Interventional Radiology In-Training Test Questions for Diagnostic Radiology Residents

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1. You are shown a chest radiograph (Figure 1) obtained after the placement of a temporary hemodialysis catheter. Where is the catheter located?

A. Superior intercostal vein
B. Descending aorta
C. Hemiazygous vein
D. **Duplicated SVC**

Rationale:
A. Incorrect
B. Incorrect
C. Incorrect
D. Correct. In less than 1% of normal patients - patients without congenital heart disease - the left brachiocephalic vein does not cross the midline to join the right brachiocephalic vein, but rather drains into the coronary sinus as a second left-sided superior vena cava.

Reference:
None

2. What is the diameter of an 18 French catheter?

A. 3 mm
B. **6 mm**
C. 12 mm
D. 18 mm

Rationale:
A. Incorrect
B. French is a scale used for denoting the size of catheters and other tubular instruments. Each unit is roughly equivalent to .33 mm; 18 French indicates a diameter of 6 mm.
C. Incorrect
D. Incorrect

Reference:
None

3. Concerning conscious sedation, which one of the following drugs may be used by an interventional radiologist to achieve the desired effect?

A. Lidocaine
B. **Fentanyl**
C. Flumazenil
D. Propofol

Rationale:

A. Incorrect. Lidocaine is the most widely used local anesthetic. It should be used liberally to diminish the amount of conscious sedation necessary to maintain the patient's comfort, but is not itself an agent for conscious sedation.

B. Correct. Fentanyl is a potent synthetic opioid often used for conscious sedation.

C. Incorrect. Flumazenil is a benzodiazepine antagonist used to counteract an overdose of midazolam, for example.

D. Incorrect. Propofol is commonly used by anesthesiologists to induce and or maintain a level of anesthesia where loss of protective reflexes is anticipated. It is not suitable for use by a radiologist for conscious sedation.

Reference:

North Shore- Long Island Jewish Health System Sedation Manual. Goodman & Gilman's The pharmacological basis of therapeutics. McGraw-Hill. 1996.

4. Concerning the natural history of atherosclerotic peripheral arterial disease, which is MOST LIKELY?

A. Intermittent claudication will progress to gangrene
B. **Mortality will be from coronary artery or cerebrovascular disease**
C. If the patient is initially asymptomatic, angioplasty or by-pass surgery will improve prognosis
D. If initially asymptomatic, the patient will enjoy an unaltered life

Rationale:

A. Incorrect

B. Correct. Peripheral arterial disease (PAD) is an important manifestation of generalized atherosclerosis and is defined as obstructive arterial disease that reduces blood flow to the lower extremities. The symptoms of PAD progress rather slowly. After 5 to 10 years more than 70% of patients report no change or improvement in their symptoms. But patients with PAD have a threefold increase in cardiovascular mortality. Patients with asymptomatic PAD appear to have the same increased risk of cardiovascular events and death as those with intermittent claudication. The indications for lower extremity by-pass surgery or angioplasty are limb-threatening ischemia or incapacitating claudication.

C. Incorrect

D. Incorrect.

Reference:

Hiatt WR. Medical treatment of peripheral arterial disease and claudication. N Engl J Med 2001; 344:1608-1621.
Weitz JI, Bryne J, Clagett GP et al. Diagnosis and treatment of chronic arterial insufficiency of the lower extremities: a critical review. Circulation 1996; 94:3026-3049.

5. Concerning varicoceles, which one is TRUE?

A. **They may impair spermatogenesis.**
B. They may obstruct the seminiferous tubules.
C. Most are diagnosed by ultrasound.
D. They are more common on the right than on the left.

Rationale:

A. Correct. A varicocele is a dilatation of the pampiniform plexus. Most occur on the left side, likely the result of reflux through incompetent left testicular veins. They are a cause of male infertility because of impaired spermatogenesis with reduced sperm count and motility. They do not obstruct the seminiferous tubules. Ultrasound can surely confirm the diagnosis and detect small varicoceles in males with infertility, but most varicoceles are diagnosed on physical examination by palpation of a worm like tangle of veins.

B. Incorrect
C. Incorrect
D. Incorrect

Reference:

Kaufman JA, Lee MJ. Vascular and Interventional Radiology. The Requisites. Mosby. 2004. Zwiebel WJ, Pellerito JS. Introduction to Vascular Ultrasonography. Elsevier Saunders 2005.

6. Concerning primary renal artery stenting, which of the following is considered a well-accepted indication?

A. Unilateral, less than 50% renal artery stenosis discovered during a cardiac catheterization
B. Unilateral, greater than 90% renal artery stenosis in an elderly chronic azotemic patient
C. **Bilateral, greater than 75% renal artery stenoses in an elderly patient with rapidly developing renal failure**
D. Bilateral medial fibromuscular dysplasia in a young, hypertensive woman

Rationale:

A. Incorrect. The indications for renal angioplasty are to treat renal vascular hypertension or azotemia. It is incorrect to perform a drive-by intervention of a hemodynamically insignificant renal artery stenosis incidental to the evaluation of the coronary arteries.

B. Incorrect. Unilateral renal artery stenosis is unlikely to be the cause of renal failure when the opposite renal artery is normal.

C. Correct. Revascularization of the kidneys may reverse or at least preserve renal function.

D. Incorrect. Certainly this patient with renal vascular hypertension should be treated, but usually with a balloon rather than a stent.

Reference:

Rundback JH, Rozenblit GN, Poplausky MR. SCVIR Syllabus: Peripheral Vascular Interventions Renal Artery Stenting. Society of Cardiovascular &Interventional Radiology 2001. Kaufman JA, Lee MG. Vascular and Interventional Radiology. The Requisites. Mosby. 2004

7. Concerning uterine artery embolization (UAE), the EMMY Trial, a multicenter randomized comparison between UAE and hysterectomy for treatment of menorrhagia showed:

A. a lower technical failure rate with UAE.
B. a lower complication rate with UAE.
C. **a shorter hospital stay with UAE**.
D. fewer post procedure hospitalizations with UAE

Rationale:

A. Incorrect. The technical failure rate was significantly higher with UAE. Bilateral UAE failed in 4.9% of patients and unilateral failure in 6.2% of patients.

B. Incorrect. Although not statistically significant, major complications developed in 4.9% of the UAE group and 2.7% following hysterectomy.

C. Correct. Hospital stay for UAE averaged 2.5 days versus 5.1 days after hysterectomy.

D. Incorrect. Patients had an 11% chance of readmission following UAE versus zero after hysterectomy in this study.

Reference:

Spies JB. Commentary. The EMMY trial of uterine artery embolization for the treatment of symptomatic uterine fibroid tumors: randomized, yes, but a flawed trial nonetheless. J Vasc Interv Radiol 2006; 17:413-415

8. What is the advantage of using the Gunther Tulip vena cava filter?

A. **It can be removed.**
B. It can be placed via a peripheral vein.
C. It can accommodate an ectatic vena cava.
D. It doesn't preclude magnetic resonance imaging.

Rationale:

A. Correct. The Gunther Tulip Filter has a hook on its superior end for transjugular retrieval.
B. Incorrect. The Simon-Nitinol Filter has a low profile (7 French) delivery system, allowing placement via small veins such as the basilic vein.
C. Incorrect. The Bird's Nest filter has two V-shaped struts connected by four stainless steel wires. It can be safely deployed in vena cavae measuring up to 38 cm, about 10 cm greater than for most other filters.
D. Incorrect. All filters are compatible with a magnetic resonance scanner.

Reference:

SCVIR Syllabus Series: Venous Interventions. Tutorials 23 and 24.