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RESULTS OF SURGICAL TREATMENT OF PATIENTS WITH VENTRICULAR SEPTAL DEFECT COMBINED WITH SUBAORTIC STENOSIS

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During the period from 2004 to 2013 years, we operated 52 patients with ventricular septal defect (VSD) in combination with subaortic stenosis (SAS).

There were no lethal cases. The early results were good in 47 patients (90.3%), 2 (3.8%) cases – satisfactory, 3 (5.7%) patients – unsatisfactory. The good long-term results were obtained in 38 (73.0%) patients, 3 (5.7%) cases – satisfactory. Unsatisfactory results was obtained in 6 (11.5%) patients.

VSD and SAS repair with minimal AoV insufficiency provides good long-term outcome with LVOT maximum pressure gradient lower than 20mmHg and preservation of AoV function in 73% and is independent on type of surgery. Reoperation rate associated with recurrent LVOT obstruction was 5.7%.

Keywords: congenital heart disease, subaortic stenosis, ventricular septal defect.

Introduction. Ventricular septal defect (VSD) is one of the most frequent congenital heart disease (20% of all congenital heart defects) with well understood natural course and treatment. But concomitant lesions can complicate treatment strategy and long-term results prediction.

By hemodynamic theory, turbulent blood flow and increased left-to-right shunting through VSD due to obstruction of left ventricular outflow tract (LVOT) are reasons of subaortic stenosis (SAS) development. So it is beneficial to study results of surgical treatment of patients with VSD and SAS combination. Reoperation rate of isolated SAS is 14-19%, so it is advantageous to study reoperation rate of obstruction LVOT, after eliminating probable provoking factor of its development – anomalous turbulent blood flow through the VSD [6, 7].

Purpose of study is to review the experience of surgical treatment of patients with ventricular septal defect and subaortic stenosis.

Material and methods. We have operated 52 patients with VSD and SAS combination from 2004 to 2013yy.

The average age of the patients was 34±57 months (from 1 month to 204 months), the average weight – 12±14 kg (from 3kg to 58kg). There were 37 (71.2%) male and 15 (28.8%) female patients.

Comorbidities at the time revealing SAS included pulmonary stenosis (PS) – in 6 (11.5%) patients, coarctation of the aorta (CoAo) – in 5 (9.6%), aortopulmonary window – in 1 (1.9%) atrioventricular defect – in 1 (1.9%).

Previous interventions were performed in 5 (9.6%) patients: balloon dilatation CoAo – in 2 cases, banding of pulmonary artery (PAB) and CoAo repair – in 1, PAB with aortic arch interruption repair – in 1 and 1 patient received PAB. All patients had no signs of SAS at the time of previous interventions.

There were 31 (59.6%) patient with perimembranous VDSs, 19 (36.6%) – subaortic, 1 (1.9%) – inlet and 1 (1.9%) with muscle defect. The average size of defect was 6±1.9mm (from 4mm to 12mm).

The presence of SAS was confirmed by echocardiography. Echo findings correlated with intraoperative findings in all cases. Preoperative gradient on LVOT ranged from 5 to 70mmHg, average of 20±39mmHg.

Discrete form of SAS observed in 43 (82.7%) patients, tunnel form – in 3 (5,8%), SAS, due to the additional tissue of mitral valve – in 1 (1.9%) and SAS because of the interventricular septum malposition – 5 (9.6%).

Aortic valve (AoV) insufficiency was found in 11 (21.1%) patients: mild insufficiency – in 8 (15.3%), moderate insufficiency – in 3 (5.8%).

Indications for surgery in 50 (96.1%) cases were hemodynamic changes caused by VSD and co-morbidities, and only in 2 (3.8%) – the severity of SAS.

Operative technique was chosen by surgeon intraoperatively according to the anatomical features of SAS and comorbidities. A typical SAS resection was performed in 46 (88.4%) cases, SAS resection with myoectomy – in 6 (11.5%) patients.

The efficiency of LVOT obstruction removal assessed with largest value of Δp by Echo: 20mmHg – good, 21-40mmHg – satisfactory and 41-90mmHg – poor [1].

AoV plasty was performed in 6 (11.5%) cases: 4 (7.7%) patients underwent non-coronary leaflet plasty by Trasler, 1 (1.9%) patient – subcommissural annuloplasty and 1 (1.9%) patient treated with commissurotomy.

 Comorbidities were repaired by standard techniques.

Results. There were no lethal cases. There were complications in 3 patients with SAS, VSD, CoAo combination: 1 (1.9%) patient had complete AV-block treated with pacemaker implantation; 1 (1.9%) patient had severe failure with transient, resistant to external stimulation, AV-block, which required extracorporeal membrane oxygenation for 2 days; 1 (1.9%) patient had necrotizing enterocolitis III B with perforation and peritonitis, treated by ileostomy formation and ulcers suturing.

The early results of SAS elimination are independent on type of surgery and were good in 47 (90.3%) patients. Pressure gradient on LVOT was lower than 20mmHg, AoV insufficiency was absent in 39 (75%) and mild – in 13 (25%) patients.

In 2 (3.8%) cases pressure gradient was lower than 20 mmHg, but significant AoV insufficiency was observed. In 1 (1.9%) patient insufficiency progressed from mild to moderate and in 1 (1.9%) patient AoV insufficiency remained moderate after Trasler AoV plasty. Those were satisfactory results.

Unsatisfactory result obtained in 3 (5.7%) patients. In 1 (1.9%) patient with SAS, VSD and PS postoperative pressure gradient was 66mmHg due to severe hypertrophy of interventricular septum and dynamic obstruction. In 2 (3.8%) cases with SAS, VSD and CoAo postoperative pressure gradient raised from 10mmHg to 50mmHg and from 33mmHg to 67mmHg respectively due to left ventricular hypertrophy. In all three cases were managed conservatively with β-blockers in age doses.

Long-term results were studied in 47 (90.3%) patients, average observation period was 45±32 months (from 6 months to 115 months).

In the late period, independent on the type of surgery, a good result was obtained in 38 (73.0%) patients, residual gradient does not exceed 20mmHg. We observed gradual regression of residual pressure gradient from 66 to 20mmHg over 115 months in patient with SAS, VSD, PS.

Three (5.7%) cases showed satisfactory results. In 1 (1.9%) patient with VSD and tunnel form of SAS and in 1 (1.9%) patient with SAS, VSD and PS after a long time of observation (58 and 79 months respectively) was noted growth of the pressure gradient to 30 and 33mmHg respectively. In 1 (1.9%) patient with SAS, VSD and CoAo gradual regression of LVOT pressure gradient was observed from 50 to 33mmHg after 5 months.

Poor long-term outcome obtained in 6 (11.5%) patients, 5 of them required reoperations. One patient with SAS, VSD and CoAo preserved residual pressure gradient of 60mmHg.

Frequency of reoperation due to recurrence of SAS was 5.7% (n=3), AoV insufficiency – 3.8% (n=2) and recurrence of PS – 1.9% (n=1).

Conclusions.

1. VSD and SAS repair with minimal AoV insufficiency provides good long-term outcome with LVOT maximum pressure gradient lower than 20mmHg and preservation of AoV function in 73% and is independent on type of surgery.
2. Reoperation rate associated with recurrent LVOT obstruction was 5.7%.
3. Simultaneous VSD, SAS and CoAo repair associated with risk of severe postoperative complications, and the outcome is not satisfactory.

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