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PYELONEPHRITIS ETIOLOGY AND ITS DIAGNOSTICS

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ABSTRACT

In this article, the pathophysiology, clinical manifestations, diagnostic methods and treatment methods of pyelonephritis are analyzed in depth. Pyelonephritis is an infectious inflammation of the kidneys, mainly bacterial infections enter the body through the urinary tract and affect the kidney system. The main symptoms of the disease are characterized by fever, back pain, changes in urine. Laboratory and hardware methods, in particular, urinalysis and ultrasound examinations play an important role in diagnosis. Also, how antibiotics and other drugs and therapeutic measures are used in the treatment of pyelonephritis will be explained. The importance of early detection and effective treatment is emphasized.

Key words: acute pyelonephritis, chronic pyelonephritis, urinary tract infection, Escherichia coli, staphylococci, streptococci, enterococci, Proteus and Pseudomonas aeruginosa, Nechiporenko's test, sepsis.

INTRODUCTION

Pyelonephritis is an infectious, inflammatory kidney disease. Among other nephrological pathologies, pyelonephritis takes the leading place in both women and men. But it should be noted that women often suffer from Pyelonephritis [16]. Pyelonephritis belongs to the group of diseases called "urinary tract infection". With improper antibacterial treatment of infectious diseases of the lower parts of

the urinary system, bacteria begin to multiply and gradually move to the upper parts, eventually reaching the kidneys and causing symptoms of pyelonephritis [15].

What is the global incidence of pyelonephritis? Epidemiological data on the incidence of pyelonephritis are limited. A population-based study of acute pyelonephritis in the United States found 15-17 cases per 10,000 women and 3-4 cases per 10,000 men. Among women aged 18-49, 28 cases were reported per 10,000. Pyelonephritis is very common, with 120-130 cases per 100,000 women and 30-40 cases per 100,000 men per year. Women suffer from pyelonephritis more often than men.

In the United States, an average of 1 in 7,000 people gets pyelonephritis every year. 192,000 of them are undergoing inpatient treatment in specialized departments of hospitals and polyclinics. Acute pyelonephritis often occurs in sexually active women. This is the reason why more women get sick with pyelonephritis. In 95% of patients, the treatment of Pyelonephritis gives a positive result within the first 48 hours. In childhood, Pyelonephritis develops in approximately 3% of girls and 1% of boys. 17% of them develop cicatricial changes in the kidney parenchyma, and 10-20% develop hypertension. Plain water can significantly improve the condition of a patient with pyelonephritis. Drinking plenty of fluids maintains normal fluid balance and also thins the blood and helps eliminate more bacteria and their toxins. In response to this increase in fluid, frequent urination occurs. Although even the slightest movement can cause severe pain with pyelonephritis, it is necessary to urinate as often as possible. Although the patient feels discomfort while urinating, the only way to get rid of the causative agent of this disease is that bacteria are removed from the body only with urine. Uncontrolled growth of microorganisms worsens the condition, causes sepsis (blood poisoning) and can even lead to the death of the patient [15].

Classification of pyelonephritis. Pyelonephritis is classified according to several criteria, taking into account the stage of development of the disease, the cause and time. There are two main stages that reflect the nature of the inflammatory process: 1. Chronic pyelonephritis. Chronic pyelonephritis occurs over a long period of time and is in the acute stage may occur due to untreated pyelonephritis or other causes, for example, decreased free flow of urine. 2. Acute Pyelonephritis. If rapid and competent treatment measures are not taken against acute pyelonephritis, it will increase with the development of complications in the form of abscess and purulent inflammation of the kidney. In addition, pyelonephritis is divided into primary and secondary types. Primary pyelonephritis

is a product of an infection that enters the kidneys. Secondary pyelonephritis, in turn, is the result of other diseases of the urinary system.

Reasons for the emergence and development of the disease. Pyelonephritis has bacterial causes. Even if the rules of hygiene are not followed, the infection can enter through the urinary tract. In this respect, pyelonephritis occurs 6 times faster in women than in men. The reason for this depends on the anatomical characteristics of the short and wide urethra. In rare cases, a single bacterial pathogen is identified. Often, the tests detect a number of pathogens (*Staphylococci, E. coli, Proteus, Enterococcus, Klebsiella*). The following pathological conditions can also cause the development of the disease: history of urolithiasis; tumors in the genitourinary system; intestinal diseases; irregular flow of urine; weakened immune system; diabetes mellitus; prostate adenoma [4]. Anomalies of the kidneys, bladder and urinary tract; AIDS; diabetes mellitus; Age (risk increases with age); Diseases of the prostate gland, accompanied by an increase in its size; Kidney stone disease; Spinal cord injury; Bladder catheterization; Surgical interventions on the urinary system; Uterine prolapse [15]. The main reason for the development of pyelonephritis is opportunistic and pathogenic microflora. Most often, the causative agent of the disease: *Escherichia coli, Staphylococci, Streptococci, Enterococci,* ***Proteus and Pseudomonas aeruginosa.*** Most of these microorganisms are always present in the human body without harming health. The disease occurs when there are accompanying factors: abnormalities of the kidneys and urinary tract; disorders of urine output from the kidney (urolithiasis, prostate adenoma, nephroptosis, prostatitis); kidney blood flow disorders, acute and chronic infection foci (caries, sore throat, flu, sinusitis, otitis, bronchitis, cystitis, colitis, etc.); decreased immunity, systemic diseases (diabetes mellitus, gout, hypercortisolism, atherosclerosis); kidney and urinary tract damage; violation of hormonal status, taking hormonal drugs and contraceptives); pregnancy in women. Stress, hypothermia, spicy and salty foods are conditions that contribute to the development of pyelonephritis and its recurrence [17]. In some cases, pyelonephritis occurs in women due to insufficient hygiene of the genitals. The condition of holding urine, which creates a favorable environment for the development of pathogenic microflora, is also dangerous. Impaired blood flow in the kidney has the same harmful effect. The most common route of infection is the ascending route of infection - to the urinary tract, bladder, and above, to the kidneys [5].

Symptoms of pyelonephritis. Fever and chills; lumbar pain; feeling of general weakness; nausea or vomiting. Acute pyelonephritis causes a rapid increase in body temperature to high levels, symptoms of discomfort characteristic

of this condition appear. In this case, the patient is bothered by pain in the back, often only on one side. Abnormal urination may have no symptoms or be obvious. Symptoms such as frequent urination, periodic pains in the kidneys, and a feeling of constant weakness, poor appetite, can indicate the transition of the disease to a chronic form - chronic pyelonephritis. This can be caused by incorrect or interrupted treatment in the acute phase. If these symptoms are observed, the doctor prescribes a series of tests, including blood and urine tests, ultrasound examination of the kidneys and, if necessary, CT or other diagnostic procedures. Pyelonephritis is a serious kidney disease that requires complex treatment. It is important to detect its symptoms in time [16].

Complications of the disease. A number of complications that can occur in patients of any age and gender are: kidney failure; blood poisoning (sepsis), purulent kidney damage (carbuncle); emphysematosis Pyelonephritis; hypertensive attacks; scars of the kidney; xanthogranulomatosis of the kidney [1].

Diagnosis of pyelonephritis. Tests for pyelonephritis help confirm the diagnosis. Urine and blood tests (general clinical) are first on the list. To determine the current state of the patient's excretory system and internal organs, additional instrumental studies are required: computer tomography, radiography. They make it possible to detect pyelonephritis several years after the disease [10].

Tests for pyelonephritis. A blood test shows signs of inflammation (increased leukocytes, accelerated ESR). Urine tests show many bacteria (more than 5 CFU from 10), more than 4000 leukocytes in the Nechiporenko test, various degrees of hematuria, protein up to 1g per liter, specific gravity of urine decreases. Biochemical blood test creatinine, urea and potassium may indicate an increase. The growth of the latter indicates the formation of kidney failure. During the ultrasound examination of the kidneys, the volume of the damaged organ increases, its parenchyma becomes thicker and denser, and the expansion of the renal pelvis is observed [15].

Treatment of pyelonephritis. Treatment of pyelonephritis is usually conservative. The acute form of the disease is an indication for hospital treatment. The treatment regimen is selected individually. Inflammation and pain caused by pyelonephritis are eliminated by prescribing anti-inflammatory and antispasmodic drugs to the patient. Next, an antibiotic is selected for the patient. First, a broad-spectrum drug is used: fluoroquinolones, carbopenems, aminoglycosides, then therapy can be determined depending on the results of bacterial urine analysis. Also, drugs that improve microcirculation in the kidneys and general restoratives can be recommended to a person suffering from pyelonephritis. after eliminating acute symptoms, the patient can be treated on an outpatient basis. The total

duration of treatment of the acute form of the disease rarely exceeds 4-6 weeks. In the case of chronic pyelonephritis or its complications, antibacterial therapy lasts up to 2 months, preventive treatment with drugs of other groups - up to 1 year. The task of our specialists is to achieve a complete recovery of the patient in order to minimize the risk of negative consequences and complications [14].

Prevention. To prevent exacerbation or recurrence of the disease, you should follow the following recommendations: avoid hypothermia; limit spicy, fatty, sour foods and alcohol; completely empty the bladder at the first call; carefully monitor personal hygiene; active, leading a healthy life; timely treatment of urolithiasis, diseases that disturb the flow of urine from the kidney, and infections of the urinary tract [13].

In conclusion, the higher prevalence in women compared to men is due to their anatomical features and shorter urethra. The acute form of pyelonephritis requires prompt and competent treatment, otherwise complications can lead to serious conditions, such as sepsis or kidney failure. Most often, the causative agent of the disease: Escherichia coli, staphylococci, streptococci, enterococci, Proteus and Pseudomonas aeruginosa. The diagnostic process is carried out on the basis of laboratory and hardware tests: general urinalysis, general blood analysis, microscopy, USG, CT, MRI, which helps to identify the disease at an early stage. Broad-spectrum antibiotics: fluoroquinolones, carbopenems, aminoglycosides, anti-inflammatory agents, as well as microcirculation-improving drugs are used in the treatment. In order to prevent the disease, it is important to pay attention to the hygiene of the urinary system, avoid hypothermia, and treat diseases of the urinary system in time. Early detection and effective treatment of pyelonephritis helps the patient to recover, prevents the development of complications and makes it possible to preserve kidney function.

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