

# Principles of Vascular Ultrasound

## Chapter 1

1. Which of the following pathologies may cause flow within an artery to be reversed?
  - a. Upstream tight stenosis
  - b. Occlusion with large downstream collaterals
  - c. Complex recanalization
  - d. All the above
2. Which of the following **is not** a maneuver to try if a scan is technically difficult?
  - a. Change the patient/body part position
  - b. Maintain the scanning angle
  - c. Change the transducer frequency
  - d. Call a colleague for assistance
3. Which of the following **is not** useful for optimal sonographer positioning for carotid scanning?
  - a. Performing hand and arm stretches
  - b. Scanning with only the right hand
  - c. Use the elbow of the scanning arm and part of the scanning hand as a fulcrum
  - d. Learn to scan with the machine at both the head and foot of the patient
4. Using \_\_\_\_\_ to localize the position is helpful when comparing findings with radiographic studies.
  - a. Coordinates
  - b. Pictures
  - c. Landmarks
  - d. Notes
5. The optimization of \_\_\_\_\_ smooths the appearance of the image and reduces speckle artifacts.
  - a. Harmonics
  - b. Tissue colorization
  - c. Persistence
  - d. Doppler flow
6. When grayscale bleeds through the color Doppler flow mapping, what function assigns more color pixels to the color Doppler map in proportion to the background scale?
  - a. Harmonics
  - b. Persistence
  - c. Color Write
  - d. Tissue Colorization
7. Where significant occlusive disease or venous thrombosis is present, the potential for complicated flow patterns and altered flow directions in both the main and branch vessels is high.
  - a. True
  - b. False

## Chapter 2

8. Anatomic variants of the aortic arch occur in what percentage of cases?
  - a. One eighth
  - b. One fourth
  - c. One third
  - d. One half

9. Which of the following are the main branches of the external carotid artery?
- Superior thyroid artery
  - Ascending pharyngeal artery
  - Lingual artery
  - All the above
10. Which arteries are the principal vessels that supply collateral flow around an internal carotid occlusion?
- Facial and superficial temporal arteries
  - Lingual and facial arteries
  - Facial and superior thyroid arteries
  - Superficial temporal and lingual arteries
11. The superficial temporal artery runs in front of the tragus of the ear and continues as a single artery that continues across the forehead.
- True
  - False
12. What is the segment of the internal carotid artery (ICA) that runs between the carotid bifurcation and the carotid canal?
- Supraclinoid segment
  - Cavernous segment
  - Petrous segment
  - Extracranial segment
13. Carotid artery disease accounts for approximately \_\_\_\_ of all cases of stroke.
- 20%
  - 25%
  - 30%
  - 35%
14. Occlusion of the carotid artery by itself does not result in stroke if the \_\_\_\_\_ is completed and has adequate inflow.
- Circle of Willis
  - Posterior communicating artery
  - Anterior communicating artery
  - Basilar artery
15. The usual location of an atherosclerotic carotid lesion is in the \_\_\_\_\_.
- Distal ICA
  - Proximal CCA
  - Proximal ICA
  - Distal CCA
16. For symptomatic individuals the stroke and mortality risk for CEA should be less than what percentage?
- 2%
  - 4%
  - 6%
  - 8%
17. Carotid scanning protocols should include which of the following vessels?
- Both carotid arteries
  - Subclavian and vertebral arteries
  - Brachiocephalic arteries
  - All the above

18. What class recommendation is daily antiplatelet therapy with 75 to 325 mg of aspirin?
- Class I
  - Class Ia
  - Class IIa
  - Class III
19. With grayscale imaging a significant CCA stenosis is greater than a \_\_\_\_\_ narrowing.
- 50%
  - 60%
  - 70%
  - 80%
20. Brachial blood pressure is done only in one arm to identify unilateral subclavian artery stenosis.
- True
  - False
21. In asymptomatic patients echo lucent plaques are associated with \_\_\_\_\_ to \_\_\_\_\_ times the risk of stroke than with echogenic plaques.
- One, two
  - Two, three
  - Two, four
  - Three, four
22. What class recommendation is the following statement? In asymptomatic patients with known or suspected carotid stenosis, duplex ultrasonography, performed by a qualified technologist in a certified lab, is recommended as the initial diagnostic test to detect hemodynamically significant carotid stenosis.
- Class I
  - Class IIa
  - Class IIb
  - Class III
23. Aortic insufficiency causing a bisferiens peak is seen in what percentage of cases?
- 20%
  - 30%
  - 40%
  - 50%
24. Severe aortic stenosis does not affect the velocity of which artery?
- Common carotid artery
  - Internal carotid artery
  - External carotid artery
  - Vertebral artery
25. As referenced in table 2-5 primary parameters of an ICA PSV of >230 and plaque estimate of >50 is indicative of what percentage of carotid stenosis?
- Normal
  - <50%
  - 50% - 69%
  - ≥70% but less than near occlusion
26. Tortuosity of the middle and distal ICA is commonplace.
- True
  - False

27. What is the incidence of restenosis within two years after an endarterectomy?
- 3-5%
  - 6-8%
  - 9-15%
  - 10-20%
28. What is the incidence of spontaneous carotid artery dissection per 100,000 populations per year?
- 1 to 3
  - 2 to 4
  - 3 to 4
  - 4 to 5
29. Carotid artery dissection usually begins \_\_\_\_\_ distal to the bulb and extends no further than the base of the skull.
- 1 to 3 cm
  - 2 to 3 cm
  - 3 to 4 cm
  - 4 to 5 cm
30. According to the Intersocietal Commission for the Accreditation of Vascular Laboratories (ICAVL) standard for accreditation carotid testing must include a minimum of \_\_\_\_\_ completed carotid exams annually
- 75
  - 100
  - 125
  - 150

### Chapter 3

31. The left vertebral artery arises from the aortic arch at the level of what thoracic vertebrae?
- T2
  - T3
  - T4
  - T5
32. The main trunk of the subclavian artery is divided into how many sections?
- Two
  - Three
  - Four
  - Five
33. The thyroid cervical trunk is absent in what percentage of cases?
- 14%
  - 15%
  - 16%
  - 17%
34. In the presence of thoracic-scapular-humoral trauma how many arteries may arise from the axillary artery to form a collateral pathway?
- 1-4
  - 5-7
  - 6-11
  - 7-12

35. The brachial artery bifurcation into the ulnar artery and radial artery at approximately \_\_\_\_\_ cm distal to the radiohumeral line.
- 1.1
  - 1.5
  - 1.7
  - 1.9
36. In what percentage of cases does the radial artery have a variable origin arising from the axillary artery, or from the proximal, mid, or distal brachial artery?
- 10% - 20%
  - 11% - 22%
  - 13% - 25%
  - 14% - 29%
37. The radial artery is the more dominant of the two forearm arteries.
- True
  - False
38. The superficial palmar arch is incomplete in what percentage of cases?
- 5%
  - 10%
  - 15%
  - 20%
39. Which of the following are common indications for duplex evaluation of the upper extremities?
- Upper extremity ischemia
  - Reduced pulses
  - Bruit
  - All the above
40. What is the most common contraindication for duplex scanning of the upper extremities?
- Swelling
  - Wound dressing
  - Pain
  - None of the above
41. What angle should be used when using spectral Doppler measurements of the upper extremity arteries?
- 40 degrees
  - 50 degrees
  - 60 degrees
  - 70 degrees
42. A hypoechoic, poorly delineated lesion, but possible with flow disturbance is a characteristic of what type of plaque?
- Calcified
  - Irregular
  - Anechoic
  - Smooth
43. Which of the following **is not** an indication of a stenosis classification of between 50% and 99%?
- Plaque visualized
  - Loss of reverse flow component
  - 30% to 100% increase in PSV compared to that immediately proximal
  - Evidence of true post stenotic turbulence

44. A connection between an artery and vein identified with color Doppler is called what?
- a. True aneurysm
  - b. Pseudoaneurysm
  - c. Stenosis
  - d. Arteriovenous fistula
45. According to ICAVL standards, every three years how many extremity studies must be correlated with angiography findings?
- a. 20
  - b. 25
  - c. 30
  - d. 35
46. Which of the following is a normal scan finding for thoracic outlet syndrome?
- a. PSV: 50 to 120 cm/sec
  - b. No change with maneuvers
  - c. Obstruction of flow with maneuvers
  - d. A & B

#### Chapter 4

47. The first hemodialysis fistula was created in what year?
- a. 1966
  - b. 1968
  - c. 1970
  - d. 1972
48. Arteriovenous fistulas have a lower primary failure rate than arteriovenous grafts.
- a. True
  - b. False
49. What is most commonly used to create an upper extremity fistula?
- a. Radiocephalic
  - b. Brachiocephalic
  - c. Brachiobasilic transposition
  - d. All the above
50. What is the normal volumetric flow through an AV fistula?
- a. >600mL/min
  - b. >650 mL/min
  - c. >700 mL/min
  - d. >750 mL/min
51. What percentage of fistulas fail to mature?
- a. 5% to 20%
  - b. 15% to 25%
  - c. 20% to 50%
  - d. 30% to 60%
52. What is the preferred pre-operative diameter of the cephalic and basilic veins?
- a. > 3 mm
  - b. > 4 mm
  - c. > 5 mm
  - d. > 6 mm

53. For duplex interpretation what is the main venous criterion for the forearm and upper arm?
- a. Length
  - b. Patency
  - c. Volume
  - d. Compressibility
54. Postoperative duplex scanning is generally performed \_\_\_\_\_ weeks after surgery.
- a. 2 to 3
  - b. 4 to 6
  - c. 6 to 8
  - d. 8 to 10
55. Which is the most common fistula complication?
- a. Infection
  - b. Thrombosis
  - c. Stenosis
  - d. B & C
56. What is the peak systolic velocity for an arteriovenous fistula with a <50% stenosis?
- a. <2m/sec
  - b. <3m/sec
  - c. <4m/sec
  - d. >4m/sec
57. Blood flow volume greater than \_\_\_\_\_ is required for adequate dialysis.
- a. 500 mL/min
  - b. 550 mL/min
  - c. 575 mL/min
  - d. 600 mL/min
58. The most common site of narrowing for an arteriovenous graft is in the host vein proximal to the venous anastomosis.
- a. True
  - b. False

## Chapter 5

59. In what percentage of cases does the aorta bifurcate within 1.25 cm of the iliac artery?
- a. 60%
  - b. 70%
  - c. 80%
  - d. 90%
60. The right common iliac artery passes over what lumbar vertebrae?
- a. L2
  - b. L3
  - c. L4
  - d. L5
61. What is the average length of the internal iliac artery?
- a. 4 cm
  - b. 5 cm
  - c. 6 cm
  - d. 7 cm

62. The common femoral artery extends approximately \_\_\_\_\_ below the inguinal ligament.
- 0.5 – 1.0 cm
  - 1.5 – 2.0 cm
  - 3.0 – 4.0 cm
  - 4.5 – 5.0 cm
63. Which branch of the popliteal artery forms a collateral network around the knee?
- Paired sural arteries
  - Genicular arteries
  - Anterior tibial artery
  - Posterior tibial artery
64. The posterior tibial artery is absent in approximately what percentage of the population?
- 2%
  - 3%
  - 4%
  - 5%
65. The dorsalis pedis artery is congenitally absent in what percentage of people?
- <1%
  - 2% to 3%
  - 4% to 5%
  - 6% to 7%
66. Which of the following **is not** a contraindication for duplex scanning?
- Ulceration
  - Wound dressing
  - Infection
  - A & B
67. Which of the following are indicative of a stenotic classification between 50% and 99%?
- Visualized plaque
  - Loss of reverse flow component
  - Evidence of poststenotic turbulent/disordered flow
  - All the above
68. What is the normal pre-exercise ankle-brachial pressure?
- <0.50
  - >0.65
  - >0.80
  - >0.97
69. What is not a common indication for a bypass graft ultrasound?
- Acute postoperative ischemia
  - Thrill/bruit over graft
  - Open wound
  - Pulsatile mass
70. A venous graft velocity ratio greater than 2.5, a severe turbulence with reversed flow components, and a PSV greater than 200/cm/sec is indicative of what percentage stenosis?
- <20%
  - 20% to 50%
  - 50% to 75%
  - 75% to 99%



## Chapter 6

71. Which of the following is a catheterization-related complication?
- a. Hematomas
  - b. False aneurysms
  - c. Dissection
  - d. All the above
72. What is the most common catheterization related complication?
- a. Hematoma
  - b. False aneurysm
  - c. Dissection
  - d. Thrombus
73. What is the most common puncture site for catheterization-related hematomas?
- a. Axillary
  - b. Brachial
  - c. Femoral
  - d. Subclavian
74. Which of the following is defined as a localized hematoma with tissue that are connected to the artery of origin by a tract?
- a. Bleeding tract
  - b. Pseudoaneurysm
  - c. Arterio-venous fistula
  - d. Dissection

## Chapter 7

75. The abdominal aorta begins at what level?
- a. T8 level
  - b. Level of the diaphragm
  - c. L2 level
  - d. L3 level
76. Which of the following **is not** a visceral branch of the aorta?
- a. Celiac
  - b. Renal
  - c. Ovarian
  - d. Lumbar
77. How long is the celiac artery?
- a. 1.0 cm
  - b. 1.25 cm
  - c. 1.50 cm
  - d. 1.75 cm
78. Which of the following **is not** an artery off the celiac artery?
- a. Left gastric artery
  - b. Right gastric artery
  - c. Splenic artery
  - d. Common hepatic arteries
79. What artery supplies the small intestines?
- a. Superior mesenteric artery
  - b. Inferior mesenteric artery
  - c. Celiac artery
  - d. Left gastric artery

80. The inferior mesenteric artery **does not** supply which of the following?
- Left half of the transverse colon
  - Greater part of the rectum
  - Descending colon
  - Pancreas
81. The lumbar arteries are a series of \_\_\_\_\_ paired vessels that arise from the back of the spine.
- Two
  - Three
  - Four
  - Five
82. The right renal artery is \_\_\_\_\_ than the left renal artery.
- Longer
  - Wider
  - More posterior
  - More superior
83. Abdominal aortic aneurysms (AAA) occur in what percentage of men over the age of 65?
- 2.0%
  - 2.5%
  - 3.0%
  - 3.5%
84. An abdominal aortic aneurysm of more than \_\_\_\_\_ increases the risk of rupture.
- 4.0 cm
  - 4.5 cm
  - 5.0 cm
  - 5.5 cm
85. In post-endovascular aneurysm repair ultrasound is used to evaluate what?
- Endoleaks
  - Thrombus in the aneurysm
  - Stent size
  - A & B
86. Which of the following **is not** a limitation for duplex imaging to evaluate an endovascular stent graft?
- Age
  - Excessive bowel gas
  - Obesity
  - Abdominal tenderness
87. What type of AAA leak is described as a transgraft leak?
- Type I
  - Type II
  - Type III
  - Type IV
88. Which of the following complications **is not** apparent by ultrasound?
- Endoleak
  - Dissection
  - Perforation
  - Thrombosis

89. A less than 50% stenosis classification **does not** include which of the following?

- a. Plaque visualized in B-mode
- b. Triphasic/biphasic waveforms
- c. 30% to 100% increase in peak systolic velocity
- d. Loss of reverse flow component

## Chapter 8

90. The renal arteries arise from the aorta at approximately the level of which lumbar vertebra?

- a. L1
- b. L2
- c. L3
- d. L4

91. Accessory renal arteries extend to what area?

- a. Hilum
- b. Upper or lower poles of the kidney
- c. Spleen
- d. A & B

92. Branches of each renal artery extend to what areas?

- a. Adrenal gland
- b. Ureter
- c. Muscle
- d. All the above

93. A peak systolic velocity (PSV) greater than \_\_\_\_\_ predicts the presence of significant renal artery stenosis.

- a. .05 – 1.20
- b. 0.80 – 1.40
- c. 1.45 – 1.75
- d. 1.80 – 2.0

94. The resistance index (RI) is the ratio of peak systolic velocity (PSV) and end diastolic velocity (EDV).

- a. True
- b. False

95. The right kidney is best visualized through what organ?

- a. Spleen
- b. Liver
- c. Stomach
- d. None of the above

96. Which of the following **is not** a common indication for duplex imaging of renal artery stenosis?

- a. Lower abdominal bruit
- b. Follow-up renal artery stent
- c. Follow-up renal artery bypass
- d. Suspected renovascular hypertension

97. Which of the following equipment is needed for duplex imaging of the renal artery?

- a. 2- to 5- MHz sector/curved array transducers
- b. 2- to 4- MHz vector transducer
- c. Coupling gel
- d. All the above

98. According to ICAVL standards what percentage of exams must correlate with either angiographic or surgical findings?
- a. 70%
  - b. 75%
  - c. 80%
  - d. 85%
99. A normal renal artery study has a renal-to-aorta ratio of less than what?
- a. 2.0
  - b. 2.5
  - c. 3.0
  - d. 3.5

## Chapter 9

100. How long is the celiac artery?
- a. 1.0 cm
  - b. 1.25 cm
  - c. 1.50 cm
  - d. 1.75 cm
101. How many branches of the SMA form a series of arches supplying the small intestines?
- a. 2-5
  - b. 6-8
  - c. 9-11
  - d. 12- 15
102. The IMA does not supply blood flow to which of the following areas?
- a. Transverse colon
  - b. Ascending colon
  - c. Greater part of the rectum
  - d. Descending colon
103. The inferior mesenteric artery lies posterior to the aorta.
- a. True
  - b. False
104. A celiac artery stenosis less than \_\_\_\_\_ is not readily detected by ultrasound.
- a. 35%
  - b. 40%
  - c. 45%
  - d. 50%
105. Duplex scans are technically adequate in what percentage of SMA studies?
- a. 97%
  - b. 98%
  - c. 99%
  - d. 100%
106. Which of the following **is not** a common indication for duplex evaluation of the visceral arteries?
- a. Gi bleed
  - b. Upper abdominal bruit
  - c. Stent surveillance
  - d. Suspected bowel ischemia

107. What is the PSV for a greater than 70% stenosis of the celiac access?
- a. 90 to 110 cm/sec
  - b. 100 to 150 cm/sec
  - c. 160 to 180cm/sec
  - d. Greater than 200 cm/sec
108. What is the PSV for a 70% stenosis of the SMA?
- a. 125 cm/sec
  - b. 180 cm/sec
  - c. 250 cm/sec
  - d. Greater than 275 cm/sec
109. What is the class recommendation for surgical treatment of chronic intestinal ischemia?
- a. Class I
  - b. Class IIa
  - c. Class IIb
  - d. Class III
110. Open repair or catheter-based intervention is indicated for visceral aneurysms measuring \_\_\_\_ in diameter or larger in pregnant women.
- a. 2.0 cm
  - b. 2.5 cm
  - c. 3.0 cm
  - d. 3.5 cm
111. According to ICAVL what is the minimum number of complete splanchnic exams a lab should perform each year?
- a. 50
  - b. 100
  - c. 150
  - d. 200
112. According to ICAVL standards correlation studies must be completed within \_\_\_\_\_ preceding applying for accreditation.
- a. 6 months
  - b. 1 year
  - c. 2 years
  - d. 3 years
113. Exam correlation should have greater than \_\_\_\_ agreement for ICAVL accreditation.
- a. 70%
  - b. 75%
  - c. 80%
  - d. 85%

## Chapter 10

114. What vein in the neck is clearly seen on a typical duplex of the neck?
- a. Anterior jugular vein
  - b. Internal jugular vein
  - c. External jugular vein
  - d. B & C

115. The external jugular vein drains blood from what area?

- a. Scalp
- b. Face
- c. Neck
- d. A & B

116. The size of the external jugular vein varies inversely in size with that of its internal jugular vein.

- a. True
- b. False

117. The left and right vertebral veins drain blood from what area?

- a. Face
- b. Neck
- c. Scalp
- d. None of the above

118. There are only superficial dorsal and volar veins in the hand.

- a. True
- b. False

119. Which of the following may result in venous thrombosis of the upper extremity?

- a. Trauma
- b. Line insertion
- c. Pacemaker
- d. All the above

120. What is the contraindication for duplex evaluation of the upper extremity?

- a. Arm swelling
- b. Open wound
- c. Arm redness
- d. Palpable cord

121. To optimally scan the internal jugular vein the patient's head is turned slightly toward the side being examined.

- a. True
- b. False

122. What venous duplex protocol technique is used to image the internal jugular vein?

- a. SAX sweep
- b. LAX sweep
- c. SAX sweep with/without compression
- d. A & B

123. When there are signs of deep vein thrombosis which of the following veins **is not** a site to do a compression maneuver?

- a. Femoral vein
- b. Internal jugular vein
- c. Subclavian vein
- d. Axillary vein

## Chapter 11

124. Which of the following is part of the lower extremity venous system?

- a. Thick-walled superficial veins
- b. Thin-walled deep veins
- c. Perforating veins
- d. All the above

125. What percentage of lower extremity venous return is done by the deep venous system?
- 80%
  - 85%
  - 90%
  - 95%
126. What percentage of people do not have a venous valve between their groin and their heart?
- 5%
  - 19%
  - 15%
  - 20%
127. The long saphenous vein contains up to how many valves?
- 16
  - 18
  - 20
  - 22
128. What percentage of people have a large accessory saphenous veins?
- 10 – 20%
  - 25 – 40%
  - 50 – 70%
  - 75 – 90%
129. Communicating veins are also known as what?
- Gastrocnemius veins
  - Short saphenous veins
  - Vein of Giacomini
  - Perforating veins
130. The superficial plantar venous arch is the venous return system for the foot.
- True,
  - False
131. Which veins join to become the tibioperoneal trunk?
- Peroneal and posterior tibial veins
  - Peroneal and anterior tibial veins
  - Peroneal and popliteal veins
  - Peroneal and superficial femoral
132. The superficial femoral vein is duplicated in what percentage of the population?
- 33%
  - 38%
  - 42%
  - 45%
133. Which of the following veins **do not** drain into the external iliac vein?
- Pubic vein
  - Inferior epigastric veins
  - Deep iliac circumflex vein
  - Deep femoral veins
134. In May-Thurner syndrome the common iliac vein is compressed by the artery against what vertebra?
- Second
  - Third
  - Fourth
  - Fifth

135. A left-sided IVC occurs in what percentage of cases?
- 0.1 – 0.3%
  - 0.2 – 0.5%
  - 0.3 – 0.6%
  - 0.4 – 0.7%
136. The inferior cava receives how many pairs of veins?
- 4
  - 6
  - 8
  - 10
137. The portal veins are approximately how long?
- 4 cm
  - 6 cm
  - 8 cm
  - 10 cm
138. Annually, what percentage of the population develops venous thromboembolism?
- 0.1%
  - 0.2%
  - 0.3%
  - 0.4%
139. What percentage of venous thrombosis occurs within the deep lower extremity veins?
- 80%
  - 85%
  - 90%
  - 95%
140. What percentage of pulmonary embolism cases do not have a detectable DVT by duplex scanning?
- 60%
  - 70%
  - 80%
  - 90%
141. Which of the following **is not** a clinical indication for suspected DVT?
- Leg swelling or leg pain
  - Suspected PE
  - Palpable cord
  - A & B
142. To scan the common femoral vein, pressure is applied with the transducer every \_\_\_\_.
- 1 to 2 cm
  - 3 to 4 cm
  - 5 to 6 cm
  - 7 to 8 cm
143. Which of the following **is not** a feature of an acute thrombus?
- Bright echogenic
  - Poorly attached
  - Spongy texture
  - Dilated vein



144. Saphenous vein mapping prior to arterial bypass surgery assesses which of the following?
- Vein patency
  - Vein size
  - Vein tortuosity
  - A & B
145. Incompetent valves are present if retrograde flow is recorded for \_\_\_\_ seconds or more during compression or valsalva maneuver.
- 0.5
  - 1.0
  - 1.5
  - 2.0

## Chapter 12

146. What is the coronary wall layer adjacent to the arterial lumen called?
- Intima
  - Media
  - External elastic lamina
  - Adventitia
147. What layer offers the architectural support to the vessel?
- Intima
  - Adventitia
  - Media
  - External elastic lamina
148. Arterial stenting has become one of the most important applications for Intravascular ultrasound (IVUS).
- True
  - False
149. To utilize IVUS preintervention what is the ischemic minimal lumen for the left main artery?
- 5.6 mm
  - 5.7 mm
  - 5.8 mm
  - 5.9 mm
150. IVUS pre-PCI quantitative assessment includes which of the following?
- Vessel size and minimal lumen area
  - Lesion length
  - Plaque type
  - A & B
151. Which of the following can be a factor resulting in incomplete stent apposition?
- Stent under expansion
  - Calcification
  - Operator experience
  - A & B
152. With bare-metal stents the risk of restenosis decrease \_\_\_\_\_ for every one square millimeter increase in minimal stent area (MSA).
- 18%
  - 19%
  - 20%
  - 21%

### Chapter 13

153. The continued expansion of endovascular devices and procedures **has not** led to a major shift in the treatment of vascular disease.
- a. True
  - b. False
154. Which of the following is a type of peripheral IVUS catheter?
- a. Doppler catheter
  - b. Phase array catheter
  - c. Mechanical catheter
  - d. B & C
155. How many imaging elements are located at the tip of a phase array catheter?
- a. 24
  - b. 32
  - c. 48
  - d. 64
156. Both phase array mechanical IVUS catheters can be used over what size guidewire?
- a. 0.021
  - b. 0.025
  - c. 0.035
  - d. 0.038
157. Luminal dimensions and wall thickness determined by IVUS are accurate within \_\_\_\_\_.
- a. 0.04 mm
  - b. 0.05 mm
  - c. 0.06 mm
  - d. 0.07 mm
158. IVUS has proven efficacy in vessel characterization for which of the following?
- a. Vessel diameter
  - b. Stenosis
  - c. Morphology
  - d. All the above
159. Angulation caused by tortuosity may cause an elliptical image especially in the \_\_\_\_\_.
- a. Thoracic arch
  - b. Abdominal aorta
  - c. Common carotid
  - d. Femoral artery
160. IVUS is effective in evaluating which of the following?
- a. Assessing the result of primary intervention
  - b. Establishing the need for stenting
  - c. Guiding stent deployment
  - d. All the above
161. Inadequate stent deployment can lead to early thrombosis or stent migration.
- a. True
  - b. False
162. The use of IVUS can significantly reduce the fluoroscopy time and contrast use during procedures.
- a. True
  - b. False