

PRACTICE EXAM 13: VASCULAR TECHNOLOGY SIMULATION (170 QUESTIONS)

This standalone practice exam contains 170 questions. Allow three hours, including review time, to simulate the ARDMS Vascular Technology examination. Select the single best answer for each item. The official examination uses a scaled score from 300 to 700; a score of 555 or better passes.

1. A sonographer is reviewing a technically adequate study. which vessel is identified posterior to the medial malleolus?

- A. Posterior tibial artery
- B. Anterior tibial artery
- C. Dorsalis pedis artery
- D. Peroneal artery

2. During protocol-based image review, which response best addresses this question: which vessel is identified posterior to the medial malleolus?

- A. Anterior tibial artery
- B. Dorsalis pedis artery
- C. Posterior tibial artery
- D. Peroneal artery

3. While completing a focused duplex examination, which vein is formed by union of the splenic and superior mesenteric veins?

- A. Inferior vena cava
- B. Portal vein
- C. Hepatic vein

D. Left renal vein

4. A sonographer is reviewing a technically adequate study. which response best addresses this question: which vein is formed by union of the splenic and superior mesenteric veins?

A. Inferior vena cava

B. Hepatic vein

C. Left renal vein

D. Portal vein

5. During protocol-based image review, which paired veins accompany the corresponding calf arteries?

A. Posterior tibial veins

B. Great saphenous veins

C. Small saphenous veins

D. Common femoral veins

6. While completing a focused duplex examination, which response best addresses this question: which paired veins accompany the corresponding calf arteries?

A. Great saphenous veins

B. Small saphenous veins

C. Posterior tibial veins

D. Common femoral veins

7. A sonographer is reviewing a technically adequate study. which artery normally supplies the thyroid gland and arises from the external carotid?

A. Vertebral artery

B. Internal thoracic artery

C. Superior thyroid artery

D. Ascending cervical artery

8. During protocol-based image review, which response best addresses this question: which artery normally supplies the thyroid gland and arises from the external carotid?

A. Superior thyroid artery

B. Vertebral artery

C. Internal thoracic artery

D. Ascending cervical artery

9. While completing a focused duplex examination, which superficial vein ascends along the medial leg and thigh?

A. Small saphenous vein

B. Anterior tibial vein

C. Peroneal vein

D. Great saphenous vein

10. A sonographer is reviewing a technically adequate study. which response best addresses this question: which superficial vein ascends along the medial leg and thigh?

A. Small saphenous vein

B. Great saphenous vein

C. Anterior tibial vein

D. Peroneal vein

11. During protocol-based image review, the left renal vein normally passes between which structures?

A. Celiac artery and pancreas

B. Inferior vena cava and liver

C. Superior mesenteric artery and aorta

D. Splenic artery and left kidney

12. While completing a focused duplex examination, which response best addresses this question: the left renal vein normally passes between which structures?

- A. Celiac artery and pancreas
- B. Superior mesenteric artery and aorta
- C. Inferior vena cava and liver
- D. Splenic artery and left kidney

13. A sonographer is reviewing a technically adequate study. which artery commonly lies anterior to the aorta and crosses over the left renal vein?

- A. Inferior mesenteric artery
- B. Celiac artery
- C. Right renal artery
- D. Superior mesenteric artery

14. During protocol-based image review, which response best addresses this question: which artery commonly lies anterior to the aorta and crosses over the left renal vein?

- A. Superior mesenteric artery
- B. Inferior mesenteric artery
- C. Celiac artery
- D. Right renal artery

15. While completing a focused duplex examination, which vein lies most commonly medial to the common femoral artery at the groin?

- A. Common femoral vein
- B. Great saphenous vein

- C. Deep femoral vein
- D. External iliac vein

16. A sonographer is reviewing a technically adequate study. which response best addresses this question: which vein lies most commonly medial to the common femoral artery at the groin?

- A. Great saphenous vein
- B. Deep femoral vein
- C. External iliac vein
- D. Common femoral vein

17. During protocol-based image review, which vessel normally arises first from the aortic arch?

- A. Left common carotid artery
- B. Brachiocephalic artery
- C. Left subclavian artery
- D. Right common carotid artery

18. While completing a focused duplex examination, which response best addresses this question: which vessel normally arises first from the aortic arch?

- A. Left common carotid artery
- B. Left subclavian artery
- C. Brachiocephalic artery
- D. Right common carotid artery

19. A sonographer is reviewing a technically adequate study. where does the common carotid artery normally bifurcate?

- A. At the clavicular head
- B. Below the aortic arch

- C. At the mandibular angle only
- D. Near the upper border of the thyroid cartilage

20. During protocol-based image review, which response best addresses this question: where does the common carotid artery normally bifurcate?

- A. Near the upper border of the thyroid cartilage
- B. At the clavicular head
- C. Below the aortic arch
- D. At the mandibular angle only

21. While completing a focused duplex examination, which vessel is the direct continuation of the superficial femoral artery after the adductor hiatus?

- A. Deep femoral artery
- B. Popliteal artery
- C. Anterior tibial artery
- D. Common femoral artery

22. A sonographer is reviewing a technically adequate study. which response best addresses this question: which vessel is the direct continuation of the superficial femoral artery after the adductor hiatus?

- A. Deep femoral artery
- B. Anterior tibial artery
- C. Popliteal artery
- D. Common femoral artery

23. During protocol-based image review, which waveform is expected in a normal resting high-resistance lower-extremity artery?

- A. Continuous monophasic flow
- B. Triphasic waveform
- C. Markedly pulsatile venous flow
- D. To-and-fro portal flow

24. While completing a focused duplex examination, which response best addresses this question: which waveform is expected in a normal resting high-resistance lower-extremity artery?

- A. Triphasic waveform
- B. Continuous monophasic flow
- C. Markedly pulsatile venous flow
- D. To-and-fro portal flow

25. A sonographer is reviewing a technically adequate study. which intracranial artery is insonated through the transtemporal window flowing toward the probe at typical depth?

- A. Basilar artery
- B. Vertebral artery
- C. Middle cerebral artery
- D. Ophthalmic artery

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- A. Basilar artery
- B. Vertebral artery
- C. Ophthalmic artery
- D. Middle cerebral artery

27. While completing a focused duplex examination, which artery usually gives rise to the dorsalis pedis artery?

- A. Anterior tibial artery
- B. Posterior tibial artery
- C. Peroneal artery
- D. Popliteal artery

28. A sonographer is reviewing a technically adequate study. which response best addresses this question: which artery usually gives rise to the dorsalis pedis artery?

- A. Posterior tibial artery
- B. Anterior tibial artery
- C. Peroneal artery
- D. Popliteal artery

29. During protocol-based image review, which veins drain directly into the inferior vena cava just below the diaphragm?

- A. Portal veins
- B. Splenic veins
- C. Superior mesenteric veins
- D. Hepatic veins

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- A. Portal veins
- B. Splenic veins
- C. Hepatic veins
- D. Superior mesenteric veins

31. A sonographer is reviewing a technically adequate study. which carotid branch normally shows a low-resistance Doppler waveform?

- A. External carotid artery
- B. Superior thyroid artery
- C. Internal carotid artery
- D. Occipital artery

32. During protocol-based image review, which response best addresses this question: which carotid branch normally shows a low-resistance Doppler waveform?

- A. External carotid artery
- B. Superior thyroid artery
- C. Occipital artery
- D. Internal carotid artery

33. While completing a focused duplex examination, what is the normal directional term for portal venous flow toward the liver?

- A. Hepatopetal
- B. Hepatofugal
- C. Retrograde systemic
- D. Bidirectional arterial

34. A sonographer is reviewing a technically adequate study. which response best addresses this question: what is the normal directional term for portal venous flow toward the liver?

- A. Hepatofugal
- B. Hepatopetal
- C. Retrograde systemic
- D. Bidirectional arterial

35. During protocol-based image review, which artery is the usual continuation of the external iliac artery below the inguinal ligament?

- A. Superficial femoral artery
- B. Deep femoral artery
- C. Popliteal artery
- D. Common femoral artery

36. While completing a focused duplex examination, which response best addresses this question: which artery is the usual continuation of the external iliac artery below the inguinal ligament?

- A. Superficial femoral artery
- B. Common femoral artery
- C. Deep femoral artery
- D. Popliteal artery

37. A sonographer is reviewing a technically adequate study. which lesion commonly causes arm pressure asymmetry and dampened ipsilateral waveforms?

- A. Proximal subclavian stenosis
- B. Distal ulnar venous reflux
- C. Internal carotid tortuosity
- D. Contralateral femoral occlusion

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- A. Distal ulnar venous reflux
- B. Internal carotid tortuosity
- C. Proximal subclavian stenosis
- D. Contralateral femoral occlusion

39. While completing a focused duplex examination, which duplex finding most strongly indicates a hemodynamically significant focal arterial stenosis?

- A. Uniform velocity throughout the segment
- B. Focal velocity increase with post-stenotic turbulence
- C. Spontaneous venous phasicity
- D. Complete color filling at low scale

40. A sonographer is reviewing a technically adequate study. which response best addresses this question: which duplex finding most strongly indicates a hemodynamically significant focal arterial stenosis?

- A. Uniform velocity throughout the segment
- B. Spontaneous venous phasicity
- C. Focal velocity increase with post-stenotic turbulence
- D. Complete color filling at low scale

41. During protocol-based image review, which finding is most typical of significant venous valvular incompetence?

- A. Prolonged retrograde flow after provocation
- B. Brief flow cessation with respiration
- C. Rapid antegrade augmentation only
- D. Complete venous compressibility

42. While completing a focused duplex examination, which response best addresses this question: which finding is most typical of significant venous valvular incompetence?

- A. Brief flow cessation with respiration
- B. Rapid antegrade augmentation only
- C. Complete venous compressibility
- D. Prolonged retrograde flow after provocation

43. A sonographer is reviewing a technically adequate study. which duplex feature suggests thrombus within an aneurysm rather than flowing lumen?

- A. Anechoic channel with color filling
- B. Echogenic material without internal Doppler signal
- C. Pulsatile spectral signal in the sac
- D. Aliasing through the residual channel

44. During protocol-based image review, which response best addresses this question: which duplex feature suggests thrombus within an aneurysm rather than flowing lumen?

- A. Echogenic material without internal Doppler signal
- B. Anechoic channel with color filling
- C. Pulsatile spectral signal in the sac
- D. Aliasing through the residual channel

45. While completing a focused duplex examination, which feature supports inflammatory superficial thrombophlebitis?

- A. Compressible deep vein without symptoms
- B. Normal phasic common femoral flow
- C. Painless patent artery with triphasic flow
- D. Tender noncompressible superficial vein with surrounding edema

46. A sonographer is reviewing a technically adequate study. which response best addresses this question: which feature supports inflammatory superficial thrombophlebitis?

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- B. Normal phasic common femoral flow
- C. Tender noncompressible superficial vein with surrounding edema
- D. Painless patent artery with triphasic flow

47. During protocol-based image review, which carotid plaque feature raises concern for surface disruption?

- A. Smooth homogeneous wall contour
- B. Ulcerated irregular lumen interface
- C. Uniform anechoic blood pool
- D. Symmetric intima-media thickness

48. While completing a focused duplex examination, which response best addresses this question: which carotid plaque feature raises concern for surface disruption?

- A. Ulcerated irregular lumen interface
- B. Smooth homogeneous wall contour
- C. Uniform anechoic blood pool
- D. Symmetric intima-media thickness

49. A sonographer is reviewing a technically adequate study. which finding suggests renal parenchymal disease rather than isolated main renal artery stenosis?

- A. Focal ostial aliasing on one side
- B. Localized main renal velocity increase
- C. Elevated intrarenal resistive indices bilaterally
- D. Unilateral post-stenotic turbulence

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- A. Focal ostial aliasing on one side
- B. Localized main renal velocity increase
- C. Unilateral post-stenotic turbulence
- D. Elevated intrarenal resistive indices bilaterally

51. While completing a focused duplex examination, which condition commonly produces elevated velocities in the celiac artery during expiration?

- A. Median arcuate ligament compression
- B. Renal vein thrombosis
- C. Portal vein occlusion
- D. Inferior mesenteric aneurysm

52. A sonographer is reviewing a technically adequate study. which response best addresses this question: which condition commonly produces elevated velocities in the celiac artery during expiration?

- A. Renal vein thrombosis
- B. Portal vein occlusion
- C. Inferior mesenteric aneurysm
- D. Median arcuate ligament compression

53. During protocol-based image review, which finding distinguishes complete arterial occlusion from near occlusion?

- A. Very low trickle flow through a channel
- B. Aliasing at the narrowest segment
- C. No flow despite optimized sensitive settings
- D. Post-stenotic spectral broadening

54. While completing a focused duplex examination, which response best addresses this question: which finding distinguishes complete arterial occlusion from near occlusion?

- A. Very low trickle flow through a channel
- B. No flow despite optimized sensitive settings
- C. Aliasing at the narrowest segment
- D. Post-stenotic spectral broadening

55. A sonographer is reviewing a technically adequate study. which venous Doppler finding suggests proximal iliac obstruction?

- A. Normal augmentation after distal compression
- B. Complete collapse with transducer pressure
- C. Loss of respiratory phasicity in the common femoral vein
- D. Brief valve closure after Valsalva

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- C. Brief valve closure after Valsalva
- D. Loss of respiratory phasicity in the common femoral vein

57. While completing a focused duplex examination, which sonographic feature favors carotid dissection?

- A. Mobile intimal flap with separate flow channels
- B. Smooth concentric intima-media thickening
- C. Calcific plaque at the bulb only
- D. Uniform low-resistance flow bilaterally

58. A sonographer is reviewing a technically adequate study. which response best addresses this question: which sonographic feature favors carotid dissection?

- A. Smooth concentric intima-media thickening
- B. Mobile intimal flap with separate flow channels
- C. Calcific plaque at the bulb only
- D. Uniform low-resistance flow bilaterally

59. During protocol-based image review, which feature favors chronic rather than acute venous thrombosis?

- A. Distended vein with soft thrombus
- B. Free-floating hypoechoic tail
- C. Echogenic wall-adherent material with recanalized channels
- D. New complete noncompressibility

60. While completing a focused duplex examination, which response best addresses this question: which feature favors chronic rather than acute venous thrombosis?

- A. Distended vein with soft thrombus
- B. Echogenic wall-adherent material with recanalized channels
- C. Free-floating hypoechoic tail
- D. New complete noncompressibility

61. A sonographer is reviewing a technically adequate study. which transcranial Doppler change can indicate vasospasm?

- A. Rising focal mean flow velocity
- B. Uniformly absent venous pulsatility
- C. Falling extracranial venous velocity
- D. Stable low arterial velocities

62. During protocol-based image review, which response best addresses this question: which transcranial Doppler change can indicate vasospasm?

- A. Uniformly absent venous pulsatility
- B. Falling extracranial venous velocity
- C. Stable low arterial velocities
- D. Rising focal mean flow velocity

63. While completing a focused duplex examination, which finding supports hemodynamically significant aortoiliac disease?

- A. Triphasic ankle waveforms bilaterally
- B. Normal respiratory venous phasicity
- C. Monophasic common femoral waveforms bilaterally
- D. Low-resistance internal carotid flow

64. A sonographer is reviewing a technically adequate study. which response best addresses this question: which finding supports hemodynamically significant aortoiliac disease?

- A. Monophasic common femoral waveforms bilaterally
- B. Triphasic ankle waveforms bilaterally
- C. Normal respiratory venous phasicity
- D. Low-resistance internal carotid flow

65. During protocol-based image review, which waveform supports distal arterial vasodilation caused by tissue ischemia?

- A. Sharp triphasic high-resistance flow
- B. Monophasic flow with continuous diastolic component
- C. Zero diastolic flow with reversal
- D. Normal venous respiratory phasicity

66. While completing a focused duplex examination, which response best addresses this question: which waveform supports distal arterial vasodilation caused by tissue ischemia?

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- C. Normal venous respiratory phasicity
- D. Monophasic flow with continuous diastolic component

67. A sonographer is reviewing a technically adequate study. which waveform feature is expected near an arteriovenous fistula?

- A. Absent diastolic arterial flow
- B. Markedly increased pulsatility index
- C. Normal quiet venous phasicity
- D. High velocity with reduced downstream resistance

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- A. High velocity with reduced downstream resistance
- B. Absent diastolic arterial flow
- C. Markedly increased pulsatility index
- D. Normal quiet venous phasicity

69. While completing a focused duplex examination, which color Doppler appearance is characteristic of a patent pseudoaneurysm sac?

- A. Uniform single-color laminar flow
- B. No detectable flow at low scale
- C. Bidirectional swirling yin-yang pattern
- D. Parallel venous color bands

70. A sonographer is reviewing a technically adequate study. which response best addresses this question: which color Doppler appearance is characteristic of a patent pseudoaneurysm sac?

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71. During protocol-based image review, a tardus-parvus waveform in a renal artery segment indicates what?

- A. Normal high-resistance perfusion
- B. Distal arteriovenous fistula
- C. Isolated venous reflux
- D. Hemodynamically important proximal obstruction

72. While completing a focused duplex examination, which response best addresses this question: a tardus-parvus waveform in a renal artery segment indicates what?

- A. Normal high-resistance perfusion
- B. Hemodynamically important proximal obstruction
- C. Distal arteriovenous fistula
- D. Isolated venous reflux

73. A sonographer is reviewing a technically adequate study. reversed flow in the vertebral artery most commonly suggests what condition?

- A. Proximal subclavian artery obstruction
- B. Distal internal carotid stenosis
- C. External carotid occlusion
- D. Jugular venous thrombosis

74. During protocol-based image review, which response best addresses this question: reversed flow in the vertebral artery most commonly suggests what condition?

- A. Distal internal carotid stenosis
- B. External carotid occlusion
- C. Proximal subclavian artery obstruction
- D. Jugular venous thrombosis

75. While completing a focused duplex examination, which finding is most consistent with popliteal artery entrapment?

- A. Fixed venous reflux during Valsalva
- B. Constant carotid velocity elevation
- C. Portal flow reversal after eating
- D. Dynamic arterial compression during plantar flexion

76. A sonographer is reviewing a technically adequate study. which response best addresses this question: which finding is most consistent with popliteal artery entrapment?

- A. Fixed venous reflux during Valsalva
- B. Dynamic arterial compression during plantar flexion
- C. Constant carotid velocity elevation
- D. Portal flow reversal after eating

77. During protocol-based image review, which ultrasound finding is most concerning for impending abdominal aortic aneurysm rupture?

- A. Stable mural thrombus alone
- B. Posterior acoustic shadow from calcium
- C. New periaortic fluid with focal wall discontinuity
- D. Uniform residual lumen color

78. While completing a focused duplex examination, which response best addresses this question: which ultrasound finding is most concerning for impending abdominal aortic aneurysm rupture?

- A. New periaortic fluid with focal wall discontinuity
- B. Stable mural thrombus alone
- C. Posterior acoustic shadow from calcium
- D. Uniform residual lumen color

79. A sonographer is reviewing a technically adequate study. which finding is most consistent with acute lower-extremity deep vein thrombosis?

- A. Small compressible vein with echogenic walls
- B. Dilated noncompressible vein with hypoechoic material
- C. Complete collapse under light pressure
- D. Thin chronic web with collaterals

80. During protocol-based image review, which response best addresses this question: which finding is most consistent with acute lower-extremity deep vein thrombosis?

- A. Small compressible vein with echogenic walls
- B. Complete collapse under light pressure
- C. Thin chronic web with collaterals
- D. Dilated noncompressible vein with hypoechoic material

81. While completing a focused duplex examination, which finding is characteristic of portal hypertension?

- A. Hepatofugal portal venous flow
- B. Normal hepatopetal portal flow
- C. Triphasic hepatic arterial flow
- D. Compressible portal vein

82. A sonographer is reviewing a technically adequate study. which response best addresses this question: which finding is characteristic of portal hypertension?

- A. Normal hepatopetal portal flow
- B. Triphasic hepatic arterial flow
- C. Hepatofugal portal venous flow
- D. Compressible portal vein

83. During protocol-based image review, which plaque composition usually produces dense acoustic shadowing?

- A. Soft lipid-rich plaque
- B. Fresh hypoechoic thrombus
- C. Uncomplicated fibrous cap
- D. Heavily calcified plaque

84. While completing a focused duplex examination, which response best addresses this question: which plaque composition usually produces dense acoustic shadowing?

- A. Heavily calcified plaque
- B. Soft lipid-rich plaque
- C. Fresh hypoechoic thrombus
- D. Uncomplicated fibrous cap

85. A sonographer is reviewing a technically adequate study. which pattern is typical of pseudoaneurysm flow at the neck?

- A. Continuous hepatopetal waveform
- B. Triphasic high-resistance waveform
- C. To-and-fro spectral waveform
- D. Absent flow in every plane

86. During protocol-based image review, which response best addresses this question: which pattern is typical of pseudoaneurysm flow at the neck?

- A. Continuous hepatopetal waveform
- B. To-and-fro spectral waveform
- C. Triphasic high-resistance waveform
- D. Absent flow in every plane

87. While completing a focused duplex examination, which finding is expected distal to a severe arterial stenosis?

- A. Higher pulsatility with early reversal
- B. Uniformly increased wall motion
- C. Dampened delayed systolic upstroke
- D. Normal sharp triphasic contour

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- A. Higher pulsatility with early reversal
- B. Uniformly increased wall motion
- C. Normal sharp triphasic contour
- D. Dampened delayed systolic upstroke

89. During protocol-based image review, a focal doubling of peak systolic velocity compared with an adjacent arterial segment generally suggests what?

- A. Approximately 50% diameter-reducing stenosis
- B. Normal laminar transition
- C. Complete arterial occlusion
- D. Isolated venous hypertension

90. While completing a focused duplex examination, which response best addresses this question: a focal doubling of peak systolic velocity compared with an adjacent arterial segment generally suggests what?

- A. Normal laminar transition
- B. Approximately 50% diameter-reducing stenosis
- C. Complete arterial occlusion
- D. Isolated venous hypertension

91. A sonographer is reviewing a technically adequate study. after carotid endarterectomy, which early finding requires urgent communication?

- A. Mild smooth wall thickening
- B. Mobile intraluminal thrombus at the repair site
- C. Expected caliber enlargement
- D. Patent low-resistance internal carotid flow

92. During protocol-based image review, which response best addresses this question: after carotid endarterectomy, which early finding requires urgent communication?

- A. Mobile intraluminal thrombus at the repair site
- B. Mild smooth wall thickening
- C. Expected caliber enlargement
- D. Patent low-resistance internal carotid flow

93. While completing a focused duplex examination, which finding suggests stenosis in an infrainguinal bypass graft?

- A. Uniform laminar flow along the graft
- B. Expected low velocity in a large graft
- C. Triphasic native inflow without change
- D. Focal graft velocity increase and disturbed flow

94. A sonographer is reviewing a technically adequate study. which response best addresses this question: which finding suggests stenosis in an infrainguinal bypass graft?

- A. Uniform laminar flow along the graft
- B. Expected low velocity in a large graft
- C. Focal graft velocity increase and disturbed flow
- D. Triphasic native inflow without change

95. During protocol-based image review, which endovascular aneurysm repair finding represents persistent sac perfusion?

- A. Graft limb patency
- B. Sac shrinkage
- C. Normal triphasic limb flow
- D. Endoleak

96. While completing a focused duplex examination, which response best addresses this question: which endovascular aneurysm repair finding represents persistent sac perfusion?

- A. Endoleak
- B. Graft limb patency
- C. Sac shrinkage
- D. Normal triphasic limb flow

97. A sonographer is reviewing a technically adequate study. which finding indicates a hemodynamically significant dialysis graft stenosis?

- A. Uniform graft velocity and color fill
- B. Expected arterialized venous outflow
- C. Focal velocity acceleration with lumen narrowing
- D. Patent anastomosis without turbulence

98. During protocol-based image review, which response best addresses this question: which finding indicates a hemodynamically significant dialysis graft stenosis?

- A. Uniform graft velocity and color fill
- B. Focal velocity acceleration with lumen narrowing
- C. Expected arterialized venous outflow
- D. Patent anastomosis without turbulence

99. While completing a focused duplex examination, which waveform is expected in the artery feeding a functioning dialysis fistula?

- A. Low-resistance waveform with increased diastolic flow
- B. High-resistance waveform with reversal
- C. Absent systolic flow throughout
- D. Normal portal venous waveform

100. A sonographer is reviewing a technically adequate study. which response best addresses this question: which waveform is expected in the artery feeding a functioning dialysis fistula?

- A. High-resistance waveform with reversal
- B. Absent systolic flow throughout
- C. Normal portal venous waveform
- D. Low-resistance waveform with increased diastolic flow

101. During protocol-based image review, which physiologic pattern supports small-vessel disease in the foot?

- A. Normal toe and ankle waveforms
- B. Abnormal toe waveforms despite acceptable ankle pressures
- C. Triphasic brachial signals
- D. Normal venous augmentation

102. While completing a focused duplex examination, which response best addresses this question: which physiologic pattern supports small-vessel disease in the foot?

- A. Normal toe and ankle waveforms
- B. Triphasic brachial signals
- C. Abnormal toe waveforms despite acceptable ankle pressures
- D. Normal venous augmentation

103. A sonographer is reviewing a technically adequate study. which physiologic test is most useful when ankle arteries are noncompressible?

- A. Ankle pressure alone
- B. Carotid pressure ratio
- C. Portal pulsatility index
- D. Toe pressure or toe-brachial index

104. During protocol-based image review, which response best addresses this question: which physiologic test is most useful when ankle arteries are noncompressible?

- A. Ankle pressure alone
- B. Carotid pressure ratio
- C. Toe pressure or toe-brachial index
- D. Portal pulsatility index

105. While completing a focused duplex examination, which maneuver is used to provoke lower-extremity venous reflux?

- A. Distal compression followed by sudden release
- B. Sustained proximal arterial compression
- C. Rapid ankle pressure inflation only
- D. Quiet breathing without augmentation

106. A sonographer is reviewing a technically adequate study. which response best addresses this question: which maneuver is used to provoke lower-extremity venous reflux?

- A. Sustained proximal arterial compression
- B. Distal compression followed by sudden release
- C. Rapid ankle pressure inflation only
- D. Quiet breathing without augmentation

107. During protocol-based image review, which plethysmographic change suggests arterial inflow obstruction?

- A. Brisk upstroke with prominent peak
- B. Normal respiratory venous variation
- C. Reduced waveform amplitude with delayed systolic rise
- D. Increased amplitude after occlusion

108. While completing a focused duplex examination, which response best addresses this question: which plethysmographic change suggests arterial inflow obstruction?

- A. Reduced waveform amplitude with delayed systolic rise
- B. Brisk upstroke with prominent peak
- C. Normal respiratory venous variation
- D. Increased amplitude after occlusion

109. A sonographer is reviewing a technically adequate study. which test best evaluates segmental severity of lower-extremity arterial disease?

- A. Venous reflux examination
- B. Carotid duplex only
- C. Portal vein Doppler
- D. Segmental pressures with pulse volume recordings

110. During protocol-based image review, which response best addresses this question: which test best evaluates segmental severity of lower-extremity arterial disease?

- A. Venous reflux examination
- B. Segmental pressures with pulse volume recordings
- C. Carotid duplex only
- D. Portal vein Doppler

111. While completing a focused duplex examination, which maneuver helps evaluate thoracic outlet arterial compression?

- A. Supine Valsalva during calf compression
- B. Fasting portal velocity measurement
- C. Trendelenburg carotid scanning
- D. Provocative arm positioning with waveform monitoring

112. A sonographer is reviewing a technically adequate study. which response best addresses this question: which maneuver helps evaluate thoracic outlet arterial compression?

- A. Supine Valsalva during calf compression
- B. Provocative arm positioning with waveform monitoring
- C. Fasting portal velocity measurement
- D. Trendelenburg carotid scanning

113. During protocol-based image review, which finding suggests a pressure cuff is too narrow?

- A. Consistently absent venous signal
- B. Artificially reduced arterial diameter
- C. Artificially elevated measured pressure
- D. Reversed portal flow

114. While completing a focused duplex examination, which response best addresses this question: which finding suggests a pressure cuff is too narrow?

- A. Artificially elevated measured pressure
- B. Consistently absent venous signal
- C. Artificially reduced arterial diameter
- D. Reversed portal flow

115. A sonographer is reviewing a technically adequate study. which response is normal after distal limb exercise in a healthy artery?

- A. Pressure remains markedly depressed for minutes
- B. Ankle pressure returns promptly toward baseline
- C. Waveforms become persistently absent
- D. Venous reflux becomes continuous

116. During protocol-based image review, which response best addresses this question: which response is normal after distal limb exercise in a healthy artery?

- A. Ankle pressure returns promptly toward baseline
- B. Pressure remains markedly depressed for minutes
- C. Waveforms become persistently absent
- D. Venous reflux becomes continuous

117. While completing a focused duplex examination, which method evaluates reactive hyperemia in an arterial study?

- A. Continuous venous compression
- B. Sustained breath holding only
- C. Carotid tapping throughout
- D. Temporary cuff occlusion followed by release

118. A sonographer is reviewing a technically adequate study. which response best addresses this question: which method evaluates reactive hyperemia in an arterial study?

- A. Continuous venous compression
- B. Sustained breath holding only
- C. Temporary cuff occlusion followed by release
- D. Carotid tapping throughout

119. During protocol-based image review, which test assesses hand perfusion before radial artery harvest?

- A. Carotid bruit auscultation only
- B. Palmar arch evaluation with digital waveforms
- C. Portal vein respiratory testing
- D. Calf venous reflux timing

120. While completing a focused duplex examination, which response best addresses this question: which test assesses hand perfusion before radial artery harvest?

- A. Carotid bruit auscultation only
- B. Portal vein respiratory testing
- C. Palmar arch evaluation with digital waveforms
- D. Calf venous reflux timing

121. A sonographer is reviewing a technically adequate study. which ultrasound finding confirms guidewire location within a vessel?

- A. Shadow outside the vessel only
- B. Loss of all vessel compressibility
- C. Stationary skin artifact
- D. Echogenic linear structure coursing in the lumen

122. During protocol-based image review, which response best addresses this question: which ultrasound finding confirms guidewire location within a vessel?

- A. Echogenic linear structure coursing in the lumen
- B. Shadow outside the vessel only
- C. Loss of all vessel compressibility
- D. Stationary skin artifact

123. While completing a focused duplex examination, what is the safest needle visualization principle during ultrasound guidance?

- A. Track only the needle hub
- B. Keep the needle tip continuously identified
- C. Advance whenever tissue moves
- D. Ignore the beam orientation

124. A sonographer is reviewing a technically adequate study. which response best addresses this question: what is the safest needle visualization principle during ultrasound guidance?

- A. Keep the needle tip continuously identified
- B. Track only the needle hub
- C. Advance whenever tissue moves
- D. Ignore the beam orientation

125. During protocol-based image review, which practice helps maintain sterility during an ultrasound-guided procedure?

- A. Use ordinary gel beneath the needle
- B. Touch the field with an uncovered probe
- C. Use a sterile probe cover and sterile gel
- D. Reuse a contaminated cover

126. While completing a focused duplex examination, which response best addresses this question: which practice helps maintain sterility during an ultrasound-guided procedure?

- A. Use ordinary gel beneath the needle
- B. Touch the field with an uncovered probe
- C. Reuse a contaminated cover
- D. Use a sterile probe cover and sterile gel

127. A sonographer is reviewing a technically adequate study. before ultrasound-guided arterial access, what should be confirmed?

- A. Only the patient's height
- B. Target patency and absence of obstructing plaque
- C. Portal vein direction
- D. Carotid intima thickness

128. During protocol-based image review, which response best addresses this question: before ultrasound-guided arterial access, what should be confirmed?

- A. Target patency and absence of obstructing plaque
- B. Only the patient's height
- C. Portal vein direction
- D. Carotid intima thickness

129. While completing a focused duplex examination, what is the purpose of intraoperative completion duplex after bypass?

- A. Measure chronic venous reflux only
- B. Diagnose unrelated carotid disease
- C. Detect technical defects before wound closure
- D. Replace all clinical monitoring

130. A sonographer is reviewing a technically adequate study. which response best addresses this question: what is the purpose of intraoperative completion duplex after bypass?

- A. Measure chronic venous reflux only
- B. Detect technical defects before wound closure
- C. Diagnose unrelated carotid disease
- D. Replace all clinical monitoring

131. During protocol-based image review, during thrombin injection of a pseudoaneurysm, what requires continuous monitoring?

- A. Only systemic venous phasicity
- B. Carotid wall thickness
- C. Portal respiratory variation
- D. Parent artery patency and sac thrombosis

132. While completing a focused duplex examination, which response best addresses this question: during thrombin injection of a pseudoaneurysm, what requires continuous monitoring?

- A. Only systemic venous phasicity
- B. Carotid wall thickness
- C. Portal respiratory variation
- D. Parent artery patency and sac thrombosis

133. A sonographer is reviewing a technically adequate study. what commonly causes spectral broadening artifact?

- A. Excessively large Doppler sample volume
- B. Appropriately centered small gate
- C. Correct angle alignment
- D. Low output power alone

134. During protocol-based image review, which response best addresses this question: what commonly causes spectral broadening artifact?

- A. Appropriately centered small gate
- B. Correct angle alignment
- C. Excessively large Doppler sample volume
- D. Low output power alone

135. While completing a focused duplex examination, which transducer is generally preferred for superficial carotid imaging?

- A. Low-frequency phased array
- B. High-frequency linear array
- C. Continuous-wave pencil probe only
- D. Low-frequency curvilinear array

136. A sonographer is reviewing a technically adequate study. which response best addresses this question: which transducer is generally preferred for superficial carotid imaging?

- A. Low-frequency phased array
- B. Continuous-wave pencil probe only
- C. High-frequency linear array
- D. Low-frequency curvilinear array

137. During protocol-based image review, which quality measure compares test results with a reference standard?

- A. Room turnover time
- B. Patient arrival interval
- C. Transducer cable length
- D. Accuracy correlation

138. While completing a focused duplex examination, which response best addresses this question: which quality measure compares test results with a reference standard?

- A. Accuracy correlation
- B. Room turnover time
- C. Patient arrival interval
- D. Transducer cable length

139. A sonographer is reviewing a technically adequate study. which adjustment reduces color aliasing when true velocity is high?

- A. Increase the color velocity scale
- B. Lower the pulse repetition frequency
- C. Raise baseline without changing scale
- D. Increase persistence maximally

140. During protocol-based image review, which response best addresses this question: which adjustment reduces color aliasing when true velocity is high?

- A. Lower the pulse repetition frequency
- B. Raise baseline without changing scale
- C. Increase the color velocity scale
- D. Increase persistence maximally

141. While completing a focused duplex examination, which control most directly changes the frequency of emitted pulses?

- A. Overall B-mode gain
- B. Dynamic range
- C. Gray-map selection
- D. Pulse repetition frequency

142. A sonographer is reviewing a technically adequate study. which response best addresses this question: which control most directly changes the frequency of emitted pulses?

- A. Overall B-mode gain
- B. Pulse repetition frequency
- C. Dynamic range
- D. Gray-map selection

143. During protocol-based image review, what should be done when a transducer cable has exposed wiring?

- A. Remove it from service and report the defect
- B. Cover it temporarily and continue
- C. Immerse the connector in disinfectant
- D. Use maximum output to test it

144. While completing a focused duplex examination, which response best addresses this question: what should be done when a transducer cable has exposed wiring?

- A. Cover it temporarily and continue
- B. Immerse the connector in disinfectant
- C. Use maximum output to test it
- D. Remove it from service and report the defect

145. A sonographer is reviewing a technically adequate study. which action follows the ALARA principle?

- A. Use maximum output throughout imaging
- B. Maintain prolonged spectral Doppler sampling
- C. Use minimum output and exposure needed
- D. Disregard displayed output indicators

146. During protocol-based image review, which response best addresses this question: which action follows the ALARA principle?

- A. Use maximum output throughout imaging
- B. Use minimum output and exposure needed
- C. Maintain prolonged spectral Doppler sampling
- D. Disregard displayed output indicators

147. While completing a focused duplex examination, what is the effect of increasing wall filter?

- A. Improved display of slow venous flow
- B. Increased penetration of B-mode
- C. Elimination of all aliasing
- D. Removal of low-frequency Doppler shifts

148. A sonographer is reviewing a technically adequate study. which response best addresses this question: what is the effect of increasing wall filter?

- A. Removal of low-frequency Doppler shifts
- B. Improved display of slow venous flow
- C. Increased penetration of B-mode
- D. Elimination of all aliasing

149. During protocol-based image review, what does color Doppler blooming indicate?

- A. The vessel is definitely stenosed
- B. The transducer frequency is too low only
- C. Color gain is excessively high
- D. The wall filter is always too high

150. While completing a focused duplex examination, which response best addresses this question: what does color Doppler blooming indicate?

- A. The vessel is definitely stenosed
- B. Color gain is excessively high
- C. The transducer frequency is too low only
- D. The wall filter is always too high

151. A sonographer is reviewing a technically adequate study. which Doppler angle practice best supports reproducible velocity measurement?

- A. Keep the correction cursor parallel to flow at 60 degrees or less
- B. Use 90 degrees for every vessel
- C. Align the cursor with the vessel wall regardless of flow
- D. Change the angle between serial measurements

152. During protocol-based image review, which response best addresses this question: which Doppler angle practice best supports reproducible velocity measurement?

- A. Use 90 degrees for every vessel
- B. Keep the correction cursor parallel to flow at 60 degrees or less
- C. Align the cursor with the vessel wall regardless of flow
- D. Change the angle between serial measurements

153. While completing a focused duplex examination, which phantom test evaluates distance measurement accuracy?

- A. Measuring patient blood pressure
- B. Counting stored reports
- C. Imaging known targets at calibrated separations
- D. Reviewing appointment duration

154. A sonographer is reviewing a technically adequate study. which response best addresses this question: which phantom test evaluates distance measurement accuracy?

- A. Measuring patient blood pressure
- B. Counting stored reports
- C. Reviewing appointment duration
- D. Imaging known targets at calibrated separations

155. During protocol-based image review, which change improves detection of very slow venous flow?

- A. Raise scale and wall filter
- B. Increase transducer pressure
- C. Lower scale and wall filter
- D. Reduce color gain to zero

156. While completing a focused duplex examination, which response best addresses this question: which change improves detection of very slow venous flow?

- A. Raise scale and wall filter
- B. Increase transducer pressure
- C. Reduce color gain to zero
- D. Lower scale and wall filter

157. A sonographer is reviewing a technically adequate study. what should occur before scanning a painful postoperative limb?

- A. Explain the examination and assess tolerance and precautions
- B. Apply maximal pressure immediately
- C. Remove dressings without authorization
- D. Ignore infection-control requirements

158. During protocol-based image review, which response best addresses this question: what should occur before scanning a painful postoperative limb?

- A. Apply maximal pressure immediately
- B. Explain the examination and assess tolerance and precautions
- C. Remove dressings without authorization
- D. Ignore infection-control requirements

159. While completing a focused duplex examination, before beginning a vascular examination, which action is essential?

- A. Rely only on room location
- B. Verify patient identity using approved identifiers
- C. Use the diagnosis as identity
- D. Ask another patient to confirm

160. A sonographer is reviewing a technically adequate study. which response best addresses this question: before beginning a vascular examination, which action is essential?

- A. Rely only on room location
- B. Use the diagnosis as identity
- C. Verify patient identity using approved identifiers
- D. Ask another patient to confirm

161. During protocol-based image review, how should a critical vascular finding be documented?

- A. Mention it only at shift change
- B. Delete preliminary images
- C. Wait for routine report signing
- D. Record the finding, recipient, time, and read-back per policy

162. While completing a focused duplex examination, which response best addresses this question: how should a critical vascular finding be documented?

- A. Record the finding, recipient, time, and read-back per policy
- B. Mention it only at shift change
- C. Delete preliminary images
- D. Wait for routine report signing

163. A sonographer is reviewing a technically adequate study. what is the best response when the ultrasound order conflicts with the patient's symptoms?

- A. Clarify the requested examination before proceeding
- B. Perform an unrelated study without notice
- C. Change the order silently
- D. Ignore the symptoms completely

164. During protocol-based image review, which response best addresses this question: what is the best response when the ultrasound order conflicts with the patient's symptoms?

- A. Perform an unrelated study without notice
- B. Change the order silently
- C. Ignore the symptoms completely
- D. Clarify the requested examination before proceeding

165. While completing a focused duplex examination, which documentation supports reproducible serial surveillance?

- A. Save one unlabeled image
- B. Report only that flow was seen
- C. Record vessel segment, method, angle, and measured values
- D. Omit prior-study comparison

166. A sonographer is reviewing a technically adequate study. which response best addresses this question: which documentation supports reproducible serial surveillance?

- A. Save one unlabeled image
- B. Record vessel segment, method, angle, and measured values
- C. Report only that flow was seen
- D. Omit prior-study comparison

167. During protocol-based image review, which preparation is commonly requested for a mesenteric duplex study?

- A. Heavy meal immediately beforehand
- B. Continuous exercise before scanning
- C. Full bladder for every patient
- D. Fasting to reduce bowel gas and postprandial flow effects

168. While completing a focused duplex examination, which response best addresses this question: which preparation is commonly requested for a mesenteric duplex study?

- A. Fasting to reduce bowel gas and postprandial flow effects
- B. Heavy meal immediately beforehand
- C. Continuous exercise before scanning
- D. Full bladder for every patient

169. A sonographer is reviewing a technically adequate study. which history detail is most relevant before a lower-extremity arterial study?

- A. Preferred sleeping position only
- B. Location and timing of exertional symptoms
- C. Remote dental procedure
- D. Dominant writing hand alone

170. During protocol-based image review, which response best addresses this question: which history detail is most relevant before a lower-extremity arterial study?

- A. Preferred sleeping position only
- B. Remote dental procedure
- C. Location and timing of exertional symptoms
- D. Dominant writing hand alone

Practice Exam 13: Answer Key and Explanations

- 1. A** — The posterior tibial artery travels behind the medial malleolus with its paired veins and is accessible there for Doppler assessment. The anterior tibial continues onto the dorsum as dorsalis pedis. The peroneal artery courses deeper along the fibula. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final.
- 2. C** — The posterior tibial artery travels behind the medial malleolus with its paired veins and is accessible there for Doppler assessment. The anterior tibial continues onto the dorsum as dorsalis pedis. The peroneal artery courses deeper along the fibula. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique.
- 3. B** — The main portal vein is usually formed posterior to the pancreatic neck by union of the splenic and superior mesenteric veins. It carries nutrient-rich blood toward the liver. Hepatic veins instead drain the liver into the inferior vena cava. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the.
- 4. D** — The main portal vein is usually formed posterior to the pancreatic neck by union of the splenic and superior mesenteric veins. It carries nutrient-rich blood toward the liver. Hepatic veins instead drain the liver into the inferior vena cava. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent.
- 5. A** — Deep calf arteries are commonly accompanied by paired venae comitantes, including the posterior tibial veins. The great and small saphenous veins are superficial single trunks, while the common femoral vein is normally a single proximal vessel. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.
- 6. C** — Deep calf arteries are commonly accompanied by paired venae comitantes, including the posterior tibial veins. The great and small saphenous veins are superficial single trunks, while the common femoral vein is normally a single proximal vessel. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.
- 7. C** — The superior thyroid artery is usually the first anterior branch of the external carotid and supplies the upper thyroid. Its presence can help distinguish the external carotid from the internal carotid, which has no cervical branches. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.
- 8. A** — The superior thyroid artery is usually the first anterior branch of the external carotid and supplies the upper thyroid. Its presence can help distinguish the external carotid from the internal

carotid, which has no cervical branches. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.

9. D — The great saphenous vein travels anterior to the medial malleolus and ascends along the medial leg and thigh to join the common femoral vein. The small saphenous courses posteriorly, while tibial and peroneal veins are deep paired veins. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final.

10. B — The great saphenous vein travels anterior to the medial malleolus and ascends along the medial leg and thigh to join the common femoral vein. The small saphenous courses posteriorly, while tibial and peroneal veins are deep paired veins. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique.

11. C — The left renal vein crosses anterior to the aorta and posterior to the superior mesenteric artery before entering the inferior vena cava. This anatomic corridor is clinically important because compression there can produce nutcracker physiology. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

12. B — The left renal vein crosses anterior to the aorta and posterior to the superior mesenteric artery before entering the inferior vena cava. This anatomic corridor is clinically important because compression there can produce nutcracker physiology. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

13. D — The superior mesenteric artery arises from the anterior aorta and passes over the left renal vein. This relationship creates the anatomic angle implicated in renal vein compression. The other arteries have different origins or courses. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

14. A — The superior mesenteric artery arises from the anterior aorta and passes over the left renal vein. This relationship creates the anatomic angle implicated in renal vein compression. The other arteries have different origins or courses. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

15. A — At the groin the common femoral vein generally lies medial to the common femoral artery. Recognizing this relationship supports correct vessel identification and compression technique. The great saphenous joins superficially, while the deep femoral and external iliac occupy different levels. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before.

16. D — At the groin the common femoral vein generally lies medial to the common femoral artery. Recognizing this relationship supports correct vessel identification and compression technique. The great saphenous joins superficially, while the deep femoral and external iliac occupy different levels.

The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding..

17. B — In the usual arch configuration, the brachiocephalic artery is the first branch. It subsequently divides into the right common carotid and right subclavian arteries. The left common carotid and left subclavian arise separately and more distally from the arch. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the.

18. C — In the usual arch configuration, the brachiocephalic artery is the first branch. It subsequently divides into the right common carotid and right subclavian arteries. The left common carotid and left subclavian arise separately and more distally from the arch. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent.

19. D — The common carotid typically bifurcates near the C3-C4 level, around the upper border of the thyroid cartilage, although normal variation exists. The clavicle and aortic arch are too proximal, and the mandibular angle is usually more distal. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

20. A — The common carotid typically bifurcates near the C3-C4 level, around the upper border of the thyroid cartilage, although normal variation exists. The clavicle and aortic arch are too proximal, and the mandibular angle is usually more distal. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and.

21. B — After passing through the adductor hiatus, the superficial femoral artery becomes the popliteal artery. The popliteal later divides into tibial pathways. The deep femoral branches proximally, and the common femoral is located above the bifurcation. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

22. C — After passing through the adductor hiatus, the superficial femoral artery becomes the popliteal artery. The popliteal later divides into tibial pathways. The deep femoral branches proximally, and the common femoral is located above the bifurcation. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

23. B — A healthy resting limb artery typically shows rapid systolic forward flow, brief early-diastolic reversal, and late-diastolic forward flow. This triphasic pattern reflects good arterial compliance and high peripheral resistance. Continuous monophasic flow suggests altered resistance or disease, while the other patterns are venous. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's.

24. A — A healthy resting limb artery typically shows rapid systolic forward flow, brief early-diastolic reversal, and late-diastolic forward flow. This triphasic pattern reflects good arterial compliance and high peripheral resistance. Continuous monophasic flow suggests altered resistance or disease, while the

other patterns are venous. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best.

25. C — The middle cerebral artery is commonly found through the transtemporal window and normally flows toward the transducer at standard depths. The basilar and vertebral arteries are usually assessed through the suboccipital window, while the ophthalmic artery is examined transorbitally. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the.

26. D — The middle cerebral artery is commonly found through the transtemporal window and normally flows toward the transducer at standard depths. The basilar and vertebral arteries are usually assessed through the suboccipital window, while the ophthalmic artery is examined transorbitally. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent.

27. A — The anterior tibial artery crosses the ankle and continues as the dorsalis pedis artery on the foot. The posterior tibial passes behind the medial malleolus, while the peroneal remains deeper and lateral. The popliteal divides proximally into tibial pathways. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the.

28. B — The anterior tibial artery crosses the ankle and continues as the dorsalis pedis artery on the foot. The posterior tibial passes behind the medial malleolus, while the peroneal remains deeper and lateral. The popliteal divides proximally into tibial pathways. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent.

29. D — The hepatic veins carry blood from the liver directly into the inferior vena cava near the diaphragm. Portal, splenic, and superior mesenteric veins belong to the portal circulation and deliver blood to the liver rather than directly to the cava. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before.

30. C — The hepatic veins carry blood from the liver directly into the inferior vena cava near the diaphragm. Portal, splenic, and superior mesenteric veins belong to the portal circulation and deliver blood to the liver rather than directly to the cava. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding..

31. C — The internal carotid supplies the brain, a continuously perfused low-resistance vascular bed, so forward diastolic flow is normally prominent. External carotid branches supply higher-resistance facial and scalp beds and generally demonstrate more pulsatility and less sustained diastolic flow. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final.

32. D — The internal carotid supplies the brain, a continuously perfused low-resistance vascular bed, so forward diastolic flow is normally prominent. External carotid branches supply higher-resistance facial and scalp beds and generally demonstrate more pulsatility and less sustained diastolic flow. The

alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique.

33. A — Hepatopetal means flowing toward the liver and describes normal main portal venous direction. Hepatofugal denotes flow away from the liver and may occur with significant portal hypertension. The remaining terms do not correctly describe normal portal venous direction. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final.

34. B — Hepatopetal means flowing toward the liver and describes normal main portal venous direction. Hepatofugal denotes flow away from the liver and may occur with significant portal hypertension. The remaining terms do not correctly describe normal portal venous direction. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique.

35. D — The external iliac artery becomes the common femoral artery as it passes beneath the inguinal ligament. The common femoral later bifurcates into the superficial femoral and deep femoral arteries. The popliteal artery is a distal continuation beyond the adductor hiatus. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before.

36. B — The external iliac artery becomes the common femoral artery as it passes beneath the inguinal ligament. The common femoral later bifurcates into the superficial femoral and deep femoral arteries. The popliteal artery is a distal continuation beyond the adductor hiatus. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding..

37. A — A proximal subclavian stenosis reduces pressure delivered to the affected arm, creating interarm pressure differences and dampened downstream arterial waveforms. Severe disease may alter vertebral flow direction. The alternative lesions do not explain the full upper-extremity pattern. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

38. C — A proximal subclavian stenosis reduces pressure delivered to the affected arm, creating interarm pressure differences and dampened downstream arterial waveforms. Severe disease may alter vertebral flow direction. The alternative lesions do not explain the full upper-extremity pattern. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and.

39. B — A significant narrowing accelerates blood locally and often produces spectral broadening and turbulence downstream. Comparing the stenotic velocity with an adjacent normal segment strengthens interpretation. Uniform velocity and normal venous findings do not demonstrate focal arterial narrowing. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

40. C — A significant narrowing accelerates blood locally and often produces spectral broadening and turbulence downstream. Comparing the stenotic velocity with an adjacent normal segment strengthens interpretation. Uniform velocity and normal venous findings do not demonstrate focal arterial narrowing. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and.

41. A — Sustained retrograde flow following Valsalva or distal augmentation indicates failure of valve closure and supports reflux. Compressibility evaluates thrombus, while antegrade augmentation demonstrates a patent pathway but does not itself prove valvular competence. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

42. D — Sustained retrograde flow following Valsalva or distal augmentation indicates failure of valve closure and supports reflux. Compressibility evaluates thrombus, while antegrade augmentation demonstrates a patent pathway but does not itself prove valvular competence. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

43. B — Mural thrombus may appear echogenic or heterogeneous and lacks internal flow when Doppler settings are sufficiently sensitive. The remaining patent lumen should fill with color and produce spectral signals. Multiple planes help distinguish thrombus from artifact. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

44. A — Mural thrombus may appear echogenic or heterogeneous and lacks internal flow when Doppler settings are sufficiently sensitive. The remaining patent lumen should fill with color and produce spectral signals. Multiple planes help distinguish thrombus from artifact. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.

45. D — Superficial thrombophlebitis typically produces pain, tenderness, wall thickening, intraluminal thrombus, noncompressibility, and surrounding inflammatory change in a superficial vein. Deep veins must also be assessed because concurrent deep thrombosis can occur. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

46. C — Superficial thrombophlebitis typically produces pain, tenderness, wall thickening, intraluminal thrombus, noncompressibility, and surrounding inflammatory change in a superficial vein. Deep veins must also be assessed because concurrent deep thrombosis can occur. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

47. B — An irregular plaque surface with a distinct crater communicating with the lumen suggests ulceration and possible embolic potential. Smooth homogeneous contour and uniform blood filling do not indicate surface disruption. Careful multiplanar imaging helps avoid artifact. The conclusion should

be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

48. A — An irregular plaque surface with a distinct crater communicating with the lumen suggests ulceration and possible embolic potential. Smooth homogeneous contour and uniform blood filling do not indicate surface disruption. Careful multiplanar imaging helps avoid artifact. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.

49. C — Bilateral elevation of intrarenal resistance suggests diffuse parenchymal or small-vessel disease, especially when kidneys show structural changes. Focal ostial acceleration and post-stenotic turbulence are direct signs of main renal artery narrowing. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

50. D — Bilateral elevation of intrarenal resistance suggests diffuse parenchymal or small-vessel disease, especially when kidneys show structural changes. Focal ostial acceleration and post-stenotic turbulence are direct signs of main renal artery narrowing. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

51. A — The median arcuate ligament may compress the proximal celiac artery more during expiration as the diaphragm rises, producing respiratory variation in velocity and vessel contour. The other conditions do not characteristically create this dynamic celiac pattern. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

52. D — The median arcuate ligament may compress the proximal celiac artery more during expiration as the diaphragm rises, producing respiratory variation in velocity and vessel contour. The other conditions do not characteristically create this dynamic celiac pattern. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.

53. C — True occlusion requires failure to detect flow after optimizing gain, scale, wall filter, power Doppler, and insonation approach. Demonstrable trickle flow establishes patency and near occlusion. Aliasing or post-stenotic disturbance also implies residual flow. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

54. B — True occlusion requires failure to detect flow after optimizing gain, scale, wall filter, power Doppler, and insonation approach. Demonstrable trickle flow establishes patency and near occlusion. Aliasing or post-stenotic disturbance also implies residual flow. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

55. C — Common femoral venous flow should vary with respiration. Persistent continuous flow, especially when asymmetric, suggests proximal obstruction such as iliac thrombosis or compression. Normal augmentation and compressibility address patency but do not exclude a more proximal lesion. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

56. D — Common femoral venous flow should vary with respiration. Persistent continuous flow, especially when asymmetric, suggests proximal obstruction such as iliac thrombosis or compression. Normal augmentation and compressibility address patency but do not exclude a more proximal lesion. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and.

57. A — Dissection may create an intimal flap separating true and false lumens, with differing flow patterns or mural hematoma. Atherosclerotic calcification at the bulb and symmetric normal flow do not establish dissection. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

58. B — Dissection may create an intimal flap separating true and false lumens, with differing flow patterns or mural hematoma. Atherosclerotic calcification at the bulb and symmetric normal flow do not establish dissection. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

59. C — Chronic thrombotic change commonly appears echogenic, contracted, wall adherent, and partly recanalized, sometimes with collaterals. Acute thrombus more often distends the vein and is relatively hypoechoic. Clinical history and the full examination remain important. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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61. A — Vasospasm narrows the arterial lumen and can produce a focal rise in mean velocity. Interpretation should consider velocity ratios, trends, insonation quality, and hyperemia because elevated flow states can also increase velocity. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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63. C — Bilateral monophasic common femoral waveforms suggest inflow disease proximal to both groins, often involving the aorta or iliac arteries. Normal triphasic distal waveforms would argue against major inflow compromise. The other findings involve different vascular systems. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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65. B — Ischemic tissue lowers distal resistance, often producing monophasic arterial flow with persistent forward diastolic flow. A crisp triphasic pattern reflects normal high resistance at rest. Venous phasicity is not an arterial resistance indicator. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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67. D — An arteriovenous fistula provides a low-resistance pathway, increasing arterial velocity and diastolic flow near the communication. The draining vein may become pulsatile and arterialized. Absent diastolic flow and increased resistance contradict this physiology. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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69. C — A patent pseudoaneurysm often shows bidirectional swirling color, commonly called the yin-yang sign, because blood circulates within the sac. The diagnosis is strengthened by demonstrating neck continuity and a to-and-fro spectral waveform. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

71. D — Tardus-parvus morphology combines a delayed systolic upstroke with reduced systolic amplitude and reflects dampening beyond a significant proximal stenosis. It is an indirect downstream sign. Venous reflux and isolated fistula physiology produce different waveform changes. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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73. A — A pressure-reducing stenosis or occlusion proximal to the vertebral origin can draw blood retrograde down the vertebral artery to supply the arm, producing subclavian steal physiology. Carotid and jugular lesions do not create this classic pattern. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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75. D — Popliteal artery entrapment can be provoked by plantar flexion or dorsiflexion, causing dynamic lumen narrowing, velocity change, or temporary occlusion. Testing must correlate symptoms and compare neutral with provocative positions. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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77. C — Periaortic fluid or hematoma combined with focal wall disruption is an urgent sign of possible leakage or rupture. Mural thrombus and calcification are common chronic aneurysm features and do not alone establish rupture. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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79. B — Acute thrombus often makes the vein enlarged and noncompressible, with relatively hypoechoic intraluminal material. Chronic disease more often produces wall thickening, echogenic residual material, webs, reduced caliber, and collateral channels. Compression remains the primary diagnostic maneuver. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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81. A — Advanced portal hypertension may reverse portal flow away from the liver, termed hepatofugal flow, and can produce collateral pathways. Normal portal flow is hepatopetal. Direction must be verified with correct color map and spectral baseline settings. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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83. D — Calcium strongly attenuates and reflects ultrasound, commonly creating bright echoes with posterior acoustic shadowing. Soft plaque and fresh thrombus tend to be less echogenic and usually do not produce dense shadowing. Shadowing can obscure the residual lumen. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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85. C — Blood entering the pseudoaneurysm during systole and returning toward the parent artery during diastole creates the characteristic to-and-fro neck waveform. Swirling color may appear within the sac. Complete absence of flow suggests thrombosis rather than a patent pseudoaneurysm. The

conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final.

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87. C — A severe upstream lesion dissipates pulse energy and delays systolic acceleration, causing a dampened tardus-parvus or monophasic distal waveform. A sharp triphasic contour argues against major proximal obstruction at that level. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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89. A — A focal velocity ratio near 2:1 commonly supports an approximately 50% diameter reduction in many peripheral arterial criteria sets. Exact thresholds are laboratory and vessel specific, so morphology, color findings, and downstream waveforms must also be considered. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report.

90. B — A focal velocity ratio near 2:1 commonly supports an approximately 50% diameter reduction in many peripheral arterial criteria sets. Exact thresholds are laboratory and vessel specific, so morphology, color findings, and downstream waveforms must also be considered. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and.

91. B — A mobile thrombus at a fresh carotid repair poses an embolic risk and warrants immediate communication according to laboratory policy. Mild wall irregularity or caliber change may be postoperative. The complete study and clinical condition guide escalation. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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93. D — A focal velocity rise with visible narrowing and disturbed flow supports bypass graft stenosis. Surveillance requires assessment of inflow, the entire conduit, both anastomoses, and outflow. Uniform laminar flow does not indicate a focal lesion. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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95. D — An endoleak is continued blood flow outside the stent graft but within the aneurysm sac. Surveillance evaluates leak presence, source, sac size, and graft limb patency. Sac shrinkage generally supports successful exclusion rather than persistent perfusion. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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97. C — A graft stenosis produces focal narrowing, marked velocity acceleration, aliasing, and often downstream turbulence. Interpretation also considers access flow and velocity ratios. Arterialized venous outflow is expected in a functioning access and is not alone abnormal. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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99. A — A mature fistula creates a low-resistance shunt, so the feeding artery demonstrates increased volume flow and prominent forward diastolic flow. High resistance may suggest access dysfunction or poor outflow. Portal venous morphology is unrelated. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

101. B — Distal small-vessel disease may impair toe pressures and photoplethysmographic waveforms even when ankle pressures appear acceptable, particularly when calcification makes ankle vessels unreliable. Toe findings better reflect distal perfusion. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

102. C — Distal small-vessel disease may impair toe pressures and photoplethysmographic waveforms even when ankle pressures appear acceptable, particularly when calcification makes ankle vessels unreliable. Toe findings better reflect distal perfusion. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

103. D — Digital arteries are less commonly affected by medial calcification than ankle arteries, so toe pressures and toe-brachial indices can provide useful perfusion information when ankle pressures are artificially elevated or noncompressible. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

104. C — Digital arteries are less commonly affected by medial calcification than ankle arteries, so toe pressures and toe-brachial indices can provide useful perfusion information when ankle pressures are artificially elevated or noncompressible. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

105. A — Manual distal compression followed by release creates an antegrade bolus and then challenges valve closure. Retrograde flow persisting beyond the laboratory threshold supports reflux. Patient position and technique should follow validated protocol. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

106. B — Manual distal compression followed by release creates an antegrade bolus and then challenges valve closure. Retrograde flow persisting beyond the laboratory threshold supports reflux. Patient position and technique should follow validated protocol. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

107. C — Pulse volume recordings distal to significant inflow disease lose amplitude, have a rounded delayed upstroke, and may lose the dicrotic notch. These contour changes complement pressure measurements and are less affected by noncompressible arteries. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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109. D — Segmental limb pressures and pulse volume recordings localize hemodynamically important arterial disease by comparing pressure drops and waveform morphology at multiple levels. Venous, carotid, and portal examinations answer different clinical questions. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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111. D — Thoracic outlet assessment compares arterial waveforms or photoplethysmographic signals during neutral and provocative arm positions while reproducing symptoms cautiously. Positional loss alone can occur in healthy people, so clinical correlation is essential. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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113. C — A cuff that is too narrow requires excessive pressure to occlude the artery and can falsely elevate the recorded systolic pressure. Correct cuff width and placement are essential for reliable segmental and ankle measurements. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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115. B — In a healthy arterial system, exercise increases flow but ankle pressure recovers rapidly. A substantial postexercise pressure drop with delayed recovery can unmask hemodynamically significant disease that is not evident at rest. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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117. D — Inflating a cuff to temporarily occlude arterial inflow and then releasing it produces reactive hyperemia. The resulting pressure and waveform response can reveal disease by increasing flow demand, although exercise testing is often preferred when feasible. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

118. C — Inflating a cuff to temporarily occlude arterial inflow and then releasing it produces reactive hyperemia. The resulting pressure and waveform response can reveal disease by increasing flow demand, although exercise testing is often preferred when feasible. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical.

119. B — Palmar arch testing evaluates whether ulnar collateral flow can maintain digital perfusion if the radial artery is removed or used. Digital photoplethysmographic waveforms are observed during selective arterial compression. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

120. C — Palmar arch testing evaluates whether ulnar collateral flow can maintain digital perfusion if the radial artery is removed or used. Digital photoplethysmographic waveforms are observed during selective arterial compression. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

121. D — A guidewire appears as an echogenic linear structure within the vessel lumen and should be followed in more than one plane when practical. Visualization helps prevent extraluminal advancement or entry into an unintended branch. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

122. A — A guidewire appears as an echogenic linear structure within the vessel lumen and should be followed in more than one plane when practical. Visualization helps prevent extraluminal advancement or entry into an unintended branch. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

123. B — Continuous identification of the needle tip reduces the chance of unintended vessel, nerve, or organ injury. In-plane or out-of-plane technique may be used, but the operator must distinguish the tip from the shaft before advancing. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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125. C — A sterile transducer cover and sterile coupling gel help preserve the sterile field during invasive guidance. Standard nonsterile gel or an uncovered probe can introduce contamination. Local infection-control policy also governs preparation and handling. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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127. B — Preaccess ultrasound should identify the artery, vein, bifurcation, plaque, thrombus, depth, and surrounding structures. Selecting a patent segment without obstructive anterior-wall plaque improves access safety and success. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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129. C — Completion duplex can identify residual stenosis, intimal flap, thrombus, poor anastomotic geometry, or inadequate flow while surgical correction remains immediately possible. It complements, rather than replaces, operative judgment and postoperative surveillance. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

130. B — Completion duplex can identify residual stenosis, intimal flap, thrombus, poor anastomotic geometry, or inadequate flow while surgical correction remains immediately possible. It complements, rather than replaces, operative judgment and postoperative surveillance. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

131. D — Ultrasound monitoring documents needle position, progressive sac thrombosis, and continued parent artery and distal arterial patency. Thrombin entering the native artery can cause embolic occlusion, so real-time observation is critical. The conclusion should be correlated with the complete

examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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133. A — A large sample volume includes a wider range of velocities from different streamlines and can fill the spectral window artificially. Gate size, placement, gain, and beam-vessel geometry should be optimized before interpreting turbulence. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

134. C — A large sample volume includes a wider range of velocities from different streamlines and can fill the spectral window artificially. Gate size, placement, gain, and beam-vessel geometry should be optimized before interpreting turbulence. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

135. B — A high-frequency linear array provides strong near-field detail and a rectangular field suitable for superficial carotid vessels. Lower-frequency arrays penetrate deeper but sacrifice resolution. A pencil probe does not provide anatomic B-mode imaging. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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137. D — Comparing vascular laboratory classifications with angiography, surgery, or another accepted reference helps estimate sensitivity, specificity, predictive values, and overall accuracy. Operational timing measures may be useful administratively but do not establish diagnostic agreement. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

138. A — Comparing vascular laboratory classifications with angiography, surgery, or another accepted reference helps estimate sensitivity, specificity, predictive values, and overall accuracy. Operational timing measures may be useful administratively but do not establish diagnostic agreement. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

139. A — Increasing the color scale or pulse repetition frequency expands the measurable velocity range and reduces aliasing. Lowering the scale worsens aliasing. Baseline shift changes display allocation but does not increase the total Nyquist range. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

140. C — Increasing the color scale or pulse repetition frequency expands the measurable velocity range and reduces aliasing. Lowering the scale worsens aliasing. Baseline shift changes display allocation but does not increase the total Nyquist range. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

141. D — Pulse repetition frequency determines how often pulses are transmitted and affects the maximum unaliased Doppler velocity and imaging depth. Gain and gray mapping change display appearance but do not set transmission timing. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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143. A — Exposed wiring creates electrical, infection-control, and equipment risks. The transducer should be removed from clinical service, labeled according to policy, and reported for inspection or replacement rather than temporarily patched and reused. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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145. C — ALARA means keeping acoustic exposure as low as reasonably achievable while obtaining diagnostic information. Operators should minimize output power and dwell time, particularly with spectral Doppler, without compromising the necessary examination. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

146. B — ALARA means keeping acoustic exposure as low as reasonably achievable while obtaining diagnostic information. Operators should minimize output power and dwell time, particularly with spectral Doppler, without compromising the necessary examination. The alternatives describe a different

vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

147. D — The wall filter suppresses low-frequency signals from vessel wall and tissue motion. Setting it too high can erase genuine slow flow, especially venous or end-diastolic signals. It does not directly improve penetration or eliminate velocity aliasing. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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149. C — Excess color gain allows noise and color to extend beyond the vessel walls, creating blooming and an apparent oversized lumen. Gain should be increased to noise and then reduced slightly for a stable display. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

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151. A — Velocity error increases sharply as the insonation angle approaches 90 degrees. Aligning the correction cursor with the actual flow direction and maintaining an angle of 60 degrees or less improves accuracy and reproducibility. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

152. B — Velocity error increases sharply as the insonation angle approaches 90 degrees. Aligning the correction cursor with the actual flow direction and maintaining an angle of 60 degrees or less improves accuracy and reproducibility. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

153. C — A tissue-equivalent phantom contains targets at known distances. Comparing displayed measurements with those reference separations evaluates vertical and horizontal distance accuracy. Patient and workflow measures do not test scanner spatial calibration. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

154. D — A tissue-equivalent phantom contains targets at known distances. Comparing displayed measurements with those reference separations evaluates vertical and horizontal distance accuracy. Patient and workflow measures do not test scanner spatial calibration. The alternatives describe a

different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

155. C — Slow venous flow produces low-frequency shifts. Lowering the pulse repetition frequency and wall filter makes these signals easier to display. Excess pressure may collapse the vein, while excessive gain reduction hides flow. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

156. D — Slow venous flow produces low-frequency shifts. Lowering the pulse repetition frequency and wall filter makes these signals easier to display. Excess pressure may collapse the vein, while excessive gain reduction hides flow. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

157. A — The sonographer should explain the procedure, review surgical precautions, inspect the area, assess pain and tolerance, and modify pressure or positioning appropriately. Dressings and wounds require authorization and infection-control measures. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

158. B — The sonographer should explain the procedure, review surgical precautions, inspect the area, assess pain and tolerance, and modify pressure or positioning appropriately. Dressings and wounds require authorization and infection-control measures. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

159. B — Using approved identifiers, commonly name and date of birth, prevents wrong-patient examinations and reporting errors. Room number, diagnosis, or another patient's statement is not a reliable identity check. Institutional policy determines the exact process. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

160. C — Using approved identifiers, commonly name and date of birth, prevents wrong-patient examinations and reporting errors. Room number, diagnosis, or another patient's statement is not a reliable identity check. Institutional policy determines the exact process. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

161. D — Critical-result communication should be prompt and traceable. Documentation generally includes the finding, person notified, time, and confirmation or read-back according to institutional policy. Routine reporting alone may delay necessary care. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

162. A — Critical-result communication should be prompt and traceable. Documentation generally includes the finding, person notified, time, and confirmation or read-back according to institutional policy. Routine reporting alone may delay necessary care. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

163. A — When the order and clinical presentation do not match, the sonographer should clarify the intended examination with the responsible clinician according to policy. Silent substitution or ignoring relevant symptoms risks an incomplete or incorrect study. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

164. D — When the order and clinical presentation do not match, the sonographer should clarify the intended examination with the responsible clinician according to policy. Silent substitution or ignoring relevant symptoms risks an incomplete or incorrect study. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

165. C — Clear labels, standardized segments, technique, Doppler angle, measurements, and comparison with prior results allow subsequent examinations to reproduce the method and evaluate change. Unlabeled or vague documentation weakens surveillance. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

166. B — Clear labels, standardized segments, technique, Doppler angle, measurements, and comparison with prior results allow subsequent examinations to reproduce the method and evaluate change. Unlabeled or vague documentation weakens surveillance. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

167. D — Fasting commonly improves visualization by reducing bowel gas and avoids the normal postprandial increase in mesenteric flow that can alter velocities and resistance. Laboratory protocol determines duration and medication instructions. The conclusion should be correlated with the complete examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

168. A — Fasting commonly improves visualization by reducing bowel gas and avoids the normal postprandial increase in mesenteric flow that can alter velocities and resistance. Laboratory protocol determines duration and medication instructions. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.

169. B — Claudication location, walking distance, rest pain, wounds, prior interventions, medications, and risk factors help tailor the arterial examination and interpret findings. Unrelated history does not meaningfully address limb perfusion. The conclusion should be correlated with the complete

examination, technical quality, symptoms, and the laboratory's validated criteria before the final report is issued.

170. C — Claudication location, walking distance, rest pain, wounds, prior interventions, medications, and risk factors help tailor the arterial examination and interpret findings. Unrelated history does not meaningfully address limb perfusion. The alternatives describe a different vessel, mechanism, or testing purpose and therefore do not best explain the finding. Consistent technique and clinical correlation remain essential.