

# Assessment of cardiac volumes using an isotropic whole-heart dual cardiac phase sequence in pediatric patients

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## Abstract

### Purpose

To evaluate the accuracy of a three-dimensional dual phase (3D DP) whole-heart technique for cardiac volumetric assessment in pediatric patients with cardiac abnormalities.

### Materials and Methods

The institutional approved this study, and informed consent was obtained from patients or their guardians. This prospective study involved 31 pediatric patients (mean age, 7.9 years; range, 15 days to 15 years) for the assessment of cardiac abnormalities using cardiovascular MR. A standard protocol was performed for assessing cardiac anatomy and function. For evaluating the 3D DP technique, statistical comparison with a 2D cine multi-slice technique (2D steady-state free-precession [SSFP]) was performed using linear regression, intraclass correlation coefficient, and Bland Altman plots.

### Results

Left (LV) and right (RV) ventricular cardiac volumes obtained with the 3D DP technique were in strong agreement with those obtained with the 2D SSFP technique for small and large ventricular volumes. The intraclass correlation coefficients (ICC)

between both techniques were 0.992 for the LV end-diastolic volume (EDV), 0.983 for the LV end-systolic volume (ESV), 0.952 for the LV-systolic volume (SV), 0.992 for the RV-EDV, 0.992 for the RV-ESV, 0.928 for the RV-SV. Interobserver analysis indicated good reproducibility for both the 2D SSFP and the 3D DP techniques.

## Conclusion

The 3D DP technique provides as accurate cardiac volumes as the 2D SSFP technique in the pediatric population, but with the added benefits of easier data acquisition and detailed anatomical information of the whole heart and great vessels in a single free-breathing scan.