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Right ventricle linear measurements z score in children.

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Introduction: reference linear measures of normal right ventricle (RV) in children is important,
especially to detect abnormal RV dimensions in patients with congenital heart disease (CHD). Data
relating RV diameters is scant in pediatric population. Z score of RV internal diameters (basal,
midcavity and longitudinal) versus body surface area (BSA) is provided.

Methods: a healthy study cohort of 400 patients (0 days to 18 years old) was enrolled. RV end-
diastolic internal diameters (basal, midcavity and longitudinal) was measured in a 4-chamber focused
view as 2D RV guidelines recomend. Using body surface area (BSA) as a significant determinant of
RV size versus the different diameters allowed the development of normal z-score tables for each of
the diameters.

Results: in published recommendations for quantification methods in pediatric echocardiography, RV
internal dimension parameters are described to be useful, but normative data is scant. All investigated
RV diameters increased from neonates to adolescents in a nonlinear way.
There was strong collinearity of BSA with basal diameter (basRV), midcavity diameter (midRV) and
longitudinal diameter (longRV), with correspondingly R² values of 0.79, 0.77 and 0.87.
BSA related -2, 0 and +2 z-score for RV diameters were:
- for 0.5 m² BSA, in basRV: 13.8mm, 17.6mm and 22.5mm respectively, in midRV: 12.3mm, 15.9mm,
20.5mm and in longRV: 34.3mm, 40.8mm, 48.6mm.
- for 1 m² BSA, in basRV: 19.8mm, 25.3mm and 32.3mm respectively, in midRV: 17.6mm, 22.7mm,
29.2mm and in longRV: 47.4mm, 56.4mm, 67.2mm.
- for 1.5 m² BSA, in basRV: 23.5mm, 30mm and 38.3mm respectively, in midRV: 20.4mm, 26.3mm,
33.9mm and in longRV: 55.9mm, 66.8mm, 79.3mm,
as shown in the graphics.

Conclusions: the normal ranges of pediatric RV internal diameters are provided and the z-score is
also calculated. This diameters are easy to determine and may be used as noninvasive
measurements to study RV size. Normal RV internal diameters z-scores might be important predictors
in identifying enlarged RV in patients with congenital heart disease. Determination of RV internal
parameters in children with CHDs and its comparison with normal z-score could provide a new insight
in follow up and decision making in CHD.