

The Impact of Flat-detector computed tomography during Catheterization of congenital Heart Disease

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Objectives: To analyze the diagnostic profit of flat-detector-CT (FD-CT) in the catheterization of patients with congenital heart disease, the help of overlaid 3D-Images on the fluoroscopy and the utility of image-fusion. To develop application protocols for different questions and imaging.

Methods: In 2010 we analyzed all our cases where FD-CT was used during catheterization of congenital heart disease. The diagnostic value was determined by the opinion of two pediatric cardiologists and one surgeon independently. While diagnostic or interventional catheterization, the assistance of image integration in fluoroscopy, either from FD-CT or former MRI or conventional CT (MSCT), was estimated by the operator. The radiation exposure of the FD-CT and contrast volume for rotational angiography was evaluated.



Results: 303 cardiac catheterizations were performed in 2010; in 68/303 (20%) we used the new possibility of FD-CT, mainly as angiographic computed tomography (ACT). Median age of the patients was 7.0 years (range 0-42.5). In 35/68 cases the FD-CT-technique was used for diagnostic issue, in 25/68 case we used the 3D-rekonstruktion for navigation in interventions; in 8/68 times we utilized former pictures as MRI-Images or CT-scans for image-fusion in interventions. In over 75% we achieved useful diagnostic images. The median dose-area-product was $125.1 \mu\text{Gym}^2$ (range 19.3-1295.7), the needed contrast medium was 1.62 ml/kg (range 0-5.7). Applications protocols divers between the varying anatomical regions and the hemodynamic.

Conclusions: FD-CT with 3d rotational angiography is a new and very helpful modality, particularly in catheter interventions, also with the option to integrate former pictures from MRI or MSCT and for surgical planning, first of all in the surgery of the great vessels. For the imaging different application protocols are needed. Radiation exposure and needed contrast volume are reasonable.