



BLOOD SUPPLY TO THE PARTS OF THE CARDIAC CONDUCTION SYSTEM

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Abstract: *The cardiac conduction system is a specialized complex of cardiomyocytes that generates and conducts electrical impulses that coordinate the rhythmic activity of the myocardium. Adequate blood supply to its structures—the sinoatrial and atrioventricular nodes, the bundle of His, its branches, and the Purkinje fibers—is critical for maintaining normal heart rhythm and preventing conduction disturbances.*

The conduction system receives blood primarily from the coronary arteries, with significant anatomical variations associated with the type of coronary circulation (right, left, or balanced). The sinoatrial and atrioventricular nodes most often receive blood from the right coronary artery, while the bundle of His and its branches are predominantly supplied by branches of the left coronary artery, particularly the anterior interventricular artery.

Impaired blood supply to the conduction system caused by ischemia, atherosclerosis, or thrombosis of the coronary arteries can lead to the development of various arrhythmias, including sinus bradycardia, atrioventricular blocks, and intraventricular conduction disturbances. Histological examination of the vascular supply to these structures allows us to identify the morphological basis of these pathological conditions.

This study aims to comprehensively examine the blood supply to various parts of the cardiac conduction system using morphological and histological methods. The

findings are of significant importance for clinical cardiology, particularly in the diagnosis and prevention of cardiac arrhythmias.

The aim of the study was to examine the blood supply to various parts of the cardiac conduction system and their morphological characteristics.

Objectives of the study: To study the anatomy of the cardiac conduction system. To determine the sources of blood supply to the sinoatrial and atrioventricular nodes. To examine the blood supply to the bundle of His, its branches, and the Purkinje fibers. To analyze variations in coronary circulation. To identify morphological changes in cases of blood supply impairment. To evaluate the clinical significance of the characteristics of the conduction system's blood supply.

Research methods. Anatomical examination of the heart (macropreparations). Histological examination of tissues of the conduction system. Staining of preparations (hematoxylin and eosin, special methods for vessels). Microscopic analysis. Morphometric analysis of the vascular network. Comparative analysis of various parts of the conduction system.

Results of the study. During the anatomical and histological examination, it was established that the blood supply to the cardiac conduction system has pronounced characteristics and variability depending on the section. The sinoatrial node in most cases (about 60-70%) is supplied by a branch of the right coronary artery, in the remaining cases - by a branch of the left coronary artery (circumflex). Histologically, a developed capillary network is noted, providing high metabolic activity of the node cells. The atrioventricular node receives blood supply predominantly (up to 80-90%) from the right coronary artery. In samples with the left type of coronary circulation, blood supply was revealed due to the circumflex branch of the left coronary artery. A high density of microvessels was noted, however, with ischemic changes, signs of cellular degeneration were observed. The bundle of His and its branches are predominantly supplied with blood Septal branches of the anterior interventricular artery (branches of the left coronary artery).

Histological analysis revealed that these structures have a more limited blood supply compared to the nodes, making them more susceptible to ischemia. Purkinje fibers receive their supply from small branches of the coronary arteries, primarily in the subendocardial zone. Under conditions of insufficient blood supply, these structures are the first to undergo ischemic changes. Impaired coronary blood flow is accompanied by morphological changes: degeneration of conduction system cells, stromal edema, decreased capillary density, and signs of necrobiosis. The most pronounced changes were observed in the area of the bundle of His and its branches.

The drug of choice for anesthetic management during electrophysiological studies in children is propofol, which does not alter the electrophysiological parameters of the cardiac conduction system. Sodium oxybutyrate is not the drug of choice for anesthetic management of transesophageal electrophysiological studies for bradycardia and endocardial EPSI for radiofrequency ablation of atrioventricular nodal reciprocating tachycardia in children, since in all cases it affects the function of the sinus node and changes the parameters of the cardiac conduction system, which is not typical for ketamine, propofol, and midazolam. The electrical stimulation threshold for TEESI does not depend on the amplitude of the transesophageal endograms and is not affected by sodium oxybutyrate, propofol, and ketamine. Ectopic atrial tachycardia is sensitive to general anesthesia, and may be terminated, slowed, or become unstable in response to ketamine and sodium oxybutyrate. The optimal depth of insertion of the left atrial pacing electrode through the esophagus closely correlates with the patient's height.

Conclusions. The blood supply to the cardiac conduction system is provided by the coronary arteries and exhibits significant anatomical variations. The sinoatrial and atrioventricular nodes are supplied primarily by the right coronary artery. The bundle of His and its branches receive blood primarily from branches of the left coronary artery, particularly the anterior interventricular artery. Purkinje fibers They are supplied with blood by small branches of the coronary arteries and are most susceptible to ischemia. The bundle of His and its branches are most vulnerable to

disruption of blood supply. Ischemic changes in the conduction system can lead to the development of cardiac rhythm and conduction disturbances.

The obtained data are of great importance for clinical practice, especially in the diagnosis and treatment of arrhythmias.

List of references.

1. Rustamovna, Q. S. (2025). A MODERN VIEW OF THE PROBLEM OF CARDIOVASCULAR DISEASES IN WOMEN.

2. Yuldasheva, F. U., & Imamova, A. O. (2022). The role of sports in the formation of a healthy lifestyle among young people. *European International Journal of Multidisciplinary Research and Management Studies*, 2(11), 85-89.

3. Закирова, М.Р. (2024). Интраназальная иммунотерапия аллергического ринита.

4. Закирова, М.Р. (2024). Растворимые формы мембранных белков клеток иммунной системы при бронхиальной астме у детей.

5. Кобилжонова, Ш. Р. (2024). КЛИНИЧЕСКИЕ И МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ГАСТРОДУОДЕНИТА У ДЕТЕЙ С СОЛЕННЫМ ДИАТЕЗОМ.

6. Кобилжонова, Ш. Р., & Садуллаева, Х. А. (2021). IMPACTS OF THE ENVIRONMENT ON HUMAN HEALTH.

7. КОБИЛЖОНОВА, Ш. Р., ХАМИДУЛЛАЕВА, С. Ш., & АЗИЗОВА, О. Д. (2023). Установление сезонной динамики и корреляционных связей уровней загрязнений атмосферного воздуха в различных зонах.

8. КОБИЛЖОНОВА, Ш., ЗИЯЕВА, И., & АЗИЗОВА, О. (2023). Лечение больных гастроинтестинальной пищевой аллергией и реабилитация детей на поликлиническом этапе наблюдения.

9. Маликов, QSRMM (2024). Ишемическая болезнь сердца и рак.

10. Миррахимова, М. Х., Садуллаева, Х. А., & Кобилжонова, Ш. Р. (2022). Значение экологических факторов при бронхиальной астме у детей (Doctoral dissertation, Россия).

11. Саломова Ф.И., С.Г. (2024). Влияние факторов окружающей среды на распространенность аллергических заболеваний.
12. Саломова ФИ, К. Ш. (2024). Факторы риска аллергических заболеваний у детей дошкольного возраста.
13. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2023). Оценка эффективности диетотерапии при пищевой аллергии у детей в различные возрастные периоды. Вестник ТМА SPECIAL ISSUE Dedicated to The 10th International Symposium On Important Problems of the Environmental Protection and Human Health.
14. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2026). ФАКТИЧЕСКОЕ ПИТАНИЕ ДЕТЕЙ С ОЦЕНКОЙ БИОЛОГИЧЕСКОЙ И ПИЩЕВОЙ ЦЕННОСТИ РАЦИОНОВ У АЛЛЕРГИЧЕСКИХ ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА. Медицинский журнал молодых ученых, (17 (03)), 384-389.
15. Саломова, Ф. И., Кобилжонова, Ш. Р., & Юлдашева, Ш. П. (2026). Journal of Healthcare and Life-Science Research.
16. Саломова, Ф. И., Садуллаева, Х. А., Кобилжонова, Ш. Р., & Гаибназаров, С. С. (2022). Генные модификации при аллергических заболеваниях и действие их на детей.
17. Axmedova, P. B. (2025). Adenotomy in children with allergic rhinitis and bronchial asthma. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(3), 459-466.
18. Durдона, Q. S. R. O. T. (2024). THE CURRENT STATE OF THE PROBLEM OF SEVERE ACUTE PANCREATITIS.
19. Imamova, A. (2023). FEATURES AND PROSPECTS OF THE DEVELOPMENT OF CHILDREN'S NUTRITION IN THE PRESCHOOL INSTITUTION.
20. Kobiljonova, S. R., Jalolov, N. N., Sharipova, S. A., & Mirsagatova, M. R. (2022). SPECTRUM OF CAUSE-SIGNIFICANT ALLERGENS CAUSING POLYNOSIS IN CHILDREN.

21. Malikov, Q. S. R. M. M. (2024). DISEASES OF THE POPULATION FROM THE LEVEL OF AIR POLLUTION IN REGIONAL CONDITIONS.

22. Mirrahimova, M. X., Kohiljonova, S. R., & Sadullayevna, X. A. (2022). PREVALENCE AND RISK FACTORS OF ALLERGIC DISEASE IN CHILDREN.

23. Khakimova, D., Sh, K., & Salomova, F. (2023, May). Results of hygiene assessment of food of school students. International Scientific-Practical Conference “Only English: Advances in Medical Research and Practice Conference”.

24. Salomova FI, Q. S. R. (2024, February). STIMULATION OF THE IMMUNE RESPONSE BY CYTOKINE PREPARATIONS AND THEIR STANDARDIZATION. European youth innovation society conference volume 1№.

25. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2024, March). РАЗРАБОТКА СИСТЕМНЫХ АЛГОРИТМОВ СНИЖЕНИЯ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ. Международный форум «ANaMed Forum–New Generation 2025» Алматы: КазНМУ, 2025.

26. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2024, May). ФАКТОРЫ РИСКА РАЗВИТИЯ АЛЛЕРГИИ У ДЕТЕЙ. Международный форум «ANaMed Forum–New Generation 2025» Алматы: КазНМУ, 2025.-С. 1154-1155.