Results: Acquisition of RT-3DE data sets was feasible in all 20 patients. Nine patients (45%) had good, 5 patients (25%) moderate and in 6 patients (30%) the image quality was reduced both on the longitudinal and radial planes. Thus a mean difference of 2.0±20 g. Interobserver agreement was good (r = 0.99).

Conclusion: Assessment of LV mass from real-time 3D echocardiographic data is feasible in patients with congenital heart disease. The mass of abnormally shaped left ventricle can be determined with high accuracy and low interobserver variability in patients with good or moderate echo image quality.

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Right ventricular radial and longitudinal function in patients with pulmonary regurgitation after surgically repaired tetralogy of Fallot
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Background: Right ventricular (RV) dysfunction represents a major concern in patients with pulmonary regurgitation (PR) after surgically repaired tetralogy of Fallot (TOF). Studies on the RV myo-architectural in TOF pts showed presence of a mid-wall abnormality.

Aim: To assess by echocardiographic examination RV shape, function and myocardial deformation (strain (S) and strain rate (SR) analysis) on the longitudinal and radial planes in patients with moderate-severe PR after surgically repaired TOF.

Methods: Our study population includes 74 subjects: 44 pts with moderate-severe PR after surgically repaired TOF (age at study 12±3 yrs) (TOF group) and 30 age-matched healthy children (control group). As measure of RV shape, the ratio between maximal minor axis (S) and long axis (L) of the right ventricle was calculated. RV function was assessed as RV fractional shortening (RVFS) at the S level, while RV long axis function was evaluated by the tricuspid annular peak systolic excursion (TAPSE).

Results: Compared to control group, TOF patients showed: a) significant increase of S/L ratio (p<0.05) b) reduced TAPSE (p<0.001) but comparable values of RVFS at the S level (p=0.10); c) impairment of both longitudinal and radial systolic Ssr at the IVS and RVFW (p<0.01). In TOF group the values of RV myocardial Ssr were not significantly different in patients with moderate versus severe pulmonary regurgitation (p>0.05).

Conclusions: our data show that in patients with moderate-severe PR operated on TOF: 1) RV remodels by a more spherical shape; 2) systolic function is impaired on the longitudinal plane and "apparently" preserved on the radial plane; 3) RV myocardial deformation is reduced both on the longitudinal and radial planes. Thus Ssr analysis, although it is not able to distinguish between pts with moderate versus severe PR, represents an accurate tool to evaluate RV myocardial properties in patients with RV volume overload due to PR.

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Live 3D echocardiography in infants and children: visualization of ventricular septal defects (VSD) in complex congenital heart disease
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Introduction: Many complex congenital heart defects (CHD) are associated with VSDs. For the planning of surgery exact information about size and localization of the VSD and the spatial relationship between the VSD and the adjacent cardiac structures is essential. We report our experience with Live-3D echocardiography in the assessment of VSDs in complex CHD in pediatric patients.

Methods: In the preoperative assessment of 10 infants and children with complex CHD (DORV, TOF, VSD with posterior malalignment, TGA with VSD) Live-3D echo (Philips Live-3D) was applied in addition to 2D echo and catheterization. The 3D data were acquired using subcostal and thoracosternal windows in a bedside setting. In most cases this was possible without sedation.

Results: Live-3D echo permitted fast and easy acquisition of 3D datasets in all patients. The generation of new cut planes and surface reconstructions from any desired perspective provided an anatomical and surgical view into a virtual heart model. Live-3D enabled direct 3D visualization and exact definition of the VSD regarding size, shape and relation to adjacent cardiac structures in all patients. 3D was especially valuable for the surgical planning of intraventricular tunneling in TGA and DORV (Fig.1) and in borderline biventricular correction of VSD with posterior malalignment and LVOTO. Intraoperative findings confirmed the results of this echo.

Figure 1: Live 3D - VSD in complex CHD

Conclusions: Live-3D echo is easy to apply in pediatric patients without sedation. It is a useful diagnostic tool in determining position, size and shape of VSDs and their relation to adjacent cardiac structures in infants and children with complex CHD. This information improves the preoperative assessment and gives additional valuable input for the planning of surgical procedures.