

MECHANISM OF DEVELOPMENT OF SINUS ARRHYTHMIA

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Abstract: The sinus node is a group of cells in the wall of the heart that produce electrical impulses. It is in the sinus node that the normal heartbeat impulse begins to form. It flows along the fibers of the heart wall, which is called the conduction system. This system is divided into many fibers, and the smallest of them ends in each fiber of the heart wall. This mechanism ensures rhythmic and harmonious functioning of the heart (contractions occur at equal intervals, maintaining the optimal frequency of 60-90 per minute).

Key words: Causes, origin, pathogenesis, prevention, detection method

It is a conductive system that ensures the correct sequence of contractions of the heart chambers. Malfunctions in this system cause the development of heart diseases, against the background of which heart rhythm disorders develop.

According to the degree of severity, this pathology is of two types - moderate and severe.

Moderate sinus arrhythmia is characterized by mild symptoms or occurs without obvious symptoms and is often noted in childhood and adolescence.

Severe sinus arrhythmia occurs more often in the elderly, is characterized by specific clinical manifestations, and is combined with various diseases.

Causes of sinus arrhythmia

There are several groups of causes that cause this pathology. The main trigger for the development of severe sinus arrhythmia is heart failure, especially coronary artery disease. During ischemia, the heart muscle does not receive enough oxygen, resulting in hypoxia. It is usually accompanied by pain in the heart.

Another common trigger is myocardial infarction. With this pathology, part of the heart muscle dies as a result of hypoxia. Later, a scar appears in this area of the heart.

Heart failure causes the heart's pumping mechanism to malfunction. This phenomenon is also accompanied by heart rhythm disturbances. Cardiomyopathy causes structural changes in the heart muscle and causes arrhythmia.

Heart rhythm disturbances are possible for reasons unrelated to the functioning of the cardiovascular system (for example, as a result of bronchitis, asthma, vegetative-vascular dystonia). In cases of dysfunction of the nervous system, sinus arrhythmia is usually moderate. Also, non-cardiac factors include pathologies of the adrenal glands and diabetes mellitus.

Often, reversible sinus arrhythmia develops due to the use of glycosides, diuretics and antiarrhythmic drugs. A characteristic feature of sinus arrhythmia of the heart caused by alcohol or smoking is that it is an irreversible disorder, which means that it does not disappear even if the patient completely gives up bad habits. However, this pathology is mild in people who stop smoking and drinking alcohol.

Sinus arrhythmia during pregnancy is caused by physiological features, usually treatment is not necessary, as the pathology passes by itself after delivery.

Causes of sinus arrhythmia in children and adolescents

The factors that cause this disease in children are usually heredity, congenital heart disorders, acquired pathologies of heart activity and the consequences of previous diseases.

The heredity factor is of particular importance. If one of the parents is prone to heart disease, then this tendency is more likely to be passed on to the child. Children at risk are under the special supervision of a doctor.

Congenital heart rhythm disorders are often associated with problems during fetal development. Acquired arrhythmias may develop as a result of severe emotional shocks.

In adolescents, this pathology is noted in adulthood. The cause of the phenomenon is the increased function of hormone-producing organs. In this case, it is not necessary to treat sinus arrhythmia, because after puberty it will pass by itself.

Respiratory and non-respiratory sinus arrhythmia in children

This pathology in children can be respiratory or non-respiratory in nature. A characteristic feature of respiratory sinus arrhythmia in children is that this phenomenon is associated with respiratory movements: breathing is accompanied by an increase in heart rate, and exhalation is accompanied by a decrease. Such rhythm disorders are often observed in babies with intracranial hypertension syndrome, postpartum encephalopathy, as well as premature babies.

In overweight children, arrhythmia can manifest itself during physical activity. Precipitating factors include rickets, which affects the excitability of the nervous system. Sinus arrhythmia is a very common phenomenon in children aged 6-7 and 9-10 years, that is, during the period of rapid growth.

Sinus respiratory arrhythmia in children does not affect their well-being and does not require drug treatment.

Non-respiratory arrhythmias are less common and are usually triggered by various diseases. This disorder can be permanent and paroxysmal. An attack of sinus arrhythmia in a child can occur once every 1 year or several times a day. Usually, in such conditions, the main pacemaker continues to provide the heart with the correct rhythm, and changes occur in the conduction system of the heart or in its cells, which lead to arrhythmia.

A factor in the development of non-respiratory sinus arrhythmia may be heredity. If the mother or father is prone to heart rhythm disorders, then the probability of passing this disease to the child is very high.

Infectious diseases accompanied by fever, intoxication or dehydration also cause the development of non-respiratory arrhythmias in children. This is due to changes in the water-electrolyte composition of the blood. Another provoking factor is neurocirculatory dystonia: in this case, the rhythm disorder is caused by the fact that the vessels supplying the heart cannot change their lumen in accordance with the tissue's need for oxygen.

In inflammatory processes in the heart muscle (of bacterial or viral origin), sinus arrhythmia, atrial fibrillation, extrasystolic arrhythmia and heart block may occur. Rheumatism affects the valvular apparatus of the heart and can cause myocarditis, which leads to the development of arrhythmia in a child. The onset of the disease may be associated with a sore throat along with high fever. Also, non-respiratory arrhythmia in children develops against the background of congenital heart defects.

Moderate to severe sinus arrhythmia in a child

Depending on the severity of the disease, the disease is divided into two categories. Moderate sinus arrhythmia in a child manifests itself mildly or without symptoms at all. Often it is discovered by chance. Severe sinus arrhythmia in a child manifests itself very clearly and can be combined with serious heart diseases.

Symptoms that help identify sinus arrhythmia in a baby: poor sleep, frequent crying at night, refusal to eat, shortness of breath, blue or pale skin.

Older children may experience symptoms such as chest pain, fatigue, poor exercise tolerance, and fainting. Parents should be careful if their child starts playing less active games and tries to avoid other physical activities.

Sinus arrhythmia and sports

Often, the parents of a child with sinus arrhythmia, thinking that they caused the problem, do everything to protect him from physical education. However, if the child does not have a tendency to heart rhythm pathologies, then even playing professional sports will not lead to the development of arrhythmia. At the same time, if there is a predisposition, the onset of the disease can be triggered by any physical activity.

In most cases, it does not make sense to completely protect your child from physical education, because moderate physical activity is very important for health. Respiratory arrhythmia is not even a contraindication for sports. At the same time, the child should be under the supervision of a cardiologist, and the control should undergo an electrocardiographic examination. Children who play professional sports should be monitored by a sports doctor and have an EKG every 3 months.

If a child is diagnosed with non-respiratory arrhythmia, sports activities are strictly limited. In such a situation, physical activity is very dangerous.

How is sinus arrhythmia treated in children? The child should undergo a control electrocardiographic examination and an ultrasound examination of the heart, a general urine test and a clinical blood test. If the only detected disorder is sinus arrhythmia, the child is monitored by a cardiologist every six months. If the arrhythmia does not have a respiratory nature, then it is necessary to treat the heart pathologies that provoked it. A mild sinus arrhythmia in a child will go away on its own over time.

Symptoms of sinus arrhythmia

This pathology can have different symptoms. An increase in heart rate is accompanied by shortness of breath, a feeling of lack of air, a feeling of pulsation in the temples and pain in the chest. Against the background of a decrease in heart rate, headache, weakness and dizziness appear. With severe sinus arrhythmia of the heart, the blood supply to the brain is disrupted, so the patient may lose consciousness. Average pathology occurs without severe symptoms.

Sinus arrhythmia in a newborn baby can manifest itself with the following symptoms: skin discoloration (skin color becomes pale or bluish), refusal to eat, frequent crying, shortness of breath. Older children experience symptoms such as fatigue and poor exercise tolerance, and in some cases fainting.

How is this disease diagnosed? The diagnosis is made based on the patient's complaints and examination results. Changes in heart rate are determined using electrocardiography.

A Holter monitoring technique is used: the patient wears a small ECG-type device for 24 hours. At the same time, records are kept, that is, the patient's daily activities are recorded: weight lifting, eating, climbing stairs, waking up and lying down, etc. After removing the device and decoding the received data, results are entered. on the summary sheet.

Sometimes the diagnosis is made using ultrasound. Biochemical analysis of blood and urine is carried out, sex hormones are checked.

How to treat sinus arrhythmia

If the pathology is severe, drug therapy is needed. Therapeutic methods and heart rate are used. The choice of drugs is made by a cardiologist, taking into account the individual characteristics of the patient's body.

If the pathology is triggered by a stressful situation or emotional instability, then a neurologist can prescribe treatment. Sedatives and nootropics are used for such sinus arrhythmia. In some cases, tranquilizers and antipsychotics are needed. These drugs are prescribed by a psychiatrist.

If the heart rate is below 50 per minute and serious disturbances in central hemodynamics are noted, then the installation of a pacemaker is indicated. This miniature device is inserted under the skin in the collarbone area.

In the treatment of sinus arrhythmia, it is necessary to avoid physical overload and stress, follow a diet limiting sweets, flour and fatty foods.

If this pathology is detected in a pregnant woman, the following measures are taken: the patient is registered by a perinatologist and visits her according to a certain schedule, undergoes examinations, takes multivitamins and follows the rules of a balanced diet.

Treatment of sinus arrhythmia in children, of course, implies a reasonable organization of work and rest. If the pathology is severe, then it is necessary to be treated in pediatric cardiology. The amount of simple carbohydrates in the child's diet is limited, the main focus is on vegetables and fruits, which provide a large amount of fiber. Also, an important condition for recovery is the use of psychotherapeutic methods: it is necessary to restore the child's normal emotional state and protect him from stress. A doctor who diagnoses sinus arrhythmia will tell you in detail what it is and explain how to behave in order to avoid complications.

Diet for respiratory arrhythmia

The diet should be balanced and varied, in which raw fruits and vegetables, herbs, dairy products and fish prevail. It is necessary to limit the consumption of sweet, starchy and very fatty foods, as well as products containing caffeine. It is also useful to engage in walks, nature trips and any hobby that fills the patient's life with positive emotions and helps to avoid stress.

What are the best foods for heart rhythm disorders? Watermelon and melon remove excess cholesterol. Turnips are great for calming heartburn. Grapes eliminate swelling and shortness of breath, improve the tone of heart muscles. Apple reduces the risk of swelling, normalizes blood pressure and improves digestion.

Avocados contain enzymes that help the body absorb substances necessary for the proper functioning of the heart. Potatoes and cabbage are sources of potassium that normalizes heart muscle activity. Cereals effectively inhibit the absorption of cholesterol. Pumpkin corrects water-salt balance and helps lower blood pressure.

If a person diagnosed with respiratory arrhythmia eats properly, devotes time to moderate physical activity and avoids stress, he will not feel any discomfort.

Prevention of sinus arrhythmia

General preventive measures include regular physical exercise without overloading, walking in fresh air and controlling body weight.

An integral part of the prevention of sinus arrhythmia is dosed physical activity, especially for people with diabetes, obesity and thyroid pathologies. The optimal forms of physical activity are walking and swimming.

In cases of tension and anxiety, a fifteen-minute walk in the fresh air is often more effective than mild sedatives. When you walk, the brain produces endorphins, which improve your mood, relax you, and relieve pain. An exercise such as walking can be done by absolutely anyone, including children, and does not require a special suit or equipment.

With the permission of the doctor, walking can be supplemented with running, skiing or other more active sports.

Often, the source of heart rhythm disorders is neuroses, lack of sufficient sleep, overwork and stress. In this regard, the main component of prevention is adequate rest and sleep at least 8 hours a day. Exercise, aromatherapy and medicinal plants (decoctions and infusions of valerian, motherwort, calendula, peppermint and hawthorn) help to control stress.

Arrhythmia drugs can be used to prevent arrhythmias in the treatment of diseases that can cause heart rhythm disturbances.

Sinus arrhythmia during pregnancy

Causes of sinus arrhythmia during pregnancy

Among the processes that cause the development of this pathology, the following can be distinguished.

the appearance of additional blood circulation that connects the fetus to the mother's body;

increase the emotionality of the future mother and reduce her resistance to stress;

high activity of the sympathetic nervous system;

electrolyte disturbances;

anemia.

Future mothers with heart defects are at risk. For them, the risk of developing arrhythmia during pregnancy is very high, even after a successful operation. Heart rhythm disorders are also very often noted in women with congenital diseases of the heart conduction system.

Symptoms of sinus arrhythmia during pregnancy

The most common symptoms of this heart rhythm disorder are a feeling of frequent beating in the chest, throbbing in the temples and dizziness, shortness of breath and high fatigue even with minimal effort, frequent and even pulse rhythm, without interruptions.

Complications of sinus arrhythmia during pregnancy

Serious consequences of heart rhythm disorders include:

thromboembolism;

tachycardia;

heart failure.

Thromboembolism is characterized by the formation of blood clots as a result of blood stagnation. Anticoagulants are prescribed to prevent blood clots.

Tachycardia is accompanied by shortness of breath, weakness and a sharp drop in pressure. This pathology is associated with the inability of the heart to pump the required amount of blood due to frequent contractions.

Heart failure develops due to the retention of excess fluid in the body due to a violation of normal blood circulation. As a result, breathing becomes difficult, gas exchange disorders and hypoxia occur in the lungs.

Treatment of sinus arrhythmia in pregnant women

All substances that enter the blood of the future mother will pass to the fetus. Taking medication during pregnancy is allowed only for strict instructions.

A pregnant woman should control her weight: if she gains more than 300 grams per week, she should revise her diet. It is especially important to limit the consumption of flour, fried and salty foods. As for sports, physical exercises such as walking and swimming, as well as gentle yoga, are recommended during pregnancy.

Sinus arrhythmia during pregnancy requires consultation with doctors of various specialties: cardiologist, gynecologist, pediatrician. A slight disturbance in the future mother's heart can also lead to oxygen starvation and delay in fetal development. For preventive purposes, it is recommended to undergo an examination at the stage of pregnancy planning. If any serious pathology is detected, it will be possible to conduct an effective course of treatment in advance.

To prevent heart rhythm disturbances during pregnancy, measures such as a balanced diet, avoidance of caffeine-containing products and moderate exercise are necessary. In addition, you should avoid stressful situations and nervous tension.

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