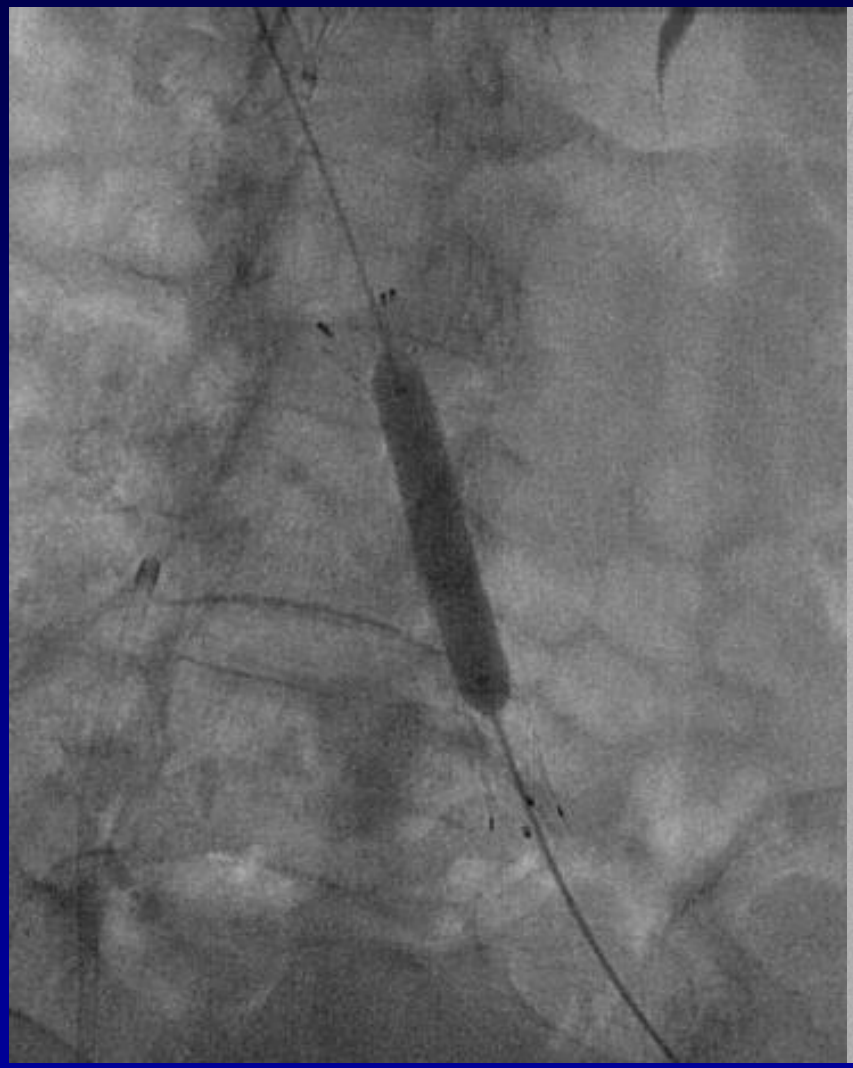


May-Thurner Syndrome



Compression, cords, or webs impair outflow

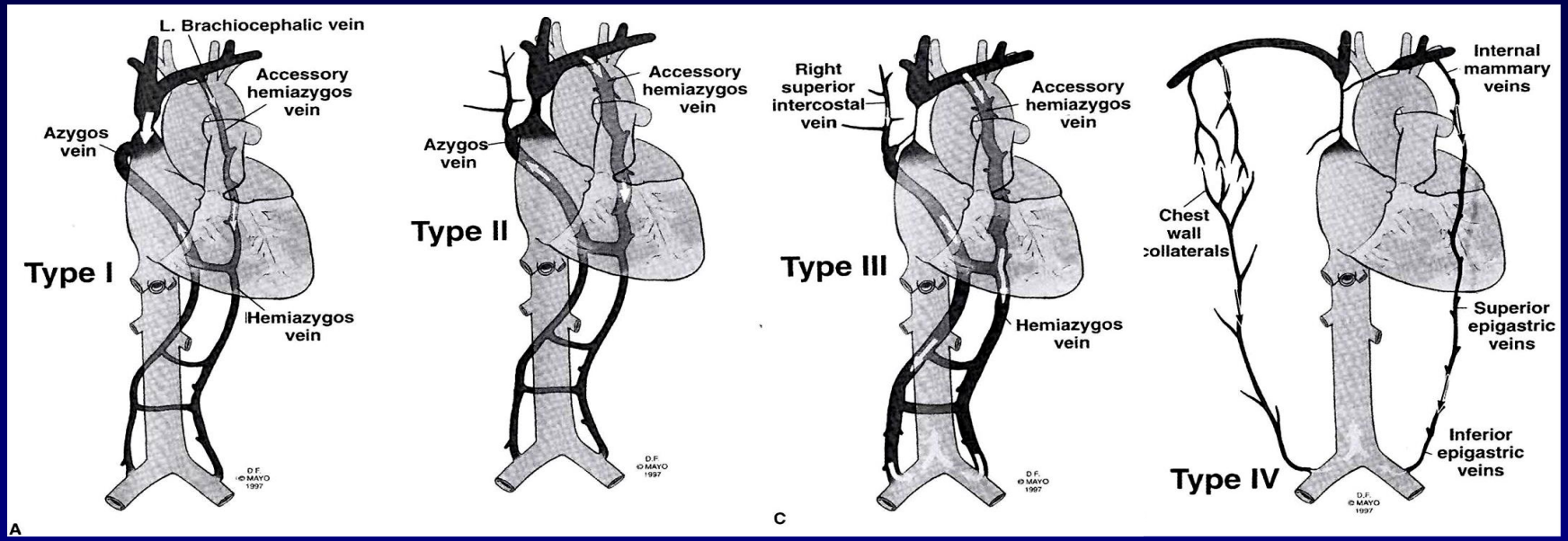
May-Thurner Syndrome



May-Thurner Syndrome

- Very focal if not thrombosed
- 3-6 months of warfarin post stent
- Followed by ultrasound post procedure
- Removable IVC filters

Superior Vena Cava Syndrome



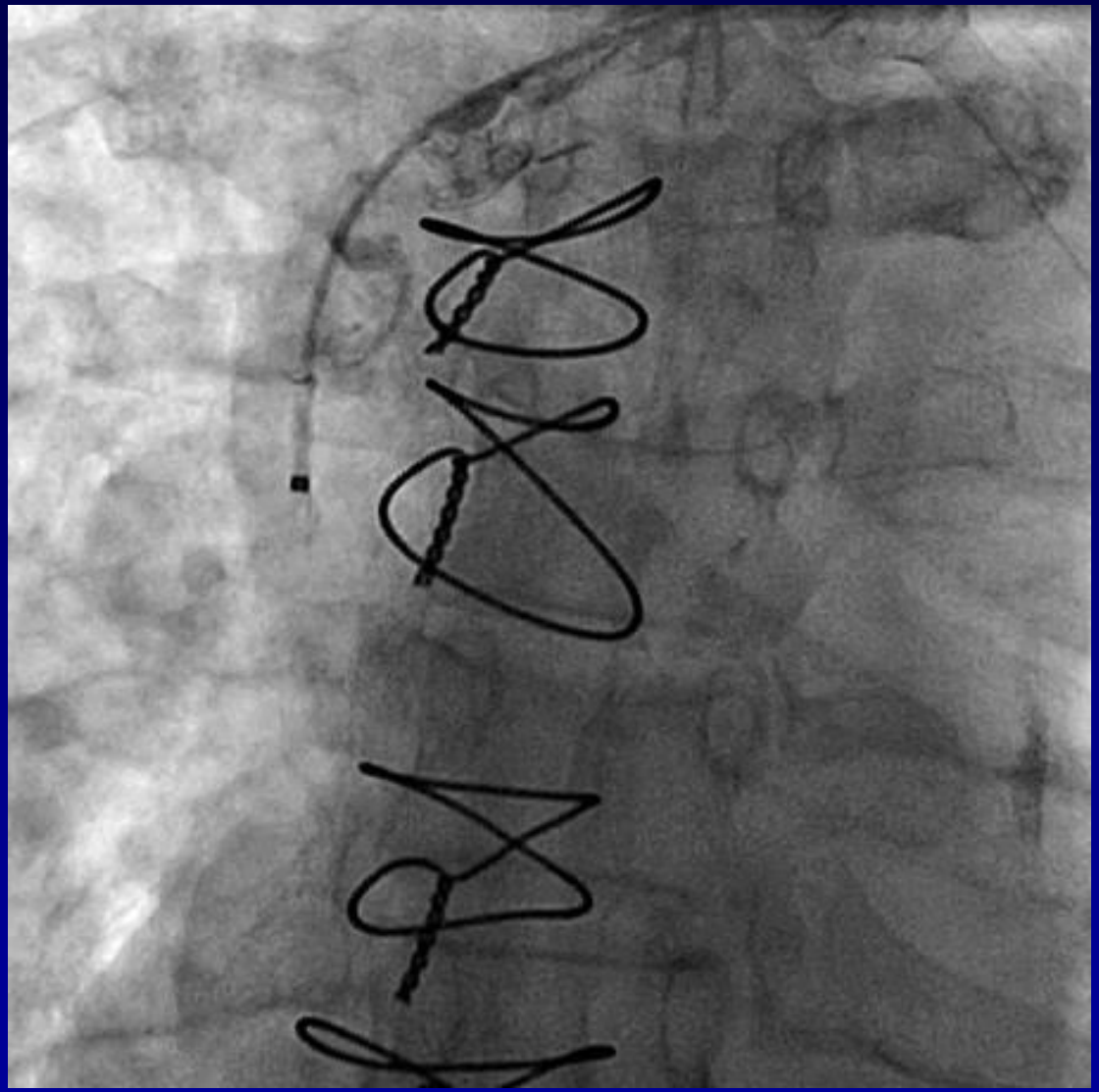
- Stanford and Doty classification Type I-IV
- Surgery is no longer the standard of care
- Endovascular procedures better tolerated by patients
- Localization is critical to pre-procedure planning
- Combination of brachial vein and jugular access

Alimi et al J Vasc Surg 27:298-299; 1998

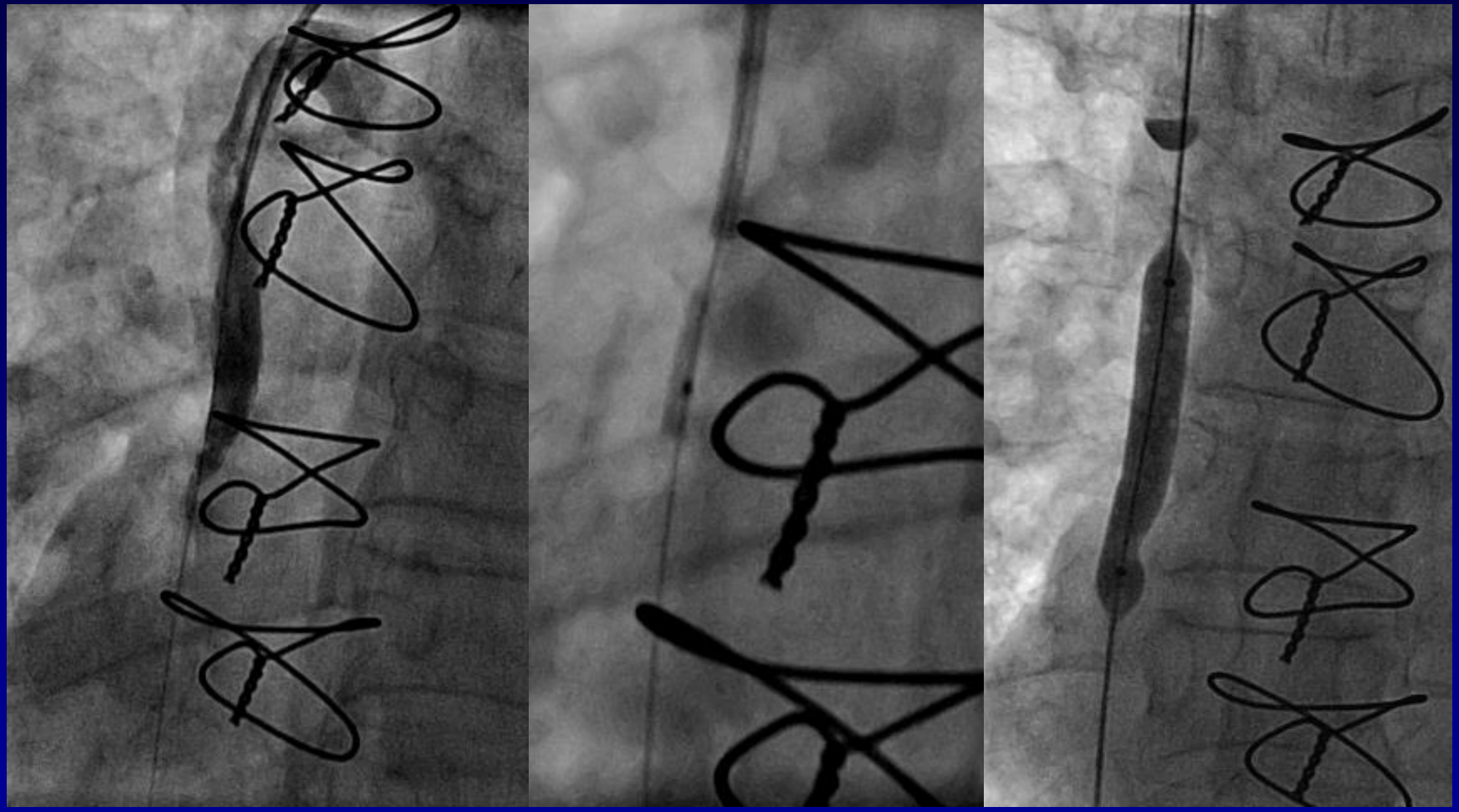
Superior Vena Cava Syndrome

- Symptomatic SVC syndrome post CABG/PFO
- Facial swelling, dyspnea, and hoarse voice
- Stanford and Doty Type III
- Occluded SVC with prominent Accessory hemiazygos vein communicating to iliac vein
- CT angiogram with significant thrombus in SVC
- Left brachial access for venogram and rt-PA thrombolysis prior to stent

Superior Vena Cava Syndrome

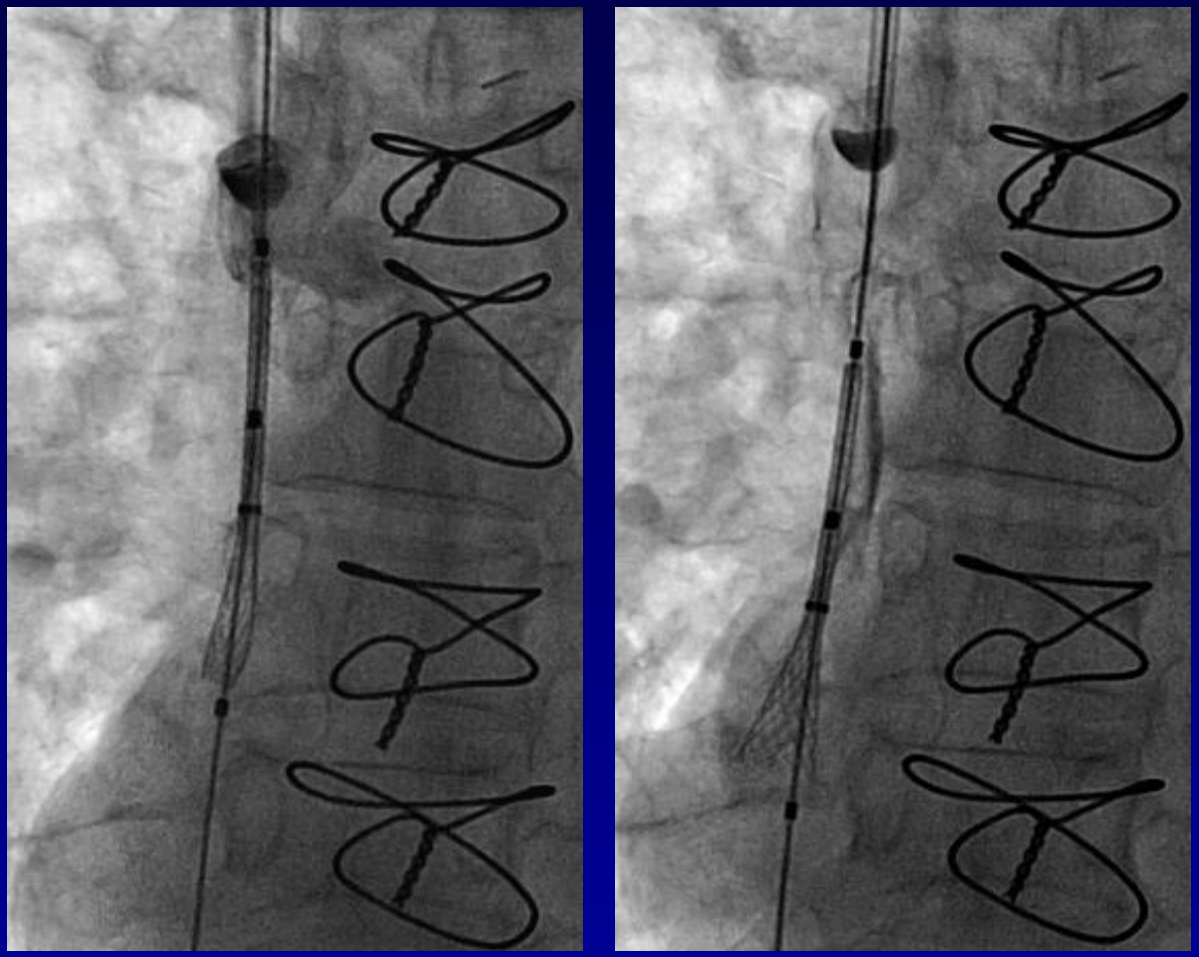


Superior Vena Cava Syndrome



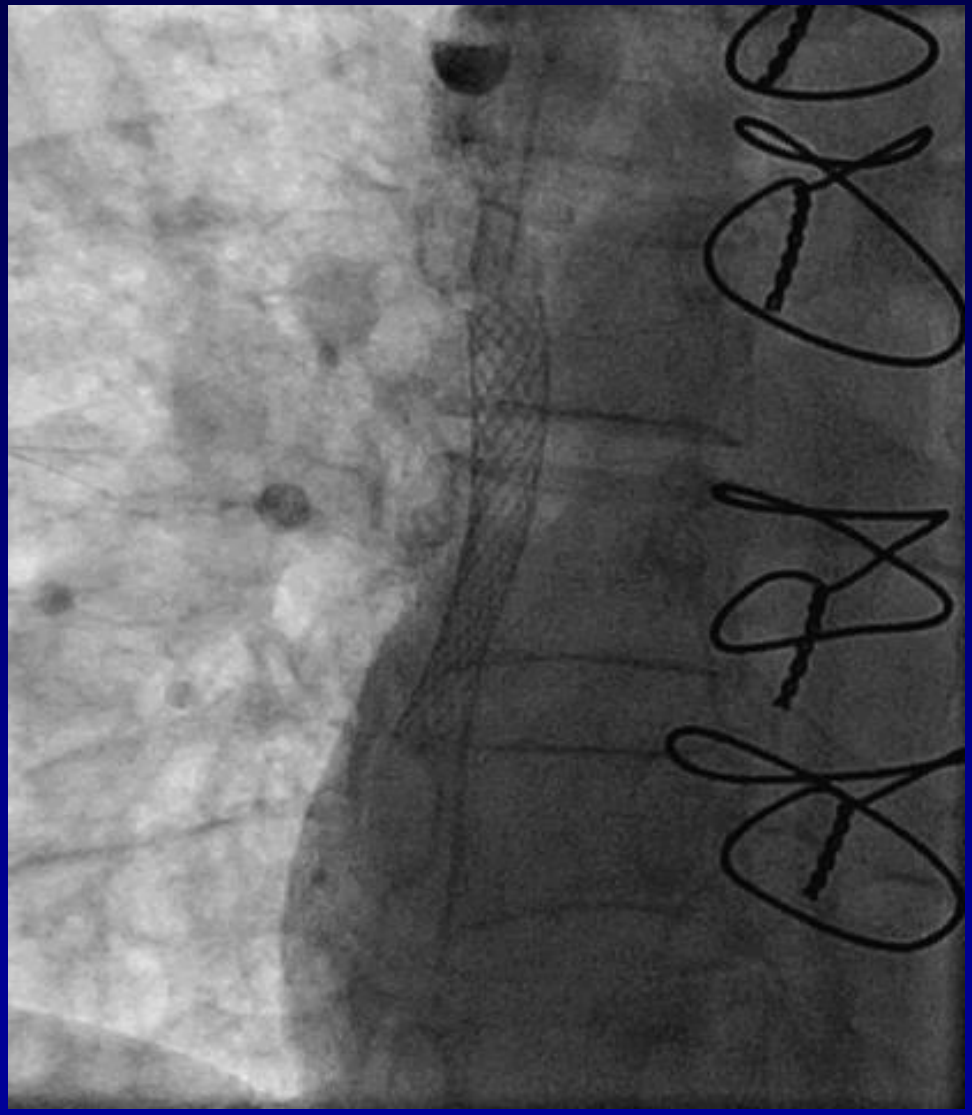
- Access via right jugular after venogram
- Angioplasty with coronary 1.5 mm balloon
- Progressive dilatation for stent placement

Superior Vena Cava Syndrome

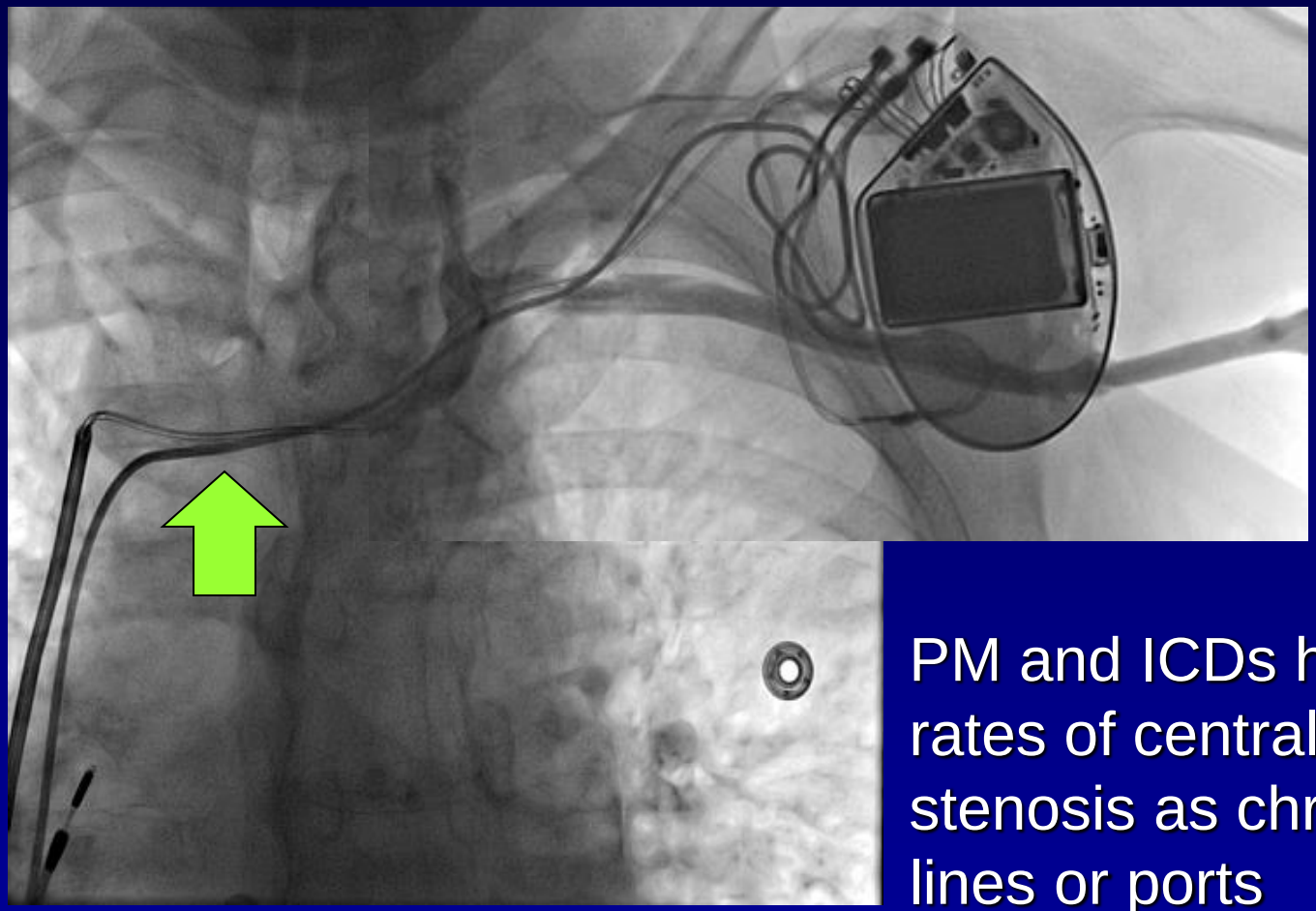


- Deploy Wallstent in right atrium and withdrawal stent after "flowers"
- Position distal stent into atrium with traction to prevent migration

Superior Vena Cava Syndrome



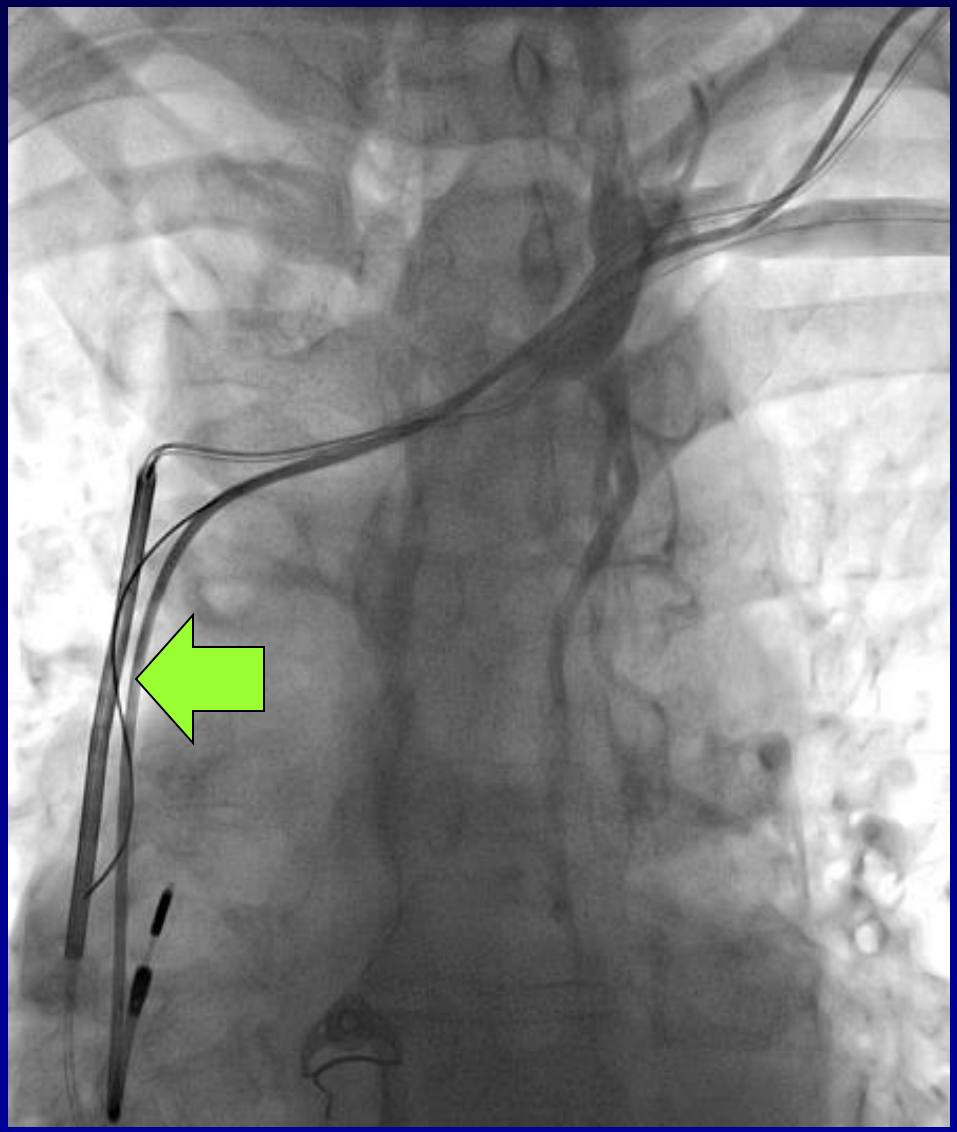
Pacemakers and ICDs



PM and ICDs have similar rates of central venous stenosis as chronic central lines or ports

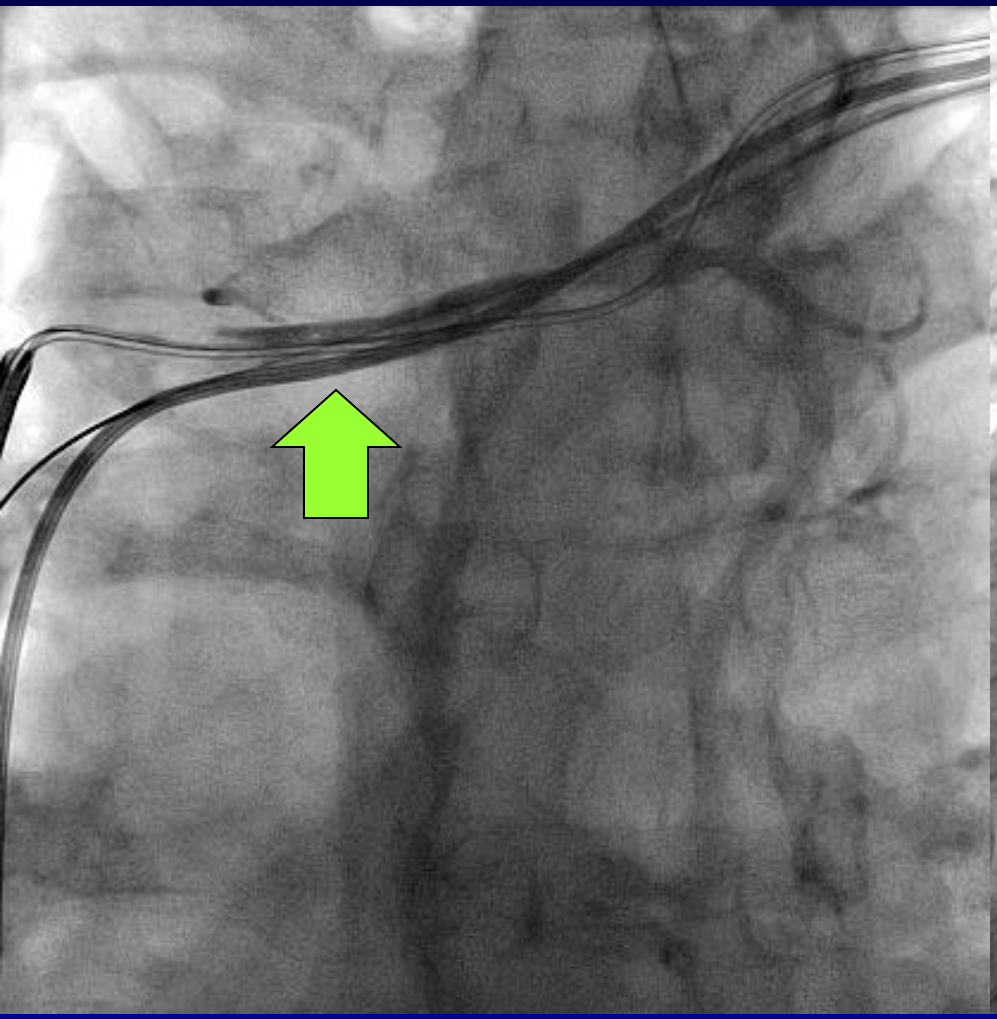
Symptomatic - edema of the effected extremity
Asymptomatic - needs device upgrade or new lead

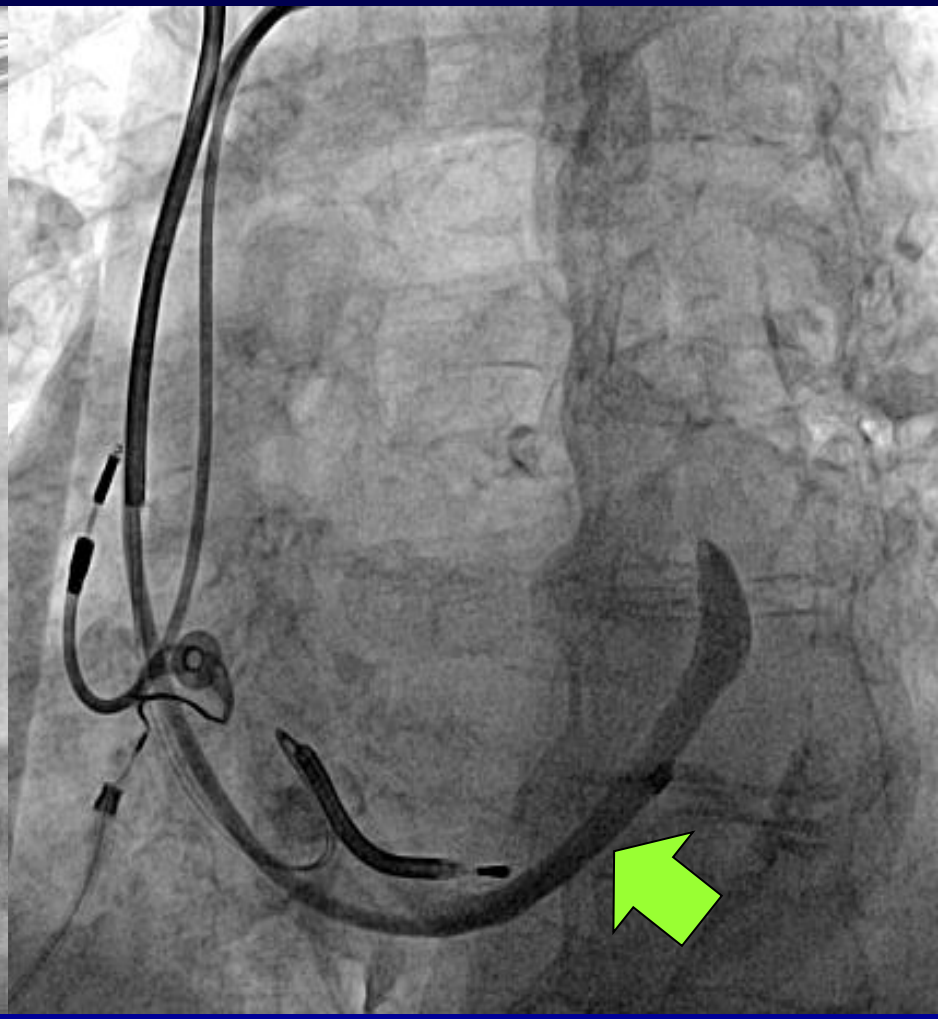
Pacemakers and ICDs



- Balloon angioplasty only- very compliant balloons
- No anti-coagulation during or following procedure if upgrading leads
- Warfarin therapy for 6 months if symptomatic
- Access distal to device site to ensure sterility
- 4F sheaths with 0.018 inch wires

Pacemakers and ICDs





Summary

- Venous interventions should be preformed by cardiologist
- Learning curve is short
- Similar technologies to your current practice
- Stent patency rates 70-95%
- Patients are very satisfied by endovascular results due to low risk, minimal invasiveness, and dramatic improvement in symptoms