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Guidelines for conducting a practical lesson with 5th year students
of the Faculty of Medicine on the topic:

CLINICAL INTERPRETATION OF DATA
ADDITIONAL RESEARCH METHODS
IN THE DIAGNOSTICS OF KIDNEY DISEASES.
(CLASS DURATION 4 HOURS)

Guidelines for conducting a practical lesson with 5th year students of the Faculty of Medicine on the topic:

CLINICAL INTERPRETATION OF THESE ADDITIONAL RESEARCH METHODS IN THE DIAGNOSTICS OF KIDNEY DISEASES.

PURPOSE OF THE LESSON: to increase the level (quality) of knowledge and skills of students in the interpretation of laboratory and instrumental research methods in the nephrology clinic.

Students should be able to:

1. be able to identify the main complaints in diseases of the urinary organs and key points in the anamnesis, on the basis of complaints, anamnesis and objective status, make a preliminary diagnosis of the presence of a kidney disease in a patient;

2. substantiate the need for additional research;

3. interpret the results of the received studies;

MOTIVATION OF THE TOPIC RELEVANCE.

Kidney disease is often not diagnosed in the early stages of development, so at autopsy, every 4th deceased over 80 years of age is diagnosed with chronic pyelonephritis, not defined during the life of the patient. The importance of early diagnosis of kidney diseases is determined by the development of complications, such as chronic and acute renal failure, nephrotic syndrome, symptomatic arterial hypertension, etc.

Determining the level of students' preparation. The second level of knowledge:

control methods - written survey (20 min). Students should know the main issues of etiology, pathogenesis, clinic and diagnosis of diseases of the kidneys and urinary tract, the definition and classification of pyelo and glomerulonephritis, the main drugs used to treat kidney diseases, their mechanisms of action; students should be able to possess propaedeutic skills.

Report of student curators in the Chamber. When reporting a patient, students should pay special attention to the following manifestations of the disease.

Complaints: renal and extrarenal, basic and general pathological.

Main renal complaints:

- complaints about changes in the organic properties of urine - color, transparency, odor, etc. (reddish color of urine or the color of "meat slops" with hematuria, cloudy urine with the presence of flakes and sediment in it with an inflammatory lesion of the bladder).

- complaints of urination disorders - oliguria, anuria, polyuria, nocturia, pollakiuria, dysuria, stranguria and ischuria.

- complaints of pain in the lumbar region on one or both sides, in the abdominal cavity along the ureters or above the pubis

Main extrarenal complaints:

typical "renal" edema, headache with arterial hypertension and visual impairment.

For example, "renal" edema is pale, warm, friable, and hypertension in kidney diseases is persistent, with high numbers, poorly amenable to drug correction, and is practically not accompanied by subjective sensations.

The nature of each complaint must be analyzed, given a qualitative and quantitative assessment, to identify the time of its occurrence, the causes that cause it, the phenomena that accompany it, to find out from what and how effectively it is reduced or stopped (including the medications used).

General pathological complaints: irritability, general weakness, decreased performance, decreased or no appetite, weight loss, fever.

With decompensation and the development of azotemia - skin itching, bad breath, nosebleeds, drowsiness, dry skin and mucous membranes, nausea, vomiting, diarrhea, thirst and dry mouth.

In severe and complicated course of kidney diseases - complaints indicating the involvement of other organs (brain, heart, lungs, liver, musculoskeletal system) and systems (hematopoietic system, central and peripheral nervous systems, endocrine, etc.) .). So, with damage to the heart - shortness of breath, palpitations, pain in the region of the heart; with cerebral edema - for headache and vomiting, impaired vision and consciousness; with anemia - dizziness, tinnitus, etc.

Disorders of urination (normally 1000-2000 ml of urine is excreted per day).

- Physiological oliguria - with dry eating, limited fluid intake, eating very salty foods, with prolonged exposure to a dry, hot room and increased sweating

- Pathological oliguria - a significant decrease in urine output (less than 500 ml per day) - in acute diseases or kidney damage (acute glomerulonephritis, kidney injury, poisoning with nephrotropic poisons, etc.); in shock with a drop in blood pressure; indomitable vomiting and diarrhea, polyserositis and the formation of peripheral edema.

- Anuria - cessation of urine output by the kidneys. Prerenal (prerenal - due to a decrease in blood flow to the kidneys - with a sharp drop in blood pressure, large blood loss, thrombosis and compression of the renal arteries by a tumor, with severe circulatory failure), renal (renal, secretory - occurs as a result of a significant damage to the renal parenchyma - with intoxication, poisoning organic poisons, heavy metal salts, nephritis, sulfanilamide kidney, kidney tuberculosis, kidney injury, etc.); postrenal (subrenal - as a result of a violation of the outflow of urine from the upper urinary tract - with obstruction by a stone, compression of the ureters by a tumor, erroneous ligation of the ureters during surgery, etc.).

- Physiological polyuria - with excessive water intake, cooling

- Pathological polyuria - more than 1800 ml of urine per day. As a result of pathological processes in the kidneys, impaired water-salt metabolism and its regulation.

The mechanism of polyuria of any origin is associated with a decrease in reabsorption in the tubules. Polyuria in kidney diseases has a compensatory value, since the excretion of osmotically active substances with their reduced concentration is possible due to a larger volume of urine output. Extrarenal polyuria (extrarenal) - with increased excitability of the thirst center, especially in connection with encephalitis; with diabetes insipidus and diabetes mellitus, Kohn's syndrome (hyperaldosteronism); vegetative sympatho-adrenal crises; during the period of convergence of edema; when using diuretics, etc.

- Nocturia - excretion of large amounts of urine at night (usually daytime diuresis is 3-4 times greater than nighttime). It indicates a violation of blood flow in the kidneys, observed in diseases of the kidneys and the cardiovascular system: renal - more often in the initial stage of glomerulonephritis and nephrosclerosis, due to a decrease in the reduction of renal vessels during sleep and improved blood circulation in the kidneys; cardiac - an early symptom of heart failure - due to venous congestion and water retention in tissues during the day, at night, as a result of rest, renal circulation improves, which leads to compensatory nocturia.

- Pollakuria - frequent urination, more than 6 times a day - with inflammatory processes in the bladder and prostate gland; with a decrease in the capacity of the bladder (tumor, wrinkling in chronic cystitis, uterine compression).

- Dysuria - difficult excretion of urine from the bladder - in diseases of the urinary and genital organs that cause compression or narrowing of the urethra (prostate adenoma, stricture and tumors of the urethra, etc.)

- Stranguria - urination in small portions (drops), due to its difficulty, is accompanied by soreness and increased urination, false urge to urinate, a feeling of incomplete emptying of the bladder - with pathological processes in the neck of the bladder and urethra, disrupting the normal emptying of the bladder).

- Ischuria - urinary retention in the bladder. It happens partial and complete, acute and chronic - in violation of the patency of the urethra (prostate diseases, stones, strictures, etc.), inflammatory processes and tumors of the pelvic organs, cerebral hemorrhages, lesions of the spinal cord, during serious illnesses

Anamnesis of the disease and life - it is necessary to find out in detail when and how the disease began, establish the sequence of development of the symptoms of the disease, describe in detail their conditions of occurrence (for example, connection with past infections and other diseases, cooling, etc.). To study the course of the disease (periods of deterioration and improvement and what they are connected with), to clarify the data of laboratory-instrumental and other clinical studies carried out during the period of the disease, what therapeutic agents the patient used.

In the anamnesis of life, clarify past diseases, the presence of bad habits, nutrition (consumption of pickles, spicy dishes, etc.), living and working conditions.

Objective examination of the patient

Inspection - pay attention to the presence of the smell of ammonia from the mouth. Changes in the skin and visible mucous membranes (normal color, pallor, hemorrhages, scratching), the presence or absence of edema, their localization and nature.

Palpation of the kidneys is possible only with their increase or omission, in the position of the subject lying on his back or in an upright position, bimanually.

A symptom of tapping the kidney area from the side of the lower back with the edge of the palm or fist on the back of the hand.

Laboratory research methods in nephrology

Clinical analysis of urine: begin with an assessment of: urine color (normally yellow, color intensity depends on the presence of urinary pigments in it) transparency (complete, turbidity depends on the presence of salts, cellular elements, bacteria, mucus, fat.), smell (weak specific smell), reactions (slightly acidic is normal, with a sharply acidic reaction ($\text{pH} < 5.5$), urate stones are formed, with an alkaline reaction, oxalate and phosphate stones are formed); relative density (1.002 - 1.030); a qualitative study on the content of protein (traces - 0.033 g / l), glucose (neg.), ketone bodies, bilirubin, etc.

urine sediment elements: organic (cellular - cells of squamous, cylindrical and renal tubular epithelium (units in p / c); erythrocytes (norm 0-1 in p / c, cylinders), leukocytes (up to 5 in p / c), cylinders (hyaline - in healthy individuals no more than 100 per 1 ml of urine, granular and waxy - always a sign of organic kidney disease; inorganic - crystals of uric acid, calcium oxalate, urates, phosphates, crystals of cholesterol, cystine, tyrosine; in addition - bacteria (cocci, rod flora), fungi (most often of the genus Candida), protozoa.

Pathological conditions:

hematuria (macro- and microhematuria), leukocyturia, cylindruria, proteinuria, isosthenuria, glucosuria

Methods using counting chambers (according to Nechiporenko, Kakovsky-Addis) - a more accurate determination of the degree of leukocyturia and hematuria and its dynamics - in 1 ml - 4×10^3 leukocytes, 4×10^3 -erythrocytes; per day - more than $2 \cdot 10^6$ leukocytes and $1 \cdot 10^6$ erythrocytes.

A three-glass test - to distinguish between hematuria from the lower urinary tract and renal hematuria (the presence of blood only in the 1st portion - damage to the initial part of the urethra; at the end - with inflammation and tumors of the prostate and the cervical part of the bladder, with infringement of a stone in the internal opening of the urethra; in all 3 servings - for various diseases of the bladder, ureters, renal pelvis, kidneys).

Provocative tests - to detect latent leukocyturia - are based on a comparison of the number of leukocytes in the urine isolated before and after the leukocyturia-provoking measures - the introduction of prednisone, pyrogenal, water load, etc.

Assessment of the functional state of the kidneys

excretory function - according to the level of creatinine in the blood (normally 0.062-0.123 mmol / l);

filtration function - study of GFR using endogenous creatinine clearance - Reberg's test (normally 80-120 ml / min), Reberg's test also evaluates tubular reabsorption (normal 90%);

functional tests with a protein load to determine glomerular filtration reserves: acute - eating 70-90 g of meat protein, 100 g of vegetable protein or intravenous administration of a set of amino acids, or short-term - within 3-5 days, the protein content in the diet in the amount 1.8 g/kg. In healthy individuals, in response to an acute protein load

- GFR increases by 20-65% in the next 1-2.5 hours after exercise; with a short-term load - CF increases by 3-4 days by 10-30% of the initial level.

concentration function - Zemnitsky's test - if OPM is detected above 1018 - 1020 in a single analysis, the functional state of the kidneys is characterized as intact, Zemnitsky's test also evaluates the distribution of diuresis per day.

Imaging research methods

(instrumental research methods)

Ultrasound, ultrasound dopplerography, plain radiography of the urinary system, tomography, X-ray computed tomography, excretory urography, infusion urography, retrograde pyelourethrography, antegrade pyelography, renal angiography, indirect radioisotope angiography of the kidneys (angtonephroscintigraphy), renography and dynamic nephroscintigraphy, magnetic resonance imaging, biopsy kidneys.

Conducting classes in a thematic classroom. Analysis of the features of etiology, pathogenesis, clinic and treatment of a particular patient. Indicate the main methods of non-drug exposure (changing lifestyle, nutrition, giving up bad habits, doing physiotherapy exercises). The main groups of drugs and their mechanisms of action, the main indications and contraindications for use and the rationale for choosing a particular drug from pharmacological groups.

The final part of the lesson: control of the acquired knowledge - solving situational problems without possible options for correct answers.

Summary.