Longitudinal systolic right ventricular performance in preterm and term neonates: Reference values of the tricuspid annular peak systolic velocity (S') in 290 patients and calculation of z-score values

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Background: The tricuspid annular peak systolic velocity (S’) is an echocardiographic measurement to assess systolic right ventricular function in adults and children.
Objective: We determined growth and birth weight related changes of S’ to establish references values in preterm and term neonates. A correlation of the S’ values with tricuspid annular plane systolic excursion (TAPSE) values was performed.
Methods: A prospective study was conducted in a group of 290 preterm and term neonates (age: 26 + 0 week of gestation to 40+6 weeks of gestation; birth weight of 660 g – 4460 g)
Results: The S’ ranged from a mean of 4.5 cm/s (Z-score ± 2: 3.6 – 5.5 cm/s) in preterm neonates in the 26/0-6 week of gestation to 7.8 cm/s (Z-score ± 2: 5.5 – 10.1 cm/s) in term neonates in the 40/0-6 week of gestation. The S’ values increased in a linear way from the 26 to 40 week of gestation. S’, week of gestation and birth weight are strongly correlated: Pearson’s correlation coefficient was 0.66 for week of gestation – S’ (p < .001) and 0.65 for birth weight – S’ (p <.001). There was no significant difference of normal S’ values between female and male patients (p = .446). A significant correlation was found between S’ and TAPSE values (r = 0.67; p < 0.001).
Conclusion: Z-scores of S’ values were calculated and percentile charts were established to serve as reference data for preterm and term neonates with structurally normal hearts and with congenital heart disease in the future.