

Left ventricular systolic function in preterm and term neonates: Calculation of reference values and of z-score values of the M-mode derived mitral annular plane systolic excursion

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Background: The mitral annular plane systolic excursion (MAPSE) is a quick and reliable echocardiographic tool to assess longitudinal left ventricular (LV) systolic function in children and adults. As this parameter is affected by the LV longitudinal dimension, pediatric and adult normal values are not suitable for preterm and term neonates.

Objective: We determined growth and birth weight related changes of MAPSE to establish normal Z-score values in preterm and term neonates.

Methods: A prospective study was conducted in a group of 261 preterm and term neonates (gestational age: 26/0-6 to 40/0-6, birth weight: 670 g to 4140 g).

Results: The MAPSE ranged from a mean of 0.36 cm (Range: 0.26 – 0.46 cm) in preterm neonates with gestational age of 26/0-6 to 0.56 cm (Range: 0.40 – 0.73 cm) in term neonates with a gestational age of 40/0-6. MAPSE, gestational age and birth weight are strongly correlated: Pearson's correlation coefficient was 0.56 for gestational age – MAPSE ($p < .001$), and 0.58 for birth weight – MAPSE ($p < .001$). There was no statistically significant difference of normal MAPSE values between females and males ($p = 0.946$).

Conclusions: Absolute values and Z-scores of normal MAPSE values were calculated and percentile charts were established to serve as reference data in preterm and term neonates with congenital heart disease and acquired LV dysfunction (e.g. in neonates with asphyxia). Determination of LV function using MAPSE might be useful in vulnerable infants where a prolonged examination is inappropriate and in neonates with suboptimal visualization of the endocardium.