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Outcome of bioprosthetic valves in pulmonary position implanted for reconstruction of the right ventricular outflow tract in adults with congenital heart disease

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Objectives: Pulmonary valve replacement (PVR) is the most frequent surgical procedure in adult patients with congenital heart diseases (ACHD). However, none of used valve substitutes is ideal. The aim of the study was to determine the impact of PVR on clinical outcome and right ventricular function. **Methods:** We retrospectively reviewed the outcome and performance of bioprosthetic valves implanted in the pulmonary position. Since 2005 to April 2015, 133 consecutive patients with a median age of 35 (range 18.4 to 70.4) years underwent valve implantation: Carpentier-Edwards Perimount Magna™ (N=106), St. Jude Trifecta™ (N=10), St. Jude Medical Epic™ (N=11), St. Jude Toronto™ (N=4) and other (N=2). Median follow-up was 4.3 (0.1-11.0) years. Patients diagnoses included tetralogy of Fallot (n = 84), pulmonary stenosis (n = 33), complex diagnoses (n=14) or other (n = 2). One hundred twenty nine patients had 182 previous surgical procedures. Eighty-two patients (61%) had concomitant surgical procedures.

Results: There were no perioperative deaths, and 1 (0.8%) late death. Probability of freedom from reoperation was 100%, 99%, and 86.1% at 1, 4, and 8 years, respectively. Probability of freedom from valve dysfunction (pulmonary insufficiency more than moderate and or stenosis >40 mmHg) was 98.3%, 90.2%, and 56.9%, respectively. There was a significant improvement ($p<0.001$) in NYHA functional class. Echocardiography confirmed lasting reduction in pulmonary ($p<0.001$) and tricuspid valve regurgitation ($p<0.001$), decrease in the size of tricuspid valve annulus ($p<0.001$) and improvement of right ventricular function ($p<0.001$).

Conclusions: PVR using bioprosthetic valves has a low mortality and carries lasting improvement in functional status and right ventricular function in ACHD patients. Freedom from re-operation and valve dysfunction is acceptable. Further studies are needed to compare long-term performance of different valves types in the pulmonary position.