Ultrasound of Vascular Emergencies and Dilemmas and Controversies in Venous Imaging  
*Presented by Ulrike M. Hamper, MD, Professor of Radiology, Urology & Pathology, Director, Ultrasound Section, Russell H. Morgan Department of Radiology, Johns Hopkins University School of Medicine*

**Self-Assessment Questions:**

**Lecture 1: Ultrasound of Vascular Emergencies**

**Question 1.1:** What is the most common location of an abdominal aortic aneurysm?
- A. Subdiaphragmatic
- B. Infrarenal
- C. Suprarenal
- D. Iliac

**Question 1.2:** Which of the following statements regarding aortic dissection is correct?
- A. It often is an extension of thoracic disease
- B. It is common in hypotensive patients
- C. It is not associated with trauma
- D. It commonly results in occlusion of the true lumen

**Question 1.3:** Which statement regarding femoral pseudoaneurysm is correct?
- A. Ultrasound cannot reliably diagnose pseudoaneurysms
- B. Pseudoaneurysms often develop after catheterization or penetrating trauma
- C. Pseudoaneurysms are indistinguishable from an arteriovenous fistula on ultrasound
- D. US guided compression therapy is the preferred method of treatment

**Lecture 2: Dilemmas and Controversies in Venous Imaging**

**Question 2.1:** The most sensitive and specific sonographic criterion for the diagnosis of acute deep venous thrombosis (DVT) is:
- A. Absence of spontaneous and phasic flow
- B. Absence of color Doppler flow
- C. Lack of compressibility of the vein
- D. Non-visualization of a venous segment

**Question 2.2:** Which of the following statements regarding lower extremity deep venous thrombosis (DVT) is correct?
- A. The clinical diagnosis of DVT is highly specific.
- B. The sensitivity and specificity for calf vein thrombosis is 95%
- C. Pulmonary embolism (PE) occurs in about 50% of untreated DVT
- D. 75 % of patients with DVT are asymptomatic

**Question 2.3:** Which of the following statements regarding lower extremity deep venous thrombosis (DVT) is incorrect?
- A. The presences of synechiae or webs are a sign of chronic DVT.
- B. The risk of pulmonary embolism (PE) is increased in patents with bilateral compared to unilateral DVT.
- C. The Radiology community does not accept limited or “2 point-US”.
- D. A positive D-Dimer test is highly sensitive and specific for the diagnosis of DVT.
Answer Key & References for Additional Study:

Lecture 1: Ultrasound of Vascular Emergencies

Question 1.1: Correct answer = B - Infrarenal

The most common location of an abdominal aortic aneurysm is infrarenal and due to atherosclerotic disease. If the aneurysm is suprarenal one should consider other etiologies such as trauma, syphilis or a mycotic aneurysm.

References for Additional Study:


Question 1.2: Correct answer = A - It often is an extension of thoracic disease

Aortic dissection most commonly is an extension from thoracic disease. Atherosclerosis is the most common etiology. Other predisposing conditions include Marfan disease, bicuspid aortic valves and coarctation, trauma and hypertension. If the dissection is acute there will be flow in the true as well as the false lumen. If the dissection is chronic the false lumen will clot.

References for Additional Study:


Question 1.3: Correct answer = B - Pseudoaneurysms often develop after catherization or penetrating trauma

Femoral pseudoaneurysms occur due to a contained rupture of the arterial wall. They are usually caused by arterial catherization or penetrating trauma. The duplex sonographic finding of a “to and fro” signal is typically seen in the neck of the pseudoaneurysm. Ultrasound guided thrombin injection has almost completely replaced ultrasound-guided compression techniques for treatment.

References for Additional Study:


Lecture 2: Dilemmas and Controversies in Venous Imaging

Question 2.1: Correct answer = C - Lack of compressibility of the vein

The primary diagnostic criterion for acute deep venous thrombosis is lack of compression of the vessel on transverse gray scale images. While absence of spontaneous phasic flow, absence of flow on Color Doppler ultrasound and non-visualization of a venous segment may be seen in DVT they are non-specific and may also be seen in very slow or sluggish flow.

References for Additional Study:


**Question 2.2:** Correct answer = C - Pulmonary embolism (PE) occurs in about 50% of untreated DVT

Pulmonary embolism (PE) occurs in about 50% of untreated DVT with a mortality rate of about 30%. The clinical signs and symptoms of DVT are non-specific with patients presenting with extremity pain, swelling and edema, all of which can be caused by other conditions. The sensitivity of calf vein thrombosis ranges from 60-80% and is therefore much lower than the sensitivity for thrombosis of the deep veins. Only about 50% of patients with DVT are symptomatic whereas 2/3 of patients harboring a DVT are asymptomatic.

**References for Additional Study:**


**Question 2.3:** Correct answer = D - A positive D-Dimer test is highly sensitive and specific for the diagnosis of DVT.

While a negative D-Dimer assay is highly specific for excluding a DVT, a positive D-Dimer assay has many false positive causes particularly in hospitalized and elderly patients, requiring further imaging evaluation the presence of synechiae and webs along with small vein walls and circumferential vein wall thickening are sonographic signs of chronic DVT. Bilateral calf DVT unlike unilateral calf DVT has a higher risk of pulmonary embolism and risk of subsequent chronic venous insufficiency. Patients with bilateral calf DVT have a similar risk as patients with proximal DVT of developing PE. Limited or “2 point” US simply evaluating the common femoral and popliteal vein is not endorsed by the AIUM/ACR or ICAVL.

**References for Additional Study:**