

**Interventional Radiology
In-Training Test Questions
for Diagnostic Radiology Residents**



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Sponsored by:

Commission on Education

Committee on Residency Training in Diagnostic Radiology

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1. Concerning acute gastrointestinal hemorrhage, which statement is TRUE?
 - A. Radionuclide scanning should not be performed.
 - B. Bright red blood per rectum excludes an upper gastrointestinal bleed.
 - C. The angiographic diagnosis is based upon the visualization of contrast extravasation into the bowel lumen.
 - D. Bleeding from Mallory-Weiss tears may be diagnosed upon injection of either the superior or inferior mesenteric arteries.

Rationales:

- A. *Incorrect.* Radionuclide scanning is more sensitive than arteriography in detecting gastrointestinal hemorrhage and can be helpful in localizing the bleed.
- B. *Incorrect.* About 10% of patients with brisk upper gastrointestinal hemorrhage, bleeding proximal to the ligament of Treitz, will have bright red blood per rectum.
- C. **Correct.** The hallmark of gastrointestinal hemorrhage is extravasation of contrast material into the bowel.
- D. *Incorrect.* Mallory-Weiss tears occur at the gastroesophageal junction, not in the distribution of either the superior or inferior mesenteric arteries.

Citations:

Kaufman JA, Lee MJ. *Vascular and Interventional Radiology: The Requisites*. St. Louis, Mo: Mosby; 2004.
Valji K. *Vascular and Interventional Radiology*. Philadelphia, Pa: W.B. Saunders; 1999.

2. Concerning inferior vena cava filters, which statement is TRUE?
 - A. Removable filters are not available.
 - B. The ideal location for filter placement is at the iliac vein confluence.
 - C. Current filters require surgical cut down for placement.
 - D. Current filters can be placed from femoral or jugular venous approach.

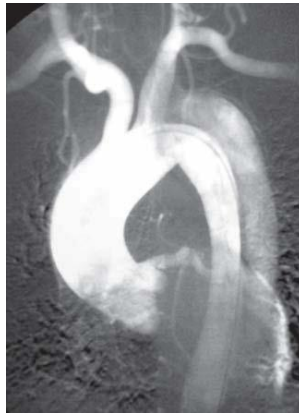
Rationales:

- A. *Incorrect.* Removable filters are now commercially available.
- B. *Incorrect.* The ideal location is just below the renal veins.
- C. *Incorrect.* Most devices are placed percutaneously.
- D. **Correct.** Current devices can be placed via a transfemoral or transjugular access.

Citations:

Kinney TB. Update on inferior vena cava filters. *J Vasc Interv Radiol*. 2003;14:425-440.

3. A 67-year-old man presents with acute onset of back pain. You are shown a thoracic aortogram. What is the MOST likely diagnosis?



- A. Intraluminal thrombus
- B. Traumatic laceration
- C. Dissecting hematoma
- D. Mycotic aneurysm

Rationales:

A. *Incorrect.*

B. *Incorrect.*

C. **Correct.** Aortic dissection is the separation of the intima from the adventia by blood within the medial layer of the artery.

D. *Incorrect.*

Citations:

Kaufman JA, Lee MJ. *Vascular and Interventional Radiology: The Requisites*. St. Louis, Mo: Mosby; 2004.

4. A 52-year-old construction worker had bluish discoloration and numbness of the fifth finger of his right hand. You are shown an arteriogram (Figure 4) of the right hand and wrist. The proximal arteries were intact. What is the MOST likely diagnosis?



- A. Paget-Schroetter syndrome
- B. Giant cell arteritis
- C. Scleroderma
- D. Hypothenar hammer syndrome

Rationales:

- A. *Incorrect.* All 4 possible answers are associated with occlusions of upper extremity blood vessels. However, Paget-Schroetter is a syndrome of venous occlusion at the thoracic outlet.
- B. *Incorrect.* Giant cell arteritis is associated with long strictures of the subclavian and axillary arteries.
- C. *Incorrect.* Scleroderma does cause small vessel occlusions of the arteries of the hand and wrist and should be seriously considered in the differential diagnosis, but the patient is a male construction worker, and it is the ulnar artery that is occluded.
- D. **Correct.** Finger ischemia resulting from repetitive trauma to the ulnar artery, often the result of occupational exposure, is hypothenar hammer syndrome.

Citations:

- Taylor LM. Hypothenar hammer syndrome. *J Vasc Surg.* 2003;37:697.
- Valji K. *Vascular and Interventional Radiology.* Philadelphia, Pa: W.B. Saunders; 1999.
- Vedantham S, Gould J. *Case Review Vascular and Interventional Imaging.* St. Louis, Mo: Mosby; 2004.

5. You are shown a single image from a percutaneous transhepatic cholangiogram of a jaundiced patient (Figure 2). What is the MOST LIKELY diagnosis?

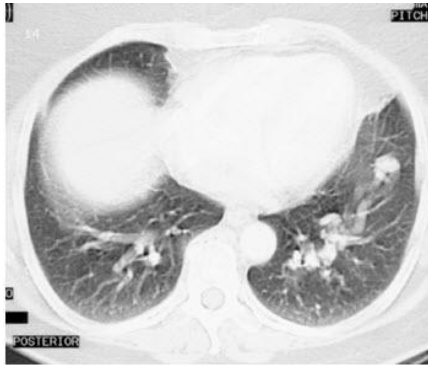


- A. Gallbladder carcinoma
- B. Sclerosing cholangitis
- C. Pancreatic carcinoma
- D. Choledochocoele

Rationales:

- A. *Incorrect.* Gallbladder carcinoma causes obstruction at the level of the proximal common hepatic duct or higher. Because gallbladder carcinoma usually arises in the setting of chronic cholecystitis you will not expect to see a distended gallbladder.
- B. *Incorrect.* Sclerosing cholangitis typically causes diffuse, multifocal strictures often with a beaded appearance in the intra and extrahepatic ducts.
- C. **Correct.** The “rat tailed” appearance of the extrinsic obstruction and the location of the stricture at the level of the head of the pancreas make this diagnosis the favorite. The “Courvoisier’s gallbladder” is also typical.
- D. *Incorrect.* A choledochocoele appears as a focal cystic collection of contrast at the level of the ampulla.

6. You are shown a single image from a non-contrast-enhanced CT scan of the chest (Figure 3). Which of the following statements is true?



- A. An excisional biopsy should be the next diagnostic step.
- B. A percutaneous needle biopsy should be the next diagnostic step.
- C. Radiofrequency ablation is the standard therapy for this disorder.
- D. Coil embolization is a standard therapy for this disorder.

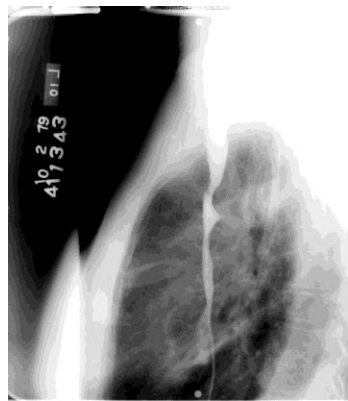
Rationales:

The correct answer is D. The findings are diagnostic for a pulmonary arteriovenous malformation. The nodule is the saccular communication between the feeding pulmonary artery and the draining pulmonary vein. It is incorrect to think this is a solid tumor, perhaps a small lung cancer. The diagnosis could be confirmed with a CT angiogram, but certainly it would be incorrect to perform a needle biopsy of a vascular lesion. Standard therapy is coil embolization. It would be too invasive to excise this lesion, particularly as they are so often multiple. Radiofrequency ablation at this point is an experimental technique for malignant lung lesions not amenable to surgery. Not recommended here.

Citations:

SCVIR Syllabus Series: Thoracic and Visceral Vascular Interventions, Chapter 5. Valgi p 278, Kaufman p211.
Fernando HC, Hoyas AD, Litle V, Belani CP, Luketich JD. Radiofrequency ablation: identification of the ideal patient. Clin Lung Cancer. 2004;6:149-53.

7. The patient presented with sudden onset of facial and upper extremity swelling. You are shown biplanar angiographic images (Figures 4A and 4B). What action should be taken?



- A. Emergency surgery
- B. Catheter directed thrombolysis
- C. Systemic chemotherapy
- D. Angioplasty and stent placement

Rationales:

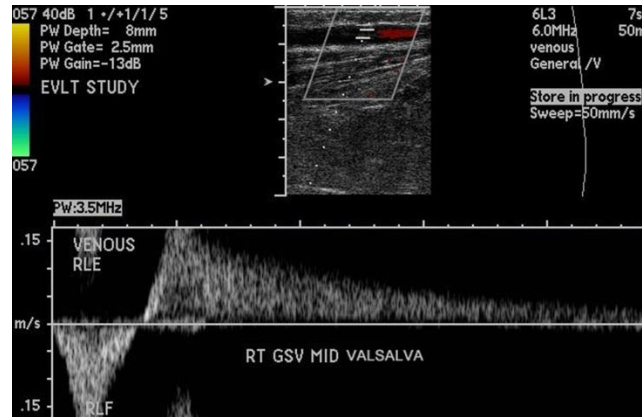
The correct answer is A. The clinical history confirmed by the angiogram is diagnostic of superior vena cava syndrome. Acute superior vena cava syndrome is considered a medical emergency. The treatment options for superior vena cava syndrome are endovascular therapy and external beam irradiation. The response to angioplasty and stent placement is more rapid than to radiotherapy. In this case there is no clot to lyse.

Citations:

Kaufman JA, Lee MJ. *Vascular and Interventional Radiology. The Requisites.* Mosby 2004.

Vendatham S, Gould JE. *Case Review Vascular & Interventional Imaging.* Mosby 2004.

8. You are shown duplex Doppler ultrasound images of the right greater saphenous vein during a Valsalva maneuver (Figure 5). What is the MOST LIKELY diagnosis?



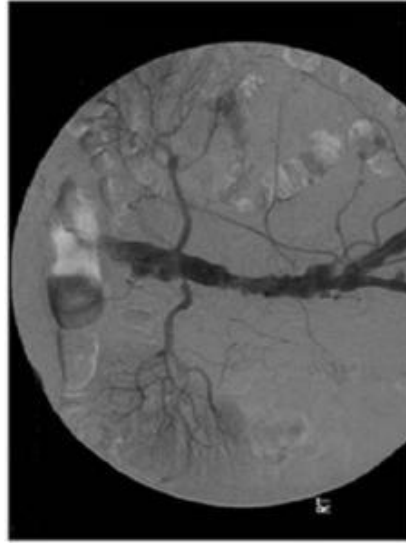
- A. Superficial thrombophlebitis
- B. Venous insufficiency
- C. Arteriovenous fistula
- D. Phlegmasia cerulea dolens

Rationales:

The correct answer is B. Superficial thrombophlebitis and phlegmasia can be easily eliminated as correct answers because there is flow through a patent vein and no clot is demonstrated. An arteriovenous fistula will show a pulsatile arterial wave form. The retrograde flow through the greater saphenous vein on Valsalva demonstrates incompetence of the venous valves. Venous insufficiency is the correct answer.

Citation: Zwiebel WJ, Pellerito JS. *Introduction to Vascular Ultrasonography*. Elsevier Saunders 2005.

9. You are shown an image from an abdominal aortogram. Which one of the following BEST describes the patient?



- A. 25-year-old woman with recently discovered hypertension
- B. 45-year-old man with acute renal failure
- C. 70-year-old man with poorly controlled hypertension
- D. 80-year-old woman being evaluated for an aortic stent graft

Rationales:

A. *Incorrect.* This is an elderly patient with atheromatous disease. In a young woman, a more common cause for renal vascular hypertension would be fibromuscular dysplasia, the most characteristic appearance of which is a string-of-bead appearance along the course of the renal artery.

B. *Incorrect.* Even for a 45 year-old, this is advanced atherosclerotic disease and renal failure is unusual with unilateral renal artery stenosis. Not the best choice.

C. **Correct.** The age is right for the amount of disease in the aorta. The renal artery stenosis could easily explain the difficult to control hypertension.

D. *Incorrect.* Aortic stent grafts are typically used as an alternative to surgery for abdominal aortic aneurysms.

Citations:

Kaufman JA, Lee MJ. *Vascular and Interventional Radiology. The Requisites.* Mosby. 2004.

10. Drug-eluting stents have been used in the treatment of coronary artery disease. What is the purpose of the drugs?
- A. To retard post-procedure elastic recoil.
 - B. To retard post-procedure platelet aggregation.
 - C. To retard the development neointimal hyperplasia.
 - D. To retard the progression of atherosclerotic occlusive disease.

Rationales:

The correct answer is C. The advantage of a stent over angioplasty alone is it prevents elastic recoil. The purpose of the eluted drugs is to retard neointimal hyperplasia as a cause for in-stent stenosis. These are not antiplatelet medications or drugs to inhibit progressive atherosclerosis. Although drug eluting stents have revolutionized the treatment of coronary artery disease, it has been difficult to show that they are an improvement over bare stents for the treatment of superficial femoral artery disease.

Citations:

Oliva VL, Soulez G. Sirolimus-eluting stents versus the superficial femoral artery: second round. *J Vasc Interv Radiol* 2005; 16:313-315.