

**MINISTRY OF HEALTH PROTECTION OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY**

Medical Faculty №2

Department of radiation diagnostics, therapy and radiation medicine and oncology

I APPROVE

Vice-rector for scientific and pedagogical work

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September 1, 2023

**METHODOLOGICAL DEVELOPMENT
TO PRACTICAL LESSONS
FROM EDUCATIONAL DISCIPLINE**

Faculty, MEDICAL course, 2nd year

Educational discipline RADIOLOGY

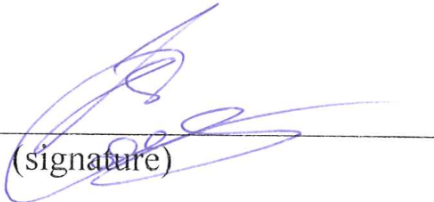
Odesa-2023

Approved:

Meeting of the Department of the Radiation Diagnostics, Therapy and Radiation
Medicine and Oncology
Odessa National Medical University

Protocol No. 1 dated 30.08. 2023

Head of the department _____


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PRACTICAL TRAINING

Content module 6.

Comprehensive radiation diagnostics in endocrinology. Radiation signs of diseases of the thyroid gland, breast gland and reproductive system

Practical lesson No. 17

Topic 17. Radiation methods in endocrinology. Radiation signs of diseases of the thyroid gland

Goal: to learn how to choose a certain method of radiological research and to analyze the indications and contraindications for carrying out this or that radiological method of research of the thyroid gland ; explain the advantages and disadvantages of each of the radiation research methods and their characteristics; to learn how to analyze radiographs of the thyroid gland in normal and pathological conditions

Basic concepts:

Topic 17. Radiation methods in endocrinology. Radiation signs of diseases of the thyroid gland.

Radiation methods of imaging the thyroid gland: ultrasound, radionuclide, X-ray, CT, MRI. Indications and contraindications for this or that radiological method of thyroid research. The main RFP. Preparation of patients for radionuclide examination of the thyroid gland. Radionuclide study of the functional state of the thyroid gland; accumulation test with ^{131}I , dynamic thyroscintigraphy with $^{99\text{m}}\text{Tc}$ -pertechnetate. Radiation anatomy and physiology of the thyroid gland. Radiation semiotics of pathology of the thyroid gland: hypothyroidism, hyperthyroidism, tumor lesions, inflammatory processes, abnormal location.

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

- distinguish the normal radiological anatomy of the thyroid gland
- choose a radiological examination method for various pathologies of the thyroid gland, compile an algorithm for radiological examination for various pathologies of the thyroid gland;
- to analyze radiation symptoms of diseases of the thyroid gland
- evaluate the results of the used method of radiation examination of the thyroid gland

2.2. Questions to check basic knowledge on the topic of the lesson:

Which of the methods of radionuclide research of the thyroid gland refers to the in vitro method and. radioimmunological analysis of the organic phase of iodine metabolism

b. scanning

in. scintigraphy

g. $^{99\text{m}}\text{Tc}$ -pertechnetate capture test

A 32-year-old patient notes a tumor-like formation on the front surface of the neck, which appeared two years ago. In the last three months, the tumor has been growing rapidly, there have been

difficulties in swallowing, and a feeling of pressure from the tumor. Objectively: skin of normal moisture, Ps- 80/min., rhythmic. In the right lobe of the thyroid gland, a 3.0x3.5 cm, dense, lumpy nodule is identified, which shifts during swallowing. On the scanogram, there is a "cold node" in the thyroid gland. What is the previous diagnosis?

- A. Cancer of the thyroid gland
- B. Adenoma of the thyroid gland
- C. Cyst of the thyroid gland
- D. Nodular goiter
- E. Autoimmune thyroiditis

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. based on the anamnesis, choose a radiological examination method
2. to analyze the necessity of radiological research methods
3. justify indications and contraindications to the beam method
4. to analyze the radiation semiotics of functional and morphological changes of organs
5. to determine pathological changes based on the results of a radiological examination

Recommendations (instructions) for the performance of tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.)

To determine the leading X-ray syndrome, the following actions must be performed sequentially:

- distinguish the norm from pathology;
- determine radiological symptoms of pathology;
- determine radiological signs of the syndrome.

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient
2. The date of the examination
3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

- 1 methodology and research area
- 2 projections of the studied area
- 3 positions, sizes, contours and shape of the organ under study
- 4 definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson (tasks, assignments, tests, etc.)

PRELIMINARY DIAGNOSIS: endemic goiter. Choose the optimal research method

1. radiography
2. X-ray computed tomography
- *3. sonography
4. radiometry
5. scintigraphy
6. radioimmunoassay

PRELIMINARY DIAGNOSIS: thyrotoxicosis. Choose the optimal research method

1. radiography
2. X-ray computed tomography
3. sonography
4. radiometry
5. scintigraphy
- *6. Radioimmunoassay

PRELIMINARY DIAGNOSIS: hyperparathyroidism. Objectively: deformation of the right lower leg, its tenderness during palpation. Ultrasound of the kidneys: multiple calculi in both kidneys. Choose the optimal research method

- *1. radiography
2. X-ray computed tomography
3. sonography
4. radiometry
5. scintigraphy
6. radioimmunoassay

PRELIMINARY DIAGNOSIS: volumetric formation of the thyroid gland. Ultrasound: a neoplasm of reduced echogenicity with a diameter of up to 1.5 cm is registered in the right lobe of the thyroid gland. Choose the optimal research method

1. radiography
2. X-ray computed tomography
3. sonography
4. radiometry
- *5. scintigraphy
6. radioimmunoassay

Practical lesson No. 18.

Topic 18. X-ray research methods and X-ray anatomy of the reproductive system, mammary gland. Radiation signs of diseases of the reproductive system and breast.

Goal: learn how to choose a certain method of radiation examination and analyze the indications and contraindications for carrying out this or that radiation method of examination of the breast and organs of the reproductive system; explain the advantages and disadvantages of each of the radiation research methods and their characteristics; to learn how to analyze the radiographic image of the breast and organs of the reproductive system in normal and pathological conditions

Basic concepts: radiological methods of examination of the genitals and mammary gland: ultrasound, x-ray, CT, MRI. Radiological anatomy of genital organs and breast. Possibilities and main indications and contraindications for radiation examination. Radiation semiotics of genital and breast diseases: inflammatory processes, tumors.

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

- distinguish the normal radiological anatomy of the breast and organs of the reproductive system ;
- to choose a method of radiation examination for various pathologies of the breast and organs of the reproductive system ;
- to draw up an algorithm for radiation examination in case of various pathologies of the breast and organs of the reproductive system ;
- to analyze radiation symptoms of diseases of the breast and organs of the reproductive system ;
- evaluate the results of the used method of radiation examination of the breast and organs of the reproductive system

2.2. Questions to check basic knowledge on the topic of the lesson:

1. The main method of breast cancer screening is:

1. mammography
2. palpation of the mammary gland
3. Ultrasound of mammary glands
4. thermography

2. Mammography is:

1. X-ray of mammary glands
2. ultrasound examination of mammary glands
3. contrast study of the ducts of the mammary gland
4. Puncture of mammary gland formation under X-ray control
5. a set of measures invested in the prevention of breast cancer

3. The main purpose of pneumocystography:

1. determination of the degree of cyst filling
2. specifying the dimensions of education
3. Study of wall growths in the cyst
4. detection of microcalcifications
5. performing a stereotaxic biopsy

4. The main purpose of ductography is to determine:

1. degree of tortuosity of the channel
2. the length of the duct to the terminal sections
3. the presence of intraductal formations
4. the presence of linear calcifications
5. inflammatory processes

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

6. based on the anamnesis, choose a radiological examination method
7. to analyze the necessity of radiological research methods
8. justify indications and contraindications to the beam method
9. to analyze the radiation semiotics of functional and morphological changes of organs
10. to determine pathological changes based on the results of a radiological examination
11. analyze radiographs

Clinical situations

Task No. 1

A 71-year-old patient was found to have a tumor measuring 5 cm in the mammary gland, the skin above it is ulcerated, the nipple is retracted and deformed, and multiple lymph nodes in the armpit are enlarged. The patient is bothered by pains in the thoracic region of the back. An X-ray of the spine revealed the destruction of 3-4 thoracic vertebrae. What kind of research should the patient conduct in the first place?

Task 2 .

A 46-year-old serviceman came to see a doctor with complaints of pain in the pubic area radiating to the lower back and right leg. Over the past 2 years, urination has slowly worsened ("often but little"). I lost weight by 3 kg. Ultrasound: the prostate gland is enlarged, the contours are clear, an echonegative formation is determined in the middle of the right lobe, the bladder is of the "correct" shape.

What pathological condition does this picture most likely correspond to:

Task 3.

A prostate cancer patient (2.5 years after radical treatment) developed a slight aching pain in the right hypochondrium. The examination revealed: accelerated ESR, leukocytopenia, thrombocytopenia. During sonography, a rounded formation 4 X 6 cm with uneven, indistinct edges was found in the 1st and 5th segment of the liver; the internal structure is homogeneous — hypoechoic;

What pathological condition does this picture most likely correspond to:

Recommendations (instructions) for the performance of tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.)

To determine the leading X-ray syndrome, the following actions must be performed sequentially:

- distinguish the norm from pathology;
- determine radiological symptoms of pathology;
- determine radiological signs of the syndrome.

Algorithm of radiation research of the reproductive system

Type of pathology	Primary research methods	Additional research methods
Uterine disease	ultrasound Hysterosalpingography	MRI with contrast CT with contrast (for example, to detect bone metastases)
Urethral disease	osteoscintigraphy, ultrasound, Radiography	urethrography CT-urethrography SCT urethrography MRI MR urethrography
Prostate disease	ultrasound	MRI CT Radiography

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient
2. The date of the examination

3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

- 1 methodology and research area
- 2 projections of the studied area
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- 4 definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson (tasks, assignments, tests, etc.)

If an abnormality of the development of the uterus and appendages is suspected, the examination begins with:

1. ultrasound examination
2. computer tomography
3. magnetic resonance imaging
4. X-ray examination of the abdominal cavity and pelvis
5. hysterosalpingography

Examination of the female reproductive system is performed by the following method:

1. transabdominally
2. transvaginally
3. transrectally
4. by all the above-mentioned methods

Which sign is not characteristic of fibroadenoma of the mammary gland?

1. Round shape
2. Clear contours
3. Presence of microcalcifications
4. Homogeneous structure

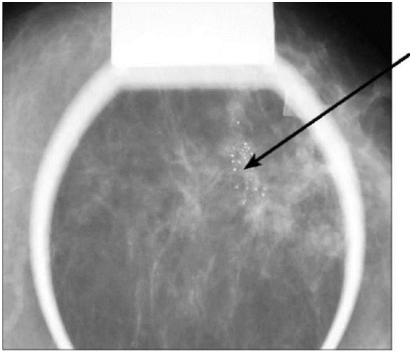
Diffuse thickening of the skin of the mammary gland is characteristic of:

1. Edema-infiltrative cancer
2. Secretory disease
3. Fibrous mastopathy
4. Fibroadenomas

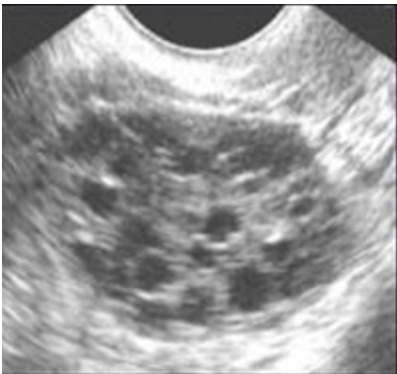
Patient U., 32 years old. Name the research method, research area and research projection.
Sign the notation on the radiograph:



Patient S., born in 1953. A fragment of a target X-ray of the mammary gland. Name the X-ray symptom characteristic of a malignant process of the mammary gland. Your conclusion:



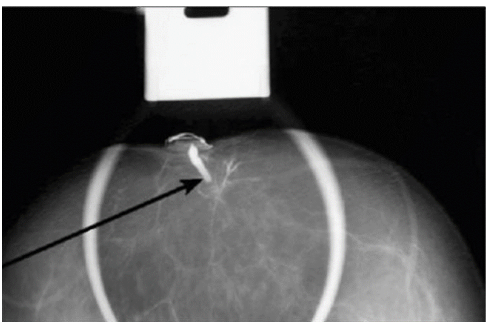
Patient A., 35 years old. Research of the left ovary. Name the research method. Your conclusion:



Patient P., 27 years old. Research of the left ovary. Name the research method. Your conclusion:



Patient U., 36 years old. Name the research method. What contrast agents can be used? What is the name of the symptom shown in the picture? Your conclusion:



4. Summary:

Current evaluation criteria in practical training

Rating	Evaluation criteria
Perfectly "5"	<p>The applicant takes an active part in practical training; demonstrates deep knowledge, gives complete and detailed answers to questions; takes an active part in the discussion of the results of the radiological examination, correctly and consistently compiles the algorithm of the radiological examination in relation to a certain pathology; uses additional educational and methodological and scientific literature; expresses his own reasoning, gives appropriate examples, demonstrates clinical thinking.</p> <p>The test tasks are completed in full, all 100% of the answers to the questions are correct.</p>
Fine "4"	<p>The applicant participates in a practical session; knows the material well; demonstrates the necessary knowledge, but gives answers to questions with some errors; participates in the discussion of the results of radiation research, uses basic educational and methodological and scientific literature. The winner expresses his opinion on the subject of the lesson, demonstrates clinical thinking.</p> <p>The test tasks are completed in full, at least 70% of the answers to the questions are correct.</p>
Satisfactorily "3"	<p>The acquirer sometimes participates in a practical activity; partially speaks and asks questions; makes mistakes when answering questions; shows passive work in practical classes; the radiological research algorithm for a certain pathology is inconsistent with significant errors; shows fragmentary knowledge of the conceptual apparatus and literary sources. The acquirer does not express his opinion on the topic for any reason .</p> <p>The testing is done in full, at least 50% of the answers are correct.</p>
Unsatisfactorily "2"	<p>The acquirer does not participate in the practical session, is only an observer; never speaks or asks questions, disinterested in learning the material; does not take part in the discussion of the results of radiological examination, incorrectly compiles the algorithm of radiological examination for a certain pathology, gives incorrect answers to questions, shows unsatisfactory knowledge of the conceptual apparatus and literary sources.</p> <p>Testing is done, but less than 50% of the answers are correct.</p>

5. List of recommended literature

Main:

1. Kovalsky O.V. Radiology. Radiation therapy. X-ray diagnostics: assistant. for students higher honey. education closing IV level of accreditation / O. V. Kovalskyi, D. S. Mechev, V. P. Danylevich. 2nd edition Vinnytsia: New Book, 2017. 512 p.
2. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 1. Kyiv: Book plus. 2015. 104 p.
3. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 2. Kyiv: Book plus. 2015. 168 p.

4. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 3. Kyiv: Book plus. 2015. 248 p.
5. Methods of radiation diagnostics: a study guide (Protocol of the Medical Center No. 5 dated 05.25.17) N.V. Tumanska, K.S. Barska. 143 p.

Additional:

6. Radiation medicine: Textbook for medical universities 3-4 academic year. approved by the Ministry of Education and Culture / edited by E. Pylypenka Kyiv, 2018. 232 p. kind. "Medicine".
7. Tomographic methods of radiodiagnostics: a study guide (Protocol of the Central Medical Center No. 5 dated 05.25.17) N.V. Tumanska, K.S. Barska, I.P.Jos, 91 p.
8. Diagnostic, treatment and preventive algorithms in internal medicine: teaching method. manual / under the editorship Prof. V. I. Denesyuk; Vinnytsia national honey. University named after M. I. Pirogov, Cafe. internal Medicine No. 3. Kyiv: DZK Center, 2015. 151 p. : fig., tab.
9. Clinical Radiology : The Essentials Fourth Edition by Daffner MDFACR, Dr. Richard H., Hartman MD, Dr. Ma 4th edition. 2014. 546 p.

Electronic information resources:

1. <https://radiographia.info/>
2. <http://nld.by/help.htm>
3. <http://learningradiology.com>
4. <http://www.radiologyeducation.com/>
5. <http://www.radiologyeducation.com/>
6. <https://www.sonosite.com>