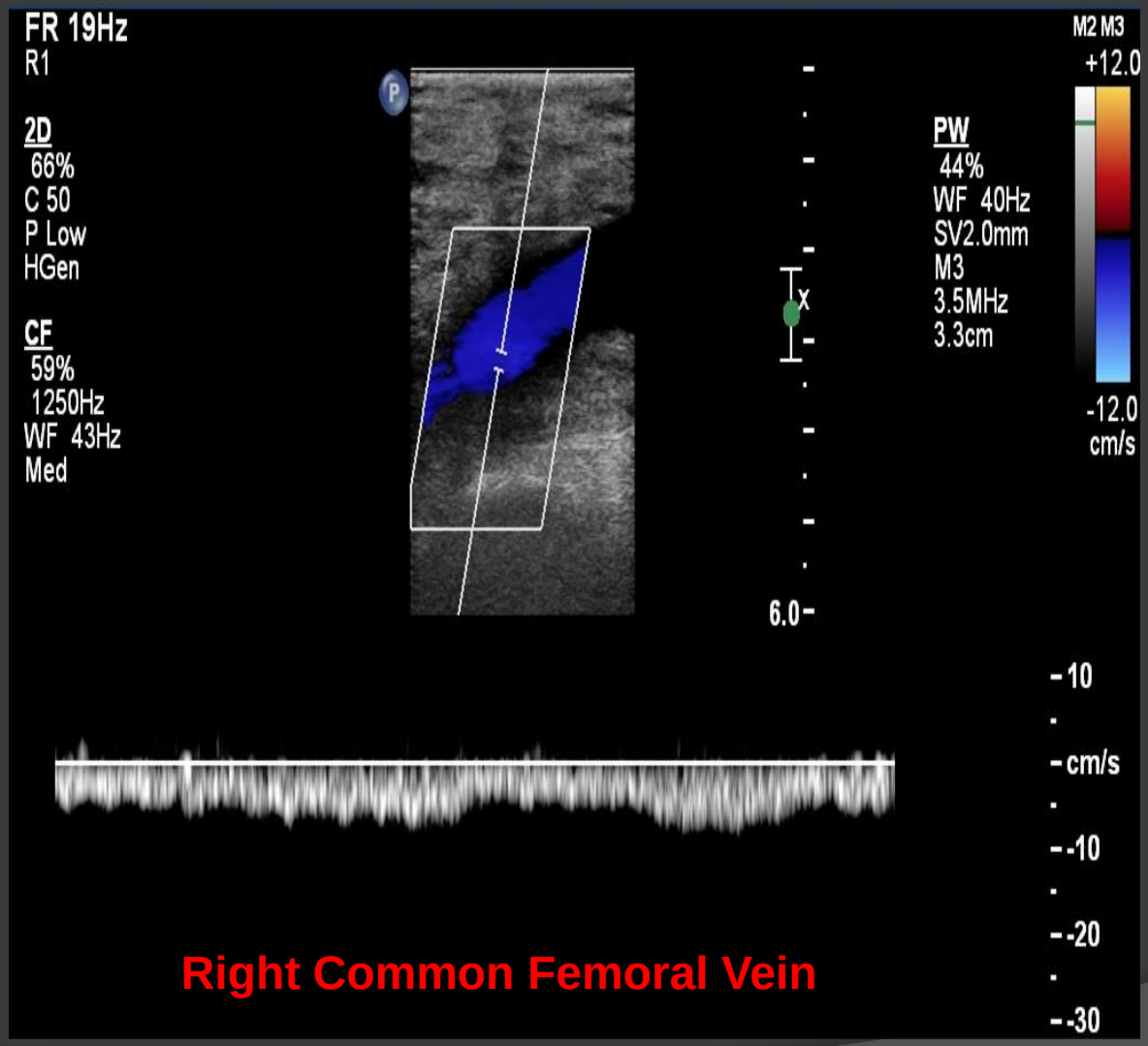
CAIR CASE OF THE MONTH

Case Courtesy of Dr. M. Lubanovic
McMaster University

Background

- A previously healthy 33-year old male presented to hospital with a two day history of right lower extremity swelling and elevated D-dimer (> 4,000 ug/L)

Ultrasound Findings



No DVT from right common femoral to proximal trifurcation veins

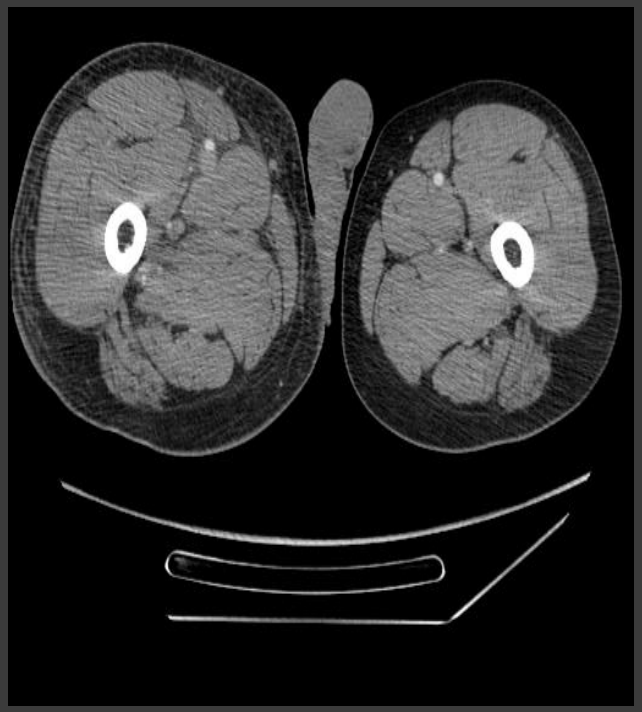
Repeat Ultrasound 1 Day Later

- Repeat US was again negative for DVT

Case Presentation

- The patient presented to hospital 5 days later with worsening leg swelling
- Contrast-enhanced CT demonstrated a long segment IVC stenosis
- Prominent renal vein and left lumbar vein collaterals were seen, suggestive of chronic obstruction

CT Findings



Axial CT image showing swelling of the right leg

Axial CT image showing dilation of the right common ilac vein

CT Findings

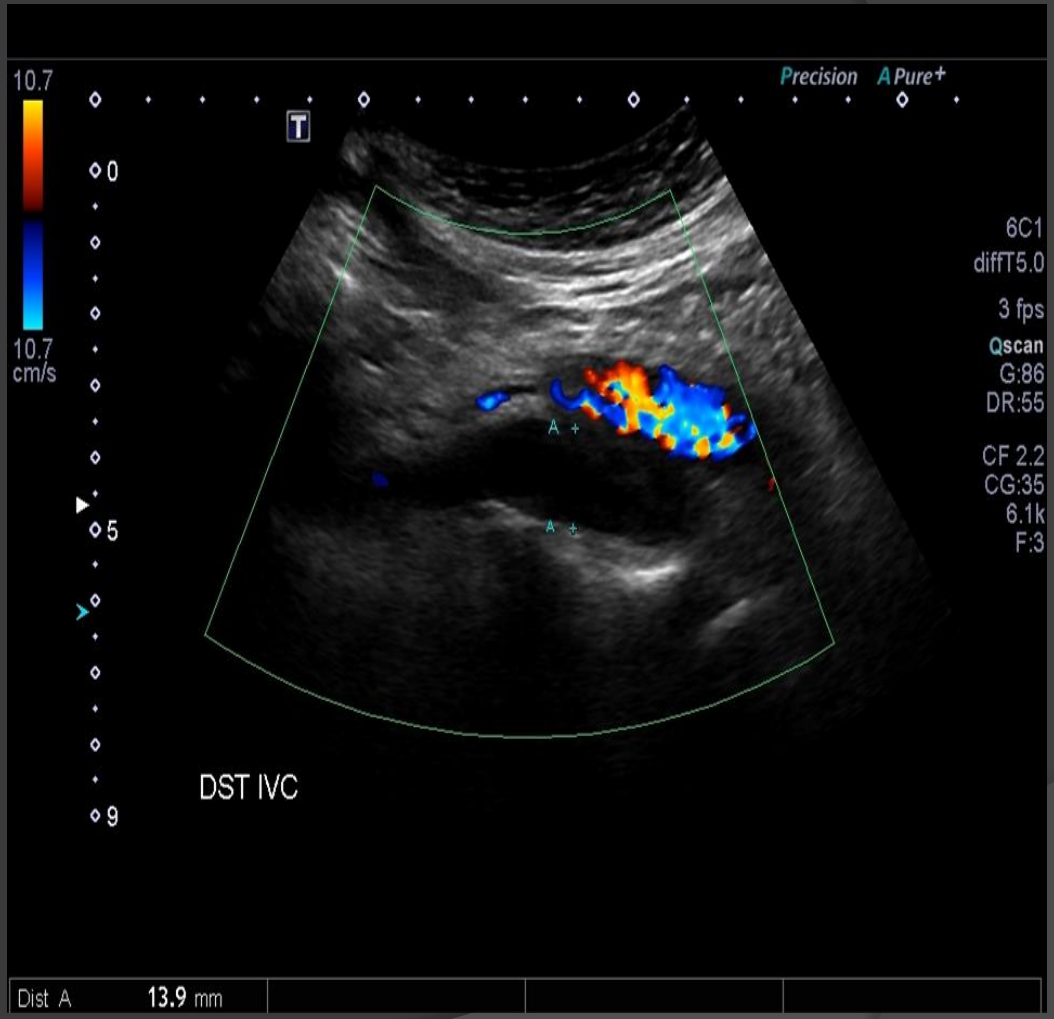
Coronal CT image showing prominent left paralumbar collateral vein

CT Findings

Sagittal CT image showing long segment stenosis of the IVC

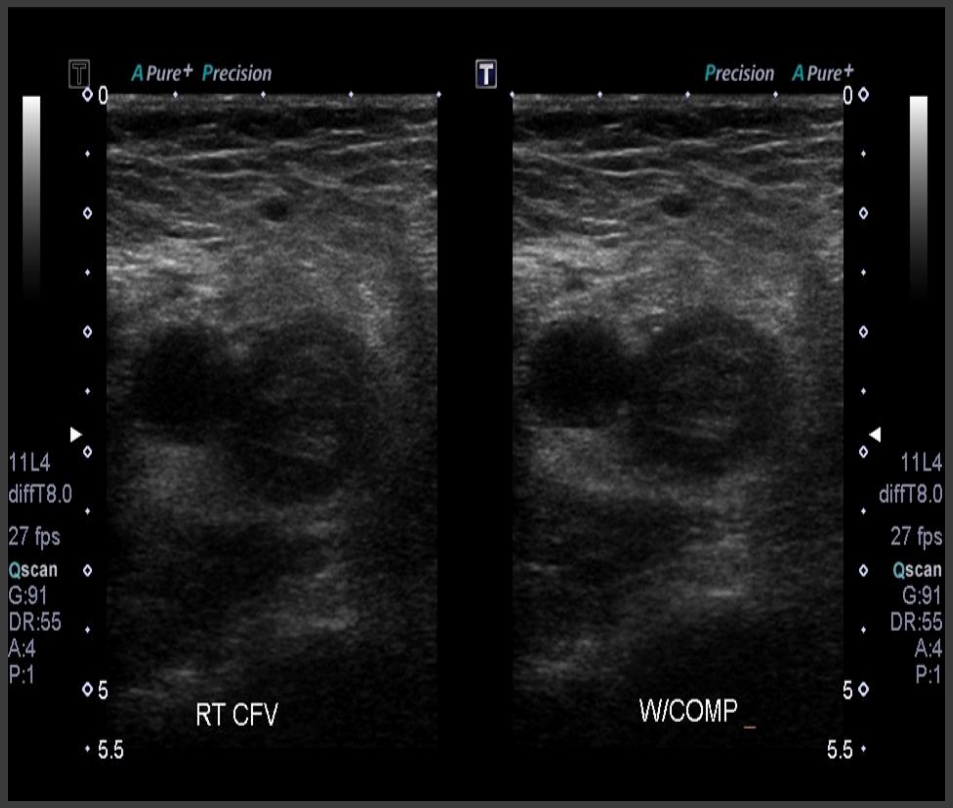
US Findings

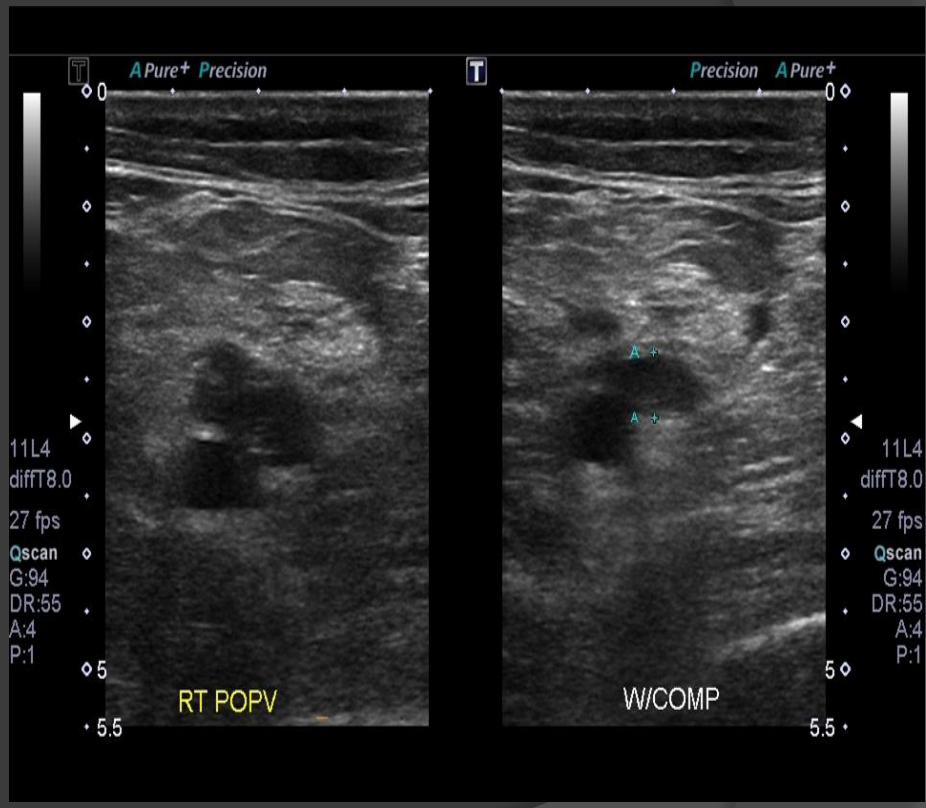
- A repeat ultrasound was completed which showed occlusive thrombus from the distal IVC to the popliteal vein and trifurcation



US image showing absent flow within the distal IVC

US Findings





US images showed non-compressibility of right CFV to the popliteal veins

Treatment

- Interventional radiology was consulted for consideration of catheter-directed thrombolysis (CTPA) and mechanical thrombectomy
- Multiple venograms obtained via a popliteal approach demonstrated non-occlusive thrombus from the popliteal vein to the common iliac vein
- Additional clot was seen within the left common iliac vein which was draining via an accessory paraspinal vein

Venogram showing multiple filling defects within the right femoral vein

Venogram Findings

Venogram image showing stenosed IVC

Venogram image showing prominent left lumbar collateral vein

CTPA and Mechanical Thrombectomy

- Using a 6 Fr Angiojet device, the left common iliac vein, and right common iliac to popliteal veins were laced with 20 mg of TPA followed by mechanical thrombectomy
- Heparin and t-PA were then continuously infused via the right popliteal catheter overnight

Post-thrombectomy venogram showing increased patency of the right femoral vein

IVC Stenting

- The IVC was cannulated with multiple overlapping balloon dilations performed to a maximal diameter of 12 mm
- A 16 mm x 140 mm Zilver Vena self-expanding stent was placed with multiple angioplasties of the inferior portion using a 14 mm balloon
- Post-angioplasty venogram demonstrated persistent stenosis and stenting was thus extended to the right common iliac vein using an overlapping 14mm x 60mm Epic self-expanding stent
- Venogram demonstrated excellent inline flow to the right atrium

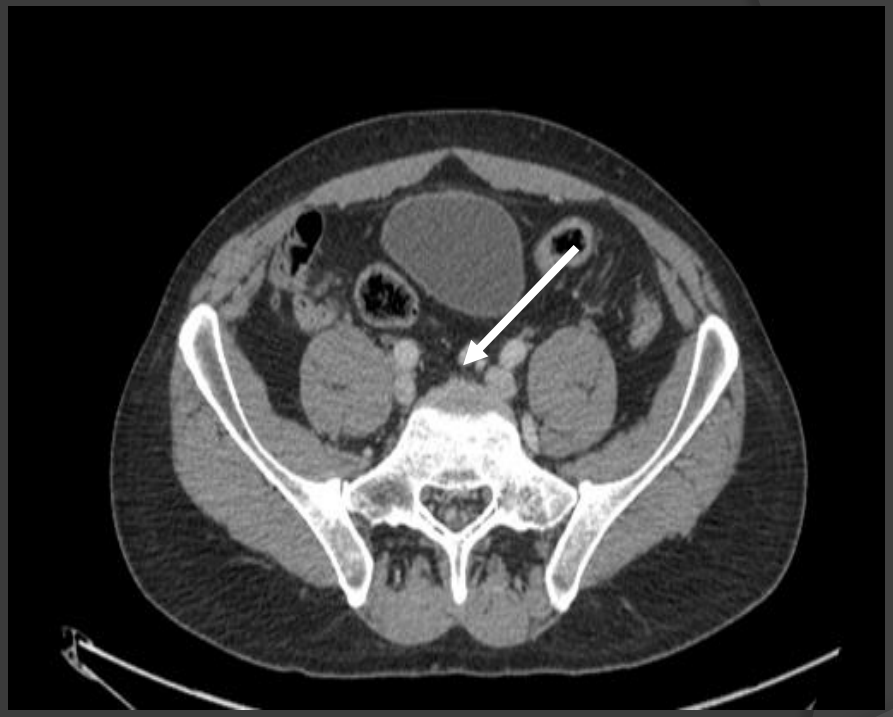
IVC Stenting

Fluoroscopy image showing balloon dilation of the stenosed IVC

Venogram showing deployment of self-expanding stent within the IVC

Follow up

- Follow-up CT one month later showed patency of the stents and IVC
- Decreased calibre of the bilateral common iliac veins and draining collateral veins



1 month post-procedure CT showing normal calibre of the common iliac veins

Follow-Up

Coronal CT showing patency of the IVC stent

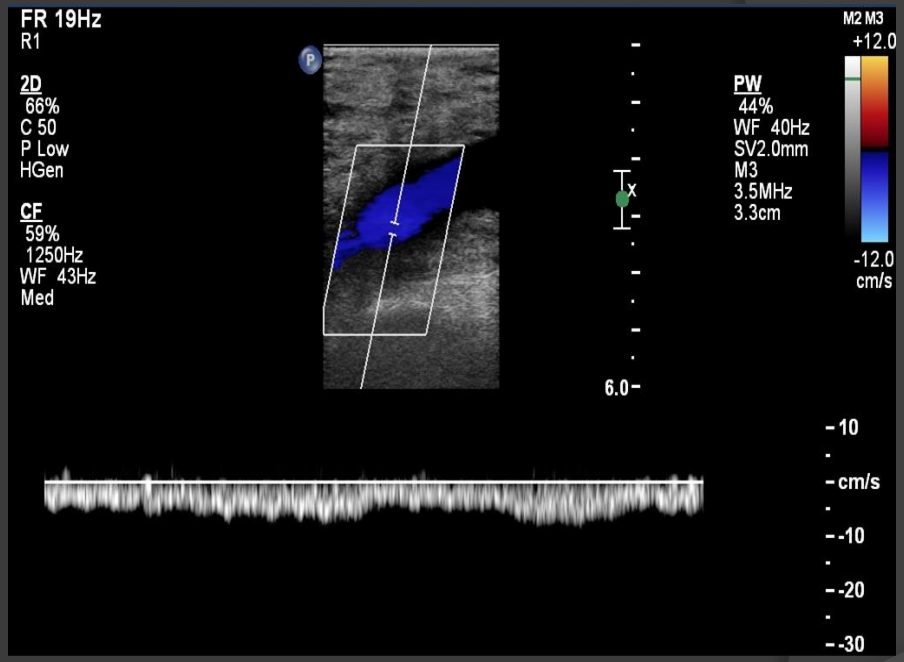
Coronal CT showing decreased calibre of the left lumbar collateral vein

Case Discussion and Learning Points

- Why was DVT not diagnosed on initial ultrasound examinations?
- The patient was later found to have a thrombus extending into the IVC yet presented with only unilateral symptoms

Ultrasound Findings

- Normal venous waveform within the CFV should demonstrate respiratory phasicity and cardiac pulsatility, however amplitude can vary between individuals
- If the waveform lacks pulsatility or phasicity, imaging of the contralateral vein should be performed for comparison and if abnormal, further investigation of the iliac veins and IVC
- Non-visualization of the IVC with US was likely due to significant stenosis



Unilateral Symptoms with IVC Thrombus

- Consideration of IVC pathology was initially not considered highly likely given the patient's presentation with unilateral symptoms
- The presence of prominent collaterals on the contralateral side allowed for sufficient compensation and venous drainage of the leg

Prevention of Post-Thrombotic Syndrome

- Up to 40% of patients with DVT will develop post-thrombotic syndrome (PTS) with persistent pain and swelling
- Pharmacomechanical catheter-directed thrombolysis (PCDT) was shown in the ATTRACT Trial (Vedantham, 2017) a multicentre RCT which showed that patients randomized to receive PCDT in addition to standard anticoagulation did not experience decreased rates of PTS and had increased rates of bleeding
- The PCDT arm experienced reduced severity of PTS and had better relief of DVT pain and swelling compared to those who were randomized to anticoagulation therapy alone

References

Vedantham S, Goldhaber S, Julian J, et al., Pharmacomechanical Catheter Directed Thrombolysis for Deep Vein Thrombosis N Engl J Med 2017; 377:2240-2252

Marcetta M, Romaynilo E, Cosmi D, Coluccio V, Luppi M. Is There a Role For Interventional Radiology For The Treatment Of Lower Limb Deep Venous Thrombosis In The Era Of Direct Oral Anticoagulants? A Comprehensive Review. European Journal of Internal Medicine. 2018; 52:13-21

Wang CN, Deng H. Percutaneous Endovascular Intervention Plus Anticoagulation Versus Anticoagulation Alone For Patients With Proximal Deep Venous Thrombosis Meta Analysis and Systematic Review. Annals of Vascular Surgery. 2018; 59:39-48.

Wang W, Sun R, Chen Y, Liu C. Meta Analysis and Systematic Review of Percutanous Mechanical Thrombectomy for Lower Extremity Deep Venous Thrombosis. Journal of Vascular Surgery: Venous and Lymphangitic Disorders. 2018; 6 (6): 788-800.

Katz D, Hon M. Current Deep Venous Thrombosis Imaging. Techniques in Vascuar Surgery and Interventional Radiology. 2004; 7 (2): 55-62.