

Increased pressure in a pulmonary artery: is it a contraindication to bidirectional cavopulmonary connection?

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Introduction: Bidirectional cavopulmonary connection (BCPC) is optimal intermediate stage for hemodynamic correction of congenital heart diseases (CHD) with single ventricle (SV). However, there is no identical opinion upon optimal criteria for BCPC performance.

Methods: Over the 2012 to 2014 period 89 patients with SV at the age from 2 months to 13 years old (Me=0,64; IQR:0,5-1,18) were involved into the study. They were performed catheterization of heart cavities with pulmonary resistance calculation at different stages of hemodynamic correction. The patients were divided into two groups: the first group (n=64) – children with initial pulmonary artery (PA) pressure under 15 mm Hg, the second group (n=25) – patients with PA pressure above 15 mm Hg.

Results: The average PA pressure was 11 mm Hg (IQR:10,00–13,75), pulmonary blood flow volume indexed to lung volume (iQp) - 3,57 (mL/Min)/m² (IQR;2,69-4,87), pulmonary resistance indexed to body surface area (iRp) - 1,41 WU/m² (IQR;0,90-1,98) in the first group. In the second group the average PA pressure was 20 mm Hg (IQR:17,00-26,00), iQp 4,56 (mL/Min)/m² (IQR:3,17-6,04), iRp 2,36 WU/m² (IQR:1,85-3,10). Taking into consideration increased PA pressure, oxygen test was performed. A slight decrease of average PA pressure up to 19 mm Hg (IQR:17,00-30,00), p=0,02, iQp increase up to 11,2 (mL/Min)/m² (IQR:5,85-15,6), p=0.003) and iRp decrease up to 1,37 WU/m² (IQR:0,72-1,95), p=0,002 were marked after the test. All the patients were performed BCPC. Before the total cavopulmonary connection the average PA pressure was 8 mm Hg (IQR:7,00–9,13), iQp 2,69 (mL/Min)/m² (IQR;2,14-3,15), iRp was 1,04 WU/m² (IQR;0,81-1,57), p=0,1 in the first group. In the second group it was 8 mm Hg (IQR:6,38–11,25), iQp 2,46 (mL/Min)/m² (IQR;2,22-3,30), iRp was 1,23 WU/m² (IQR:0,86-2,3). The comparative analysis between two groups of patients after DCPC showed no significant difference of cardiopulmonary hemodynamics, p > 0,05.

Conclusion: Thus, the pressure in a pulmonary artery higher than 15 mm Hg is not a contraindication to BCPC. An operability criterion is the index of pulmonary resistance that after 100% inspired oxygen should be lower than 2 WU/m².