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Predictors of left ventricular outflow tract obstruction after conventional repair for patients with interrupted aortic arch or coarctation of the aorta, combined with ventricular septal defect – single-centre experience.

Szaflik K. (1), Ostrowska K. (1), Kazmierczak P. (2), Moll M. (2), Moll J.A. (1)
Department of Cardiology, Polish Mother's Memorial Hospital, Research Institute, Lodz, Poland (1);
Department of Cardiac Surgery, Polish Mother's Memorial Hospital, Lodz, Poland (2)

Introduction

Left ventricular outflow tract obstruction (LVOTO) is an important factor affecting survival and reoperation rates after surgical treatment of patients with interruption of the aortic arch or coarctation of the aorta (IAA/CoA) with ventricular septal defect (VSD). The aim of the study was to determine predictors of LVOTO after the repair of IAA/CoA with VSD and to evaluate the relationship between aortic valve (AoV) morphology and the re-intervention rate.

Methods

We conducted a retrospective study of patients after conventional repair for IAA/CoA with VSD at our institution between 1996 and 2017. The pre- and post-operative echocardiographic parameters and re-interventions (surgical and trans-catheter) were reviewed.

Results

A total of 52 patients were included in the study [one-stage repair, 47 (90.4%); staged repair, 5 (9.6%)]. The median age at the surgery was 21 days (range 14-27). In the median follow up of 8.31 years (range 6.15-10.27) 8 patients (15.4%) presented with a significant LVOTO; seven of them required reoperation after median period of 2.1 years (range 0.83-8.14). Multivariable logistic regression identified AoV diameter and z-score (OR 0.57, $p=0.035$) as predictors of LVOTO. The mean AoV z-score before the primary repair was significantly smaller in those with LVOTO as compared to those with unobstructed flow from the LV (-3.46 ± 1.56 vs. -1.53 ± 1.57 ; $p=0.0023$). At 1-year follow-up, both groups showed an increase in the AoV z-score (-0.78 ± 0.42 and 0.17 ± 0.26), although the difference was not statistically significant ($p=0.91$). The re-intervention rate, either for LVOTO or reCoA, was higher in patients with AoV z-score ≤ -3 (58.3% vs. 30.8%; $p=0.16$). Similarly, there was an increased incidence of LVOTO and reCoA in patients, whose aortic annulus was less or equal than patient's weight [kg] + 1.5 mm as compared to those with larger aortic annulus (71.4% vs. 33.3%; $p=0.13$) [Hirata et al.].

Conclusions

In patients after surgical treatment of IAA/CoA with VSD, the AoV diameter and z-score at the diagnosis are significant risk factors for LVOTO.

With age, AoV growth and z-score improvement is expected.

Our data show that small AoV increases the re-intervention rate for reCoA.