MULTIPLE CHOICE

VT CEREBROVASCULAR - PRACTICE SET - ANSWER KEY

PROPOSED FOR REVIEW - questions are the author's verbatim Q&A; distractors are auto-selected from other answers in the same bank and must be checked by a subject-matter reviewer (a distractor could coincidentally be correct). Not authoritative assessment content.

1. A patient has a tight ICA stenosis with markedly reduced flow distally. Velocities at the stenosis fall paradoxically low. Which finding best supports a near-occlusion (string sign) rather than a less severe stenosis?

A. A normal-appearing color-filled ICA with PSV of 110 cm/s
B. Complete absence of any color or spectral signal in the ICA
C. A very narrow, thread-like color jet within the ICA lumen with low velocities and a high-grade appearance
D. A widely patent ICA with a focal velocity of 180 cm/s

2. Which of the following best describes the location of the carotid bulb?

A. A focal dilatation at the origin of the CCA from the aortic arch
B. A focal dilatation of the vertebral artery at the C2 level
C. A focal dilatation of the ECA at the angle of the mandible
D. A focal dilatation at the distal CCA extending into the proximal ICA

3. By SRU consensus criteria, which ICA peak systolic velocity (PSV) threshold defines an ICA stenosis of 50 percent or greater?

A. Greater than 100 cm/s
B. Greater than 125 cm/s
C. Greater than 200 cm/s
D. Greater than 230 cm/s

4. In a confirmed complete subclavian steal, what does the spectral Doppler of the affected vertebral artery show at baseline?

A. Normal antegrade low-resistance flow
B. Fully retrograde (reversed) flow throughout the cardiac cycle
C. Antegrade flow with a mid-systolic deceleration notch only
D. Absent flow signal

5. The NASCET method for measuring carotid stenosis uses which two diameters?

A. The residual lumen at the stenosis and the diameter of the normal distal ICA
B. The residual lumen at the stenosis and the diameter of the distal CCA
C. The residual lumen at the stenosis and the diameter of the carotid bulb
D. The residual lumen at the stenosis and the estimated original lumen at the same site

6. Which artifact is most likely to falsely elevate measured peak systolic velocity at the site of a heavily calcified plaque?

A. Twinkle artifact behind the plaque
B. Acoustic shadowing causing the operator to sample only the visible jet rather than the true peak
C. Color bleed into adjacent tissue
D. Mirror-image artifact in the contralateral neck

7. Diffuse tardus-parvus (delayed upstroke, low amplitude) waveforms in both common carotid arteries are most suggestive of which condition?

A. Significant aortic valve stenosis or proximal innominate disease
B. Subclavian steal
C. Carotid body tumor
D. Bilateral severe ICA stenosis distal to the bulb

8. Color Doppler is set up for a carotid duplex study. Which color-scale (PRF) adjustment is appropriate when imaging a normal mid-CCA?

A. A very high PRF that eliminates color filling even at stenoses
B. Always the lowest PRF available regardless of velocity
C. A very low PRF that produces aliasing throughout the lumen even in normal segments
D. A PRF that fills the lumen without aliasing in a normal vessel and reveals focal aliasing only at true high-velocity sites

9. In a standard transcranial Doppler examination, the basilar artery is best insonated through which window?

A. Suboccipital (foramen magnum) window
B. Submandibular window
C. Transorbital window
D. Transtemporal window

10. When examining the vertebral artery in the cervical segment, the sonographer scans between which anatomic landmarks?

A. The thyroid cartilage and the cricoid cartilage
B. The carotid bulb and the angle of the mandible
C. The spinous processes of the cervical vertebrae
D. The transverse processes of the cervical vertebrae

11. By SRU consensus criteria, which ICA-to-CCA peak systolic velocity ratio supports a diagnosis of ICA stenosis of 70 percent or greater?

A. Greater than 1.5
B. Greater than 4
C. Greater than 2
D. Greater than 8

12. Which is the most appropriate next step when carotid duplex velocity criteria are equivocal or borderline (for example, PSV in the 200 to 250 cm/s range with discrepant ratio)?

A. Correlate with a confirmatory imaging study such as CT angiography or MR angiography
B. Ignore the borderline result and report the vessel as normal
C. Report whichever cutoff yields the higher stenosis grade
D. Repeat only the same study on the same machine and report the second result

13. During a carotid duplex, the sonographer performs the temporal tap maneuver. In which vessel will rapid oscillations transmitted into the Doppler waveform confirm the identity of the vessel?

A. Internal carotid artery
B. External carotid artery
C. Common carotid artery
D. Vertebral artery

14. Which is a recognized indication for transcranial Doppler in clinical practice?

A. First-line diagnosis of carotid plaque ulceration
B. Routine screening of asymptomatic adults for atherosclerosis
C. Monitoring for cerebral vasospasm after aneurysmal subarachnoid hemorrhage
D. Measurement of carotid intima-media thickness

15. Internalization of the ECA waveform (loss of diastolic notch, more low-resistance appearance) is most often a clue to which condition?

A. Severe ECA stenosis
B. Ipsilateral ICA occlusion with the ECA serving as a collateral to the brain
C. Subclavian steal
D. Acute carotid dissection of the same side

16. Which gray-scale and color Doppler finding is most characteristic of internal carotid artery dissection?

A. A tapered, smoothly narrowed ICA lumen with an intimal flap or eccentric intramural hematoma
B. A focal calcified plaque at the carotid bulb with acoustic shadowing
C. A heterogeneous, hypervascular soft tissue mass splaying the carotid bifurcation
D. An aneurysmal dilatation of the common carotid bulb

17. A focal aliasing color jet is identified in the proximal ICA with adjacent tissue vibration (a bruit artifact in soft tissues). What is the most appropriate next step?

A. Increase the color gain until aliasing disappears and then report the vessel as normal
B. Switch to power Doppler and report only the velocity-independent signal

C. Record the color image as the diagnostic finding without spectral Doppler
D. Obtain spectral Doppler at and just distal to the jet to measure peak systolic and end-diastolic velocities

18. A focal turbulent jet with markedly elevated PSV in the proximal ICA, immediately downstream of plaque, is most plausibly explained by which mechanism?

A. Conservation of flow through a narrowed lumen, increasing local velocity
B. Reduction of color PRF at the lesion
C. Use of a higher transducer frequency at the lesion
D. Increased Doppler angle at the lesion

19. Which spectral Doppler feature most reliably distinguishes a normal internal carotid artery (ICA) from a normal external carotid artery (ECA)?

A. The ICA gives multiple anterior branches in the neck
B. The ICA shows a low-resistance waveform with continuous forward diastolic flow
C. The ICA waveform shows sharp diastolic notching
D. The ICA demonstrates the highest peak systolic velocity in the neck under normal conditions

20. Color Doppler of a carotid body tumor most typically demonstrates which of the following?

A. Only peripheral rim vascularity with an avascular center
B. A completely avascular mass with no internal color
C. Marked internal hypervascularity with prominent intratumoral arterial signals
D. A single feeding artery and no other internal flow

21. A normal vertebral artery spectral Doppler waveform most closely resembles which of the following?

A. A high-resistance waveform with reversed diastolic flow, similar to a resting external iliac
B. A low-resistance waveform with continuous forward diastolic flow, similar to the ICA
C. A waveform identical to the ECA with sharp diastolic notching
D. A bidirectional pendular waveform

22. After endarterectomy or carotid stenting, duplex surveillance is performed. Which finding is most concerning for hemodynamically significant restenosis or in-stent stenosis?

A. An unchanged PSV compared with the previous post-procedure baseline
B. A focal marked elevation of PSV with an elevated ICA-to-CCA ratio compared with the post-procedure baseline
C. Bilateral symmetric IMT measurements within normal range
D. A normal mid-CCA waveform with no focal change

23. Which structure is the only major branch of the ICA in the neck before it enters the carotid canal?

A. The superior thyroid artery
B. The lingual artery
C. The occipital artery
D. None; the ICA normally has no extracranial branches in the neck

24. In a patient with suspected subclavian steal but a borderline vertebral waveform at rest, which provocative maneuver is most appropriate to unmask the steal?

A. Ipsilateral arm hyperemia after a brief blood-pressure cuff inflation and release
B. Valsalva maneuver
C. Carotid sinus massage
D. Temporal tap of the affected side

25. In the Society of Radiologists in Ultrasound (SRU) consensus criteria for ICA stenosis, which ICA peak systolic velocity (PSV) threshold defines a stenosis of 70 percent or greater?

A. Greater than 230 cm/s
B. Greater than 400 cm/s
C. Greater than 125 cm/s
D. Greater than 180 cm/s