Impact of type of repair on exercise capacity in patients with atrioventricular discordance
Does the anatomical repair have the advantage over the functional repair?

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Introduction: Anatomical repair (AR), i.e., double switch operation, has been applied to patients with atrioventricular discordance (AVD) due to possible disadvantages of the morphological right ventricle and tricuspid valve for the systemic circulation. However, there has been no data demonstrating clear clinical benefits of AR over conventional functional repair (FR).

Objectives: This study was to find determinant factors of exercise capacity in AVD patients and to see whether AR was advantageous over FR in terms of the exercise pathophysiology.

Method and Results: We measured peak oxygen uptake (PVO2: % of normal) in 99 AVD patients (42 after AR, 37 after FR, 20 corrected transposition of the great arteries without repair [cTGA]) during cardiopulmonary exercise testing (CPX). Of those, serial CPXs were performed to determine a rate of change in PVO2 (dPVO2/year) in 30 AR, 22 FR and 10 cTGA patients with an interval of 10±5 years. Although PVO2 (%) tended to be higher in the AR than the FR group (67±19% vs. 58±19%, p=0.067), those PVO2 were lower than that (85±13%) of the cTGA (p<0.01). In all subjects, age at CPX, a number of cardiac surgeries, use of diuretics and heart rate reserve (HHR), instead of the type of repair, independently determined PVO2 (p<0.05 to 0.0001). In the serial study, the first to latest values of PVO2 for the AR, FR, and cTGA was 65±18 to 67±17, 62±16 to 59±18, 90±11 to 90±15, respectively (p<0.0001) and there was no difference in the dPVO2/year among the 3 groups (p=0.80). Male gender and change in HRR, rather than type of repair, were independently associated with the dPVO2/year (p<0.05) and HRR was independently determined by a number of cardiac surgeries and pacemaker implantation (p<0.01).

Conclusions: AR for AVD patients had a marginal benefit on the exercise capacity and its follow-up change. Greater number of cardiac surgeries, lower HRR, and use of diuretics, rather than the type of repair, were major determinants of lower exercise capacity in AVD patients.