TEST QUESTIONS AND CME APPLICATION-TEST VERSION #3
Techniques In Noninvasive Vascular Diagnosis, 3rd & 4th Editions
Note: This CME application is valid only for the Third and Fourth Editions of Techniques. Continuing Medical Education Credits are sponsored by the Society for Vascular Ultrasound (SVU), and are approved by the ARDMS.

Introduction

• Upon successful completion of the textbook and CME self-test, participants can earn 15 CME credits.
• ARDMS-approved CME credits may be applied towards the CME requirements of the ARDMS, the ARRT, CCI, and CARDUP, as well as ICAVL and ACR accreditation organizations. However, these are not AMA Cat. 1 credits.
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Process

1) Read and study the textbook. Download this test and application from our website at www.Summerpublishing.com. Print entire document, or just print pages 2 and 3. Only one version of the test is needed for CME credits.

2) Take the self-study examination and use the answer sheet provided. Complete the applicant information and the evaluation form (the evaluation form is required for CME activity). Submit pages 2 and 3, (no need to send in the test questions).

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5) If there are additional applicants from your lab or office, use a different test version for the other applicants (test versions 2-4). If there are more applicants than test versions, the 5th person can use test #1, 6th person test #2, etc. Do not take this exam as a group exercise; CME’s will be denied if this occurs. For questions, e-mail us at Info@Summerpublishing.com.

6) Submit the application, payment and exam answer sheet by mail or fax to:

   Summer Publishing, LLC, 4572 Christensen Circle, Littleton, CO 80123
   Fax 866-519-0674; E-mail address: Info@summerpublishing.com. Phone 303-734-1789
   Please do not mail special delivery, or a method that requires signature delivery.

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Applicant Information

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Proof of purchase can be one of the following: 1) enter the CME book code found on the CME instruction page in Techniques, 2) provide the name and address of the purchaser, or 3) provide a photocopy of the CME instruction pages found in the book.

Course Objectives: Upon completion of reading and studying “Techniques in Noninvasive Vascular Diagnosis”, the participant should be able to:

1. Describe basic Doppler and color Doppler fundamentals as they apply to vascular diagnosis.
2. Describe cerebrovascular, upper and lower venous and arterial anatomy.
3. List and apply diagnostic criteria for carotid, venous, and arterial disease determination.
4. Describe normal venous and arterial hemodynamics and how flow patterns are altered by disease.
5. Describe abdominal vascular anatomy.
7. Describe bypass and hemodialysis grafts/fistulas, and list normal and abnormal flow velocity parameters.
8. Describe methods of physiologic, indirect testing for upper and lower arterial disease.
9. Describe potential collateral pathways, and Doppler waveforms in the presence of subclavian or innominate artery obstruction.
10. Change and adjust appropriate imaging, Doppler and Color Doppler controls to optimize exam quality.
11. Recognize Doppler and imaging artifacts and describe how they occur.
Name:____________________________________________

**Evaluation form: Required for CME. Please circle answer.**

1) To what extent was the material in the book of direct value in your practice?

2) To what extent were the stated course objectives met?
   Greatly. Partially. Not at all.

3) The quality of the graphics and educational material were:
   Excellent. Good. Fair. Poor.

4) What did you like best about the book and self instructional program?
   _______________________________________________________
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6) What subject matter should be included in future editions?
   _______________________________________________________
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7) Do you wish to receive product information updates via e-mail from Summer Publishing?   Yes   No

*The Society of Vascular Ultrasound has determined that a minimum of 60 Post-test questions are required for 15 CME credits.*

**Please circle one answer for each question.  Online Test Version #3**

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1) What’s causing this peripheral arterial waveform to look “goofy”?
A. Low wall filter.
B. High wall filter.
C. No diastolic flow.
D. Wrong PRF.

2) This Doppler waveform is derived from what type of processing or analysis?
A. Autocorrelation.
B. Fast Fourier Transform.
C. Zero crossing detection.
D. Time interval histogram.

3) A patient presents with the classic cerebrovascular symptom of left amaurosis fugax. Of the choices below, what is the most likely cause?
A. Occlusion of the left ICA.
B. Atheroemboli from the right ICA.
C. Atheroemboli from the left ICA.
D. Occlusion of the left vertebral artery.

4) A stroke symptom in which a patient cannot speak or express themselves is called:
A. Aphasia.
B. Syncope.
C. Amaurosis.
D. Dysarthria.

5) Which of the following is a non-atherosclerotic disease involving the mid segment of the ICA and found predominately in females?
A. Takayasu’s arteritis.
B. Scleroderma.
C. Arteriosclerosis.
D. Fibromuscular dysplasia.

6) The carotid angiographic measurement method advocated by the SRU consensus panel and used in the NASCET study compares the ICA residual lumen to the diameter of the distal ICA. True or False?
A. True.
B. False.

7) A subclavian artery aneurysm is a possible complication of:
A. Thoracic outlet compression.
B. Raynaud’s disease.
C. Fibromuscular dysplasia.
D. Marfan’s syndrome.

8) Distal venous pressure in the lower limb is increased when walking. True or False?
A. True.
B. False.

9) In addition to incompetent valves, which of the following can also cause venous insufficiency?
A. Arterial occlusive disease.
B. Hydrostatic pressure.
C. Chronic outflow obstruction.
D. Superficial thrombophlebitis.

10) Virchow’s triad is best described as the following?
A. Circulatory stasis, hypercoagulability and intimal injury.
B. Circulatory stasis and hypocoagulability with intimal injury.
C. High cardiac output and intimal injury.
D. Intimal injury, hypercoagulability and poor stroke volume.

11) ABIs are calculated in the following manner: the left ankle pressure is divided by the left brachial pressure, and the right ankle pressure is divided by right brachial pressure. True or False?
A. True.
B. False.

12) The dorsalis pedis artery is a continuation of which vessel?
A. Peroneal artery.
B. Gastrocnemius artery.
C. Anterior tibial artery.
D. Posterior tibial artery.

13) For accurate blood pressure determination, the cuff bladder should be______ of the limb circumference.
A. 40%
B. 30%
C. 20%
D. 10%

14) What CFA waveform characteristic would suggest significant aorto-iliac disease?
A. The presence of diastolic flow.
B. Absence of triphasic flow.
C. Low peak systolic velocity.
D. Delayed rise time.

15) A hyperemic waveform, existing in the in situ vein graft 3 weeks following a femoral to distal vein bypass, is most likely due to which of these conditions?
A. Graft occlusion.
B. Vasoconstriction.
C. Chronic vasodilation.
D. Graft stenosis.
16) A condition resulting in a grossly swollen and cyanotic leg that is caused by iliofemoral venous thrombosis is known as:
A. Stasis dermatitis.
B. Lymph edema.
C. Homan’s sign.
D. Phlegmasia cerulea dolens.

17) The pulsed Doppler frequency most suitable for an adult transcranial Doppler exam is:
A. 0.5 MHz.
B. 2.0 MHz.
C. 3.5 MHz.
D. 4.5 MHz.

18) In most spectral Doppler systems, blood flow away from the Doppler beam is depicted as a _____ sign and is displayed _________ the baseline in the un-inverted spectral display.
A. positive, above
B. negative, below
C. positive, below
D. negative, above

19) Which of the following ankle/brachial indices (ABI) is most consistent with the symptom of ischemic rest pain?
A. 0.3
B. 0.5
C. 0.8
D. 1.0

20) In the presence of an innominate artery occlusion, the ipsilateral common carotid artery (CCA) is often supplied by _________ flow in the right _________ artery.
A. retrograde, external carotid
B. retrograde, subclavian
C. antegrade, vertebral
D. antegrade, external carotid

21) The portal vein is formed by the confluence of which two veins?
A. Hepatic, IVC.
B. Celiac, duodenal.
C. Splenic, superior mesenteric.
D. Inferior mesenteric, renal.

22) Buerger’s disease or thromboangiitis obliterans is an arterial disorder involving which of the following vessels?
A. Renal arteries.
B. Coronary arteries.
C. Pelvic arteries.
D. Digital arteries.

23) A high resistivity index found unilaterally in one of the main renal arteries suggests:
A. Renal dissection.
B. Main renal artery stenosis.
C. Renal parenchymal disease.
D. Fibromuscular dysplasia.

24) Which of the following conditions would cause an abnormal pulse volume recording (PVR) at the high-thigh location?
A. Superficial femoral artery occlusion.
B. Internal iliac artery stenosis.
C. Popliteal artery occlusion.
D. Significant aorto-iliac disease.

25) A Brescia-Cimino fistula is created for hemodialysis access by anastomosis of which upper extremity artery and vein?
A. Radial artery and cephalic vein.
B. Ulnar artery and cephalic vein.
C. Subclavian artery and subclavian vein.
D. Brachial artery and brachial vein.

26) The appearance of “early systolic deceleration” in the left vertebral artery waveform is usually due to which of the following conditions?
A. Basilar artery obstruction.
B. Axillary artery stenosis.
C. Proximal vertebral artery stenosis.
D. Proximal left subclavian stenosis.

27) A high-pressure extravasation of blood out of an artery and into the surrounding tissue is called a(n):
A. Aneurysm.
B. Arterial-Venous fistula.
C. Pseudo-aneurysm.
D. A-V malformation.

28) In transcranial Doppler, the middle cerebral artery is accessed through the _________ “window” and typically demonstrates flow direction _________ the transducer.
A. suboccipital, away from
B. transtemporal, away from
C. transorbital, towards
D. transtemporal, towards

29) The reported advantage of a four-cuff segmental pressure test over a three-cuff method is differentiating which of these diseased segments?
A. Aorta disease from iliac disease.
B. Femoral artery from popliteal artery disease.
C. Aorto-iliac (inflow) from femoral artery disease.
D. Common femoral artery from profunda femoris disease.
30) **What pulsed-wave Doppler parameter is decreased when the range gate or sample volume is reduced in size?**
A. Gain.
B. Spatial pulse length.
C. Lateral resolution.
D. PRF.

31) **What is the average speed of sound in tissue?**
A. 1450 cm/sec.
B. 750 m/sec.
C. 1540 m/sec.
D. 6000 m/sec.

32) **Packet size, ensemble length, and color sensitivity are all terms used to describe which function of Doppler?**
A. Scan line density.
B. Frame rate.
C. Color encoding.
D. Number of transmitted pulses per scanline.

33) **To reduce or eliminate aliasing in spectral Doppler, you should:**
A. Increase PRF.
B. Decrease PRF.
C. Use a high frequency transducer.
D. Increase sample volume size.

34) **Elevation-plane focus of a transducer is also referred to as:**
A. Lateral resolution.
B. Slice thickness.
C. Axial resolution.
D. Temporal resolution.

35) **To increase color Doppler frame rate, you should:**
A. Increase packet size.
B. Turn on “triplex” function.
C. Reduce color box width.
D. Reduce color box length.

36) **Which normal vessel demonstrates the highest flow resistance?**
A. Common carotid artery.
B. Internal carotid artery.
C. External carotid artery.
D. Vertebral artery.

37) **Which of the following best describes the position of the ICA in the neck?**
A. It’s situated lateral to the ECA.
B. It lies posterior to the ECA.
C. It lies in the far-field of the ultrasound image.
D. It appears in the near field of the ultrasound image.

38) **Normal portal vein flow direction in the liver is called?**
A. Hepatofugal flow.
B. Hepatopetal flow.
C. High resistant flow.
D. Collateral flow.

39) **A high resistance flow pattern in the distal portion of the ICA suggests which of the following conditions?**
A. Proximal CCA disease.
B. Proximal ICA disease.
C. Intracranial A-V fistula.
D. Severe distal ICA stenosis.

40) **Which of these statements would best describe the low threshold of a >70% ICA stenosis?**
A. End diastolic velocity > 80 cm/sec.
B. ICA/CCA ratio >4.0.
C. Peak systolic velocity > 125 cm/s.
D. >70% stenosis by diameter measurement of plaque.

41) **Which of the following is not a potential complication of a reversed femoro-popliteal vein graft?**
A. Neo-intimal hyperplasia.
B. Graft aneurysm.
C. Graft kink.
D. Fistula via non-ligated perforator vein.

42) **Of the symptoms listed below, which is generally not associated with arterial insufficiency?**
A. Limb swelling.
B. Dependent rubor.
C. “Blue Toe” syndrome.
D. Rest pain in feet and toes.

43) **The calf muscle veins that drain into the popliteal vein are known as:**
A. Lesser saphenous vein.
B. Soleal veins.
C. Gastrocnemius veins.
D. Perforator veins.

44) **Blue Toe syndrome is usually caused by which of the following?**
A. Buerger’s Disease
B. Thrombo-emboli.
C. Vasospasm.
D. Venous insufficiency.

45) **The left innominate vein is formed by the confluence of the internal jugular vein and what other vein?**
A. Superior vena cava.
B. Internal mammary.
C. Subclavian.
D. External jugular.
46) In which bypass graft procedure is a valvulatome used?
A. Aorto-bifemoral.
B. In situ vein bypass.
C. Reversed vein bypass.
D. Radial artery harvest.

47) Which of the following is the manual test for palmar arch patency?
A. Adson’s test.
B. TOS test.
C. PPG.
D. Allen’s test.

48) Intracranial cross-filling often occurs in which of the following vessels in the presence of an occluded ICA?
A. Vertebral artery.
B. Anterior communicating artery.
C. Basilar artery.
D. Posterior cerebral artery.

49) Which of the following arteries supplies blood flow to the reproductive organs?
A. Inferior epigastric
B. External iliac.
C. Profunda femoral
D. Hypogastric

50) Which of the following is the single most important feature that defines a normal pulse volume recording waveform?
A. Triphasic shape.
B. Height or amplitude
C. Anacrotic slope.
D. Reflected wave in late systole

51) Which of the following statements regarding subclavian steal is most likely true?
A. Subclavian steal occurs most frequently on the right side.
B. The right vertebral artery supplies the left arm.
C. Subclavian steal usually results in neurological symptoms.
D. The left common carotid artery flow is reduced.

52) What relationship does the right renal artery (RRA) have to the inferior vena cava (IVC)?
A. RRA passes transverse to the IVC.
B. RRA passes anterior to the IVC.
C. RRA passes posterior to the IVC.
D. RRA passes superior to the IVC.

53) Which of the following is the threshold for an abnormal renal artery to aortic ratio (RAR)?
A. 3.5
B. 2.5
C. 2.0
D. 1.5

54) Abdominal pain that develops 15-30 minutes after eating is sometimes called “fear of food” syndrome. Which of the following is a possible cause?
A. Cardiac angina.
B. Mesenteric ischemia.
C. Nutcracker syndrome.
D. Budd-Chiari syndrome.

55) A tardus-parvus waveform in a segmental renal artery suggests what condition?
A. Renal parenchymal disease.
B. Stenosis or occlusion of the main renal artery.
C. Coarctation of the aorta.
D. Renal vein thrombosis.

56) Which of the following is the first branch off the abdominal aorta?
A. Superior mesenteric artery.
B. Renal artery.
C. Celiac axis.
D. Common iliac artery.

57) A transjugular intrahepatic portosystemic shunt (TIPS) courses between what 2 vascular structures?
A. Portal vein to hepatic vein.
B. Portal vein to hepatic artery.
C. Jugular vein to hepatic vein.
D. Hepatic vein to inferior vena cava.

58) The calf muscle veins that drain into the posterior tibial or peroneal veins are known as:
A. Soleal veins.
B. Small saphenous veins.
C. Gastrocnemius veins.
D. Perforator veins.

59) Which of the following is the best “window” for the evaluation of vertebral and basilar arteries with transcranial Doppler?
A. Transorbital window.
B. Suborbital window.
C. Suboccipital window.
D. Transtemporal window.

60) What is the first branch of the internal carotid artery (ICA)?
A. Superior thyroid artery.
B. Middle cerebral artery.
C. Ophthalmic artery.
D. Superficial temporal artery.