

# ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Urology of Nephrology

## METHODICAL INSTRUCTIONS of practical class for students

Academic discipline “Urology”

Lesson №7 "Acute pyelonephritis ."

Academic discipline “Urology”

**Level of higher education:** Second (Master’s)

**Knowledge field:** 22 "Health Care"

**Specialty:** 222 "Medicine"

**Program of professional education:** Medicine

Approved  
methodological meeting on the chair  
28. 08. 2023  
Protocol № 1  
Head. Chair prof. F.I. Kostev

Odesa 2023

## **1. Background.**

Inflammatory diseases of the kidneys and urinary organs are among the most common in all regions of the world. Inflammatory diseases of the urinary tract account for about 2/ 3 of all urological diseases. They can be worn as acute progressive flow of the threat to human life and long-term chronic relapsing gradual dysfunction of the urinary tract , development of other complications and long-term disability, high mortality. In recent years, admitted notable increase of these diseases among all age groups , especially among children. Result of inflammatory diseases is largely depend on the timely diagnosis and proper treatment of patients with adequate consideration of etiological factor, phases of inflammation and pathogenesis of diseases. Given the above , in these matters must be guided physicians of all specialties, especially therapeutic profile to which these patients are treated primarily for timely diagnosis and appropriate treatment.

## **2. Objectives of the lesson:**

### **3.1. General objectives:**

1. Study the etiology, pathogenesis, clinical and basic principles of treatment of nonspecific inflammatory diseases of the urinary system.

### **3.2. Educative Objectives:**

1. Examine the main provisions of national urological school on non-specific and specific inflammatory diseases of the urinary system.
2. Develop a modern professional - clinical thinking for students.
3. Develop a sense of responsibility for each individual patient.

### **3.3. Specific objectives:**

• know:

1. The incidence of pyelonephritis in different age groups.
2. Etiology of pyelonephritis.
3. Factors contributing to the development and progression of acute pyelonephritis.
4. The pathogenesis of acute pyelonephritis.
5. Clinical symptoms of acute pyelonephritis.
6. Diagnosis of acute primary and secondary pyelonephritis.
7. Principles etioloysesko and pathogenetic treatment of acute pyelonephritis.
8. Indications for surgical treatment of acute pyelonephritis and volume of surgical intervention.
9. Prognosis of acute pyelonephritis.

### 3.4. Based on the theoretical knowledge on the topic:

• be able to:

1. Collect anamnesis of patients with acute pyelonephritis.
2. Conduct an objective examination of patients with acute pyelonephritis.
3. 's Right to assign and interpret laboratory and biochemical methods for acute pyelonephritis.
4. Apply radiological methods of examination of patients with acute pyelonephritis and correctly interpret them.
5. Conduct sampling of urine for bacteriological tests and interpret them.
6. Putting indications for instrumental methods of examination of patients with acute pyelonephritis .
7. Identify principles of therapeutic tactics in acute pyelonephritis.
8. Write recipes on the drugs used for etiologic and pathogenetic therapy of acute pyelonephritis.

### 1. Materials for the class of independent study (interdisciplinary integration).

SUBJECTS	KNOW	BE ABLE TO
Previous disciplines		
Anatomy and Histology	Building of kidney and nephron, the building of the bladder and urethra	
Normal physiology	Function of pelvis and ureter, pelvis - renal and vesical - renal refluxes, tank bladder function and principles of urination act	
Physiopathology	Changes in acute purulent processes in the body and kidney	
Pathological anatomy	Changes in the kidney in acute and chronic pyelonephritis, changes in the kidney in apostematosi pyelonephritis, kidney carbuncle, and paranephritis. Pyonephrosis changes in the kidney in pyelonephritis during pregnancy, changes in the bladder and urethra in nonspecific and specific inflammation	Distinguish changes in infected hydronephrosis and pyonephrosis distinguish between changes in specific and non-specific inflammation
Topographic anatomy	Blood supply and building of the kidneys, retroperitoneal drainage of retroperitoneum and kidney in	

	acute purulent diseases, indicators for urgent nephrectomy	
Microbiology	Properties of pathogenic and conditionally - pathogenic bacteria, viruses, protozoa	Taking and preparation of smears for bacteriological examination
Biochemistry	All types of metabolism	
Pharmacology	The effect of antibiotics on pathogens and antimicrobial effect of drugs on pregnant uterus and fetus	To get a prescription for antibiotics and broad-spectrum drugs used in urological practice
Introduction of internal diseases	Clinical - Laboratory studies; palpation of the kidneys, urinalysis, urine 3-cups-test, urine test by Zemnytski, quantitative method for determination of bacteriuria	To be able to interpret the results of clinical - laboratory tests
Surgery	Know the principles of operative interventions, asepsis and antiseptics	Identify the blood group and Rh - factor, to test the compatibility of blood and blood products to choose substitutes for immunosuppressive therapy acute & purulent kidney disease
Obstetrics	The course of a normal pregnancy and delivery, changes in the organs of the urinary and reproductive system during pregnancy	

The following subjects		
Anesthesiology & intensive care	The clinical picture and the stage of shock, diagnosis methods of terminal states	<b>To be able to diagnose</b>
Infectious Diseases	Renal disease in various infectious diseases	<b>Differentiate</b>
Obstetrics and Gynecology	Renal disease in different types of obstetrical and gynecological pathology	<b>Differentiate</b>
Integration within other subjects		
Infectious Diseases	Know clinic and diagnosis of influenza, hepatitis B, typhoid, meningitis, HIV - infection	Differentiate
Surgical diseases	Know clinic and diagnosed appendicitis, peritonitis, cholecystitis, pancreatic	Differentiate
Nephrology	Clinic and diagnosis of glomerulonephritis, amyloidosis	Differentiate
Proctology	Clinic and diagnostics paracolitis, ulcer - destructive colitis, paraproctitis	Differentiate
Gynecology	Clinic and diagnostics pelvioperytonitis, suppurating ovarian cyst, adneksitis, endo - and peri-metritis	Differentiate

### 3. Content of lectures:

The most common non-specific inflammatory diseases of the urogenital organs that make up about 2/3 of all urological diseases are acute and chronic pyelonephritis. To non-specific inflammatory diseases also include pyonephrosis, paranephritis, retroperitoneal fibrosis (Ormond's disease), cystitis, paratsystyt, urethritis, prostatitis, vesiculitis, epididymitis, orchitis, balanitis, balanoposthitis, kavernita.

In pyelonephritis understand infectious - inflammatory process in nonspecific interstitial tissue and tubules of the kidney, simultaneously or sequentially impressive parenchyma. In the final stage it spreads to the blood vessels and glomeruli. Pyelonephritis may wonder predominantly renal parenchyma or pelvis (in which case the disease is more favorable).

Pyelonephritis is the most common kidney disease in all age groups. It is the reason for hospitalization of 4-5% of all children. During pregnancy, acute pyelonephritis occurs in 3 - 5 -% of pregnant women. Among adults it occurs at 100 people per 100 000 population in children - 480-560.

According to pathologists statistics, pyelonephritis detected in 8 - 20% of all autopsies, but the life the diagnose turns out to be only 1/4 of patients. In 60-75% of cases develop between the ages of 30-40 years. Younger women sufferers pyelonephritis 4-5 times more often than men. This is due to anatomical features of

the women urethra, which is much shorter than male and is near the vagina, which contributes to easy penetration by ascending infection in the bladder.

Pyelonephritis in men in younger and middle age is linked mainly with urolithiasis, chronic prostatitis, urethral stricture, various abnormalities of the kidneys and urinary tract. Increased frequency of pyelonephritis in elderly men is associated with the presence of prostate cancer, making it difficult to flow from the bladder and out of the kidneys.

**Etiology.** Pyelonephritis - bacterial disease. Refers publications on the role of viruses in causing pyelonephritis, mycoplasma, fungal flora. But, apparently, these microorganisms and is the starting factor, or acting in association with bacteria, play a supporting role in the development of the disease.

Leading place in the etiology of pyelonephritis assign Gram-negative flora - E. coli, Proteus. Along with drilled staphylococcus, enterococcus, klebsyella. There are associations of microbes.

One evidence of bacterial origin pyelonephritis in clinical trials is seeding bacteria from urine - bacteriuria. The absence of bacteriuria with clinically undeniable pyelonephritis may be associated with the separation of suppurative focus or blockade of the entire kidney, the transfer of bacteria in L - forms or protoplasts. Established the possibility of L - forms virtually all types of microorganisms responsible for the development piyelo nephritic process. L - forms of bacteria can persist for a long time in the body and be kind slumbering infection.

**Pathogenesis.** Factors preceding acute pyelonephritis, frequency arranged in the following order: Cool, pregnancy, bouts of renal colic, gynecological surgery, ARI and pneumonia.

The main pathogenetic link is the penetration of bacteria into the affected organ (kidney) and the state of immune defense microorganism. Of great importance are violations of urodynamics and renal blood - and lymph circulation. Currently accumulated extensive experimental, clinical, morphological data clearly demonstrate the role of all these factors in causing pyelonephritis, forming flow characteristics, becomes chronic. With apparent ease schemes infectious - inflammatory process - hit the infectious agent in the body, damage to the organ of inflammation - multifaceted needed detailed study to understand each pathogenetic link pyelonephritis. Specifies the types of microorganisms that cause uroinfections, and some factors of nefropatohenose: tropism to the renal parenchyma, the phenomenon of Gram-negative bacteria adhesion to the epithelium of the urinary tract through special fibers, the similarity of microbial antigens antigens of the human ABO system, found in 44 - 56% of strains of E. coli, the ability to proliferate in an acidic environment.

The basic pathways of microorganisms in the kidney: hematogenous and rynogenous. Some researchers admit the possibility and lymphogena drift of the abdominal cavity. Hematogenous route possible on the background of acute bacterial origin of diseases (bronchitis, pneumonia, tonsillitis) or if there is a focus of chronic infection in the mouth, in the biliary tract, in the pelvis, etc. Urynogenic path is

implemented with infection of the lower urinary tract departments or by activation of saprophytes that normally exist in the distal urethra.

Equally important in the development of pyelonephritis is renal blood and lymph circulation. They may be due to processes that cause an increase in inside junction pressure, complicated pelvis - renal reflux with flebo and lymphostasis in renal parenchyma. Flebostasis and lymphostasis associated with them interstitium swelling, help fixing microorganisms in the parenchyma and parenchyma hypoxia - their survival.

**Acute pyelonephritis** is an acute inflammation of the renal parenchyma and chashechno-pelvis system. In most cases, it occurs as a severe infection that is accompanied by severe intoxication. Acute pyelonephritis can be primary if it is not preceded by kidney and urinary tract, and second, if it occurs on the basis of other urological diseases, leading to disruption of the flow of urine, or disorders of blood and lymph circulation in the kidney. The disease occurs in all age groups, but they often suffer from children and women young and middle age. Acute pyelonephritis is 10-15% of all kidney disease.

In the current acute pyelonephritis distinguish two stages: serous and purulent inflammation. Purulent pyelonephritis forms develop in 25-30% of patients.

To severe purulent inflammation of the kidneys include apostematososis (pustular) pyelonephritis, abscess and carbuncle of the kidney. In some cases, the disease can be complicated by papillary necrosis (necrotizing papillitis).

**Primary acute pyelonephritis.** The primary conventionally called pyelonephritis that occurs without previous disease of the kidney or urinary tract, although in most cases the primary pyelonephritis preceded by at least a short and subtle conventional research methods violation urodynamics. In primary pyelonephritis microorganisms penetrate the kidney hematogenous route from distant foci of infection.

**Pathological anatomy.** In acute pyelonephritis kidney serous dark - red, increased in size, intense, fatty capsule is loose. Smears made up of multiple inflammatory infiltrates in tissue interstitial medulla of the kidney, consisting of white blood cells, plasma and polynuclear cells, located mainly along the blood vessels.

Infiltrates located near the tubules, which thinned, epithelium and the lumen is filled with fibrin clots, leukocytes, erythrocytes, scraps cells. Glomerular symptoms join later (during the development of purulent process). The transition of acute pyelonephritis in serous purulent inflammatory infiltrates formed pustules, multiple abscesses formed not only in the medulla of the kidney, but also in its cortex - developing apostematose pyelonephritis. From kidney cortex to papilla pyramids inflammatory infiltrates distributed in the form of gray - yellowish stripes, sometimes with the observed necrosis and rejection of renal papillae. In the study of kidney tissue with a microscope leukocyte infiltration are both in the interstitial tissue and in the lumen of the renal tubules and glomeruli at where bacterial flora and manure get

into the second - in the disclosure of perivascular small abscesses. At the confluence of small pustules in the cortex of the kidney or occlusion of large vessels septic embolus developing carbuncle of the kidney that protrudes above its surface and extends to a depth of up to medulla. In the healing of inflammatory lesions process of substitution by fibrous tissue which leads to the formation of scar on the surface of the kidney capsule of which is removed with effort. Renal tissue on cut has a colorful appearance.

**Symptoms and clinical progression.** For primary acute pyelonephritis characterized by a triad of symptoms - high body temperature, pain in the lumbar region, changes in urine specific to inflammation (leucocyturia, bacteriuria). The clinical picture of distinguished general and local symptoms. Primary acute pyelonephritis initially manifested common symptoms: fever, fever to high numbers, profuse sweating and headache (mostly in the frontal lobes), pain in muscles and joints, nausea, vomiting, malaise. Tongue dry and coated. Pulse accelerated.

Local symptoms associated with the appearance of pain in kidneys affected by inflammation (ie, in the lumbar region, upper quadrant). The pain can be intense, but dull and are permanent, not attack character.

Body temperature is 39-40 in the evening, falling to the morning to 37.5 - 38. Symptom Pasternatskoho positive. Urination is usually not affected, except in cases where a complication of acute pyelonephritis or acute cystitis leads to inflammation in the bladder. Urine often reduced due to excessive sweating.

Children, especially young children, often acute pyelonephritis manifested by high fever, vomiting, disturbance, meningeal symptoms leykotsituri. A similar clinical picture is observed in children with a number of other infectious - inflammatory diseases, as recognition of acute pyelonephritis in them at the beginning of the disease is particularly difficult. This is most clearly expressed these symptoms in newborns and infants. Older children complain of headaches, frequent painful urination.

**Diagnosis.** In the diagnosis of acute pyelonephritis primary criterion is the clinical symptoms and laboratory results.

In the early stages of acute primary pyelonephritis, when there is no leucocyturia, clinical disease is often mistakenly regarded as a manifestation of cholecystitis, appendicitis, influenza, typhoid fever and other infectious diseases. In this regard, the initial recognition of pyelonephritis is a very complex and demanding task.

In anamnesis paying attention to the presence of purulent foci in the body (boil, sinusitis, pulpitis, abscess, osteomyelitis), and transferred to infectious diseases (influenza, tonsillitis, pneumonia, cholecystitis, enterocolitis, etc.). In cases where initial refers characteristic symptoms of acute pyelonephritis (fever, pain in the lumbar region and changes in the urine that indicate inflammation), recognition of the disease is not difficult.



The greatest value in the diagnosis of acute pyelonephritis with laboratory techniques, especially the detection of bacteriuria and leukocyturia of determining their degree of active cells and white blood cells in urine and cells Shterngeymera - Malbyna. Active leukocytes - white blood cells is trapped in the urine of focal inflammation in the urinary tract, actively phagocytic bacteria. When urine sediment microscopy indicated Brown movement of protoplasm. In addition to the urine sediment drops of methylene blue along with the Brown movement of protoplasm marked pale - blue staining of leukocytes in connection with the dye inside to equalize osmotic concentration inside and outside the cell (cell Shterngeymera - Malbyna).

As active leukocytes and cells Shterngeymera - Malbyna indicate the presence of active inflammation in the urinary tract.

Bacteriological examination of urine aims to not only clarify the nature of microorganisms, but its quantitative determination, ie, counting the number of microorganisms in 1 ml of urine. Now it is established that the urine of healthy people can often find microorganisms including conditional - pathogenic (*Escherichia coli* and *Proteus*), so that the distal urethra and in women and men permanently vegetate microflora.

Determination of bacteriuria in the diagnosis of acute primary (hematogenous) pyelonephritis plays a crucial role because this symptom appears in the first days of the disease much earlier leukocyturia and in some cases may be the only sign of its characteristic. It is important to combine biological and bacterioscopic methods for detection of bacteriuria. Some patients with acute primary pyelonephritis after use of antibiotics after 12-24 h urine does not have the growth of microorganisms, although the urine sediment microscopy allows even find 10 or more bacteria in 1 ml. An essential feature of acute pyelonephritis is leukocyturia that is significant (more than 30-40 leukocytes per field) active leukocytes are found in all patients, cells Shterngeymera - Malbyna - more than half of them. Proteinuria observed in most patients, but the amount of protein in the urine is less than 1 g / l. Less commonly noted Uri small cylinder, indicating the involvement of inflammatory glomerular apparatus. Changes in the blood are expressed in the form of leukocytosis with a shift to the left of the formula and increased white blood erythrocyte sedimentation rate.

Increase in the degree of inflammatory intoxication accompanied by increased toxicity test: a progressive increase in the level of average molecules? - 2 - microglobulin, reducing the lifetime of simple - less than 20-24 minutes.

Given the fundamental difference in therapeutic tactics in the primary and secondary acute pyelonephritis for their differential diagnosis is first necessary to determine the nature of the flow of urine from the kidneys. If it is not broken, then the primary pyelonephritis; if broken - secondary. For this purpose, use ultrasound of the kidneys (both less invasive and low-impact method), excretory urography, radioisotope urography and chromocystoscopy.

Normal discharge indigo in chromocystoscopy allows you to say for the initial inflammation in the kidney. However, with great confidence to establish the

diagnosis by using excretory urography, exhibiting normal or slightly reduced function of the affected kidney and the absence of interference flow of urine. Research should begin with Plain radiography of the urinary tract.

**Differential Diagnosis.** Acute pyelonephritis often falls differentiated from common infectious diseases, as well as acute appendicitis and acute cholecystitis.

**Treatment.** In primary acute pyelonephritis in most cases conservative treatment, the patient should be admitted to the hospital.

Mode - bed. Recommended drinking liquids - juices, fruit drinks - 2 - 2.5 liters a day, foods rich in carbohydrates (puddings, light flour dishes, raw and cooked vegetables and dairy products - cheese, yogurt. Due to increased degradation of the protein in acute pyelonephritis patients administered parenteral administration of protein drugs.

The primary therapeutic measure is the effect on the causative agent of antibiotic and chemical antibacterial agents according to the antybyotykohtamy, detoxification and immunostymulyuyucha therapy in the presence of HIV.

To reduce the likelihood of recurrence of pyelonephritis and its transition into the chronic form, antibiotic therapy should last at least 6 continuous weeks. This is due to the fact that with a favorable current acute pyelonephritis from the moment of infection in the kidney to the total elimination of inflammation is an average of 5 weeks.

After clinical recovery should take a break from antibiotic treatment for 2-3 weeks. Then you must make a detailed monitoring urine and blood of the patient. Investigation of urine should contain a general analysis, quantitative count of white blood cells, red blood cells and cylinders, one of the methods, and determine the extent and nature of the microflora of bacteriuria with a sensitivity of urine to antibacterial agents and chemotherapy.

If you have a remission patient a course of anti-antibiotic treatment duration of 7-10 days every month for 6 months. For treatment it is advisable to use the preparations, which had previously been detected pathogen sensitivity pyelonephritis. The next in the absence of acute disease control patient survey conducted 1 time in 3 months for 2 years.

Necessity of anti-treatment and long-term control of clinical observation of patients who have had acute primary pyelonephritis, due to the fact that when examining these patients in the later periods (over 2-2.5 years after the attacks of pyelonephritis) establish chronic disease in 20-25% of them.

**Prognosis.** In acute primary pyelonephritis favorable prognosis when antibiotic treatment resulted in sustained remission. If acute pyelonephritis becomes chronic, the prognosis is unfavorable in the development of complications (chronic renal failure, nephrogenic hypertension, urolithiasis, pyonephrosis).

**Secondary acute pyelonephritis.** It differs from the initial acute pyelonephritis in the clinical picture of the severity of symptoms more local character, allowing you to quickly and easily identify the disease.

The most common cause of secondary acute pyelonephritis (approximately 2/3 of patients) are kidney and ureter stones, followed by urinary tract abnormalities, pregnancy, stricture of ureter and urethra, prostate gland, and children - due to violation of urodynamics (postoperative complications, cystic - ureteral reflux, urolithiasis).

**Acute pyelonephritis of pregnant women.** A striking example is the secondary acute pyelonephritis acute pyelonephritis during pregnancy. Because of the high incidence of it highlighted in a special form of the disease. Acute pyelonephritis occurs usually in the second half of pregnancy, on average 2.5-5% of cases when the pressure in the pelvis of the kidney is increased by 2 times. Factors that predispose to the occurrence of pyelonephritis in pregnancy are as follows: 1) lower the tone of the upper urinary tract due to neurohumoral changes, mainly neurohumoral changes, mainly hormonal nature (excess estrogen, progesterone and glucocorticoids). Lowering the tone of the upper urinary tract are marked with gestational age of 8 weeks; 2) mechanical pressure of the pregnant uterus on the ureters, especially the right; 3) the presence of asymptomatic bacteriuria in 5-10% of pregnant women. The latter is crucial because acute pyelonephritis occurs on average 30% of pregnant women with asymptomatic bacteriuria.

**Apostema pyelonephritis.** The disease is a purulent - inflammation of the formation of numerous small pustules (apostles) mainly in the cortex of the kidney.

For apostema pyelonephritis, during which largely depends on the degree of passage of urine, characterized by hectic high body temperature (up to 39-40 ° C) with a recurring fever sweeping and pouring sweat, with pronounced and rapidly developing symptoms of intoxication (fast growing malaise headache, tachycardia, nausea, vomiting, icterus sclera, dry tongue, adinamiya). Shivering usually lasts from 10-15 minutes to 1 hour in most patients it occurs several times a day after an attack of renal colic or the amplification of pains in the lumbar region. Shortly after the fever declines in body temperature to normal and subnormal numbers, profuse sweating and reduce pain in the lumbar region, with a decrease in amount of urine.

**Carbuncle of the kidney.** The disease is a purulent - necrotic lesion formation with limited infiltration in the cortex of the kidney. Carbuncle of the kidney may occur as a primary disease due to massive invasion of the remote purulent focus. This forms a bacterial clot in large blood vessels of the cortex of the kidney or in several small vessels located close to each other. In the first case produced a large fireplace aseptic infarction, and the second - a few small lesions that rapidly coalesce. Inflammatory melting anthrax can go to the kidney medulla and reveal either in Bali or perirenal tissue, leading to the development of purulent paranephritis. If anthrax is a kidney complication of acute pyelonephritis, it may occur as a result of hematogenous septic thrombosis of large blood vessels, and through its lumen sdavlennya inflammatory infiltrate.

The most common pathogens are Staphylococcus carbuncle of the kidney and white staphylococci, E. coli and Proteus. Keyboard carbuncle Pyelonephritis Kidney and apostematoznoho observed in 40% of patients.

Carbuncle of the kidney looks like swelling rounded form. In the context of this consists of necrosis of the tissue pierced many small fused pustules. The base is adjacent to the carbuncle fibrous membrane of the kidney, which is always utyahuye in the inflammatory process (perynefryt). At first she infiltrated, thickened, soldered to the surface of the kidney, and later it may come purulent fusion. Often the process involves and perirenal fat. First, there are reactive swelling and infiltration, and next developed purulent paranephritis. With the localization carbuncle in the upper segment of the kidney inflammatory infiltrate can go on the adrenal glands, causing it hypofunction syndrome, accompanied by reactive pleurisy.

**Abscess of kidney.** The disease is extremely rare form of acute purulent pyelonephritis. It can be formed as a complication of acute pyelonephritis due to purulent fusion of tissue at the site of large inflammatory infiltrate, or as a result of the merger group pustules at apostematoznomu pyelonephritis, abscess formation, or in the case of carbuncle of the kidney. Observed and metastatic abscesses of the kidneys, resulting in infection of drift extrarenal foci of inflammation (destructive pneumonia, bacterial endocarditis). Solytarni abscesses usually occur on the one hand, metastatic - are often multiple and bilateral.

**Necrosis of the renal papillae.** There is usually during one of exacerbations of chronic pyelonephritis, accompanied by total gross hematuria and renal colic in cases where there is occlusion of the urinary tract, otorhnulysya necrotic tissue. It occurs in 3% of patients with pyelonephritis.

## **2. Classes Methodological materials provided**

### **6.1. The task source for self-knowledge skills: issues, problems, tests.**

#### **Exercise.**

1. Patient, 30 years old, admitted to foster ward with complaints of general weakness, fever up to 39,3 ° C, fever, dull pain in the left lumbar region. Pain and temperature over the day, connecting with cooling. What disease can be suspected?

- A. Left hand pneumonia.
- B. Acute pancreatitis.
- I. Acute gastritis.
- G. Acute pyelonephritis.
- D. intercostal neuralgia.

2 The child 2.5 years, girl. Complaints of headache, abdominal pain. The patient suffers at 12 hours, taken to hospital due to an increase in temperature to 39,3 ° C fever. Tongue dry, pulse and breathing accelerated, skin pale. On palpation of the abdomen tense muscles of the abdominal wall and right lumbar region. Blood test - leukocytes 12.0 g / l; Urinalysis - protein 0.099 g / L, white blood cells - 40-50 in sight. What is the most likely diagnosis?

- A. Acute appendicitis.
- B. dyspepsia.
- B. Acute pyelonephritis.
- G. Pneumonia.
- D. Scarlet Fever.

### Tests.

1. Pyelonephritis associated with ...

- A. urolithiasis.
- B. Chronic prostatitis.
- B. stricture urethra.
- D. All of the above. (A)

2. Important part in the pathogenesis of pyelonephritis play ...

- A. The general condition of the body.
- B. Local factors.
- B. Violation of the flow of urine.
- D. All of the above. (A)

3. The differential diagnosis of acute pyelonephritis should not be held with ...

- A. Common infectious diseases (sepsis, influenza, etc.).
- B. Acute appendicitis.
- V. uterine fibroids.
- G. Acute cholecystitis. (B)

4. Apostematoznyy pyelonephritis - is...

- A. purulent - inflammation
- B. Occurs mainly in the cortex of the kidney.
- B. All of the above.
- D. None of the above. (A)

5. Carbuncle of the kidney - is ...

- A. purulent - necrotic lesion formation with limited infiltration in the cortex of the kidney
- B. Weather it favorable.
- B. The course of the disease difficult.
- G. Possible self. (A)

6. Reasons for the transition of acute infectious - inflammatory process in chronic is following ...

- A. Violation of the flow of urine .
- B. Improper and insufficient duration of treatment.
- V. The formation of L - forms of bacteria and protoplasts .
- G. Ymmunodefitsytzni states.
- D. Chronic comorbidities .
- G. All of the above. ( F )

7. Pyonephrosis - is ..

- A. End-stage specific or nonspecific purulent - destructive pyelonephritis.
- B. The inflammatory process in adipose tissue navkolonyrkoviy .
- B. Exudative inflammation.
- G. The inflammatory process in the retroperitoneal tissue with the formation of dense fibrous tissue. (A)

## 6.2. Information necessary for the formation of knowledge - skills can be found in textbooks:

1. Urology: textbook for students of higher medical educational institutions / S.P. Pasiechnikov., S.O. Vozianov, F.I. Kostev, V.D. Shvets, M.V. Shostak.; ed. by S.P. Pasiechnikov. – Vinnytsia : Nova Knyha, 2016. – 400 p.
2. Materials Association of Urology Congress of Ukraine, Odessa, 16-18 September 2010 Urology, Vol 14. Annex 54, Dnipropetrovsk, "ArtPres", 2010; 400p.

2.3 Orienting map on independent work with literature on the topic of lesson.

Number	The main objectives	Guidelines	Answers
1	2	3	4

## 7. Materials for self-training qualfy

Question:

1. Identification and classification of acute pyelonephritis.
2. Etiology, pathogenesis, clinical manifestations of acute pyelonephritis.
3. Algorithm examination of the patient with acute pyelonephritis.
4. Principles of treatment of acute pyelonephritis.

## Problems.

1. Patient man, 27 years old, hospitalized in the urology department with complaints of pain in the left lumbar region, worse with a deep breath, fever up to 39,5 ° C with a fever in the evening. Fell ill with acute third day back when after hypothermia symptoms noted above. Three weeks ago was treated on the boil on the back. The patient is limping on his left leg, has scoliosis to the right side. Deep palpation is moderate pain in the left upper quadrant. Leukocytosis - 14 g / l, accelerated ESR - 38 mm / h, fibrinogen - 8.0 g / dL, urinalysis - no change. Plain and excretory urography contrasting shades, renal failure and flow of urine was found. What is urological disease should be suspected?

- A. acute left-sided primary paranephritis.
- B. left-sided acute primary pyelonephritis.
- B. Necrotizing papillitis left.
- G. Myocardial left kidney.
- D. The tumor of the left kidney. (A)

2. Patient, 32 year, complaining of pain in the permanent right abdomen, nausea, fever up to 37,5 ° C. ill for two days. On palpation tenderness in the right lumbar region and right podvzdosnnoy area. In a general analysis of blood - white blood cells - 10.2 g / l, ESR - 18 mm / h In Urinalysis - leukocytes in 12-15 p / sp. What kind of disease you can think of the patient?

- A. Acute pyelonephritis.
- B. Acute cholecystitis.
- B. Acute appendicitis.
- G. Acute adnexit.
- D. Premenstrual Syndrome.

3. Patient P., 22 years. In 17 years, suffered acute pyelonephritis with bright primary clinical and laboratory symptoms that ended quick recovery. After 5 years of aggravation occurred. On excretory urogram revealed deformation of the calyx of the left kidney. What does this radiographic finding? What is the diagnosis of the patient?

(In patients with chronic pyelonephritis, a former process is over. Upon elimination of the symptoms of acute pyelonephritis he secretly leaked, leading to deformation of the cavity of the kidneys).

4. Patient, 30 years old, admitted to foster ward with complaints of general weakness, fever up to 39,3 ° C, fever, dull pain in the left lumbar region. Pain and temperature over the day, connecting with cooling. What disease can be suspected?

- A. left-hand pneumonia.
- B. Acute pancreatitis.
- B. Acute gastritis.
- G. Acute pyelonephritis.
- D. intercostal neuralgia.

5. 2.5 years old child , a girl. Complaints of headache, abdominal pain. The patient at 12 hours, taken to hospital due to an increase in temperature to 39 ( C, chills . Tongue dry, pulse and breathing accelerated , skin pale . Palpation of the abdomen tense muscles of the abdominal wall and right lumbar region . blood test - leukocytes 12.0 g / l urine test - protein 0.099 g / L , white blood cells - 40-50 in sight. Which is the most likely diagnosis ?

- A. Acute appendicitis.
- B. dyspepsia.
- B. Acute pyelonephritis.
- G. Pneumonia .
- D. Scarlet Fever .

### Tests.

1. The most informative method of diagnosing kidney carbuncle .

- A. An ultrasound of the kidneys.
- B. urography.
- B. Research glomerular filtration.
- G. Retrograde pyelography .
- J. Kidney biopsy . (A)

2. Having any number of bacteria in 1 ml of urine indicates inflammation in the kidneys or urinary tract ?

- A. 5000 - 10000.
- B. 10-20. (A)

3. Most frequent nonspecific inflammatory disease of the urinary tract are:

- A. pyelonephritis.
- B. retroperitoneal fibrosis.
- V. Cystitis .
- G. Pyonephrosis . (A)

4. Pyelonephritis associated with ...

- A. urolithiasis.
- B. Chronic prostatitis.
- B. stricture urethra.
- D. All of the above . (A)

5. Important role in the pathogenesis of pyelonephritis play ...

- A. The general condition of the body.
- B. Local factors.
- B. Violation of the flow of urine .
- D. All of the above . (A)

6. Differential diagnosis of acute pyelonephritis should not be held s ...

- A. Common infectious diseases (sepsis , influenza , etc.).



- B. Acute appendicitis .
- V. uterine fibroids.
- G. Acute cholecystitis. (B)

7. Apostematoznyy pyelonephritis - is ...

- A. purulent - inflammation
- B. Occurs mainly in the cortex of the kidney.
- B. All of the above.
- D. None of the above. (A)

8. Carbuncle of the kidney - is ...

- A. purulent - necrotic lesion formation with limited infiltration in the cortex of the kidney
- B. Weather it favorable.
- B. The condition easily.
- G. Possible self. (A)

9. Reasons for the transition of acute infektsino - inflammation in chronic kidney to the following ...

- A. Violation of the flow of urine .
- B. Improper and insufficient duration of treatment.
- V. The formation of L - forms of bacteria and protoplasts .
- G. Immunodefitytyni states.
- D. Chronic comorbidities .
- G. All of the above. ( F )

10. Pyonephrosis - is ..

- A. End-stage specific or nonspecific purulent - destructive pyelonephritis.
- B. The inflammatory process in adipose tissue navkolonyrkoviy .
- B. Exudative inflammation.
- G. The inflammatory process in the retroperitoneal tissue with the formation of dense fibrous tissue. (A)

## **1. Audience materials for self training.**

### **8.1 List of educational practical tasks to be performed during the practical (laboratory) classes:**

#### **Tasks:**

1. Gather history in patients with various non-specific inflammatory diseases of the kidney.
2. Inspect patient with acute pyelonephritis evaluate clinical symptoms, physical examination data.
3. Evaluate clinical - laboratory tests in acute and chronic pyelonephritis: analysis of blood and urine.

4. Evaluate the results of X-ray and ultrasound of the kidneys.
5. Study of clinical - laboratory tests and their interpretation in different types of inflammatory diseases nonspecific led by an assistant.
6. Compilation of the study plan and scheme of possible therapy for various types of non-specific inflammatory disease.
7. Drafting independent situational problems, to better understand the issue, led by an assistant.

### **Instructional materials for acquiring professional skills**

Task	Procedure	Guidelines for implementation
1	2	3
Supervision of patient	1. complaints	1.1.Type and localization of pain 1.2. The type of urination (frequency, pain, quantity of urine allocated each urination) 1.4. The presence of hyperthermia 1.5. Expressive weakness
	2. History of the disease and life	2.1 Time of pain intensity, irradiation 2.2Moment occurrence of hyperthermia 2.3. Were the last kidney disease, prostate cancer, sexually transmitted diseases 2.4. find out the presence of past complaints, diseases of other organs.
	3. objective status	3.1. The general condition of the patient, the adequacy of behavior, the patient's position, color and visible mucous membranes

		<p>3.2. Pay attention to the heart rate, blood pressure, hyperthermia</p> <p>3.3. On examination of the abdomen to pay attention to in the act of breathing, symmetry, bulging bladder by heart, intensity.</p> <p>3.4. Particular attention is paid to palpation of the kidneys in three positions, the presence of symptoms Pasternatsky, percussion determination of urine in the bladder</p> <p>3.5. Macroscopic evaluation of urine</p>
	4. Evaluation of laboratory data	<p>4.1 Total blood</p> <p>4.2. Urinalysis</p> <p>4.3 Biochemical blood tests (glucose, urea, creatinine, bilirubin, fibrinogen, electrolytes)</p>
	5. Analysis of X-ray studies	<p>5.1. In obzorniy radiograph of the urinary system to evaluate the quality radiographs, the condition of the skeleton. The presence of artifacts, shadows of suspected concretions in the projection of the urinary system</p> <p>5.2. On excretory urograms, find outlines the kidneys, determine kidney function, the presence of</p>

		one - or two-way hidronefrosis.
	6. Evaluation of instrumental methods	6.1. Ultrasound capabilities of the method 6.2. Chromocystoscopy 6.3. Radioisotope renography.

### 9.1 Methods of work, stages of progress.

10. Materials for self-mastery of knowledge, skills provided by this work.

10.1. different tests levels.

11. The topic of the next session.

12. The challenge for UDRS and NIRS on the topic of the next session.

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### **Recommended literature.**

#### **Basic:**

1. S.P. Pasechnikov; Urology: textbook/ Ed. S. P. Pasyechnikova, S. A. Voizianov, V. N. Lesovy [and others]. - View. 3rd – Vinnytsia: New Book, 2019.

2. Pasechnikov S.P. Modern problems of urology: [manual]: doctor's guide/ S.P. Pasechnikov, V.I. Zaitsev. - Kyiv: L-ry Health of Ukraine; 2017.

3. Stus V.P. Urology (practical skills for intern doctors) / V.P. Stus, S.P. Pasechnikov. Teaching and

methodical manual. - Dnipropetrovsk: Akcent PP LLC, 2016.

4. Sarychev L.P. Symptoms of urological diseases: method. rec. For teachers / L. P. Sarychev, S. M. Suprunenko, S. A. Sukhomlyn, Ya. V. Sarychev. – Poltava, 2019.
5. O.V., Lyulko, O.F. Voizianov Textbook "Urology" 3rd edition. Thresholds Dnipropetrovsk. - 2012 p.
6. "Urology (Methodical development of practical classes for students)" edited by Professor V.P. Stus, second edition, supplemented. / A.P. Stus, Moiseenko M.M., Fridberg A.M., Pollion M.Yu., Barannik K.S., Suvaryan A.L., Krasnov V.M., Kryzhanivskiy O.Yu. - Dnipro: Accent LLC. - 2018. - 336c.
7. Urology: textbook for students. higher med. academic established: translation from Ukrainian publications / S.P. Pasechnikov, S.A. Voizianov, V.N. Lesovoy, F.I. Kostev, V.P. Stus, et al./ Ed. S.P. Pasechnikov - Edition 2. - Vinnytsia: Novaya Knyga, 2015. - 456 p.: illustr.
8. Urology: textbook for students of higher medical education Institutions /S.P. Pasechnikov, S.O. Voizianov, V.M. Lesovoy (et at.); ed. by Pasechnikov. / S.P. Pasechnikov, S.O. Voizianov, V.M. Lesovoy (et at.) - Vinnytsia: Nova Knyha, 2016. - 400 p.
9. EAU Guidelines, edition presented at the 28th EAU Annual Congress, Milan 2021. ISBN 978-90-79754-71-7. EAU Guidelines Office, Arnhem, The Netherlands.
10. Alan W. Partin, Alan J. Wein, et. all - Campbell Walsh Wein Urology, E-Book (12th ed.) – 2020.
11. Omar M. Aboumarzouk - Blandy's Urology, 3rd Edition – 2019.
12. David Thurtle, Suzanne Biers, Michal Sut, James Armitage. - Emergencies in Urology – 2017.
4. Philipp Dahm, Roger Dmochowski - Evidence-based Urology, 2nd Edition – 2018.

Additional:

1. Boyko M.I., Pasechnikov S.P., Stus V.P. and others Clinical andrology // Doctor's guide "Androlog". - K.: LLC "Library "Health of Ukraine", 2013. - 222 p.
2. Sarychev L.P. Clinical anatomy and physiology of organs of the urinary and male reproductive system: method. rec. for teachers / comp. L. P. Sarychev, S. A. Sukhomlyn, S. M. Suprunenko. – Poltava, 2019. – 11 p.
3. Sarychev L.P. Symptoms of urological diseases: method. rec. for teachers / L. P. Sarychev, S. M. Suprunenko, S. A. Sukhomlyn, Ya. V. Sarychev. – Poltava, 2019. – 14 p.
4. Medical student's library. Urology. Edited by F.I. Kosteva. - Odesa, 2004. – 296p.
5. Atlas-guide to urology. Ed. A.F. Voizianova, A.V. Lulko Dnipropetrovsk, 2002.-T. 1,2,3
6. Urology / Ed. Prof. O.S. Fedoruk - Chernivtsi: Bukovyna State Medical University, 2011. - 344p.

### **Information resources:**

University website <https://onmedu.edu.ua>

Library [library.odmu.edu.ua](https://library.odmu.edu.ua)

1. <https://uroweb.org/>
2. <https://www.nccn.org/>
3. <https://www.auanet.org>
4. <https://www.inurol.kiev.ua/>
5. <https://www.souu.org.ua/>