



**TETRALOGY OF FALLOT IN CHILDREN: CLINICAL COURSE AND TREATMENT TACTICS**

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**Annotation:** Tetralogy of Fallot is one of the most common cyanotic congenital heart defects in children, characterized by a combination of four anatomical abnormalities: ventricular septal defect, pulmonary stenosis, right ventricular hypertrophy, and overriding aorta. This study focuses on the clinical presentation, diagnostic approaches, and treatment tactics of Tetralogy of Fallot in pediatric patients. Early recognition of symptoms such as cyanosis, dyspnea, developmental delay, and hypoxic spells plays a crucial role in timely intervention. Echocardiography remains the gold standard for diagnosis, providing essential information for surgical planning. Both palliative and radical surgical corrections significantly improve survival and quality of life in affected children. The study also underlines the importance of postoperative rehabilitation and long-term cardiological follow-up in ensuring favorable outcomes.

**Key words:** Tetralogy of Fallot, congenital heart disease, cyanosis, echocardiography, hypoxia, cardiac surgery, pediatric cardiology.

**Main part.** Tetralogy of Fallot (Tetralogy of Fallot) is a cyanotic congenital heart defect characterized by complex morphological changes that occur during embryogenesis of the heart and great vessels. This defect was first fully described in 1888 by the French pathologist Etienne-Louis Fallot. Anatomical basis The disease consists of four main anatomical components:

1. Right ventricular outflow tract stenosis (pulmonary stenosis) - narrowing of the pulmonary artery, which reduces pulmonary blood flow.
2. Ventricular septal defect (VSD) - blood mixes between the left and right ventricles.
3. Dextraposition of the aorta - the aorta is displaced to the right and protrudes above both ventricles.
4. Right ventricular hypertrophy - the wall of the right ventricle thickens as a result of a constant increase in pressure. As a result of these changes, venous blood mixes with arterial blood, which causes hypoxemia and a state of constant cyanosis.

**Pathogenesis.** The main role in the pathogenesis of tetralogy of Fallot is played by the degree of obstruction of the right ventricular outflow tract. This leads to difficulty in blood flow through the pulmonary veins, resulting in a right-to-left shunt rather than a left-to-right shunt. This leads to a decrease in oxygen in the arterial blood. As a result of chronic hypoxia, the number of red



blood cells increases (secondary erythrocytosis), which increases blood viscosity and increases the risk of thromboembolism.

Clinical course. The severity of clinical signs depends on the degree of stenosis and the size of the VSD. The disease is usually detected in the first months or first year of life.

The main clinical symptoms are:

Cyanosis (blueness): initially observed in the lips, nail tips and ear area, then spreads throughout the body.

Dyspnea and hypoxic attacks: the child experiences shortness of breath, fainting during crying, physical activity or stress.

“Squatting position”: the child intuitively squats, at which time peripheral vascular resistance increases and pulmonary blood flow improves.

Physical and mental retardation: as a result of chronic hypoxia, oxygen deficiency occurs in the tissues.

“Drumstick” fingers and “hourglass” nails are trophic changes associated with prolonged hypoxia.

Complications: hypoxic attacks, thromboembolic conditions, brain abscess, endocarditis, heart failure.

Diagnostics The diagnosis of tetralogy of Fallot is made on the basis of clinical signs, auscultation data and instrumental methods.

1. Auscultation: a rough systolic murmur is heard at the apex of the heart.
2. ECG (electrocardiography): shows signs of right ventricular hypertrophy.
3. X-ray: the heart appears “boot-shaped”, the shadow of the pulmonary vessels is reduced.
4. Echocardiography (EXO): is the most reliable diagnostic method, determines the size of the defects, the degree of stenosis and the location of the aorta.
5. Kardiak kateterizatsiya: jarrohlikdan oldingi aniq anatomiya va gemodinamikani baholash uchun ishlatiladi.

Treatment tactics Tetralogy of Fallot is not completely curable conservatively. The main treatment is surgical correction.

1. Conservative (drug) treatment Conservative measures are mainly aimed at reducing hypoxic attacks and preventing heart failure before surgery.

$\beta$ -blockers (Propranolol): prevent attacks by reducing heart rate. Oxygen therapy - to relieve hypoxia.

Morphine - has a sedative and stabilizing effect on the respiratory center in severe attacks.

Sodium bicarbonate - corrects metabolic acidosis.

Diuretics - are prescribed for signs of heart failure.

2. Surgical treatment Surgical intervention is performed in two stages:

a) Palliative operations: For example, Blalock-Thomas-Taussig anastomosis - a path is created between the subclavian artery and the pulmonary artery, providing additional blood flow. This temporarily reduces hypoxia.

b) Radical correction: The interventricular defect is closed with a patch, the right ventricular outflow tract is expanded, the pulmonary valve is prosthetic or plastic. The operation is usually performed at 6–12 months of age, but in case of severe hypoxia, it can be performed at an earlier age.

3. Rehabilitation After the operation, patients must be under the supervision of a pediatrician and cardiologist, and ECG and EXO should be performed regularly. Prevention of heart infections, limitation of physical activity and psychological support are important.



Prognosis Children who have undergone radical correction have a high chance of improving their quality of life and living a long life. According to world practice, more than 90% of patients after a successful operation live for more than 20 years and lead a normal social life.

**Conclusion:** Tetralogy of Fallot is one of the most severe cyanotic congenital heart defects in children, which, if not diagnosed and treated promptly, poses a serious threat to the child's life. The clinical course of the disease depends on the degree of narrowing of the right ventricular outflow tract and the size of the interventricular septal defect, and the main symptoms are cyanosis, shortness of breath, hypoxic attacks, and physical development lag. Modern diagnostic methods, especially echocardiography, provide complete information for determining the structure of the defect and surgical intervention. Surgical treatment is the only effective solution for tetralogy of Fallot. Timely surgery improves the quality of life in children, reduces hypoxic complications, and allows for a long life.

Also, postoperative rehabilitation, pediatric and cardiologist supervision, prevention of heart infections, and proper planning of physical activity are important in forming a healthy lifestyle for the patient.

In conclusion, early detection, correct diagnosis, and timely surgical treatment of tetralogy of Fallot in children are vital areas of pediatric cardiology.

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