

### **3-Dimensional rotational angiography to assess the pulmonary circulation in patients with single ventricle after Bidirectional Glenn operation**

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#### **Background:**

Rotational angiography with three-dimensional reconstruction (3DRA) is an emerging technology that has been successfully used in neuroradiology, electrophysiology, coronary angiography and more often in visualizing congenital heart defects. It could be a beneficial adjunct to fix plane angiography and could enhance diagnostic capabilities in patients with single ventricle after various stages of palliation. We report our experience using 3DRA to visualize the pulmonary circulation in patients with single ventricle after Bidirectional Glenn operation (BDG).

#### **Methods:**

A retrospective analysis of all patients after BDG who underwent 3DRA was performed. Philips Allura system was used to acquire non-gated, breath-held images. During a 240 degrees, 4.1 seconds isocentric rotation, 122 angiographic images were acquired and automatically reconstructed in real time.

#### **Results:**

Between 05/2010 and 12/2011, we performed 80 3DRA's in 68 patients after BDG. All patients underwent diagnostic catheterization, which in 32 (47%) was followed by 38 interventions. Median age and weight was 3.8yrs (1.5-7) and 16kg (8.5-58kg), respectively. Median contrast dose for 3DRA acquisition and for total study was 2ml/kg (0.7-3.3) and 4.8ml/kg (2.0-15.5), respectively. Median area dose for the whole study, time of fluoroscopy and total time of study was 132,8 cGycm<sup>2</sup> (25.9-1056.8), 7,7min (0,7-80) and 52.5 min (15-180), respectively. There were no acute complications related to 3DRA. Overall quality of 3DRA images was graded by the primary operator as good in 64 (80%) studies and satisfactory in 9 (11%). Seven (9%) studies were graded as bad due to: angiographic catheter pushed too far into the proximal pulmonary artery making visualization of superior vena cava impossible in 5 (6%), wrong localization of isocenter in further 2. In the remaining 3DRA's vena cava superior, Glenn connection, right and left pulmonary arteries were visualized. In all 38 interventions 3DRA images were judged by the operator to be superior to fix plane angiography in making decision concerning the interventions or in assessing the result..

#### **Conclusions:**

In patients after BDG operation 3DRA allowed for good visualization of superior vana cava, BDG shunt and course of pulmonary arteries. It was superior to fix plane angiography in planning and assessing results of percutaneous interventions.