Transcatheter Mitral Valve-in-Valve / Valve-in-Ring Implantations for Degenerative Post Surgical Valves: Results from the Global Valve-in-Valve Registry

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Background: Transcatheter mitral valve-in-valve / valve-in-ring implantation is an emerging therapeutic alternative for patients with failed mitral valves after surgical intervention and may obviate the need for a redo operation. We aimed to evaluate the clinical results of this technique using a large worldwide registry.

Methods: The registry included 190 patients with degenerated mitral valves after surgical intervention (17.4% ring only, median of 9 years post procedure). Mean age 73.6 ± 12.6 years; 65.2% female (STS score 14.4 ± 11.9%). The mode of failure was regurgitation (n=70, 37%), stenosis (n=47, 25%), and combined (n=73, 38%).

Results: Transcatheter Edwards SAPIEN (Edwards Lifesciences, Irvine, CA) implantation was performed in 93.7% of cases (23 mm in 11.1%, 26 mm in 57.4%, and 29 mm in 25.3%) and Inouave in 6.3%. Procedural access was transapical in 161 cases (84.7%), transseptal in 23 (12.1%), and through the left atrium via right mini-thoracotomy in 3 (1.5%). Twenty-three combined procedures (12.1%) included aortic valve-in-valves, aortic valve replacement, tricuspid valve-in-ring implantation, and paravalvular leak closure. Device malposition appeared in 5.3% of cases and post implantation valvuloplasty was utilized in 8%. Post-procedural, mitral valve area was 1.91 ± 0.7 cm² and valve mean gradients was 6.2 ± 2.7 mmHg. Significant mitral regurgitation (>2+) was observed in 4.2% of patients. Median length of hospital stay was 8 days. At 30-day follow-up, all-cause mortality was 8.9%, 2.2% of patients had stroke and 85.8% were at New York Heart Association Functional class II. 1-year mortality was 22.3%. Independent predictors, for 1-year mortality included baseline STS score (HR 1.04, CI 1.02-1.06) and renal failure (GFR< 60mL/min, HR 2.37, CI 1.06-5.28).

Conclusions: Mitral valve-in-valve/ valve-in-ring implantations, performed in extremely high-risk patients, were clinically effective in most patients with degenerative mitral valves after surgery. However, safety and efficacy concerns include device malposition and elevated post procedural gradients.

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Effects of the Percutaneous Mitral Balloon Valvuloplasty on the Left Atrial Compliance

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Background: Percutaneous mitral balloon valvuloplasty (PMV) is the treatment of choice for patients with symptomatic mitral stenosis (MS). Rapid improvement in symptoms and hemodynamic parameters can be observed after increasing mitral valve area and decreasing left atrial pressure. However, left atrial pressure has been shown to be influenced by both MS severity and left atrial compliance (Ca). Effects of PMV on Ca are still unknown. The aim of this study is to define the immediate effects of PMV on Ca and to identify factors influencing the changes in Ca post PMV in patients with MS.

Methods: We enrolled patients in our institution with MS who underwent successful PMV from December 2012 to May 2014. Transthoracic echocardiography (TTE) was performed in all the patients pre and 24-h post procedure. PMV was performed by the Inoue technique, guided by TTE. Gas analyses of blood samples from aorta and pulmonary artery were obtained and pressure tracings were recorded from aorta, left ventricle and left atrium before and after the balloon dilation in order to calculate cardiac index and the left atrial compliances.

Results: Sixty-one patients were enrolled. The mean age was 45±12 years, 84% were female. Mean mitral valve area (MVA) pre procedure was 0.96 ± 0.25 cm². After PMV we observed a significant decrease in mPAP (35.1±12.4 mmHg vs. 29.6±9.7 mmHg, p< 0.001) and an increase in cardiac output (4.1±1.3 L/min vs. 4.4±1.3 L/min, p< 0.001). The median Ca pre procedure was 6.6 [4.5-9.2] mL/mmHg with increase after PMV to 12.4 [6.6-22.5] mL/mmHg (p< 0.001). The change in Ca correlated with changes in mitral transvalvular gradient, pulmonary artery pressure, left atrial pressure and pulmonary vascular resistance pre and post PMV. Multivariate analysis revealed that the degree of change post PMV in mPAP (p=0.004), left atrial pressure (p=0.012) and pulmonary vascular resistance index (p=0.001) were independently associated with changes in Ca.

Conclusions: This study demonstrates that successful PMV can significantly increase Ca, which is associated with improvement in cardiac hemodynamics. These results may also provide potential mechanistic insights into the pathophysiology of the hemodynamic changes seen in MS.