Muscular calf vein thrombosis: sonographic diagnosis

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Section: Cardiovascular
Imaging Technique: Ultrasound
Imaging Technique: Ultrasound-Colour Doppler
Case Type: Clinical Cases
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Patient: 54 years, female

Clinical History:

54-year-old female with left calf pain two days after a 10-hour flight.

Imaging Findings:

A 54-year-old female presented with a two day left calf pain. She had no history of leg injury or venous disease. Two days earlier she has been on a long flight back from her holidays. Physical examination didn’t show swelling of the leg but tenderness of the calf. The patient was referred for sonographic evaluation of the left lower extremity venous system.

Discussion:

Risk factors for deep venous thrombosis (DVT) include malignancy, major surgical procedures, trauma, immobilization, pregnancy, use of oral contraceptives, and a number of congenital and acquired hypercoagulable syndromes [1]. Acute DVT may develop at any level of the deep venous system. But several studies support that thrombi in symptomatic patients usually originate in the calf veins and subsequently extend into the proximal veins. Especially the soleal sinuses seem to be the most important site for thrombi to occur [2,3]. Because clinical symptoms are insensitive and non-specific, objective testing must be performed in order to reduce risk of pulmonary embolism and severity of post-thrombotic syndrome [3]. Sonography is the imaging method of choice in evaluating symptomatic legs for DVT and has substituted venography as the first imaging method [1]. High sensitivities and specificities have been reported for the femoro-popliteal segment and also for the axial calf veins in symptomatic patients. Another advantage of sonography is its ability to depict alternative causes of symptoms like ruptured Baker cysts, haematomas, masses, superficial phlebitis, and arterial aneurysms [1]. Recent sonographic studies have also shown the soleal veins to be the most common site of thrombosis and have demonstrated the value of sonography in investigating the muscular calf veins [4,5]. Therefore, the muscular calf veins should be evaluated especially in symptomatic patients [3]. The proximal part of the paired axial veins is located deeper in the calf than the soleal and gastrocnemial veins. The muscular calf veins are therefore sometimes more readily accessible for sonographic evaluation. The gastrocnemius muscle veins join directly into the popliteal veins; the soleal veins extend from the soleal sinuses to the posterior tibial or peroneal veins. Sonographic criteria of thrombosis include direct signs (visible thrombus; loss of compressibility; absence of flow in colour Doppler evaluation) and indirect signs (distension of the involved vein; loss of phasic respiratory venous flow; enlarged collateral veins) [3]. Limitations to sonographic examinations are: obesity; lower extremity surgery; tense, swollen extremities, burn patients. Moreover, sonography is reported to be less sensitive in its use as a screening test for diagnosing DVT following hip or knee surgery. In these instances, more isolated and segmental thrombi occur in the postoperative patient without lower leg
symptoms [1].

**Differential Diagnosis List:** Soleal vein thrombosis

**Final Diagnosis:** Soleal vein thrombosis

**References:**

Fraser JD, Anderson DR. Deep venous thrombosis: recent advances and optimal investigation with US. Radiology 1999; 211: 9-24. (PMID: 10189448)


Description: Transverse sonogram of the soleus muscle shows hypoechoic veins (arrows). The inability to compress the veins indicates the presence of deep venous thrombosis. Origin:
Description: Longitudinal sonogram of the same segment as Fig. 1a also shows thickened non-compressible vein (arrows) in the soleus muscle (arrowheads). Origin:
Description: Colour Doppler sonography of the same region as Fig. 1a shows absence of blood flow in the two hypoechoic veins confirming diagnosis of deep vein thrombosis (arrows). Origin:
Description: The vein is enlarged due to a hypoechoic clot. Colour Doppler sonography shows that only small areas of the soleal vein are not filled with thrombotic material (arrows). Origin: