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American Registry for Diagnostic Medical Sonography

Fetal Echocardiography Examination Content Outline

(Outline Summary)

#	Domain	Subdomain	Percentage
1	**Assess Anatomy**	Assess anatomy and physiology	**18%**
2	**Evaluate Pathology and Pathophysiology**	Assess abnormal perfusion and function Evaluate for congenital anomalies	**21%**
3	**Integrate Data**	Assess fetal diagnostic images	**31%**
4	**Perform the Exam**	Gather pertinent medical history prior to the exam Perform ultrasound exam	**30%**

(Detailed Outline)

1.	Assess Anatomy 18%	Knowledge and/or skill related to assessing anatomy
1.A.	**Assess anatomy and physiology**	
1.A.1.	Assess for normal embryologic development (e.g., timing of development, early chamber development, normal septal formation)	Understanding of cardiac embryology and its major components (e.g., ventricular looping, atrioventricular junction development, conal/infundibular development, truncal/semilunar valve development) Understanding of methodology for determining situs, axis, and position Ability to perform situs, axis, and position techniques Ability to differentiate between normal and abnormal positioning Knowledge of normal fetal abdominal and thoracic anatomy Ability to recognize the fetal abdomen, femur, liver, bladder, and other gross anatomy Ability to measure extracardiac structures such as biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), and femur length (FL) Knowledge of normal and abnormal fetal cardiac anatomy Knowledge of fetal aortic arch anatomy, including brachiocephalic artery origins and course
1.A.2.	Evaluate situs, axis, and position	
1.A.3.	Evaluate fetal anatomic structures related to the abdomen/pelvis (e.g., inferior vena cava, ductus venosus, hepatic veins, stomach, bladder, spleen)	
1.A.4.	Evaluate fetal anatomic structures related to the chest/thorax (e.g., lungs, esophagus, trachea)	
1.A.5.	Evaluate tissues composing the heart (e.g., pericardium, myocardium)	
1.A.6.	Evaluate cardiac chambers	
1.A.7.	Evaluate septa (e.g., atrial, ventricular, and arterial septa)	
1.A.8.	Evaluate valves (e.g., atrioventricular and semilunar valves)	
1.A.9.	Evaluate systemic veins and arteries	
1.A.10.	Evaluate pulmonary veins and arteries	
1.A.11.	Evaluate aortic arch	
1.A.12.	Evaluate ductal arch (e.g., ductus arteriosus)	

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		Knowledge of normal and abnormal fetal patent ductus arteriosus

2.	Evaluate Pathology and Pathophysiology 21%	Knowledge and/or skill related to evaluating pathology and pathophysiology
2.A.	**Assess abnormal perfusion and function**	
2.A.1.	Assess for signs of fetal distress	Knowledge of normal, abnormal fetal and fetoplacental hemodynamics Knowledge of congenital heart disease associated with various genetic syndromes Knowledge and recognition of differences and key features associated with cardiac malposition, including atrial malposition, ventricular malposition, and great artery malposition Knowledge and recognition of normal and abnormal fetal atrioventricular junction, fetal atrial septum, and fetal ventricular septum Knowledge and recognition of normal and abnormal left atrium, mitral valve, left ventricle, left ventricular outflow tract, aortic valve, and aortic arch Knowledge and recognition of normal and abnormal right atrium, tricuspid valve, right ventricle, right ventricular outflow tract (RVOT), and pulmonary valve Knowledge and recognition of conotruncal anomalies such as tetralogy of Fallot, truncus arteriosus, double outlet right ventricle, and dextro-transposition of the great arteries (d-TGA) Knowledge and recognition of normal and abnormal fetal systemic veins Knowledge and recognition of normal and abnormal fetal pulmonary veins Knowledge and recognition of the three-vessel view, the three-vessel trachea view, and the aortic arch long axis view Knowledge and recognition of common fetal congenital cardiac masses and echocardiographic characteristics Knowledge and recognition of features of different types of fetal cardiomyopathies Knowledge of normal fetal heart rate and rhythm, and recognition of abnormalities such as complete heart block, premature atrial and ventricular contractions, and tachyarrhythmias (e.g., fetal supraventricular tachycardia and atrial flutter)
2.A.2.	Evaluate for the presence of fetal cardiomyopathies	
2.A.3.	Evaluate for the presence of fetal dysrhythmias	
2.B.	**Evaluate for congenital anomalies**	
2.B.1.	Evaluate for abnormalities related to genetic syndromes (e.g., Down, Noonan, Turner)	
2.B.2.	Evaluate for cardiac malpositioning (e.g., mesocardia, levoposition, ambiguous, inversus)	
2.B.3.	Evaluate for cardiac septal defects	
2.B.4.	Evaluate for left-sided cardiac anomalies	
2.B.5.	Evaluate for right-sided cardiac anomalies	
2.B.6.	Evaluate for conotruncal anomalies	
2.B.7.	Evaluate for systemic venous anomalies	
2.B.8.	Evaluate for pulmonary venous anomalies	
2.B.9.	Evaluate aortic arch anomalies	
2.B.10.	Evaluate ductal arch abnormalities (e.g., ductus arteriosus)	
2.B.11.	Evaluate for the presence of congenital cardiac masses	

3.	Integrate Data 31%	Knowledge and/or skill related to integrating data
3.A.	**Assess fetal diagnostic images**	
3.A.1.	Assess fetal cardiac function	Knowledge of normal fetal cardiac hemodynamics and normal fetal heart rate Knowledge of normal fetal heart rhythm Knowledge and recognition of abnormal fetal cardiac rhythm and rate Knowledge of cardiac electrical conduction system Knowledge of normal fetal anatomy of thoracic and abdominal cavities Knowledge of normal fetal anatomic measurements Knowledge of appropriate measurements of cardiac structures Knowledge of appropriate color and spectral Doppler techniques to assess fetal hemodynamics Recognition of abnormal fluid collections in the fetus Knowledge of M-mode evaluation Recognition and knowledge of artifacts, e.g., 2-D, color, and Doppler
3.A.2.	Assess fetal hemodynamics	
3.A.3.	Assess fetal heart rhythm	
3.A.4.	Use Doppler to evaluate fetal heart rate	
3.A.5.	Use M-mode to evaluate fetal heart rate	
3.A.6.	Measure mechanical PR intervals	
3.A.7.	Evaluate for normal and abnormal fluid collection (e.g., pericardial effusion, ascites, pleural effusion, skin edema)	
3.A.8.	Perform two-dimensional measurements to assess pathology	
3.A.9.	Perform measurements of chamber size using two-dimensional or M-mode techniques	
3.A.10.	Perform Doppler measurements to assess pathology	
3.A.11.	Perform measurements of valves	
3.A.12.	Perform measurements of vessels	
3.A.13.	Use color Doppler to assess ductal arch and flow	
3.A.14.	Use color and spectral Doppler to assess for valvular regurgitation	
3.A.15.	Use spectral Doppler to assess blood flow across cardiac valves	
3.A.16.	Use spectral Doppler to assess blood flow in cardiac vessels	
3.A.17.	Use spectral Doppler to assess ductus arteriosus	
3.A.18.	Use spectral Doppler to assess ductus venosus	
3.A.19.	Use spectral Doppler to assess umbilical artery	
3.A.20.	Use spectral Doppler to assess umbilical vein	
3.A.21.	Perform measurement of cardiothoracic (CT) ratio	
3.A.22.	Perform fetal biometric measurements (e.g., abdominal circumference (AC), biparietal diameter (BPD), femur length (FL), and head circumference (HC))	
3.A.23.	Use color Doppler and power Doppler to assess cardiac blood flow	
3.A.24.	Use spectral Doppler to assess middle cerebral artery (MCA)	
3.A.25.	Recognize and inform the supervising physician of findings of an emergent nature	

4.	Perform the Exam 30%	Knowledge and/or skill related to performing the exam
4.A.	**Gather pertinent medical history prior to the exam**	
4.A.1.	Review referral information and clarify pertinent data and indications for exam (e.g., review lab work and prior sonographic studies)	Understanding of indications for fetal echocardiogram exams, including patient history, lab tests, and previous imaging Knowledge of universal precautions Knowledge of caval compression syndrome Understanding of system settings to optimize two-dimensional and Doppler evaluation of fetal cardiac structure and function Ability to evaluate the number of fetuses Knowledge of fetal position evaluation Knowledge of normal and abnormal fetal abdominal and thoracic anatomy Ability to obtain and recognize normal cardiac anatomy in various views
4.A.2.	Correlate indication(s) with the order using existing data (e.g., previous images, imaging reports, lab values, written patient history) to identify risk factors for fetal heart disease	
4.A.3.	Interview the patient to identify additional risk factors for fetal heart disease	
4.B.	**Perform ultrasound exam**	
4.B.1.	Practice universal precautions	
4.B.2.	Explain procedure and educate patient on signs and symptoms of positional discomfort	
4.B.3.	Prepare and monitor the patient	
4.B.4.	Select transducer and console settings appropriate for the exam	
4.B.5.	Determine the number of fetuses	
4.B.6.	Determine fetal position	
4.B.7.	Determine visceral-atrial situs	
4.B.8.	Obtain four-chamber view (e.g., apical, subcostal)	
4.B.9.	Obtain short axis views (e.g., ventricles, great vessels)	
4.B.10.	Obtain cardiac left ventricular outflow tract (LVOT) long axis view	
4.B.11.	Obtain cardiac right ventricular outflow tract (RVOT) long axis view	
4.B.12.	Determine orientation and relationship of the great vessels using various cardiac views	
4.B.13.	Obtain views of branch pulmonary arteries	
4.B.14.	Obtain views of systemic veins (e.g., bicaval view)	
4.B.15.	Obtain views of pulmonary veins	
4.B.16.	Obtain three-vessel-and-trachea view	
4.B.17.	Obtain various views of the arches (i.e.., aortic, ductal)	