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Inadequate response of pulmonary artery pressure after percutaneous mitral valvuloplasty: determinant factors and prognostic impact

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Introduction: Pulmonary hypertension (HP) has long been known to be a marker of poor outcome in patients with mitral stenosis (MS). Percutaneous mitral valvuloplasty (PMV) is currently the treatment of choice for MS, which results in improvement in HP. However, despite the successful valve opening, the regression of PH may be incomplete. This has been attributed to irreversible morphologic changes within the pulmonary vasculature.

Purpose: To assess the clinical, echocardiographic and hemodynamic parameters associated with an inadequate response of the pulmonary artery pressure (PAP) immediately after a successful PMV, and also the impact of residual PH on long-term outcome in these patients.

Methods: 181 patients undergoing PMV for rheumatic MS were enrolled. Invasive hemodynamic and echocardiographic measures were examined in all patients. Inadequate response of PAP was defined as the mean pulmonary artery pressure (mPAP) values unchanged at the end of the procedure. Long-term outcome was a composite endpoint of death, mitral valve replacement, repeat PMV, new onset of atrial fibrillation (AF), or stroke.

Results: The mean age was 44.1±12.6 years, and 157 patients were women (86.7%). In the overall population, mPAP decreased from 33.4±13.1 mmHg pre to 27.6±9.8 mmHg post (p<0.001), as mitral valve increased from 0.96±0.2 cm² pre to 1.68±0.2 cm² post (p<0.001) PMV. Following PMV, 10 patients developed severe mitral regurgitation and were excluded from the analysis. Of the 171 patients analyzed, 52 (30%) did not present reduction of mPAP immediately after the PMV. Transmitral pressure gradients were significantly greater and mitral valve area was smaller in those patients with unchanged mPAP after PMV than in those whose PAP had decreased. Systolic, diastolic and mPAP pressures as well as left atrial pressure were higher in those patients who had improvement in pulmonary pressures after PMV. Multivariate analysis revealed the following independent predictors of unchanged mPAP: AF (Odds ratio [OR] 2.7, 95% [confidence interval] CI 1.1 to 6.4), mitral valve area (OR 1.3, 95% CI 1.1 to 1.5), maximum mitral valve leaflets displacement (OR 0.8, 95% CI 0.7 to 0.9), and left ventricular compliance after PMV (OR 0.8, 95% CI 0.6 to 0.9). During a mean follow-up of 28 months, the endpoint was reached in 48 patients (26%). The pulmonary pressure response to PMV was not predictor of long-term events.

Conclusions: In a large cohort of patients with MS undergoing PMV, mean pulmonary artery pressure values do not reduce immediately after the procedure in 30% of the cases, despite adequate opening of the valve. The factors associated with inadequate PAP response following PMV were presence of AF, larger mitral valve area, reduced valve leaflets mobility and post procedural low left ventricular compliance. The early non-reduction of mPAP after PMV is not associated with adverse outcome.