

**Neoaortic root dilatation and its impact on neoaortic regurgitation in adolescents and young adults with transposition of the great arteries after an arterial switch operation.**

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Introduction: Neoaortic regurgitation(NeoAR) is a common sequel in patients with the transposition of the great arteries(TGA) after an arterial switch operation(ASO). Aside the native pulmonary valve functioning in the systemic circulation, neoaortic root abnormalities are proved to be related to this feature.

The aim of this study was to assess the frequency of neoaortic root dilatation and its impact on neoaortic valve function in patients with TGA after ASO.

Patients and methods: Among 750 patients with TGA who had ASO between years 1991 and 2016, we qualified for this study the initial cohort of 53 consecutive patients older than 17 years, who had complete follow-up visit according to our institutional protocol with echocardiographic(TTE), coronary computed tomography angiography(CCTA) and magnetic resonance imaging(MRI) examinations. The presence and grade of NeoAR obtained in echo was compared with MRI findings. Differences in calculated Z-scores between two modalities(CT and TEE) and between patients who developed significant NeoAR (over 10% neoaortic regurgitant fraction in MR) were calculated.

Results: On the basis of TTE, neoaortic regurgitation was a common finding(39/53 patients; 73.6%). In most of the cases it was trace or mild(12/53 patients; 22.6% and 21/53 patients 39.6% respectively) and had no clinical significance. Moderate stenosis was present in 4 cases(7.5%), severe in two(3.8%). TTE and MR results correlate well( $R=0,62;p<0.001$ ), however there is significant difference between them in qualitative assessment ( $p<0.001$ ).

Neoaortic valve Z -score was significantly bigger in those patients, who developed significant NeoAR(mean Z-score 3.45 vs 2.02; $p=0.001$ ). Results from TTE and CT correlate well( $r=0.68;p<0.001$ ) but differences were statistically significant( $p<0.001$ ). Neoaortic sinus was also significantly bigger in patients with significant NeoAR(mean z-score 2.98 vs 1.72; $p=0.006$ ), and results obtained from CT despite their good correlation with TTE( $R=0.79;p<0.001$ ) were significantly bigger( $p<0.001$ ).

Sinotubular junction diameter was similar in patients with and without significant NeoAR( $p=0.34$ ), but the difference between CT and ECHO measurements was still significant( $p=0.003$ ).

Conclusions: TTE has a tendency to overestimate the grade of NeoAR in relation to the MRI results. Diameters of neoaortic valve and sinus are bigger in patients with significant NeoAR, however in most patients with abnormal Z- scores neoaortic valve remain competent.