

Modern Treatment Methods of Kidney Structure and Chronic Pyelonephritis

Tolmasov Ruzibek Tolmasovich

Tashkent Medical Academy, Department of Human Anatomy and OSTA ruzibektolmasov@gmail.com

Shukurov Umidjon Majid oglu

Tashkent Medical Academy umidjon.shukurov007@gmail.com

Abstract: This scientific article is devoted to a comprehensive analysis of the anatomical structure of the kidney and chronic pyelonephritis, a common kidney disease, from a medical point of view. It provides detailed information about the causes of the disease, its development processes, types of clinical course, diagnostic methods and modern medical treatment strategies. The main purpose of the article is to scientifically highlight current issues related to the early detection of kidney diseases, correct assessment of their course and selection of the most effective treatment methods.

Keywords: Kidney anatomy, Chronic pyelonephritis, Urinary tract infection, Pyelonephritis symptoms, Bacteriological analysis, Urinalysis, Antibiotic therapy, Nephrology practice.

Introduction: The kidneys perform a number of vital functions in the body. They mainly perform functions such as blood purification (filtration), excretion of excess fluid and metabolic products through urine, maintenance of fluid-electrolyte balance, participation in blood pressure control, stimulation of erythropoiesis (production of blood cells), regulation of calcium metabolism, and maintenance of the stability of the internal environment of the body.

Any pathological change in the structure of the kidney, especially chronic infectious inflammation, can lead to disruption of these vital processes. Chronic pyelonephritis is one of such diseases, which causes serious changes not only in the kidney tissue, but also in the state of the whole organism.

Purpose: The main purpose of this scientific article is to provide an in-depth scientific, theoretical and clinical study of the anatomical structure of the kidney and its diseases, in particular chronic pyelonephritis, to improve the quality of life of patients through early diagnosis of the disease, correct assessment, and the use of modern treatment methods.

Anatomical structure of the kidney: The kidneys are a pair of bean-shaped organs located in the back of the body, on either side of the spine. Each kidney is on average 10–12 cm long and weighs 120–200 g. It is covered on the outside by a strong capsule, and its internal structure is divided into cortical (outer) and medullary (inner) parts. The most important structural unit of the kidney is the nephron. Each kidney contains about 1 million nephrons. Nephrons consist of the following parts:

- ➢ Glomerula (Bowman's capsule) − blood filtration begins;
- Proximal tubules the main site of reabsorption;
- Loop of Henle controls the concentration of urine;
- Distal tubules regulate acid-base balance;
- ➤ Collecting tubules final urine is collected and passes into the renal pelvis.

Chronic pyelonephritis: Nature and causes: Chronic pyelonephritis is a long-term inflammation of the kidney tissue (mainly the parenchyma and calyx). This disease often occurs as a result of improperly treated acute pyelonephritis or structural changes in the urinary tract.

Main reasons:

- 1. Urinary tract infection E.coli (80% of cases), Proteus, Enterococcus, Klebsiella
- 2. Kidney stones disrupt the flow of urine and cause infection to develop.
- 3. Diabetes immunity decreases, opening the "door" to infections.
- 4. Weak immunity chronic diseases, taking immunosuppressive drugs.
- 5. Hygiene and sexual life women are more susceptible to infection.

Clinical signs (symptoms): Chronic pyelonephritis is often asymptomatic or has mild symptoms. One of the dangerous aspects of this disease is that the patient may consider himself healthy for a long time and seek help only after significant kidney damage has occurred.

Common symptoms:

- Persistent lower back pain;
- Subfebrile (37–37.5 °C) body temperature, especially in the evening;
- ➢ Frequent urination, especially at night (nocturia);
- Urine has a foul, acrid odor;
- Headache, nausea, weakness;
- High blood pressure (hypertension with pyelonephritis);

Materials and methods: The article was based on an analytical study of a number of textbooks, modern clinical recommendations, scientific articles, and electronic medical information systems. Also, existing theoretical and practical sources on the anatomical structure of the kidneys and urinary system, etiology, clinical symptoms and treatment methods of pyelonephritis were studied. Pyelonephritis is characterized by symptoms such as pain in the lower back, increased body temperature, general weakness, vomiting, changes in urine color and volume. In chronic cases, the disease progresses gradually, leading to the loss of kidney tissue.

distinguishes 3 main factors that can cause chronic pyelonephritis. These are:

- 1. Urinary tract infections especially infections caused by Escherichia coli and other gramnegative bacteria, with their upward spread;
- 2. Anatomical or functional disorders of the urinary system kidney stones, urethral stricture, reflux (backward flow of urine);
- 3. A decrease in the body's overall immune status exposure to colds, weakened immunity, and resistance to infection against the background of other chronic diseases.

Results and discussion: Chronic pyelonephritis is a long-term and slowly developing inflammatory disease of the kidneys. It has an infectious-recurrent nature, and the treatment process is multi-stage. The disease usually develops after a urinary tract infection. This condition is more common in women than in men, since the structure of the urinary tract in women is more

susceptible to infection. Today, specialists in the fields of nephrology and urology are engaged in the diagnosis and treatment of pyelonephritis.

Modern diagnostic tools in the diagnosis of chronic pyelonephritis:

- General and bacteriological urine analysis,
- Blood biochemical analysis,
- Ultrasound and X-ray examinations,
- ▶ Laboratory infection tests are widely used.

of pyelonephritis develop gradually, patients should seek medical attention if they experience the following:

- Pain in the lumbar region (one or both sides);
- Constant fatigue, weakness in the body;
- Vrine that is cloudy, has a strong odor, or is mixed with pus;
- Unexplained increase in temperature (in a subfebrile state);
- Nausea, loss of appetite;
- Swelling of the face and legs;
- > Pain when pressed in the knee, lower back, or hip areas.

If chronic pyelonephritis is not treated in a timely manner, it can lead to functional renal failure.

Risk factors for the disease: There are several risk factors for the development of chronic pyelonephritis, and taking all of them into account is important for early detection and prevention of the disease. These symptoms can also occur in other urinary tract diseases, so it is important to distinguish which conditions are chronic pyelonephritis. First of all, a weak immune system creates the main conditions for the development of this disease. Walking in the cold, frequent colds, vitamin deficiency and a stressful lifestyle weaken immunity. This allows bacteria that have entered the urinary tract to reach the kidneys.

The following risk factors are identified for the development of chronic pyelonephritis:

- > Anatomical defects congenital or acquired defects of the kidneys or urinary tract
- > Women have a shorter urethra, which makes them more susceptible to infection;
- Pregnancy increased pressure on the kidneys and hormonal changes increase the risk of pyelonephritis;
- > Urinary tract infections (UTIs) especially in untreated or partially treated cases;
- Diabetes increased susceptibility to infections due to changes in blood composition and weakened immunity;
- Poor hygiene and self-medication especially the self-medication of antibiotics can lead to the disease becoming chronic.

Heredity also plays an important role in the predisposition to pyelonephritis. If close relatives have had kidney disease, the person is more likely to develop pyelonephritis.

According to clinical signs: Chronic pyelonephritis is clinically heterogeneous and manifests itself in several forms depending on the severity of symptoms, their duration, and the impact on renal function. These forms are classified based on clinical observations as follows:

During the acute phase, patients experience severe pain in the lower back, fever up to 38–39°C, chills, frequent urination, and the presence of pus and blood in the urine. Swelling of the face and legs may occur.

- In the subacute (mild) course the body temperature is usually subfebrile (37.5 -38 ° C), the patient complains of back pain, but the signs of inflammation are not strongly expressed. Although there are changes in the urine, the general condition is relatively stable.
- Latent (hidden) form in this form, the disease is almost asymptomatic. The patient complains only of general fatigue, mild pain in the lower back, and cloudy urine. The diagnosis is often made by chance.
- Prolonged (chronic) form the disease manifests itself over many years. Pain in the lumbar region, periodic fever, changes in urine (protein, erythrocytes, leukocytes) are constantly observed. In this form, deep changes occur in the kidney tissue.
- Relapsing form the disease flares up every 3–6 months. After each flare, there is a decline in kidney function. This is especially common in cases of incomplete treatment or incorrect use of antibiotics.

Classification of the disease by organ affected: Chronic pyelonephritis primarily affects the kidney tissue, but depending on the course and severity of the disease, it can also negatively affect the functioning of other organs. These include the following conditions:

- Kidneys inflammation, sclerosis, and functional failure of kidney tissue;
- Urinary tract lower spread of infection, pain and burning during urination;
- Blood pressure secondary arterial hypertension occurs against the background of pyelonephritis;
- Liver and heart late-onset pyelonephritis can disrupt heart rhythm or affect liver function through general intoxication;
- Skin and eyes in rare cases, skin rashes, facial swelling, and darkening of the under-eye area may be noticeable.

Diagnostics: Chronic pyelonephritis is diagnosed using several stages of diagnostic methods. To make a diagnosis, patients are first examined by a therapist, urologist or nephrologist. Due to the latent nature of the disease, the diagnostic process must be comprehensive.

The following are used in diagnosis:

Physical examinations - the patient's general condition, the presence of pain in the lower back, and the state of arterial pressure are examined;

Laboratory tests:

- > General urine analysis protein, leukocytes, bacteriuria are detected;
- **Bacteriological analysis** identifies microorganisms that cause infection;
- Complete blood count leukocytosis, increased ECHT;
- **Biochemical blood test** determines the level of creatinine and urea.

Instrumental examinations:

- **UTT (ultrasound)** determines the size, shape, and foci of inflammation of the kidneys;
- **X-ray, CT, or MRI** helps detect kidney tissue damage in the late stages;
- > Radioisotope tests are used to assess kidney function.

The diagnosis is based on modern clinical protocols and recommendations. However, an individual approach to each patient is necessary, since pyelonephritis occurs differently in each person.

Clinical Examination: Chronic pyelonephritis presents clinically with a variety of symptoms. Patients typically complain of the following:

- > Pain in the lumbar region (unilateral or bilateral, dull or severe pain);
- Rapid fatigue and general weakness;
- Frequent urination, especially at night;
- > Feeling of burning or discomfort when urinating;
- Occasional subfebrile elevation of body temperature (37.5–38°C);
- ➢ Nausea, loss of appetite;
- > Dark circles under the eyes, swelling in the face or legs;
- Increased blood pressure (sometimes hidden);
- > In children loss of appetite, involuntary urination (enuresis), sleep disturbances.

Laboratory tests: Laboratory tests play an important role in the diagnosis of pyelonephritis. The following changes are observed in chronic pyelonephritis:

In urinalysis:

- ▶ Leukocyturia (increased number of leukocytes) indicates the presence of inflammation;
- Proteinuria (protein in the urine) is a violation of the kidney's filtration function;
- Bacteriuria the presence of pathogenic microorganisms;
- ▶ Hematuria traces of blood in the urine (sometimes microscopically visible).

In blood tests:

- > Neutrophilic leukocytosis indicates an inflammatory process;
- > An elevated erythrocyte sedimentation rate (ESR) indicates slow, chronic inflammation;
- > The appearance of C-reactive protein (CRP) indicates the presence of infection;
- Biochemical analysis shows increased levels of creatinine and urea (in cases of decreased kidney function).

Additional tests:

- Zimnitsky test assesses the concentration function of the kidneys;
- Reberga-Tareev test helps determine the glomerular filtration rate;
- Microbiological tests (urine culture) to determine antibiotic sensitivity.

Treatment of chronic pyelonephritis: After the results of the analysis and the diagnosis are established, an individual treatment plan is developed by a nephrologist or urologist, depending on the stage of the disease, its severity and the general condition of the patient. Treatment of chronic pyelonephritis is carried out on a long-term and strict regimen. It may be difficult to completely eliminate the disease, but with the right and systematic approach, its exacerbation, renal failure and complications can be prevented.

Antibiotic treatment: The main goal of treatment is to eliminate the infection. The following antibiotics are used for this:

Quinolones (Norfloxacin, Ciprofloxacin);

Penicillin group antibiotics (Amoxicillin-clavulanate);

Cephalosporins (Cefixime, Ceftriaxone).

Treatment lasts 10–14 days. Sometimes combination therapy (two antibiotics at the same time) is prescribed. Antibiotics are administered orally or, in severe cases, intravenously. In the chronic

form of pyelonephritis, long-term antibiotic therapy (3–6 months) in low doses is used for prophylactic purposes in stage 2.

Antibacterial and anti-inflammatory drugs:

Nitrofurans (Furadonin) - have anti-inflammatory and antibacterial effects;

NSAID (Nimesulide) — relieves pain

Immune-boosting drugs: Chronic pyelonephritis often recurs when immunity is weakened, so the following drugs are used :

Immunomodulators (Lycopid, Viferon);

Vitamin therapy (especially vitamins C, E and group B).

Hormonal therapy: Only if kidney function is severely impaired and the inflammatory process has an autoimmune component, can a doctor prescribe corticosteroids (Prednisolone).

Supportive treatments:

Physiotherapy: UHF, ultrasound and magnetic therapy – heat treatments to improve blood circulation in the kidney area, reduce inflammation, and improve urinary function is applied.

Phytotherapy (herbal treatment): Teas and infusions made from medicinal plants (spruce buds, willow leaves, bearberry) have diuretic, antiseptic, and anti-inflammatory effects.

Diet therapy: Diet plays an important role in maintaining kidney function:

1. The amount of salt is drastically reduced;

2. Proteins are consumed in moderation (not too much animal protein);

- 3. Drink plenty of fluids at least 1.5–2 liters per day (unless you have kidney failure);
- 4. Carbonated drinks, spicy, fatty and salty foods, canned goods, and sausages are limited.

Tools and daily routine:

1. Dress warmer, especially around the waist;

2. Avoid excessive physical exertion;

3.Reduce stress and fatigue;

4. Do not delay urination, develop the habit of urinating every 2–3 hours.

Surgical procedures: If chronic pyelonephritis is associated with stones, reflux of urine into the kidney, or abnormalities in the urinary tract, surgical intervention may be necessary to correct the condition. This may include:

Removal of kidney stones (nephrolithotomy);

Widening of a narrowing in the urinary tract (stent placement);

Removal of a severely damaged part of the kidney (resection).

Disease prevention:

To prevent chronic pyelonephritis, it is important to:

- ➢ Be careful of the cold;
- Practice good hygiene, especially for women (avoid wiping from back to front);
- > Timely and complete treatment of urinary tract infections;
- Drink plenty of fluids and avoid dehydration;
- > Take antibiotics only on doctor's advice and for the full course;

- Maintaining a healthy lifestyle, proper nutrition, physical activity;
- > It is advisable to have a kidney ultrasound once a year, especially for those who have suffered from pyelonephritis.

Conclusion: Chronic pyelonephritis is an inflammation of the kidneys and a long-term infectious process that negatively affects the function of important organs in our body, in particular the kidneys. Therefore, a serious approach to this disease is necessary. If you notice symptoms of pyelonephritis in yourself or your loved ones, it is important to consult a doctor as soon as possible. Today, modern methods and drugs for the treatment of pyelonephritis have been developed, allowing you to better control the disease. However, it can be difficult to completely eliminate this disease, so it is very important to engage in early diagnosis, prompt treatment and preventive measures for patients. A systematic approach and regular medical supervision are necessary to restore the health of patients and ensure their complete and effective treatment.

References:

- 1. "Internal Diseases", Ne'matjon Soliyevich Mamasoliyev, Andijan Publishing House, 2013, 465 pages.
- 2. "Propideutics of Internal Diseases", EY Kasimov, Sh.G. Mukminova, BN Nuritdinov, Medical Publishing House named after Ali Ibn Sino, 1996, 368 pages.
- 3. Usmanov R.Dj. , Mirsharapov U.M ., Tolmasov R.T. "Anatomical structure of internal organs and their blood vessels anatomy" // 2024. C-70.
- 4. Толмасов Р. Т. и др. ЯЗВНАЯ БОЛЕЗНЬ ЖЕЛУДКА И СОВРЕМЕННЫЕ МЕТОДЫ ЕГО ЛЕЧЕНИЯ //ТНЕ ТНЕОКУ OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY. – 2024. – Т. 2. – №. 22. – С. 342-349.
- 5. Худойназарова С. Ш., Толмасов Р. Т. ЛЕЧЕНИЕ АРИТМИИ СЕРДЦА В СОВРЕМЕННОЙ МЕДИЦИНЕ И АНАТОМИИ СЕРДЦА //ТНЕ ТНЕОКУ ОГ RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY. 2024. Т. 2. №. 22. С. 336-341.
- 6. Толмасов Р. Т. и др. АНАТОМИЯ ПОЧЕК И СОВРЕМЕННЫЕ МЕТОДЫ РАННЕГО ВЫЯВЛЕНИЯ ПОЧЕЧНО-КАМЕННОЙ БОЛЕЗНИ //THE THEORY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY. – 2024. – Т. 2. – №. 22. – С. 329-335.
- 7. Tolmasovich T. R. et al. ANATOMY AND METHODS OF TREATMENT OF ULCERATIVE COLITIS IN MODERN MEDICINE //JOURNAL OF APPLIED MEDICAL SCIENCES. 2024. T. 7. №. 6. C. 62-70.
- 8. Tolmasovich T. R. et al. TREATMENT OF MYOCARDIAL INFARCTION IN MODERN MEDICINE //JOURNAL OF MEDICINE AND PHARMACY. 2024. T. 7. №. 6. C. 132-138.
- Tolmasovich T. R. et al. MODERN METHODS AND ANATOMY OF DETERMINING LUNG DISEASES //International journal of medical sciences. – 2024. – T. 4. – №. 08. – C. 45-50.
- 10. Толмасов Р. Т., Худойназарова С. Ш. ЛЕЧЕНИЕ АРИТМИИ СЕРДЦА В СОВРЕМЕННОЙ МЕДИЦИНЕ И АНАТОМИИ СЕРДЦА //ТНЕ ТНЕОRY OF RECENT SCIENTIFIC RESEARCH IN THE FIELD OF PEDAGOGY. 2024. Т. 2. №. 22. С. 354-359.
- Tolmasov R. T., Jamilova S. K. Causes of Rheumatism and Methods of Treatment in Modern Medicine //American Journal of Pediatric Medicine and Health Sciences. – 2024. – T. 2. – №. 8. – C. 102-107.

- 12. Tolmasovich T. R. et al. ANATOMY AND METHODS OF TREATMENT OF ULCERATIVE COLITIS IN MODERN MEDICINE //JOURNAL OF APPLIED MEDICAL SCIENCES. 2024. T. 7. №. 6. C. 62-70.
- 13. Tolmasovich T. R., Narimon oʻgʻli T. L. METHODS OF TREATMENT OF CONGENITAL HEART DEFECTS IN MODERN MEDICINE //Western European Journal of Medicine and Medical Science. 2024. T. 2. №. 8. C. 20-26.
- 14. Tolmasovich T. R. et al. MODERN MEDICAL METHODS OF EARLY DETECTION AND TREATMENT OF KIDNEY STONE DISEASE //JOURNAL OF APPLIED MEDICAL SCIENCES. – 2024. – T. 7. – №. 6. – C. 55-61.
- 15. Tolmasovich T. R., Shavkatovna K. S. HEART ARRHYTHMIA DISEASE AND ITS TREATMENT METHODS IN MODERN MEDICINE //JOURNAL OF MEDICINE AND PHARMACY. 2024. T. 7. №. 6. C. 139-145.
- 16. Tolmasovich T. R., Rasulxon oʻgʻli R. R. STOMACH STRUCTURE AND ITS CHANGES DEPENDING ON AGE //JOURNAL OF MEDICINE AND PHARMACY. 2024. T. 7. №. 6. C. 107-112.
- 17. Tolmasovich T. R., Toxir oʻgʻli E. S., Maratovich M. O. TREATMENT METHODS AND ANATOMY OF UMBILICAL HERNIA IN MODERN MEDICINE //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 198-205.
- 18. Tolmasov R. T. et al. Treatment of Glaucoma in Modern Medicine //American Journal of Pediatric Medicine and Health Sciences. 2025. T. 3. №. 1. C. 58-64.
- Tolmasovich T. R. et al. MODERN METHODS AND ANATOMY OF DETERMINING LUNG DISEASES //Ethiopian International Journal of Multidisciplinary Research. – 2025. – T. 12. – №. 01. – C. 277-282.
- 20. Yuldasheva Z. et al. NORMAL YURAK TUZILISHINI YOSHGA OID MOSLASHUV O'ZGARISHLARI //Журнал академических исследований нового Узбекистана. – 2024. – Т. 1. – №. 4. – С. 34-37.
- 21. Tolmasovich T. R., Faliddinovich F. S., Jasurbekovich E. P. TREATMENT METHODS AND ANATOMY OF ISCHEMIC HEART DISEASE IN MODERN MEDICINE //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 324-331.
- 22. Tolmasov R. LABORATORY METHODS FOR THE DIAGNOSIS OF UPPER AND LOWER RESPIRATORY TRACT INFECTIONS IN CHILDREN //International journal of medical sciences. 2025. T. 1. №. 2. C. 89-93.
- 23. Tolmasov R. T., Khudoynazarova S. S. OSTEOCHONDROSIS AND ITS TREATMENT METHODS IN MODERN MEDICINE //European Journal of Modern Medicine and Practice. 2025. T. 5. №. 3. C. 225-231.
- 24. Tolmasovich T. R., Toxir oʻgʻli E. S., Maratovich M. O. TREATMENT METHODS AND ANATOMY OF UMBILICAL HERNIA IN MODERN MEDICINE //AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE. – 2025. – T. 3. – №. 1. – C. 198-205.
- 25. Tolmasov R. et al. AGE-RELATED CHANGES IN STOMACH STRUCTURE DURING PALM OIL FEEDING DURING POSTNATAL ONTOGENESIS //International Journal of Modern Medicine. 2025. T. 4. №. 04. C. 16-23.
- 26. Ro'zibek T. T., Mirsharapov U. M. MORPHOMETRY OF GASTRIC WALL LAYERS UNDER THE INFLUENCE OF PALM OIL //Central Asian Journal of Medicine. 2025. №. 3. C. 117-125.
- 27. Tolmasov R. T. et al. Pancreas Disease-Modern Diabetes Treatment Methods and Anatomy //American Journal of Pediatric Medicine and Health Sciences. – 2025. – T. 3. – №. 4. – C. 132-137.