40 Evaluation of Leg Pain and Swelling

Christopher Gelabert

Point-of-care ultrasound for the assessment of leg pain and swelling is a rapid, high-yield assessment that can quickly lead to therapeutic interventions. Ultrasound of the lower extremity can be used to assess for deep venous thrombosis (DVT), lymphadenopathy, and visualization of subcutaneous edema for evaluation of cellulitis versus congestive heart failure (CHF). As most pathology in the lower extremity is relatively superficial, a high-frequency linear transducer is used for its superior linear resolution and flat footprint.

DVT is a disease process that affects 300,000–600,000 patients annually in the United States and carries with it an estimated 10–30% mortality within 30 days [1]. Ultrasound is the main diagnostic tool for the detection of DVT, although there are several different ultrasound protocols including two-point compression, whole leg compression, and duplex ultrasound examinations [2, 3]. While two-point compression uses the most common areas of thrombosis (proximal femoral vein and popliteal vein), a significant percentage of DVTs are missed with this technique [4]. Whole leg compression ultrasound involving serial compression from the common femoral vein to the calf veins has been found to be very accurate with a mean sensitivity and specificity of 0.64 (0.62, 0.65) and 0.98 (0.974, 0.983) [5]. Moreover, a single negative whole leg compression ultrasound has only a combined venous thromboembolism event rate of 0.57% (0.25%, 0.89%) at 3 months [6].

Frequently during lower extremity ultrasound for DVT, the clinician will find alternate diagnoses including cysts, masses, lymphadenopathy, phlebitis, hematoma, and cellulitis [7].

Figures 40.1, 40.2, 40.3, 40.4, 40.5, 40.6, 40.7, and 40.8 and Videos 40.1, 40.2, 40.3, 40.4, 40.5, 40.6, and 40.7 demonstrate technique, common pathology, and an algorithm for the assessment of leg swelling with point-of-care ultrasound.

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C. Gelabert, M.D.
Department of Emergency Medicine, UT Health San Antonio, San Antonio, TX, USA
e-mail: gelabert@uthscsa.edu

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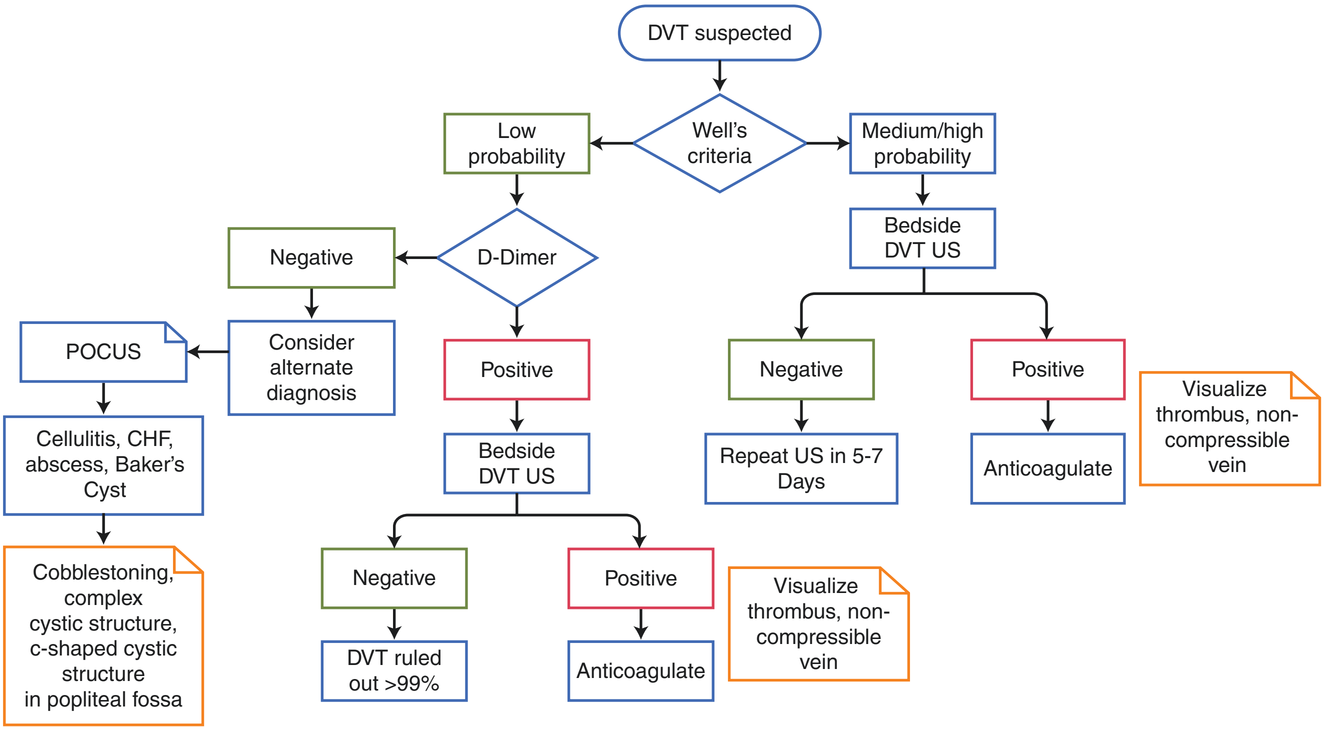

Fig. 40.1 Algorithm for diagnosis of DVT. This uses clinical-decision rules, laboratory tests, and point-of-care ultrasound in the diagnosis or exclusion of DVT

Fig. 40.2 Patient positioning for DVT ultrasound examination. Elevate the head of the bed 45° to facilitate blood pooling in the veins for improved visualization of the vasculature. The leg should be slightly flexed and held in external rotation to visualize all of the structures in the inguinal region. When visualizing the structures in the popliteal fossa, have the knee slightly bent. Image courtesy of Christopher Gelabert

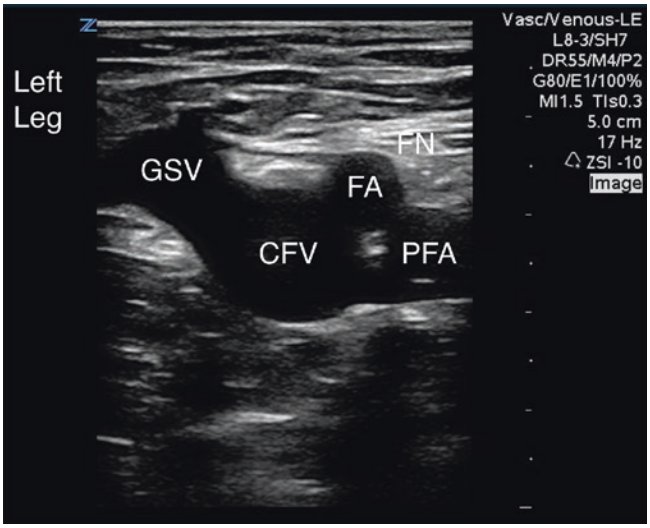

Fig. 40.3 Transverse view of the vasculature of the upper leg. Note the relationship of nerve, artery, and vein from lateral to medial. The greater saphenous vein (GSV) will terminate into the common femoral vein (CFV), and while the GSV is not considered a deep vein, its junction with the deep venous system is an area of turbulent flow and a common origin of thrombosis. The femoral artery (FA) will give off its first branch, the profunda femoris artery (PFA) at this level. The femoral nerve (FN) is a flat, thin, hyperechoic structure superficial and lateral to the FA. Courtesy of Christopher Gelabert

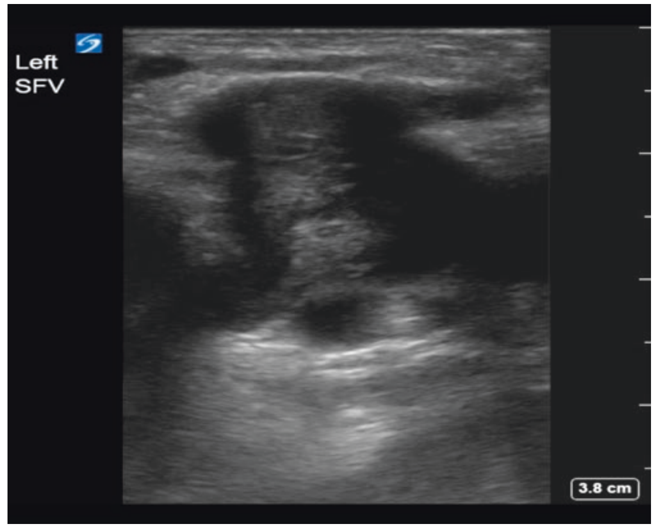

Fig. 40.5 This image demonstrates an echogenic thrombus in the lumen of the common femoral vein and greater saphenous vein. Courtesy of Christopher Gelabert

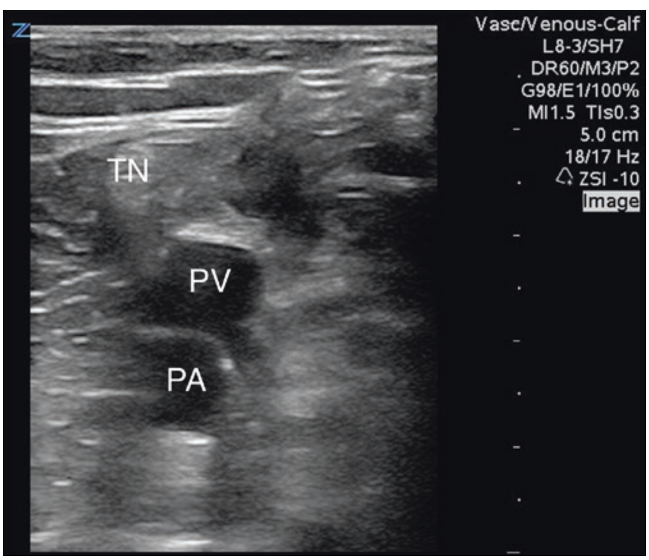

Fig. 40.4 This transverse view of the popliteal fossa demonstrates the popliteal vein (PV) superficial to the popliteal artery (PA). The tibial nerve (TN) is superficial to the vasculature. Courtesy of Chris Gelabert

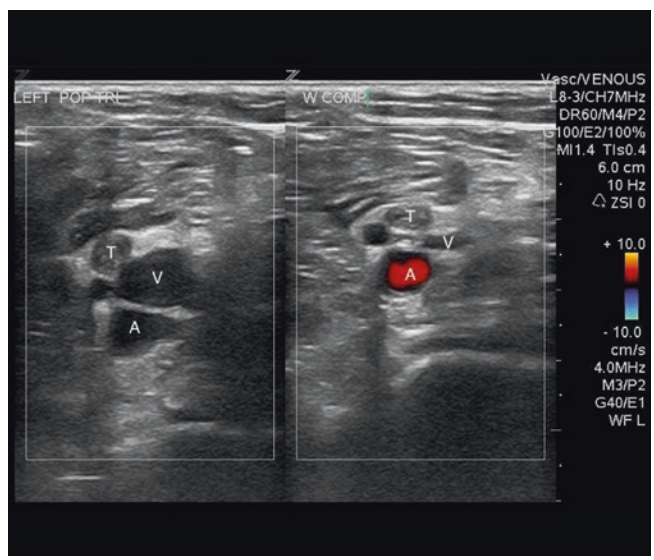

Fig. 40.6 This a split screen image of the popliteal fossa normally on the left, and with compression on the right with color doppler. A small thrombus (T) is evident one of the branches within the trifurcation of the popliteal vein (V). The artery (A) does not collapse. Courtesy of Christopher Gelabert

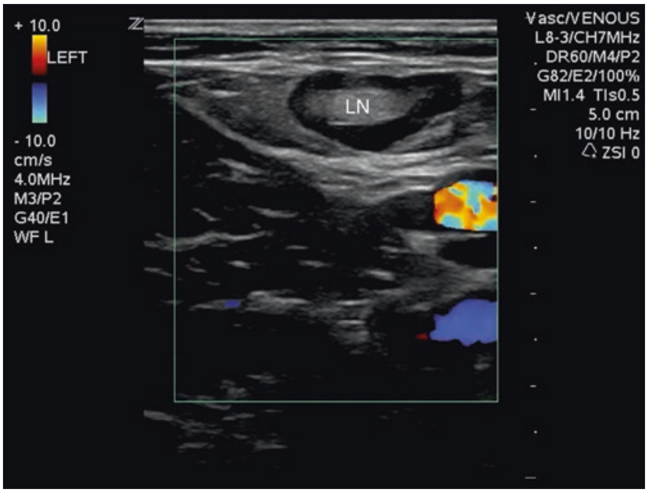

Fig. 40.7 Lymph node (LN) commonly seen while performing lower extremity ultrasound. Lymph nodes will be superficial to the vasculature and demonstrate a hyperechoic center and hypoechoic rim, typically described as a pseudokidney appearance. Courtesy of Christopher Gelabert

Fig. 40.8 When edema is present within the subcutaneous tissue, either from infection or congestive heart failure, it will surround lobules of adipose tissue, increasing the thickness of the skin layers, creating the classical cobblestone appearance. Courtesy of Christopher Gelabert

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