ABSTRACTS

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A-1

Comparative analysis of the results of VSD closure using ministernotomy and full sternotomy

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Objective: It is known that the main method of treatment of congenital heart defects (CHD) in children is surgical correction. Despite the progress in cardiac surgery, the risk of using open-heart surgery remains high. Therefore, in recent years, much attention has been paid to the introduction of less traumatic methods of surgical CHD treatment. The advantages of mini-accesses are the reduction of surgical trauma, less issues with wound, faster patient recovery and an obvious cosmetic effect.
The aim of the work is to show the results of surgical correction of VSD in children using the access of ministernotomy and full sternotomy.
Methods: the patients were divided into 2 groups: group 1- main group (n-15), operated using the ministernotomy; group 2- control (n-17), operated using full longitudinal sternotomy. The groups were matched by gender, age and diagnosis (18 girls, 14 boys, average age was equal to 3 years).
The indications for the defect plasty using partial sternotomy (in the form of an inverted club) were all types of isolated VSD, except for inlet localization, when right anterior minithoracotomy was used.
We analyzed the results based on main research criteria: the duration of the operation, duration of bypass, discharge volume through the drainage system, the size of the postoperative scar, the subjective status of the patient and the cosmetic effect of the postoperative wound upon discharge and after 3 months.
Results: The study found that there were no significant difference between two above groups in the average operation and bypass time as well as in duration of patient`s stay in the ICU. Moreover, there was no significant difference in the length of the postoperative hospital stay (10 ± 2 days). Healing of wounds in both groups was fast with primary intention.
The main advantage of partial sternotomy were the enhanced recovery of children activity in the early postoperative period and a positive subjective assessment of the size of the wound by parents of patients, especially in the late period, i.e. in 3 months.
Conclusions: we pursued a definite goal of using ministernotomy for closure of VSD to obtain a good cosmetic effect and rapid rehabilitation in the early postoperative period. The results allow us to state that the ministernotomy for the correction of congenital septal defects can be considered as a quite safe and effective surgical access.

A-2

Echocardiographic criteria for the selection of patients for the closure of VSD using right-sided anterior minithoracotomy

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Objective: In order to close the ventricular septal defect (VSD) under bypass using right-sided anterior minithoracotomy (RAMT), an exact defect characteristic of transthoracic echocardiography (EchoCG) is necessary. Echocardiography visualization during childhood is usually not difficult.
Aim of the study: to determine the criteria for the selection of patients for VSD closure using RAMT based on the EchoCG data assessment
Methods: diagnosis of inlet or outlet VSD, the relationship of the edge of the defect to aortic annulus, the degree of manifestation of the ventriculo-infundibular fold tissue based on the results of two-dimensional EchoCG with pulsed and color Doppler imaging with 5x-1 MHz transducer using Philips IE-33 device. For transthoracic EchoCG, standard positions were used to visualize the interventricular septum, but the basic morphological picture was obtained from two positions. These are parasternal view of the long- and short-axis and four- and five-chamber apical view. When examining patients with VSD, localization, shape and size of the defect, degree of dilatation of the right heart chambers, and degree of pulmonary hypertension were taken into account.

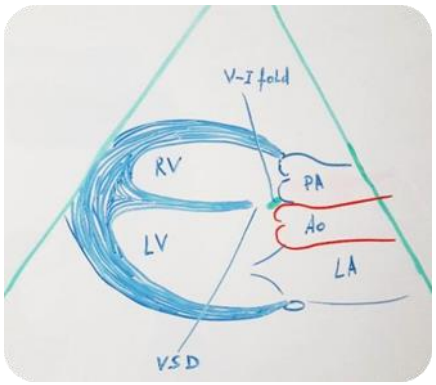

Figure 1. Parasternal long-axis view

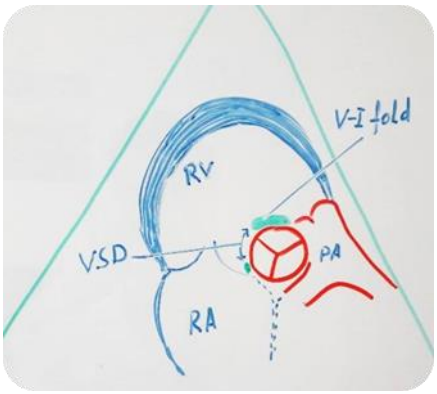

Figure 2. Parasternal short-axis view - aorta

Results: in Figure 1, the parasternal view is the long axis of the heart is shown, where the tissue of the ventriculo-infundibular fold under the aortic annulus is visible.
The basic information characterizing the inlet VSD is derived from the parasternal view along the short axis of the aorta. This can be seen in Figure 2. If we represent the aortic annulus as a clock face, then we have a shunt blood flow through VSD in the region from 9 to 11 hours, where the defect is completely surrounded by crista supraventricularis.
The outlet VSD is characterized by the visualization of a shunt blood flow between 11 and 13 hours and the absence of the tissue of the ventriculo-infundibular fold, which gives a picture of merging with the aortic annulus or as a narrow slit. While, in case of large VSD, the discontinuity on the interventricular septum extends under the septal leaflet of tricuspid valve up to 12 hours of the aortic annulus.
Conclusion: Transthoracic EchoCG allows assessing the localization, shape and size of the defect, thereby selecting groups of patients for the safe and effective closure of VSD under bypass conditions using RAMT.

A-3

Remodeling of the left heart after mitral valve replacement

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Objective: For safety of adequate contractility and better remodeling of the left heart after mitral valve replacement procedure, it is obviously to maintain the correct geometric shape of the left heart.
Purpose of the study was evaluation of immediate results of the mitral valve replacement procedures with full maintenance of subvalvular structures.
Methods: In the period from March to December 2018, totally 20 patients who underwent mitral valve replacement procedures with full maintenance of subvalvular structures. Transthoracic echocardiography was performed for all patients on admission and before discharge.
Results: The average age of patients was 46.9 ± 13.7 years, female sex was in 85% of cases. 80% of patients had heart failure III and 20 heart failure IV by NYHA classification). Overall 95% of patients simultaneously underwent tricuspid valve annuloplasty and 45% of patients to left atrial paraannular atrioplasty.

Ten patients who underwent atrioplasty had decline of left atrium dimension from 54 ± 7.9 mm to 42.6 ± 5.9 mm and volume from 164.2 ± 76.2 ml to 70.7 ± 31.4 ml. Also, all patients had decline of left ventricle end-diastolic volume from 82.2±42.1mm to 67.3±10.2 mm and end-systolic volume from 33.0±14.3mm to 25.8±7.3mm, before and after procedures respectively.

Conclusion: Mitral valve replacement procedure with preservation of the entire subvalvular apparatus allows maintaining the correct geometric shape of the left ventricle, which helps to reduce its volume and size. Performing of paraannular atrioplasty of the left atrium significantly reduces the size and volume of the left atrium. Full maintenance of subvalvular structures in the mitral valve replacement procedures with atrioplasty of the left atrium allows improving the function of the left ventricle and intracardiac hemodynamics in the nearest postoperative period.

A-4

The preliminary results of athletic heart study: left heart enlargement in male adolescent athletes with early repolarization pattern

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Objective: Early repolarization pattern (ERS) is frequent finding of athletic heart syndrome. In this observational study we analyzed the association of ERS with left cardiomegaly in male adolescent athletes.

Methods: a total of 65 male adolescent athletes with regular training background of minimal four years of Greco-Roman and freestyle wrestling categories of the Republican School of Olympic Reserve were enrolled in standard electrocardiographic and echocardiographic examinations for evaluation of athlete heart syndrome. Adolescents were divided into two groups on the basis of early repolarization pattern: ERS-group (n=34) and non-ERS (n=31). Chi-square analysis was conducted to association between electrocardiographic ERP with echocardiographic continuous variables.

Results: Baseline clinical, electrocardiographic and echocardiographic data were collected. Continuous variables was presented as mean ± standard deviation (SD) for normally-distributed data or median and interquartile range (IQR) for abnormally-distributed data. Athletes of both group did not show significant difference by BMI and heart rate (p=0,65 and p=0,74, respectively). However, statistical difference was found in mean left ventricular sizes and left atrial sizes: EDD: 56.34mm vs 46.32mm, p=0.047; ESD: 37.65mm vs 32.24mm, p=0.05 and LA: 37.76mm vs 31.49mm, p=0.043. Other echocardiographic measurements including LV systolic function parameters did not show significant difference.

Conclusion: left heart enlargement is associated to electrocardiographic early repolarization pattern in adolescent athletes.

Key words: sports cardiology, early repolarization pattern, cardiomegaly, athlete, athletic heart syndrome, adolescent, echocardiographic chamber assessment.

A-5

The analysis of structure of the valvular heart diseases

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Objective: The most frequent causes of VHD are degenerative disease, rheumatic fever and infectious endocarditis. Research objective: to study the structure of the valvular heart diseases (VHD) in Bishkek.
Methods: For studying of structure of the VHD among inhabitants of Bishkek referred to the Scientific Research Institute of Heart Surgery and Organ Transplantation, the retrospective analysis of out-patient cards of the patients observed from 2005 to 2018 was carried out. In total, the analysis included 472 patient cards. For the specified period of observation (2005-2018) 472 patients with VHD living in Bishkek were examined.
Results: Among patients with VHD the females were 312 (66.1%) patients, males – 160 (33.9%). The adult and middle age (from 18 to 60 years) prevailed among patients – 441 patients (93.4%), there were only 20 children, preadolescents, adolescents (4.2%). Overall, 217 (45.9%) the patients underwent hospital treatment.
VHD developed as a result of a chronic rheumatic fever in most of patients – 386 (81.8%), and due to primary infectious endocarditis in 9 (1.9%) patients, and secondary – in 19 (4.0%) patients. Other reasons of VHD (atherosclerosis, heart injuries, syphilis, etc.) made 58 (12.3%) patients.
By the number of the involved valves the combined VHD prevailed (372 (78.8%)), isolated or local were seen in 65 (13.8%) patients, combination of several valves met less often (36 (7.4%)). Distribution of VHD by the type of the valve was as following: aortic valve (216), mitral valve (307), tricuspid valve (196), the valve of pulmonary artery (4).
Among patients the compensated heart diseases were detected in 190 (40.3%) patients, subcompensated – 221 (46.8%), decompensated – 61 (12.9%) patients.
In total, 147 (31.1%) patients were operated, repair of the valve or replacement. Valve replacement with mechanical valves were done in 91.8% patients or bioprosthetic valves -8.2% patients. The type of valve replacement depended on the patient's age, condition, and the specific valve affected.
Closed mitral commissurotomy was performed in 22 (4.7%) cases, mitral valve replacement in 77 (16.3%) patients, mitral and aortic valve replacements were carried out in 20 (4.2%) patients, mitral, aortic and tricuspid valves replacement were carried out in 4 (0.8%) patients, mitral and tricuspid valves replacements - 18 (3.8%) of patients, aortic valve replacement – 1 (0.2%) the patient, tricuspid valve replacement – 1 (0.2%) the patient, secondary infectious endocarditis – 4 (0.8%) patients.
Conclusion: In our patients cohort, females and the adult and middle aged (from 18 to 60) patients prevailed. The most common cause of VHD was chronic rheumatic fever. By the number of the involved valves the combined VHD prevailed.

A-6

Association of heart rate variability parameters with sinus rhythm maintenance

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Objective: The relative hypersympathicotonia due to the suppression of the parasympathetic division of the autonomic nervous system (ANS) in combination with signs of baroreflex insufficiency prevents the maintenance of sinus rhythm in various structural heart diseases. In this paper, we analyzed the modulating effect of the ANS on the sinus rhythm control in patients operated due to acquired valvular heart disease.
Methods: A total of 42 patients with atrial fibrillation and 30 patients with normal sinus rhythm who were subjected to mitral valve replacement for rheumatic isolated mitral insufficiency from 2007 to 2015 in the Department of Surgery of Acquired Heart Diseases of the Scientific-Research Institute of Heart Surgery and Organs Transplantation were included in the study. The temporal and spectral indices of HRV of the 24h electrocardiographic (ECG) monitoring in the preoperative period were evaluated. In the early postoperative period, the association of HRV parameters according to the ECG monitoring data with the sinus rhythm maintenance was retrospectively studied. An active orthostatic test (tilt-test) was carried out in order to reveal heart rhythm regulation abnormalities.
Results: In the postoperative period, rhythm maintenance was observed in 14 patients from the main group of patients (hereafter AF1 group), whereas in 28 patients rhythm control was not achieved (hereafter AF2 group). Sex distribution in the main group (AF) was: 26 women and 16 men, and in the control group (hereafter NSR): 20 women and 10 men. The age of the examined patients ranged from 14 to 48 years (mean age 38.1 ± 5.9 years). The duration of the underlying disease ranged from 7-21 years, an average of 14.3 ± 7.8 years.

The indices of both the temporal and spectral parameters in patients of the AF1 group did not significantly differ from the values of the analogous indices in patients with sinus rhythm (NSR). The SDNN was 140.1 ± 26.5 ms. vs 150.2 ± 28.4 ms, ($p > 0.05$). Parasympathetic indicators of RMSSD and p-NN50% also showed no difference ($p > 0.05$). The VLF (index of subcortical structures), LF (index of the sympathetic system) and HF (index of the parasympathetic system) of the AF1 group were 2364 ± 1089 ms, 857 ± 354 ms, 301 ± 109 ms, respectively, did not significantly differ from the values of similar indicators in the group NSR (2489 ± 1254 ms, 975 ± 367 ms, 338 ± 121 ms; $p > 0.05$). The values of sympathetic-parasympathetic balance in both groups were also comparable (3.8 ± 1.1 units in the NSR group and 3.5 ± 1.3 units in the AF1 group, $p > 0.05$).

A comparative analysis of HRV indicators between the AF1 and AF2 groups showed statistically significant differences in both temporal and spectral parameters. The SDNN of the MA2 group was 124.2 ± 16.4 ms compared to 140.1 ± 26.5 ms of the AF1 group, $p < 0.05$, the RMSSD and p-NN50% also showed a significant difference: $p < 0.01$. Similar data were obtained when analyzing the frequency spectrum data. The power of the HF range in patients of the AF2 group turned out to be significantly lower than the values of the same indicator in the group of patients with AF1 (175 ± 98 ms2 vs. 301 ± 109 ms, $p > 0.05$). Naturally, against the background of suppression of the parasympathetic division of the ANS in patients of the AF2 group, a shift in the autonomic balance towards a relative predominance of sympathetic influences was noted. Thus, the indicator of sympathovagal balance (LF / HF) was significantly higher in AF2 than that in the AF1 group (5.2 ± 1.0 units versus 3.8 ± 1.1 units, $p < 0.01$).
In the NSR group, the tilt test resulted in a significant increase in the activity of sympathetic LF oscillations (from 975±367 ms^2 to 1150±328 ms^2, $p < 0.01$) and a decrease in the power of parasympathetic influences (HF drop from 338±121 ms^2 to 192±85 ms^2, $p < 0.01$). The sympato-vagal balance increased from 3.5±1.3 units. to 5.6±1.4 units ($p < 0.01$).

In the AF1 group, the tilt test also led to an increase in the LF oscillations (from 857±354 ms2 to 951±345 ms2, $p < 0.05$). The dynamical reaction of the LF trend noted, however, the degree of the reaction was slightly lower compared with the NSR group (+ 11.0% and 17.9%, respectively). The reaction of the parasympathetic component in AF1 group also consisted in reducing its power from 301±109 ms2 to 184±90 ms2 ($p < 0.01$), which led to an increase in sympatho-vagal balance (from 3.8±1.1 units up to 5.1±1.2 units, $p < 0.01$).

In the AF2 group, the tilt-test did not lead to an increase, but. on the contrary, in the drop in the power of the sympathetic component of the spectrum (from 801±305 ms^2 to 611±285 ms^2, $p < 0.01$). Thus, the fall in power of the LF trend was 23.7%, showing a disadaptive (pathological) picture. A decrease in the power of HF modulations from 175–98 ms^2 to 121–54 ms^2 ($p < 0.01$) was noted. However, the sympathetic-parasympathetic balance in this group of patients did not undergo significant dynamics in the course of the tilt test (before the test: 5.1±1.2 units, after the test: 5.2 ± 1.0 units, $p > 0.05$).

Conclusion: So, the ability to maintaining of sinus rhythm in patients operated on for mitral insufficiency depended on the ANS state. It's explained by the impact of relative hypersympathicotonia due to the suppression of the parasympathetic division of the ANS in combination with signs of baroreflex insufficiency on the prevention of sinus rhythm maintenance in this category of patients.

A-7

The diagnostic significance of NT-proBNP in patients with congenital heart disease complicated by pulmonary hypertension.

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Objective: To determine diagnostic and prognostic value of NT-proBNP in patients with congenital heart disease complicated by pulmonary hypertension.

Methods: We retrospectively reviewed 60 patients with congenital heart disease complicated by pulmonary hypertension, before and after surgery with confirmation of two-dimensional transthoracic echocardiography.

Results: In this patients following parameters of systolic pulmonary arterial pressure (determined by the Bernouli method) were noted: range 60-120 mm Hg, mean = 90mm Hg. At the same time, there was an increase in NT-pro BNP level indicators from 700 to 5631pg / ml. During the follow up (more than 6 months) after the operating period, a significant decrease in the level of pulmonary arterial pressure is observed in 86% of patients up to 55 mm Hg, and the value of NT-pro BNP from 450-560pg / ml.

Conclusion: These observations allow us to use the method of determining the level of NT-proBNP in patients with congenital heart disease complicated by pulmonary hypertension.