

Complete Echocardiogram Evaluation	
Measure Description: Proportion of echocardiograms for Kawasaki Disease (KD) patients that include documentation of coronary artery measurements.	
Numerator	Number of echocardiograms with documentation of coronary artery measurements ¹ .
Denominator	Number of echocardiograms during the measurement period for KD patients, ≤ 18 years old.
Denominator Exclusions	Patients with Kawasaki disease whose coronary arteries cannot be imaged well enough for measurement (eg. due to body habitus or poor echo windows outside the control of the echocardiographer.)
Denominator Exceptions	None
Definitions/Notes	1. Measurements should include, at a minimum, the left anterior descending coronary artery (LAD) and right coronary artery (RCA). <i>(See clinical recommendation section below)</i>
Measurement Period	Quarterly
Sources of Data	Pediatric cardiologists' outpatient medical record and echocardiography reports
Attribution	This measure should be reported by the pediatric cardiologist interpreting the echocardiogram at the time of initial diagnosis.
Care Setting	Outpatient
Rationale	
Initial study at time of diagnosis should be complete and contain accurate and reproducible measurements as described below. In order to maintain consistency in terms of diagnosis and risk stratification, coronary artery measurements should be made from standard views and measurements should be normalized for patients' body surface area (using z-score calculations).	
Clinical Recommendation(s)	
<p><u>ACC/AHA guidelines</u></p> <p>In addition to standard imaging from parasternal, apical, subcostal and suprasternal notch windows, 2DE of patients with suspected Kawasaki disease should focus on imaging the left main coronary artery (LMCA), left anterior descending coronary artery (LAD), left circumflex coronary artery (LCX), right coronary artery (RCA) and posterior descending coronary arteries. If possible, multiple imaging planes should be used to visualize each of the coronary artery segments (as described below). In addition to detailed imaging of the coronary arteries, assessment of LV dimensions and LV function should be a part of all echocardiograms (standard M-mode tracings) and mention should be made of any regional wall motion abnormalities. The aortic root should be imaged, measured and compared with z-score references for BSA as mild aortic root dilation may be common in patients with Kawasaki disease. Standard views and interrogation for any valvular regurgitation and any evidence of pericardial effusion should be performed.</p>	

Echocardiographic Views of Coronary Arteries in Patients With Kawasaki Disease

Left main coronary artery: parasternal short axis at level of aortic valve; parasternal long axis of left ventricle; subcostal left ventricular long axis

Left anterior descending coronary artery: parasternal short axis at level of aortic valve; parasternal superior tangential long axis of left ventricle; parasternal short axis of left ventricle

Left circumflex: parasternal short axis at level of aortic valve; apical 4-chamber

Right coronary artery, proximal segment: parasternal short axis at level of aortic valve; parasternal long axis (inferior tangential) of left ventricle; subcostal coronal projection of right ventricular outflow tract; subcostal short axis at level of atrioventricular groove

Right coronary artery, middle segment: parasternal long axis of left ventricle (inferior tangential); apical 4-chamber; subcostal left ventricular long axis; subcostal short axis at level of atrioventricular groove

Right coronary artery, distal segment: Apical 4-chamber; subcostal atrial long axis

Posterior descending coronary artery: Apical 4-chamber (inferior); subcostal atrial long axis (inferior); parasternal long axis (inferior tangential) imaging posterior interventricular groove

Quantification of the coronary artery dimensions:

Measurements of the internal diameters of the coronary arteries should be made from inner edge to inner edge and should exclude points of branching which may have normal focal dilation. For the LMCA, proximal LAD, and proximal RCA, these measurements should be reported with z-scores (as defined below). The remaining segments may be measured and can be described as aneurysmal dilation if they measured "1.5 times that of the surrounding segment." Aneurysms should be further classified as small (< 5 mm internal diameter), medium (5-8 mm internal diameter), or giant (> 8 mm internal diameter). In addition, mention should be made of the lack of normal tapering and/or perivascular echogenicity or brightness.

Z-score measurements are based on nonlinear regression equations derived from a normal, nonfebrile population between the ages of 0-18 years (Boston Children's Hospital from 1987-2000).

$$\text{LMCA} = 0.31747 \cdot (\text{BSA}^{0.36008}) - 0.02887, \text{SD}=0.03040 + (0.01514 \cdot \text{BSA})$$

$$\text{pLAD} = 0.26108 \cdot (\text{BSA}^{0.37893}) - 0.02852, \text{SD}=0.01465 + (0.01996 \cdot \text{BSA})$$

$$\text{pRCA} = 0.26117 \cdot (\text{BSA}^{0.39992}) - 0.02756, \text{SD}=0.02407 + (0.01597 \cdot \text{BSA})$$

Newburger JW, Takahashi M, Gerber MA, Gewitz MH, Tani LY, Burns JC, Shulman ST, Bolger AF, Ferrieri P, Baltimore RS, Wilson WR, Baddour LM, Levison ME, Pallasch TJ, Falace DA, Taubert KA. Diagnosis, treatment, and long-term management of Kawasaki disease: a statement for health professionals from the Committee on Rheumatic Fever, Endocarditis and Kawasaki Disease, Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation*. 2004 Oct 26;110(17):2747-71.

Other guidelines:

Wyman W. Lai, MD, MPH, FASE, Tal Geva, MD, FASE, Girish S. Shirali, MD, Peter C. Frommelt, MD, Richard A. Humes, MD, FASE, Michael M. Brook, MD, Ricardo H. Pignatelli, MD, and Jack Rychik, MD. Guidelines and Standards for Performance of a Pediatric Echocardiogram: A Report from the Task Force of the Pediatric Council of the American Society of Echocardiography. *J American Society of Echocardiography* 2006; 19:1413-1430.

Challenges to Implementation

No electronic medical records or electronic echocardiographic reports.

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