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## EPIDIMIOLOGY, ETIOLOGY, PATHOPHYSIOLOGY AND TREATMENT OF VISCERAL SYPHILIS

**Annotation:** Syphilis is a chronic infection that affects almost all organ systems. According to the topical feature, syphilis of the skin and mucous membranes (classic form), visceral syphilis, neurosyphilis, and syphilis of the musculoskeletal system are distinguished. Latent and atypical forms of treponematoses have been increasingly diagnosed in recent years as the total number of new cases of syphilis has decreased. Their delayed diagnosis reduces the effectiveness of specific treatment and increases mortality. Thus, cardiovascular syphilis is detected in 0.25-0.96% of cardiac patients, but it is diagnosed in vivo only in 10%.

**Key words:** Visceral syphilis, myocarditis, aortitis, vasculitis.

Pale spirochete (*Treponema pallidum*) is a gram-negative microorganism. It can exist in pathogenic spiral form and in "survival" forms (cysts, L-form, polymembrane phagosomes). The presence of the last three explains the possibility of long-term latent persistence of pale treponema in the body, its resistance to treatment, and multiple visceral lesions. When *T. Pallidum* reverses into a spiral shape, a relapse of syphilis develops.

The source of infection is exclusively a sick person. The leading pathway in the structure of infection with treponematoses is the genital tract (90-95%). There are cases of household transmission of infection (especially from sick parents to children) through kissing, breast-feeding, the use of contaminated items, toys. Transplacental transmission leads to the development of congenital syphilis. Among medical personnel (nurses, obstetricians and gynecologists, venereologists, dentists, surgeons, pathologists), professional infection is possible during the examination of patients, taking biomaterial, performing surgical interventions, autopsies of corpses, etc. Infection of healthy individuals through reusable medical instruments or blood transfusions is currently almost non-existent.

Common factors that increase the risk of any form of syphilis include promiscuous sex, neglect of barrier contraception, substance use, and low levels of general and sexual culture. The development of visceral syphilis additionally contributes to:

- late access due to denial of the disease, fear of publicity, lack of time or money;
- insufficient amount of diagnostics;
- inadequate treatment (self-medication, incorrect selection of treponemocidal agents, contacting non-core medical centers or unqualified specialists);
- seroresistant forms of syphilis.

**Pathogenesis**

The incubation period – the time interval from *T. Pallidum* ingestion to the appearance of the primary infectious focus (affect) - can range from 2-4 weeks to 2-6 months. Within a few minutes and hours after implantation, treponemas enter the bloodstream, quickly spread through the blood and lymphatic vessels, easily penetrate the placental and blood-brain barriers, which causes the dissemination of infection, damage to various tissues and visceral organs even in early syphilis.

The primary period of treponematoses lasts 7-8 weeks. It is characterized by the formation of a primary syphiloma at the site of introduction of *T. Pallidum*, regional lymphadenitis. By the end of the

period, multiplying and moving along the lymphatic pathways, treponemes reach the thoracic duct, through which they enter the venous vessels and heart, and from there – to other organs and tissues.

In the secondary period (from 2 to 4 years), generalized rashes are observed on the skin and mucous membranes. There is a wave-like course of infection with alternating active and latent processes. At this time, the nervous system, liver, kidneys, and musculoskeletal system are usually also affected.

In the tertiary period, syphilitic gum and tubercles form in the tissues. There are severe changes in the nervous, cardiovascular, and osteoarticular systems. Structural abnormalities and organ failure can develop in the period from 3-6 to several decades after infection.

According to the terms of development of clinical manifestations of visceral organs in dermatovenerology, early (up to 2 years) and late (more than 2 years from the moment of infection) syphilis are distinguished. In early visceral syphilis, organ damage is functional (reversible), and late syphilitic changes in organs are associated with their structural disorders.

According to the localization of changes, the following types of visceral syphilis are distinguished::

- syphilis of the cardiovascular system: mesaortitis, myocarditis, endocarditis, pericarditis, aortic insufficiency, aortic aneurysm, etc.
- syphilis of the digestive system: gastropathy, acute gastritis, erosions and ulcers of the stomach, syphilitic hepatitis, enteritis;
- kidney syphilis: proteinuria, lipoid nephrosis, glomerulonephritis;
- respiratory syphilis: bronchopneumonia, bronchitis;
- endocrine syphilis: thyroiditis, diabetes, orchitis, orchoepididymitis.

#### Symptoms of visceral syphilis

##### Cardiovascular syphilis

Among the cardiovascular pathologies of syphilitic origin, gummous myocarditis and mesaortitis are more common. When myocarditis is concerned about increased weakness, dizziness, shortness of breath, spilled pain behind the sternum. The temperature may rise. Over time, cardiomegaly and arrhythmia develop. Other cardiac membranes may be involved in a specific process with the addition of endo-and pericarditis.

Syphilitic mesaortitis for a long time proceeds without obvious symptoms until the formation of valvular defects. Sometimes gummous lesions affect the cerebral vessels, peripheral arteries and veins.

##### Syphilis of the abdominal organs

For transient gastropathy, functional disorders are pathognomonic: belching, nausea, lack of appetite, and a hypoacid state. Syphilitic gastritis is accompanied by epigastric pain, nausea and vomiting with blood. Often, patients significantly lose weight. It is possible to form a specific stomach ulcer. Sometimes gastrosyphilis resembles stomach cancer in its symptoms. With gum-infiltrative changes in the esophagus, dysphagia is observed. Syphilitic enteritis occurs with diarrheal syndrome.

Syphilitic hepatitis is characterized by jaundice of the sclera and skin, phenomena of hepatomegaly, often in combination with splenomegaly. Patients complain of general malaise, heaviness and pain in the right hypochondrium, itching of the skin, decreased appetite, nausea. Sometimes hepatitis occurs in a non-jaundice variant. When the spleen is affected, interstitial splenitis develops.

##### Respiratory syphilis

Visceral syphilis may affect the bronchi and lungs. The clinic of syphilitic bronchitis includes a wet cough, subfebrility, and tachypnea. The presence of gum in the lung tissue is accompanied by chest pain, fever, shortness of breath. With ulceration of gum, a cough appears with purulent sputum and an admixture of blood. The process usually ends with the formation of bronchiectasis and pneumosclerosis.

### Kidney syphilis

Benign proteinuria in visceral syphilis differs only in the presence of protein in the urine. With lipoid nephrosis, pallor and pasty skin, increased blood pressure are determined. Patients note the release of cloudy urine, in which albuminuria, leukocyturia, cylindruria, microhematuria are detected in the laboratory. Syphilitic glomerulonephritis is more often associated with nephrotic syndrome.

### Syphilis of the endocrine organs

Of the endocrine glands, the thyroid and pancreas are more often affected, in men – the testicles. Syphilitic thyroiditis can occur with a diffuse increase in the thyroid gland, but without impaired function or with the phenomena of hypo - or hyperthyroidism. With gummous orchitis (orchoepididymitis) the testicles and appendages increase in size, become dense and bumpy, and there is a heaviness in the groin.

### Complications

Cardiovascular syphilis in most cases leads to the development of aortic valve insufficiency, the clinical manifestations of which include shortness of breath, pulsation of the neck vessels, rapid fatigue, cyanosis, cough with "rusty" sputum. Mitral insufficiency and syphilitic aortic aneurysm are also often formed. If cardiac surgery is not provided, patients die from heart failure, aortic rupture. Endarteritis of the coronary arteries can cause myocardial infarction.

Gastrointestinal syphilis can be complicated by gastrointestinal bleeding. Chronic syphilitic hepatitis leads to the development of cirrhosis of the liver. Kidney syphilis is chronic and eventually leads to nephrosclerosis and CRF. Damage to the respiratory system is fraught with pulmonary bleeding, the progression of chronic respiratory failure.

### Diagnostics

The survey is conducted in two directions: search for infection and diagnosis of changes in visceral organs. Patients are referred for consultation to a venereologist, and if necessary, they are connected to narrow specialists: a cardiologist, a gastroenterologist, a hepatologist, a pulmonologist, a nephrologist, and an endocrinologist. The examination plan for visceral syphilis includes:

- Lues Studies on Direct methods suggest the detection of *T. pallidum* by microscopy or PCR in isolated syphilis. The greatest diagnostic value is represented by indirect (serological) tests aimed at searching for antibodies to the pathogen in biomaterial (blood, CSF), determining the titer and positivity coefficient: RMP, RPR, RPA, ELISA (IgM, IgG), RIF.
- Other tests. All patients with positive tests for syphilis are recommended to be tested for HIV, viral hepatitis B and C. To assess functional changes in visceral organs, OAM, liver tests, and thyroid hormone levels are examined,
- Instrumental diagnostics. As part of the examination of the heart and blood vessels, ECG, echocardiography, and aortography are performed. To exclude pathology of the respiratory system, X-rays and CT scans of the lungs are performed. Examination of the gastrointestinal tract includes ultrasound of the liver, gastroscopy. Damage to the genitourinary system is detected by ultrasound of the kidneys, scrotum organs. Syphilitic thyopathy is detected by thyroid echography.

It consists of specific anti-treponemal therapy and symptomatic therapy. Treatment is recommended in a hospital setting:

- Etiotropic therapy. The gold standard of treatment for early and late visceral syphilis is intramuscular or intravenous penicillin therapy. To avoid an acute reaction in the first days of penicillin therapy is carried out under the cover of glucocorticosteroids. If penicillins are intolerant, they are replaced with tetracyclines, macrolides, and cephalosporins.
- Symptomatic therapy. It is aimed at supporting the function of affected visceral organs. This may include prescribing cardiotropic agents, hepatoprotectors, hormonal drugs, and vitamins.

### Surgical treatment

In case of complicated course of cardiovascular syphilis, cardiac surgery is performed. When forming an aortic aneurysm, open resection with the installation of a vascular prosthesis or endovascular prosthetics is performed. In case of valve defects, the valve is repaired or replaced.

### Prognosis and prevention

With early detection of specific processes in the internal organs and the beginning of adequate therapy, complete functional recovery is possible. The prognosis of late complicated visceral syphilis is quite serious. The formation of irreversible structural changes, persistent organ dysfunction is noted. Decompensation of the pathology, severe organ failure, and death can occur at any time.

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