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Cardiac valve annulus diameters in extremely preterm infants: a cross-sectional echocardiographic study

van Ark A.E., Molenschot M.C., Wesseling M.H., de Vries W.B., Strengers J.L.M., Adams A., Breur J.M.P.J.

Wilhelmina Children's Hospital, University Medical Center Utrecht, Utrecht, The Netherlands

Introduction: With the increasing incidence of births of preterm, very low birth weight infants, there is a demand for echocardiographic reference values of cardiac dimensions. The objective of this study is to provide reference values of cardiac valve annulus diameters in a cohort of extremely preterm very low birth weight neonates, and correlate these with patient characteristics.

Methods: Valve diameters of 376 infants were measured using two dimensional echocardiography. Correlations between valve diameters and patient characteristics (birth length, body surface area, birth weight, gestational age and sex) were assessed. Birth weight only was used to establish linear regression models. Inter- and intraobserver variability were assessed through intra class coefficient (ICC) analysis.

Results: Substantial variability was found for all valves (aortic valve mean (standard deviation; range): 5.0 mm (0.6; 3.7-6.5); pulmonic valve: 5.8 mm (0.8; 3.4-7.9); mitral valve: 8.0 mm (1.0; 5.5-10.5); tricuspid valve: 7.6 mm (1.2; 4.9-10.6)). Regression analysis showed moderate correlations between birth weight and valve diameter (R² aortic valve: 0.36; pulmonic valve: 0.20; mitral valve: 0.24; tricuspid valve: 0.24). Good intraobserver (ICC range 0.74-0.91) and interobserver agreement (ICC range 0.77-0.89) was found.

Conclusions: Our study provides ready-to-use reference values for cardiac valve annulus diameters for extremely preterm infants.