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# ТИББИЁТДА ЯНГИ КУН
# НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
# NEW DAY IN MEDICINE

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# CAUSES OF PYELONEPHRITIS AND MEDICATIONS USED IN ITS TREATMENT

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✓ ***Resume***

***Pyelonephritis is a bacterial kidney infection, acute or chronic, often affecting the renal pelvis. It may result from bloodstream infection or urinary obstruction. Symptoms include fever, flank pain, and painful urination, though chronic cases may be asymptomatic. Diagnosis uses physical exam, urine tests, and imaging. Treatment is antibiotics; severe cases may need hospitalization. Untreated, it can cause kidney injury, chronic disease, scarring, systemic infection, and pregnancy complications. Early diagnosis and treatment are essential to protect kidney function.***

***Keywords: Pyelonephritis, Acute pyelonephritis, Chronic pyelonephritis, Kidney infection, Urinary tract infection, Antibiotic therapy, Renal scarring, Chronic kidney disease.***

# ПРИЧИНЫ ВОЗНИКНОВЕНИЯ ПИЕЛОНЕФРИТА И ЛЕКАРСТВЕННЫЕ ПРЕПАРАТЫ, ПРИМЕНЯЕМЫЕ В ЕГО ЛЕЧЕНИИ

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✓ ***Резюме***

***Пиелонефрит — это бактериальная инфекция почек, острая или хроническая, часто затрагивающая почечную лоханку. Она может возникнуть из-за инфекции через кровоток или обструкции мочевых путей. Симптомы включают лихорадку, боль в пояснице и болезненное мочеиспускание, хотя хронические формы могут протекать бессимптомно. Диагностика проводится с помощью физикального осмотра, анализа мочи и визуализирующих исследований. Лечение включает антибиотики; при тяжёлых случаях может потребоваться госпитализация. При отсутствии лечения пиелонефрит может привести к повреждению почек, хронической болезни, рубцеванию, системной инфекции и осложнениям при беременности. Раннее выявление и лечение необходимы для сохранения функции почек.***

***Ключевые слова: Пиелонефрит, Острый пиелонефрит, хронический пиелонефрит, инфекция почек, инфекция мочевыводящих путей, Антибактериальная терапия, рубцевание почек, хроническая болезнь почек.***

# PIYELONEFRITNING KELIB CHIQISH SABABLARI VA UNI DAVOLASHDA QO‘LLANILADIGAN DORI PREPARATLARI

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✓ ***Rezyume***

***Pielonefrit — bu bakterial buyrak infeksiyasi bo‘lib, o‘tkir yoki surunkali bo‘lishi mumkin va ko‘pincha buyrak lohankasini qamrab oladi. U qon orqali yoki siydik yo‘llarining to‘silishi oqibatida yuzaga kelishi mumkin. Alomatlarga isitma, bel og‘rig‘i va og‘riqli siydik chiqarish kiradi, garchi surunkali shakllar ba’zan alomatsiz kechishi mumkin. Diagnostika jismoniy tekshiruv, siydik tahlili va tasviriy tekshiruvlar orqali amalga oshiriladi. Davolash antibiotiklarni o‘z ichiga oladi; og‘ir hollarda kasalxonaga yotqizish talab qilinishi mumkin. Davolanmagan taqdirda, u buyrak shikastlanishi, surunkali kasallik, chandiq hosil bo‘lishi, sistemali infektsiya va homiladorlikda asoratlar keltirib chiqarishi mumkin. Erta tashxis va samarali davolash buyrak funksiyasini saqlash uchun muhimdir.***

***Kalit so’zlar: Pielonefrit, o’tkir pielonefrit, surunkali pielonefrit,buyrak infeksiyasi, siydik yo‘llari infeksiyasi, antibiotik terapiyasi, buyrakda shikastlanish.***

## Relevance

Pyelonephritis is an acute or chronic infectious disease of the kidneys that develops as a result of bacterial invasion of the renal tissue, most commonly involving the renal pelvis. The condition may arise as a primary infection, due to hematogenous spread of microorganisms from other infectious foci in the body, or as a secondary infection, caused by urinary tract obstruction or structural abnormalities of the kidneys [1,2].

**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 [3,5].

Risk factors for the development of pyelonephritis include congenital or acquired abnormalities of the urinary tract, urinary obstruction, diabetes mellitus, immunodeficiency states, and recurrent urinary tract infections. The disease is most frequently observed in children, young women, and elderly individuals [4,6].

**Etiopathogenesis**.Microorganisms can enter the urinary tract through several routes: hematogenous, urinogenous, and lymphogenous. Via the bloodstream, pathogens enter the kidney and often cause a purulent process there, with the formation of an abscess or carbuncle. In the urinogenous route, the infection spreads along the urinary tract to the bladder and then ascends through the urinary tract to the kidneys. For the development of pyelonephritis, disturbances of uro- and hemodynamics are required. This initially leads to short-term hypertonus and dyskinesia of the urinary tract, followed later by hypotonia and hypokinesia [3,4].

The clinical presentation of acute pyelonephritis typically includes fever, flank or lower back pain, nausea, vomiting, and dysuria. In contrast, chronic pyelonephritis often progresses slowly and may remain asymptomatic or present with mild, nonspecific symptoms for an extended period [7].

Diagnosis of pyelonephritis generally involves clinical evaluation, laboratory investigations such as urine culture, and imaging studies. Ultrasound or computed tomography (CT) scans are commonly used to identify anatomical abnormalities, urinary obstruction, or complications such as renal abscesses [8,12].

The cornerstone of treatment for pyelonephritis is antimicrobial therapy, with antibiotic selection based on the identified pathogen and its antibiotic sensitivity profile. Commonly prescribed antibiotics include fluoroquinolones, cephalosporins, trimethoprim-sulfamethoxazole, and beta-lactam antibiotics. Severe or complicated cases may require hospitalization and intravenous antibiotic therapy. In patients with chronic pyelonephritis, prolonged antimicrobial treatment is often necessary, along with management of underlying causes such as urinary tract obstruction, kidney stones, or prostate enlargement [9,11].

Preventive strategies focus on early diagnosis and treatment of lower urinary tract infections, maintaining adequate hydration, and lifestyle modifications. Individuals at high risk-such as pregnant women, patients with diabetes, and those with structural abnormalities of the urinary tract-should undergo regular medical follow-up and urine testing. Prompt and effective treatment significantly reduces the risk of complications, including renal damage and systemic infection [10,13].

Causes and Pathogenesis: Pyelonephritis may result from ascending infections of the lower urinary tract, such as cystitis or urethritis, where bacteria migrate upward into the kidneys. It can also develop from systemic infections-including tonsillitis, dental abscesses, or respiratory infections-through hematogenous dissemination of bacteria to the renal tissue [12,16].

Predisposing factors include urinary tract anomalies, nephrolithiasis, benign prostatic hyperplasia, diabetes mellitus, and immunosuppressive conditions. The disease is particularly common among women, children, and elderly men [6].

Complications and Negative Consequences of Pyelonephritis: If left untreated or inadequately managed, pyelonephritis can lead to serious acute and chronic complications that adversely affect kidney function and overall health.

Acute Kidney Injury (AKI): Severe or untreated acute pyelonephritis can cause inflammation and edema of the kidneys, resulting in impaired renal function. Without timely intervention, this may progress to acute renal failure [14,15].

Chronic Kidney Disease (CKD): Recurrent or prolonged infections may lead to fibrosis and scarring of renal tissue, causing a gradual decline in kidney function. Chronic pyelonephritis, particularly when both kidneys are involved, is a significant risk factor for the development of CKD.

Systemic Infection and Sepsis: Bacterial spread from the kidneys into the bloodstream can result in sepsis, a life-threatening systemic inflammatory response. Sepsis may lead to multi-organ failure, shock, and death if not treated promptly [16].

Renal and Perinephric Abscesses: In severe cases, pyelonephritis may lead to the formation of renal abscesses-localized collections of pus within the kidney tissue. These abscesses can cause persistent fever, severe pain, and may require surgical drainage if large or unresponsive to antibiotics.

Renal Scarring: Chronic or recurrent infections can result in permanent renal scarring, especially in children and young adults. This scarring reduces the kidney's filtering capacity and may ultimately lead to renal insufficiency.

Secondary Hypertension: Long-standing kidney damage due to chronic pyelonephritis may cause secondary hypertension, as impaired kidneys lose their ability to regulate blood pressure effectively. Persistent hypertension further accelerates renal and cardiovascular damage [17,18].

Urinary Tract Obstruction: Pyelonephritis may be associated with or exacerbated by obstructive uropathy caused by kidney stones, urethral strictures, or prostate enlargement. Obstruction increases intrarenal pressure, worsens infection, and contributes to irreversible kidney damage.

End-Stage Renal Disease (ESRD): Extensive renal scarring, repeated infections, or severe loss of functional renal tissue can lead to end-stage renal disease, requiring renal replacement therapy such as dialysis or kidney transplantation.

Spread of Infection: Untreated pyelonephritis can extend beyond the kidneys, leading to bacteremia, perinephric abscesses, or infection of distant organs, including the heart (endocarditis) and bones (osteomyelitis).

Recurrent Infections: Patients with a history of pyelonephritis, particularly those with underlying risk factors such as diabetes or urinary tract abnormalities, are at increased risk of recurrent episodes. Each recurrence increases the likelihood of progressive kidney damage [17].

Impact on Pregnancy: In pregnant women, untreated pyelonephritis can result in serious complications, including preterm labor, low birth weight, preeclampsia, and increased maternal and fetal morbidity. Pyelonephritis is one of the most common serious urinary tract infections during pregnancy and requires immediate medical attention [10,19].

## Conclusion

Pyelonephritis is a potentially severe renal infection that can lead to significant complications, including acute kidney injury, chronic kidney disease, sepsis, and irreversible renal damage if not properly treated. Early diagnosis and prompt initiation of appropriate antibiotic therapy are essential to

prevent disease progression and life-threatening outcomes. Chronic or recurrent pyelonephritis requires long-term management targeting both the infection and underlying predisposing conditions. Preventive measures, regular monitoring of high-risk individuals, and timely treatment of urinary tract infections are crucial for preserving kidney function and reducing morbidity and mortality.

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