

Long Term Results of Percutaneous Balloon Valvuloplasty in Infancy

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INTRODUCTION

Percutaneous balloon valvuloplasty (BV) is the treatment of choice in the management of pulmonary stenosis (PS) in infancy. Despite the excellent short and medium-term results, data on long-term outcomes with respect to exercise capacity and right ventricular (RV) function is limited. The purpose of the study was to assess the long-term functional outcomes of BV performed in infancy.

METHODS

We conducted a retrospective study of 44 patients with isolated valvular PS successfully treated with BV. All children had cardiac magnetic resonance and cardiopulmonary exercise testing. Exercise data was matched using Kernel scoring to 218 healthy controls who had an exercise test at our centre. Data are presented as median (inter-quartile range).

RESULTS

Median age at exercise test was 15.8 years (13.3-16.9). Maximum exercise tolerance (144.0 watts; 117.0-187.0; $p < 0.001$), and peak oxygen uptake (34.2 mL/kg/min; 29.6-42.9; $p < 0.05$) were significantly lower than values in healthy controls matched for age, sex, height and weight. Peak VO₂ was 86.8% (71.9-104.0%) of predicted value and 43.2% of children had an abnormal peak VO₂ (<84% of predicted).

Indexed RV end-diastolic volume (EDV) was 88.9 mL/m² (78.7-112.8), which corresponded to a Z score of 2.37 (0.88-4.92), significantly deviating from the general population ($p < 0.05$). 24 patients (54.5%) had a RV EDV z-score ≥ 2 suggestive of RV dilation. RV EDV z-scores correlated negatively with RV ejection fraction (EF; $R = -0.455$; $p < 0.05$). Left ventricular EDV z-score was -1.550 (-2.603—0.035), significantly ($p < 0.001$) less than the general population. PR fraction was 18.6% (10.9-28.4). A PR fraction >15% was present in 27 patients (60%), and 8 patients (17.8%) had a PR fraction >30%. Worsening PR fraction correlated with RV EDV z-scores ($R = 0.392$; $p = 0.009$). There was no difference in peak VO₂% between patients with PR fractions <15% and >15% (80.4 vs. 86.5%, $p > 0.05$).

CONCLUSIONS

The majority of children who have undergone BV for PS in infancy have at least mild PR and some degree of RV dilation as adolescents and a large proportion of them has reduced exercise tolerance. In this setting, a larger PR fraction is not associated with reduced exercise capacity.