

**Mitral annular peak systolic velocity (Sm) in healthy children, calculation of reference values, of z-score values, and comparison to the mitral annular plane systolic excursion**

*Koestenberger M.(1), Nagel B.(1), Ravekes W.(2), Avian A.(3), Cvirn G.(4), Burmas A.(1), Grangl G.(1), Rehak T.(1), Gamillscheg A.(1)*

*Division of Pediatric Cardiology, Department of Pediatrics, Medical University Graz, Austria (1); Division of Pediatric Cardiology, Johns Hopkins University School of Medicine, Baltimore, MD, USA (2); Institute for Medical Informatics, Statistics and Documentation, Medical University Graz, Austria (3); Institute of Physiological Chemistry, Centre of Physiological Medicine, Medical University Graz, Austria (4)*

Background: The mitral annular peak systolic velocity (Sm) is an echocardiographic measurement using tissue Doppler imaging to assess longitudinal left ventricular (LV) systolic function in children and adults. We determined growth related changes of Sm to establish reference values for the entire pediatric age group.

Methods and Results: A prospective study was conducted in a group of 690 healthy pediatric patients (age: 1 day to 18 years). We determined the effects of age, sex and body surface area (BSA) on the Sm values. Regression analysis was used to estimate Sm from age, BSA, and sex. Additionally a correlation of normal Sm with normal age-matched values of the M-mode parameter mitral annular plane systolic excursion (MAPSE) was measured.

The Sm ranged from a mean of 5.8 cm/s (Z-score  $\pm$  2: 3.6 – 8.0 cm/s) in the newborn to 11.8 cm/s (Z-score  $\pm$  2: 8.5 – 15.1 cm/s) in the 18 year old adolescent. The Sm values showed a positive correlation with age and BSA with a non-linear course. There was no significant difference in Sm values between females or males. A significant correlation was found between Sm and MAPSE values.

Conclusion: Z-scores of Sm values were calculated and percentile charts were established to serve as reference data in patients with congenital heart diseases.