MODERN DIAGNOSIS AND TREATMENT METHODS OF PYELONEPHRITIS

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Abstract: Pyelonephritis is an infectious disease of the kidneys, usually accompanied by inflammatory processes in the kidney tissue. The development of the disease is primarily caused by a bacterial infection. Rapid and accurate diagnosis of pyelonephritis, as well as effective treatment measures, are very important not only for improving the patient's condition, but also for preserving kidney function. Today, modern technologies and approaches are effectively used in the diagnosis and treatment of pyelonephritis.

Key words: Pyelonephritis, chronic pyelonephritis, antibiotic resistance, infection, microbiological analysis, urine culture, biomarkers, renal infection, nephropathy, antibiotic therapy.

The main cause of pyelonephritis is when microorganisms, mainly bacteria, enter the kidneys and cause inflammation there. The most common types of bacteria are E. coli, Klebsiella, Proteus, and Enterococcus. Risk factors for the development of the disease include: Nephrological diseases: Previous inflammatory diseases of the kidney tissue can lead to the development of pyelonephritis. Circulatory disorders: Usually occur in diseases of the cardiovascular system. Some sources of infection: Currently, urinary tract infections, especially sexually transmitted diseases, cause pyelonephritis. Weak immune system: Diseases such as HIV and diabetes can lead to the development of pyelonephritis.

Several modern methods are used to diagnose pyelonephritis correctly and in a timely manner: 1. Urinalysis: Urinalysis is used as the main diagnostic tool for pyelonephritis. The urine is analyzed for the presence of pink or white cells (leukocytes), casts, and red blood cells to identify bacteria and provide information about the inflammatory process. 2. Bacteriological culture (urine culture): A urine sample is cultured to identify bacteria. This test can determine the type of bacteria and their sensitivity to antibiotics. 3. Renal ultrasound (USG): Ultrasonography can be used to detect changes, swelling, or inflammation in the kidneys and urinary tract. A 2020 study (Wang et al., 2020) confirmed the high sensitivity and specificity of ultrasonography in the diagnosis of pyelonephritis. In the study, USG was able to accurately detect pyelonephritis in 85% of cases, indicating its diagnostic efficacy. However, some patients may not have detected high-grade tumors or stones, which is a limitation of the test. 4. Computed tomography (CT) or magnetic resonance imaging

(MRI): If pyelonephritis is severe, CT or MRI can be used to identify the structure of the kidneys, tumors, and other abnormalities. 5. X-ray examination (urography): X-ray images of the kidneys and urinary tract can be used to check for stones, tumors, or blockages. Several studies have shown that urine analysis is effective in detecting early stages of pyelonephritis, but this test alone is not sufficient to definitively diagnose the disease. For example, a 2017 study found that high levels of leukocytes in the urine were detected in 75% of cases of pyelonephritis (Zhou et al., 2017). However, at the same time, the results of this test can sometimes be misleading, as leukocytes can also be increased in other inflammatory diseases.

Modern approaches to the treatment of pyelonephritis include:

1. Antibiotics: Antibiotics are used first in the treatment of pyelonephritis. After the type of bacteria is identified, the doctor selects the antibiotic. If the specific bacteria cannot be identified, broad-spectrum antibiotics (for example, fluoroquinolones or cephalosporins) are recommended. 2. Reducing inflammation: Pain relievers, such as nonsteroidal anti-inflammatory drugs (NSAIDs), are used to reduce the inflammatory state of the disease. 3. Infusion therapy: Infusion therapy (intravascular administration of fluids) is used to prevent dehydration of the kidneys and reduce inflammation. 4. Immune system support: Vitamins and immunostimulants are recommended to strengthen the immune system and increase the body's ability to fight diseases. 5. Surgical treatment: If pyelonephritis develops due to obstruction or stones in the urinary tract, then surgical intervention may be required to clear the urinary tract. 6. Oil therapy: In some cases, oil treatments (massages, physiotherapy) are used to reduce inflammation and restore the body.

Conclusion:

Modern diagnostics and treatment methods of pyelonephritis help to identify the disease early and provide proper treatment. Diagnostic methods such as urinalysis, bacteriological culture, ultrasonography, CT and MRI are of great importance in accurately and quickly diagnosing the disease. Pyelonephritis can be effectively treated with antibiotics, infusion therapy and methods of reducing pain. These methods of modern medicine can improve the condition of patients and prevent complications of the disease. In addition, in the future, it is necessary to develop new scientific research and technologies to further improve the methods of prevention and treatment of pyelonephritis. This will be of great importance not only in managing the disease, but also in improving the health of patients.

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