

INTRACARDIAC ANATOMY AND HEMODYNAMICS IN THE REMOTE PERIOD AFTER COMPLETE CORRECTION OF FALLOT TETRALOGY

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The article presents data on the anatomy and intracardiac hemodynamics in 70 patients 28–52 years after complete correction of Fallot tetralogy. 59 (84,3%) patients were operations in the institute during their personal visits. The age of patients at the time of radical surgery ranged from 7 to 22 years, the last communication was in the range of 36 to 66 years. According to echocardiography abnormalities were reported in all four valves of the heart and great vessels: the dilatation of the ascending aorta to 4,6 cm, thickening of aortic valves cups, stenosis, regurgitation (8,1%), pulmonary valve insufficiency (46,5%), small tricuspid insufficiency (35,1%) and mitral (54,0%) valves. Left ventricular ejection fraction ranged from 47 to 69% (average – $57,5 \pm 1,83\%$). Pressure gradient at the outlet tract of the right ventricle averaged $16,8 \pm 2,78$ mm Hg). Anatomical and functional changes in the heart were mostly not severe and did not significantly affect the function.

Key words: *tetralogy of Fallot, total correction, remote postoperative period, anatomy, hemodynamics*

The cardiovascular system in the long term after tetralogy of Fallot correction is usually traced for 20-25 years after operation [1, 2, 3]. As a result numerous, data were accumulated about anatomical and functional complications [4]. They stimulated the search for improved methods of correction and follow-up treatment in the long term. The interest is the question of the impact of the factor of limitation

operation on the nature and frequency of complications. We have found the unequivocal answer on this question in the literature. **Objective:** To study the anatomical changes and features of intracardiac hemodynamics in patients with tetralogy of Fallot in the decades after corrective operation.

Material and methods.

We have information on the health status of Amosov operated 70 patients (46.4 %) of 151 patients discharged from hospital after surgery. 59 (84.3 %) have been examined, including echocardiography (37 patients) in the Institute of the personal appearance. The age of patients at the time of radical surgery ranged from 7 to 22 years. Age at the last communication was in the range of 36 to 66 years. The timing of observation after surgery, the patients divided into three groups : I group (28-34 years old - 9 cases), II group (35-40 years - 32 cases), III group (41-52 years - 29 cases).

Results. When studies have identified some important anatomical details of the operated heart. In particular, the anomaly formed all valves of the heart and great vessels. In the aortic valve leaflets and seal marked stenosis c small systolic pressure gradient from 6 to 15 mm Hg, the expansion of the ascending aorta to 4.6 mm in 3 cases . In 8 patients (21.6 %) were on the aortic valve regurgitation, 3 (8.1%) cases having clinical significance. In 17 (46.5%) noted a small pulmonary valve insufficiency. Interest is the size of the outflow tract of the right ventricle due to the occurrence of pulmonary valve insufficiency. Outflow tract diameter ranged from 2.6 to 3.7 cm (on average 3.1 cm). This index correlates with the patient's body weight . In 13 (35.1%) registered a small tricuspid valve in 20 (54.0 %) - the mitral valve. Residual ventricular septal defect was not detected, although in one case during a previous visit to the institute was registered. It was probably not a single case of spontaneous closure of residual ventricular septal defect. Left ventricular ejection fraction ranged from 47 to 69 % (average 57.5%) . Pressure gradient on the right ventricular outflow tract ranged from 9 to 43 mmHg (Mean 16.8 mm Hg). As can be seen , hemodynamic parameters were quite satisfactory. These data demonstrated that the pioneering surgery performed Amosov 28-52 years ago with tetralogy of Fallot ,

not only marked the beginning of an era of open heart surgery, but also provided a long and full life for patients with unpromising natural course . Imperfection of cardiopulmonary bypass and myocardial protection techniques forced the surgeon to save time when performing intracardiac stage, so transannular plastic outflow tract of the right ventricle is rarely used. Technical correction methods tetralogy of Fallot underwent four historical eras. 1. Nachalny period was characterized by sparing resection or dissection of the muscular elements infundibuluma and desire to preserve the pulmonary valve to the detriment of radical intervention. Valve dissected by commissure, and the ring is gradually stretched cervical dilators Gegara. As it turned out , the residual narrowing outflow tract of the right ventricle and the inevitable failure pulmonary valve were trivial tricuspid regurgitation and right ventricular aneurysm has been rare . 2. For the second period is characterized by the pursuit of maximum radical , which is achieved with the help of plastic transannular outflow tract with autopericardium monovalve of biomaterial. Perfection perfusiology techniques and methods of myocardial protection allowed slowly thoroughly corrects for vice. However monovalve valve rapidly degraded , and created additional fibrouse stenosis . In the late postoperative period there were complications such as severe impairment of pulmonary and tricuspid valve , dilatation of the right ventricle and outflow tract false aneurysm with congestive heart failure. In some patients, there was a necessity of repeated interventions, including the implantation of artificial biological prosthesis and resection of the aneurysm wall. 3. In the now common technique involves gentle dissection ventrikulofundibulyarnoy folds. 4. Present time stage is characterized by primary radical surgery in infants age. It was assumed that the absence of this age marked right ventricular hypertrophy will contribute to the preservation of myocardium. However, if there is even a small pulmonary valve insufficiency compliance is high (elongation) of the right ventricle creates conditions for the rapid progression of valve insufficiency due to high diastolic pressure gradient [5]. In early solution to this problem is extremely complex. In our view, a compromise solution is gentle respite complete correction to the formation of a moderate right ventricular hypertrophy: 1 to 2 years of age. Pioneering operations

performed 28-52 years ago with tetralogy of Fallot , not only marked the beginning of an era of open heart surgery, but also provided a long and prosperous life for patients with besperspektivnm natural course. 50 - year history of the surgical treatment of tetralogy of Fallot showed that the ideal method of operation, probably will not be found. Spectrum complications varies depending on the timing of the postoperative period. Heart Surgery corrects the anatomy, but not cure the disease, whose name tetralogy of Fallot.

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ВНУТРІШНЬОСЕРЦЕВА АНАТОМІЯ І ГЕМОДИНАМІКА У ВІДДАЛЕНИЙ ПЕРІОД ПІСЛЯ ПОВНОЇ КОРЕКЦІЇ ТЕТРАДИ ФАЛЛЮ

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У роботі представлені дані про анатомію і внутрішньосерцеву гемодинаміку у 70 пацієнтів через 28–52 роки після повної корекції тетради Фалло. 59 (84,3%) хворих обстежені в інституті за особистої явки. Вік хворих на момент радикальної операції варіював від 7 до 22 років, при останньому спілкуванні був у межах від 36 до 66 років. За даними ехокардіографії зареєстровані аномалії всіх чотирьох клапанів серця і магістральних судин: розширення висхідної аорти до 4,6 см, ущільнення стулок, стеноз, регургітація аортального клапана (8,1%), недостатність клапана легеневої артерії (46,5%), невелика недостатність тристулкового (35,1%) і мітрального (54,0%) клапанів. Фракція викиду лівого шлуночка варіювала від 47 до 69% (в середньому $57,5 \pm 1,83\%$). Градієнт тиску на вивідному тракті правого шлуночка в середньому становив $16,8 \pm 2,78$ мм рт. ст. Анатомічні та функціональні зміни серця в основному були помірно вираженими і суттєво не впливали на працездатність.

Ключові слова: *тетрада Фалло, корекція вади, віддалений післяопераційний період, анатомія, внутрішньосерцева гемодинаміка*

**ВНУТРИСЕРДЕЧНАЯ АНАТОМИЯ И ГЕМОДИНАМИКА В
ОТДАЛЕННОМ ПЕРИОДЕ ПОСЛЕ ПОЛНОЙ КОРРЕКЦИИ ТЕТРАДЫ
ФАЛЛО**

В работе представлены данные об анатомии и внутрисердечной гемодинамике у 70 пациентов через 28–52 года после полной коррекции тетрады Фалло. 59 (84,3%) пациентов обследованы в институте при личной явке. Возраст больных на момент радикальной операции варьировал от 7 до 22 лет, при последнем общении был в пределах от 36 до 66 лет. По данным эхокардиографии зарегистрированы аномалии всех четырех клапанов сердца и магистральных сосудов: расширение восходящей аорты до 4,6 см, уплотнение створок, стеноз, регургитация (8,1%), недостаточность клапана легочной артерии (46,5%), небольшая недостаточность трехстворчатого (35,1%) и митрального (54,0%) клапанов. Фракция выброса левого желудочка варьировала от 47 до 69% (в среднем $57,5 \pm 1,83\%$). Градиент давления на выводном тракте правого желудочка в среднем составлял $16,8 \pm 2,78$ мм рт. ст. Анатомические и функциональные изменения сердца в основном были невыраженными и существенно не влияли на работоспособность.

Ключевые слова: *тетрада Фалло, коррекция порока, отдаленный послеоперационный период, анатомия, внутрисердечная гемодинамика*