ARDMS
American Registry for Diagnostic Medical Sonography

Vascular Technology Examination Content Outline

(Outline Summary)

#	Domain	Subdomain	Percentage
1	**Normal Anatomy, Perfusion, and Function**	• Evaluate normal anatomy, perfusion, function	**21%**
2	**Pathology, Perfusion, and Function**	• Evaluate pathology, perfusion, and function	**32%**
3	**Surgically Altered Anatomy and Pathology**	• Evaluate surgically altered anatomy and pathology	**6%**
4	**Physiologic Exams**	• Perform physiologic arterial examinations • Perform physiologic venous examinations	**12%**
5	**Ultrasound-guided Procedures/Intraoperative Assessment**	• Participate in ultrasound-guided procedures/intraoperative assessment	**7%**
6	**Quality Assurance, Safety, and Physical Principles**	• Participate in quality assurance activities and monitor safety • Apply physical principles	**14%**
7	**Preparation, Documentation, and Communication**	• Prepare for examination • Document and communicate findings	**8%**

(Detailed Outline)

1	Normal Anatomy, Perfusion, and Function 21%	Knowledge and/or skill related to normal anatomy, perfusion, and function
1.A	**Evaluate normal anatomy, perfusion, and function**	
1.A.1	Aortoiliac vasculature	• Ability to assess vasculature • Ability to assess organs related to vasculature (liver, kidney, spleen, pancreas, gallbladder, thyroid, etc.) • Ability to recognize and apply proper scan technique in obtaining and documenting diagnostic images • Ability to recognize, evaluate, and document congenital anomalies • Ability to recognize and document normal vascular flow patterns using spectral, color, and power Doppler • Knowledge of hemodynamics as it relates to normal anatomy • Knowledge of sonographic appearance of anatomy, landmarks, and vascular structures
1.A.2	Upper extremity veins	
1.A.3	Lower extremity veins	
1.A.4	Native upper extremity arteries	
1.A.5	Native lower extremity arteries	
1.A.6	Mesenteric vasculature	
1.A.7	Renal vasculature	
1.A.8	Hepatoportal system	
1.A.9	Inferior vena cava and/or iliac veins	
1.A.10	Extracranial cerebrovascular system	

1.A.11	Intracranial cerebrovascular exams (transcranial Doppler (TCD) and transcranial imaging (TCI))	
1.A.12	Vein mapping	
2	**Pathology, Perfusion, and Function 32%**	**Knowledge and/or skill related to pathology, perfusion, and function**
2.A	**Evaluate pathology, perfusion, and function**	
2.A.1	Aortoiliac disease (atherosclerosis, aneurysm, dissection, etc.)	• Ability to assess abnormal vasculature • Ability to assess organs related to abnormal vasculature (liver, kidney, spleen, pancreas, gallbladder, thyroid, etc.) • Ability to identify pathology • Ability to identify anatomic variants • Ability to identify and communicate critical findings • Ability to recognize and document abnormal vascular flow patterns using spectral, color, and power Doppler • Ability to recognize and apply proper scan technique in evaluating and documenting pathology • Ability to identify and document incidental findings • Knowledge of pathophysiology of vascular disease • Knowledge of hemodynamics as it relates to pathology • Knowledge of sonographic appearance of abnormal anatomy and vascular structures
2.A.2	Venous insufficiency	
2.A.3	Upper extremity venous disease (thrombosis, thoracic outlet syndrome, extrinsic compression, etc.)	
2.A.4	Lower extremity venous disease (thrombosis, extrinsic compression, etc.)	
2.A.5	Native upper extremity artery disease (atherosclerosis, aneurysm, dissection, thoracic outlet syndrome, etc.)	
2.A.6	Native lower extremity artery disease (atherosclerosis, aneurysm, dissection, extrinsic compression, etc.)	
2.A.7	Mesenteric vasculature disease (atherosclerosis, aneurysm, dissection, thrombosis, extrinsic compression, etc.)	
2.A.8	Renal vasculature disease (atherosclerosis, aneurysm, dissection, thrombosis, extrinsic compression, fibromuscular dysplasia, etc.)	
2.A.9	Hepatoportal system disease (thrombosis, Budd-Chiari syndrome, portal hypertension, etc.)	
2.A.10	Inferior vena cava and/or iliac vein disease (thrombosis, extrinsic compression, etc.)	
2.A.11	Extracranial cerebrovascular disease	
2.A.12	Intracranial cerebrovascular disease (TCD and TCI) (for stroke, for vasospasm, agitated saline for patent foramen ovale (PFO), for intraoperative emboli monitoring, etc.)	
2.A.13	Incidental findings (thyroid mass, Baker cyst, carotid body tumor, etc.)	
2.A.14	Critical findings (aneurysm, acute deep vein thrombosis, critical stenosis, etc.)	
3	**Surgically Altered Anatomy and Pathology 6%**	**Knowledge and/or skill related to surgically altered anatomy and pathology**

3.A	**Evaluate surgically altered anatomy and pathology**	
3.A.1	Dialysis access	• Ability to evaluate post-procedural vasculature (after EVAR, IVC filter, venous ablation, bypass grafts, TIPS, stents, etc.) • Knowledge of sonographic appearance of surgically altered anatomy/vasculature • Knowledge of hemodynamics as it related to surgically altered anatomy and pathology • Knowledge of common causes of failure/rejection of surgically altered anatomy/vasculature • Knowledge of surgical procedures related to dialysis access, bypass grafts, stents, organ transplants, venous ablation, etc. • Ability to understand an operative report and its impact on sonographic appearance and technique
3.A.2	Post intervention (endovascular aneurysm repair (EVAR), inferior vena cava (IVC) filter, venous ablation, bypass grafts, transjugular intrahepatic portosystemic shunt (TIPS), stents, etc.)	
3.A.3	Transplanted organs	
4	**Physiologic Examinations 12%**	**Knowledge and/or skill related to physiologic examinations**
4.A	**Perform physiologic arterial examinations**	
4.A.1	Manually calculate pressure indices (ankle-brachial index (ABI), segmental pressures, etc.)	• Ability to evaluate effects of limb size and cuff diameter • Knowledge of provocative/exercise maneuvers and their effect on circulation
4.A.2	Obtain appropriate diagnostic waveforms/pressures with and without provocative/exercise maneuvers	
4.A.3	Select the appropriate instrumentation (photoplethysmography (PPG) sensors, cuffs, presets, protocols, etc.)	
4.B	**Perform physiologic venous examinations**	
4.B.1	Obtain appropriate venous photoplethysmography (PPG) diagnostic waveforms (with and without tourniquets; plantar flexion and dorsiflexion)	• Ability to optimize recordings • Ability to evaluate effects of tourniquet on hemodynamics • Knowledge of placement of venous PPG sensors and tourniquets • Knowledge of effects of tourniquet on hemodynamics
4.B.2	Select the appropriate venous photoplethysmography (PPG) instrumentation (sensors, presets, protocols, etc.)	
5	**Ultrasound-guided Procedures/Intraoperative Assessment 7%**	**Knowledge and/or skill related to ultrasound-guided procedures/intraoperative assessment**
5.A	**Participate in ultrasound-guided procedures/intraoperative assessment**	
5.A.1	Participate in manual compression of pseudoaneurysms	• Ability to provide guidance during a procedure

5.A.2	Provide guidance for thrombin injections of pseudoaneurysms	• Knowledge of appropriate procedural imaging: pre-procedure, during procedure, and post-procedure • Knowledge of contraindications to a procedure • Knowledge of expected post-procedural findings/potential complications • Knowledge of instrumentation and its appropriate use • Knowledge of sonographer's role during procedure • Knowledge of procedure protocol and required resources
5.A.3	Provide guidance for venous ablation procedures	
5.A.4	Obtain appropriate post-procedural diagnostic images	
6	**Quality Assurance, Safety, and Physical Principles 14%**	**Knowledge and/or skill related to quality assurance, safety, and physical principles**
6.A	**Participate in quality assurance activities and monitor safety**	
6.A.1	Assess the appropriateness of the exam (per indications, by applying Appropriate Use Criteria, etc.)	• Ability to provide appropriate patient care • Ability to apply Appropriate Use Criteria • Ability to correlate vascular exam findings with other imaging modalities • Ability to utilize appropriate exam protocols • Knowledge of exam protocols • Knowledge of implications of various laboratory values • Knowledge of other imaging modalities (MRI, CT, conventional angiography, etc.) • Knowledge of scanning techniques and patient/sonographer positioning • Knowledge of contraindications to a vascular exam
6.A.2	Compare exam findings to correlative studies	
6.A.3	Collaborate regarding exam protocols (including discussions, optional images, modifications, timing, and diagnostic criteria)	
6.A.4	Monitor patient condition (including safety and comfort)	
6.B	**Apply physical principles**	
6.B.1	Identify artifacts related to vascular imaging, and document and/or modify the exam as needed	• Ability to adjust study to minimize artifacts • Knowledge of artifacts, their causes, and their implications on the study
6.B.2	Calculate, perform, and analyze resistive indices and acceleration times	
7	**Preparation, Documentation, and Communication 8%**	**Knowledge and/or skill related to preparation, documentation, and communication**
7.A	**Prepare for examination**	
7.A.1	Adapt the exam to clinical setting and patient condition (patient position, physical environment, medications, etc.)	• Ability to obtain and evaluate patient history • Ability to correlate information from various types of imaging studies • Ability to establish rapport and interview patient • Ability to interpret and follow patient identification protocols • Ability to synthesize information from various sources in the patient's medical history • Ability to select correct instrumentation based on protocol and patient body habitus
7.A.2	Review and confirm patient information (patient identity, clinical history, previous imaging studies, lab findings, interventions, etc.), and communicate exam process to patient	

		• Ability to modify exam based on patient condition and body habitus • Knowledge of appropriate preparations for the test • Knowledge of implications of patient position, physical environment, and patient condition on vascular exams (hydrostatic pressure, etc.) • Knowledge of signs and symptoms pertaining to the vascular exam • Knowledge of potential effects of patient medications on exam • Knowledge of appropriate indications and contraindications for vascular exams
7.B	**Document and communicate findings**	
7.B.1	Document preliminary impression/findings and technical limitations, and verify images are appropriately archived for interpretation	• Ability to utilize resources, such as physicians, literature, or peers • Ability to modify exam based on real-time findings • Ability to communicate professionally with patient and provider • Ability to document preliminary impression/findings and technical limitations • Ability to verify that exam is properly archived • Knowledge of technical limitations of vascular exams • Knowledge of protocol for critical findings notification