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| **Comprehensive Fetal Echocardiographic Examination** | |
| This metric will assess the average completeness score, as measured by the *Comprehensiveness Fetal Echo Assessment* worksheet (see attached) of initial fetal echocardiograms for fetuses with hearts interpreted as structurally normal. | |
| Numerator | The sum of the *Comprehensiveness Fetal Echo Assessment* worksheet scores for all fetal echocardiograms included in the denominator. |
| **Denominator** | The number of complete fetal echocardiograms assessed during the measurement time period.  **Excluded Populations:**   * Studies that are identified as being incomplete or limited * Studies in fetuses with structurally abnormal cardiac anatomy, rhythm or function * Studies in fetuses that have had a prior echocardiogram at the institution, as this metric is intended to apply to all initial fetal echocardiograms performed at the institution * Studies in fetuses with poor acoustic windows due to maternal body habitus, fetal position/movement, advanced gestational age or otherwise technically limited |
| **Period of Assessment** | Minimum: Quarterly review |
| **Sources of Data** | Prospective flowsheet, retrospective review of stored fetal echocardiographic images. For each quarterly assessment a minimum of 10 fetal echocardiograms will be reviewed. |
| **Rationale** | |
| A complete fetal echocardiogram should include adequate acquisition of key elements required to exclude the presence of structural, functional and/or rhythm-related heart disease. Integration of various imaging modalities, including two-dimensional imaging, color and pulsed Doppler is vital to a comprehensive evaluation of the fetal heart. Two-dimensional imaging of all the cardiac structures, color Doppler assessment of the atrial and ventricular septae, valves, veins and arteries, and pulsed Doppler interrogation of the valves, and ductus venosus are essential components of the exam. Assessment of the heart rhythm and function should also be included. Failure to include these important features in an initial fetal cardiac exam may result in adverse fetal outcomes due to misdiagnoses and inappropriate management. This quality assessment activity provides a simple baseline strategy for evaluating compliance with standard fetal cardiac imaging techniques and may be helpful in identifying areas for sonographer, physician and/or laboratory improvement in fetal scanning. | |
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| **References** | |
| 1) Donofrio MT, Moon-Grady AJ, Hornberger LK, Copel JA, Sklansky MS, Abuhamad A, et al. Diagnosis and treatment of fetal cardiac disease: a scientific statement from the American Heart Association. *Circulation*. 2014; 129(21):2183-242.  2) Fetal Echocardiography Task Force: American Institute of Ultrasound in Medicine Clinical Standards Committee; American College of Obstetricians and Gynecologists: Society of Maternal-Fetal Medicine. AIUM practice guidelines for performance of fetal echocardiography. *J Ultrasound Med*. 2013; 32:1067-1082.  3) Lee W, Allen L, Carvalho JS, Chaoui R, Cope J, Devore G, Hecher K, Munoz H, Nelson T, Paladini D, Yagel S; ISUOG Fetal Echocardiography Task Force. ISUOG consensus statement: what constitutes a fetal echocardiogram? *Ultrasound Obstet Gynecol*. 2008; 32:239-242.  4) Rychik J, Ayres N, Cuneo B, Gotteiner N, Hornberger L, Spevak PJ, Van Der Veld M. American Society of Echocardiography guidelines and standards for performance of the fetal echocardiogram. *J Am Soc Echocardiogr*. 2004; 17:803-810.  5) Allan L, Dangel J, Fesslova V, Marek J, Mellander M, Oberhansli I, Oberhoffer R., Sharland G, Simpson J, Sonesson SE; Fetal Cardiology Working Group: Association for European Paediatric Cardiology. Recommendations for the practice of fetal cardiology in Europe. *Cardiol Young*. 2004; 14:109-114. | |
| **Attribution** | |
| This metric will be reported by each echocardiography laboratory performing maternal transabdominal fetal echocardiography. Data will be assessed quarterly by the laboratory director or their designate and reviewed with the laboratory staff involved in the performance and interpretation of fetal echocardiograms. | |
| **Method of Reporting** | |
| This measure will be reviewed at laboratory quality assurance meetings quarterly. The overall Comprehensive Fetal Echo Exam Metric includes a total of 34 elements for each exam reported for the Lab during the Quarter of interest. Each element is graded as “Yes” only if all components are visualized. | |
| **Challenges to Implementation** | |
| Time required identifying, selecting and reviewing fetal echocardiograms. | |

**Comprehensive Fetal Exam Assessment WORKSHEET**

Each worksheet is for ONE fetal echo evaluation

**Patient Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Birth: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EDD: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Gestational Age: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Sonographer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Interpreter: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Location of Study: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Echo Machine: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Review: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Reviewer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Time Spent for Review: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Indicate if each item listed is evaluated. Score as 1 for “Yes” response, 0 for “No”.

**2-DIMENSIONAL IMAGING (18), COLOR FLOW IMAGING (8), PULSED DOPPLER INTERROGATION (5)**

YES NO

Pericardial effusion (2-D)

*Image able to assess for pericardial effusion.*

Cardiac position/axis/size (2-D)

*Chest shown in cross sectional view adequate for qualitative assessment of position, axis and size.*

Situs determination (2-D)

*Sweep from heart to stomach shown, identifying clearly R/L fetal orientation.*

Ductus venosus (Color Flow)

Ductus venosus (Pulsed Doppler)

Systemic venous connections (SVC and IVC) (2-D)

*Bicaval view shown or SVC and IVC shown separately. Hepatic veins or tapering veins do not count.*

Superior and inferior vena cava (Color Flow)

Pulmonary venous connections (2-D)

*Two pulmonary veins seen by 2D imaging OR color Doppler, one from each side.*

Two pulmonary veins (one from each side) (Color Flow)

Two pulmonary veins (one from each side) (Pulsed Doppler)

Atrial morphology and size (2-D)

Atrial septum (Color Flow)

Atrial septal morphology (2-D)

*Septal anatomy visible.*

Tricuspid and mitral valve visualization adequate for morphology assessment and measurement (2-D)

*Valve leaflets seen with clear imaging in 4C view at largest diameter.*

Tricuspid and mitral valve inflows (Color Flow)

Tricuspid and mitral valve inflows (Pulsed Doppler)

Atrioventricular connection (2-D)

*4C view to determine AV concordance.*

Ventricular morphology (LV, RV) (2-D)

*LV, RV, IVS well seen in one of the following views confirming ventricular morphology: 4C and SAX.*

Ventricular size and function – qualitative assessment (2-D)

*4C view adequate for measuring RV and LV length.*

Ventricular septal morphology (2-D)

*IVS evaluated in at least 2 views to confirm septum is intact.*

Ventricular septum (in at least two views) (Color Flow)

Ventricular-arterial connections (pulmonary and aortic) (2-D)

*2D sweep showing crossover, both PA and Ao anatomic features demonstrated.*

Pulmonary and aortic valve morphology and size (2-D)

*Pulmonary and aortic valves seen well enough to measure.*

Pulmonary and aortic outflow (Color Flow)

Pulmonary and aortic outflows (Pulsed Doppler)

Great artery anatomy and size (2-D)

*The main pulmonary artery and ascending aorta are seen so that relative sizes can be compared to each other.*

3 vessel view (2-D)

*SVC/Ao/PA seen together in transverse plane, noting leftward position of the transverse aortic arch and ductal arch to the trachea; may or may not include branch pulmonary arteries in this view.*

Aortic and ductal arch morphology (2-D)

*Both arches seen in two planes, axial 3-vessel-trachea view and sagittal view.*

Ductal and aortic arches (in both sagittal and axial views) (Color Flow)

Ductal and aortic arches (Pulsed Doppler)

Proximal right and left branch pulmonary arteries (2-D and color)

*Each branch PA seen.*

**RHYTHM ASSESSMENT (2)**

YES NO

Heart rate

*Rate measured and displayed by Doppler or M-mode*

Rhythm assessment (i.e. inflow/outflow Doppler, M-mode or TDI)

**CINE CLIPS INCLUDED (1)**

YES NO

**TOTAL SCORE (34):**