Incidence, Diagnosis and Outcomes of Coronary Artery Compression During Percutaneous Pulmonary Valve Implantation

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Introduction: Coronary compression may occur during percutaneous pulmonary valve implantation and is potentially life threatening when undiagnosed before right-ventricular outflow tract stenting. We sought to evaluate its incidence, diagnosis and outcome.

Methods: All consecutive patients who underwent transcatheter right-ventricular outflow tract treatment from May 2008 to December 2011 in 4 institutions were studied. Baseline demographics, diagnosis and outcomes of coronary compression were reviewed with analysis of risk factors.

Results: Coronary compression occurred in 6 out of 100 patients (6%) at a median age of 24 (13 to 49) years, with right-ventricular outflow tract conduit stenosis as the primary lesion in all cases. The initial congenital heart disease was pulmonary atresia-ventricular septal defect (n=3), complex transposition of the great arteries (n=2) and critical aortic stenosis status-post Ross operation (n=1). The right-ventricular outflow tract initial median conduit diameter at surgical implantation was 23 (17 to 24) mm and conduit types were homograft (n=3), bioprosthesis (n=2) and a pericardial patch (n=1). Coronary compression was diagnosed by coronary angiogram during balloon dilation of the right-ventricular outflow tract in all cases whereas it was suspected on pre-procedure computed tomography in only 2 cases. Compression occurred on the left main coronary artery in 5 cases and on a single coronary artery in one patient. No risk factor was found but there was a significantly higher incidence of coronary compression in one of the 4th institutions (p=0.04). Coronary compression was well-tolerated and resolved after the balloon was deflated in all the cases. No patients underwent right-ventricular outflow tract stenting or percutaneous pulmonary valve implantation. Surgical conduit replacement was electively performed in 3 cases. Two patients with moderate residual right-ventricular outflow tract stenosis are followed. One patient with encephalopathy and respiratory insufficiency died 9 months after catheterization.

Conclusions: Coronary compression is efficiently diagnosed by coronary angiogram during balloon dilation in a small proportion of patients undergoing transcatheter interventions on right-ventricular outflow tract. Diagnosis by pre procedure computed tomography is not accurate. No specific risk factors exist. Surgical conduit replacement is indicated when balloon dilation fails to improve the right-ventricular outflow tract obstruction.