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
_____ Eduard BURYACHKIVSKY
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 _____ Victor SOKOLOV
(signature)

Developers:

Doctor of Medical Sciences, Professor Sokolov V.M.,
Associate Professor Rozhkovska G.M.,
Associate Professor Tsvigovsky V.M.,
Assistant Slyusarenko O.D.

PRACTICAL TRAINING

Content module 3.
Comprehensive radiation diagnosis of diseases of the abdominal cavity

Practical lesson No. 8, 9, 10.

Topic 8. Radiological methods of research of the gastrointestinal tract.

Topic 9. Radiation signs of diseases of the gastrointestinal tract.

Topic 10. X-ray research methods and X-ray anatomy of the hepatobiliary system systems. Radiation signs of diseases of the hepatobiliary system

Goal: to learn how to choose a certain method of radiological examination and to analyze the indications and contraindications for carrying out this or that radiological method of examination of the organs of the abdominal cavity; explain the advantages and disadvantages of each of the radiation research methods and their characteristics; to learn how to analyze the X-ray image of the organs of the abdominal cavity in normal and pathological conditions

Basic concepts:

Topic 8. Radiological methods of research of the gastrointestinal tract.

X-ray research methods: X-ray examination and X-ray of the abdominal cavity, X-ray of the esophagus, stomach, small intestine, large intestine (irigoscopy). Preparation for research. The plan of radiation research. Indications and contraindications for carrying out this or that radiation method of gastrointestinal tract research. Normal radiological anatomy of the organs of the alimentary canal: location and anatomical structure of the esophagus, stomach, small and large intestines. Artificial contrast of organs using X-ray positive and X-ray negative contrast substances. Normal radiological anatomy of the organs of the alimentary canal: location and anatomical structure of the esophagus, stomach, small and large intestines.

Topic 9. Radiation signs of diseases of the gastrointestinal tract.

The main radiological signs of the pathology of the alimentary canal: free gas in the abdominal cavity, areas of intestinal swelling, shadows of foreign bodies and calculi, narrowing (diffuse, local, symmetric, asymmetric), expansion (diffuse, local, symmetric, 8 asymmetric), irregularity of the contour (straightening , "niche", filling defect), mucosal changes (remodeling of the relief, "niche", filling defect). Radiation signs of foreign bodies: esophagus, stomach and complications. X-ray examination for perforation of the hollow organ of the abdominal cavity, tumors of the esophagus, stomach. Conductive radiation syndromes of achalasia, dilatation of the esophagus, cicatricial strictures. Leading radiation syndromes of digestive tract diseases: "acute abdomen"; inflammation (esophagitis, gastritis); gastric ulcer; malignant (cancer); benign (polyps) tumors; functional disorder (atonia, hypotension, hypertension, reflux).

Topic 10. Radiological research methods and radiological anatomy of the hepatobiliary system. Radiation signs of diseases of the hepatobiliary system.

Radiological methods of studying the liver and biliary tract: ultrasound, x-ray (cholecystography, cholangiography), radionuclide (hepatography, hepatobiliscintigraphy, hepatoscintigraphy with colloids, SPECT of the liver), CT and MRI. Indications and contraindications for X-ray examination of the liver and gallbladder. Radiation methods of functional research of the liver and gall bladder. Preparation of patients for research. Radiological anatomy of the liver and biliary tract. Ultrasound, CT, MRI: localization, number, shape, size, structure, contours of the pathological cell (cells). The nature of the cell during radionuclide examination is the degree of RFP accumulation (normal, increased, decreased). The nature of the cell in magnetic resonance imaging is the intensity of the signal in the magnetic field (hypo-, hyper-, iso-, an-). Radiation signs of tumor (primary or

secondary) and cystic lesions of the liver, hepatitis, cirrhosis. Calculous cholecystitis - radiological research methods and radiological signs.

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:
Know:

1. the principles of obtaining a radiographic image and being able to determine with which method of radiographic examination an image of the organs of the abdominal cavity was obtained
2. topographical anatomy of the organs of the human abdominal cavity in accordance with the specifics of the introduced methods of radiological diagnostics
3. anatomical and functional features of radiographic imaging of abdominal organs in normal and pathological conditions in the age aspect
4. morphological and functional indicators of abdominal organs

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

1. The main method of X-ray examination of the stapes, stomach, thin and colon
2. Techniques for detecting foreign bodies of the esophagus
3. X-ray picture of an esophageal diverticulum
4. Main X-ray symptoms of gastric and duodenal ulcers
5. X-ray picture of dynamic and mechanical intestinal obstruction.

1. The angle formed by the distal part of the esophagus and the stomach vault is called the angle: a. Hiss
   b. Keller
in. Peres
Osgood-Schlatter
d. Kinbek

2. Which technique refers to the X-ray examination of the colon:
   and. double contrast
   b. probe duodenography
   in. rectomanoscopy
   Mr. Enterography

3. X-ray examination of the stomach is carried out:
and. on an empty stomach
   b. after a light breakfast
   in. after 30 min. after a cleansing enema
g. without prior preparation

4. Irigoscopy is a contrast study:

and. colon
b. stomach
in. Duodenum
g. small intestine

5. In case of pneumoperitoneum, the following are injected into the abdominal cavity:
and. air
b. barium sulfate
in. omnipack
g. ultravist

6. To study the alimentary canal, the following are most often used:
and. barium sulfate
b. ultra vis
in. urographin
g. Yopagnost

7. X-ray signs of intestinal obstruction
and. a large amount of mucus
b. "niche" symptom
in. symptom "stairs"
Kloiber glasses

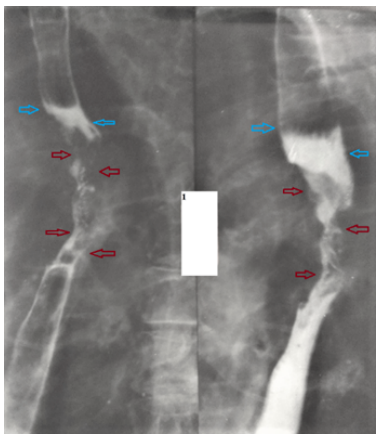
8. Parts of the gallbladder are:
and. bottom;
b. body;
in. vault;
Shyika

9. The liver has the following parts:
and. left and right
b. upper mesentery
in. lower
g. square
d. tail

10. The liver is connected to the diaphragm by ligaments:
and. sickle-shaped;
b. round ligament of the liver;
in. crown
d. venous ligament

Situational problem 1.
During the x-ray examination of the insurer, the x-rays you see were made.

- How is insurance X-ray performed?
- What are the indications for it?
- Is a contrast agent used? If yes, which one?
- Are there signs of pathological changes in the insurance layer on the given X-rays? Which exactly?
- What do the red and blue arrows point to?



Situational task No. 2 .
After 2 sips of aqueous suspension of barium sulfate in the upper part of the stomach, the interweaving of folds going in different directions is determined. In the body of the stomach, 5 longitudinal sinuous folds are defined. Close to the small curvature, the folds are parallel in the longitudinal direction. The contour of the large curvature is jagged. In the antral part of the stomach, there are 4 longitudinal folds that converge to the outlet channel. On the border of the bulb and the descending part of the duodenum, kerkring folds are found.
The answer is a normal X-ray picture of the stomach.

Situational problem #3 .
On an X-ray taken with 1-2 sips of barium suspension, folds of the mucous membrane of the stomach can be seen. 3 longitudinal meandering folds are defined in the body of the stomach. In the output part of the stomach, folds that run diagonally and longitudinally are the most common. Answer: normal relief of the gastric mucosa.

Situational problem #4.
Man, 65 years old. Complaints of nausea, impaired swallowing (stopping of food), belching of food, feeling of lack of air, dizziness. These symptoms are relieved after vomiting. Determine the type of X-ray examination to clarify the diagnosis of "esophageal diverticulum": Answer: contrast X-ray examination of the esophagus.

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

1. on the basis of anamnesis, choose a method of X-ray examination of the gastrointestinal tract
2. to analyze the need for radiological methods of gastrointestinal tract research
3. justify indications and contraindications to the beam method
4. to analyze the radiation semiotics of the functional and morphological changes of the gastrointestinal tract
5. on the basis of the results of a radiological examination, to determine the pathological changes of the gastrointestinal tract
6. to analyze radiographs of the gastrointestinal tract

1. Specify the X-ray signs of intestinal obstruction
and. Kloiber glasses
b. niche symptom
in. crescent ribbon
g. a large amount of mucus

2. Indicate the most frequent localization of gas on the X-ray examination of the abdominal cavity after perforation of a stomach ulcer:
and. under the right dome of the diaphragm
b. near the left kidney
in. along the pancreas
g. under the left dome of the diaphragm

3. From the beginning of the expansion of the food dishes on the radiograph in direct projection with a large amount of liquid, in which a barium mixture is visible , and a smooth narrowing in the lower part , characteristic of:
and. and chalazion of the esophagus
b. d diverticulum in the esophagus
in. g rice and esophageal opening of the diaphragm

4. Which radiological diagnostic method is the "first line" when acute cholecystitis is suspected
and. ultrasound
b. MRI
in. X-ray examination of abdominal organs
City of CT
d. hepatoscintigraphy
5. Gallbladder calculi during ultrasound are defined as:
and. hyperechoic rounded formations with a clear contour and an acoustic shadow
b. hypoechoic formations, multi-chamber heterogeneous echo structures
in. formations with a clear contour that deform the contours of the gallbladder
d. all of the above are true

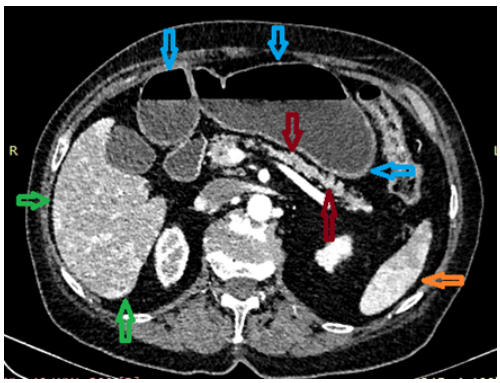
6. A woman, 20 years old, complains of dull pain in the right subcostal region after fatty, fried food. During an oblique subcostal scan, an echocholecystogram revealed an increase in the gallbladder (6 cm in diameter and 15 cm in length), thickening of the gallbladder walls (7 mm), the shape of the gallbladder approaches spherical, regional thickening of the gallbladder wall is noted. He will draw a conclusion based on the echoscanogram.

and. chronic pancreatitis
b. chronic noncalculous cholecystitis
in. chronic gastritis
g. cholelithiasis
d. biliary tract dyskinesia

7. Patient U., 56 years old, was admitted to the surgical department with complaints of pain in the liver in a serious condition. In the blood analysis, high leukocytosis with a shift of the leukocyte formula to the left. A month ago, the patient was operated on for appendicitis. Suspected liver abscess. What method of radiation diagnostics should be prescribed in this case?

Situational task No. 1.
An 84-year-old woman complains of abdominal pain.

- What radiological examination was performed?
- In what phase are the scans shown? In which section?
- What do the red, blue, green and orange arrows point to?
- Identify the pathological signs.



Situational task No. 2.

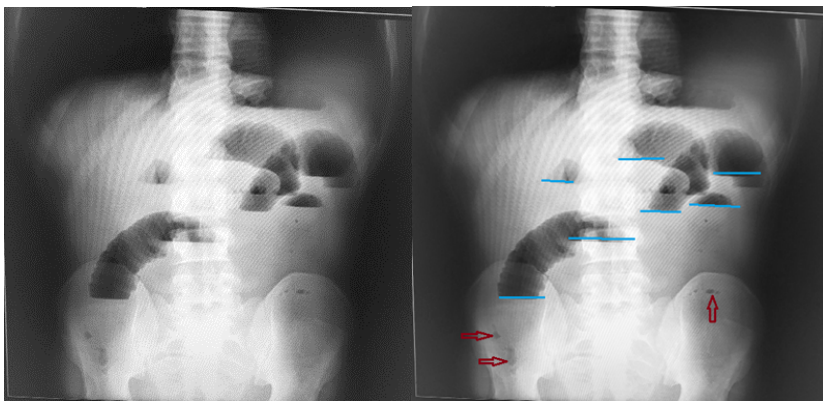
A 64-year-old woman complains of pain in the right lower quadrant of the abdominal cavity, moderate weight loss. Referred by an oncologist for X-ray examination.

- What radiological examination was performed?
-
- In what phase are the radiographs shown? In which projection?
-
- Are there signs of pathology? If there are, which ones exactly?
-
-
-

Situational task No. 3 .

Patient, 45 years old. In the reception department of the hospital, a radiation examination was prescribed to rule out suspicion of intestinal obstruction.

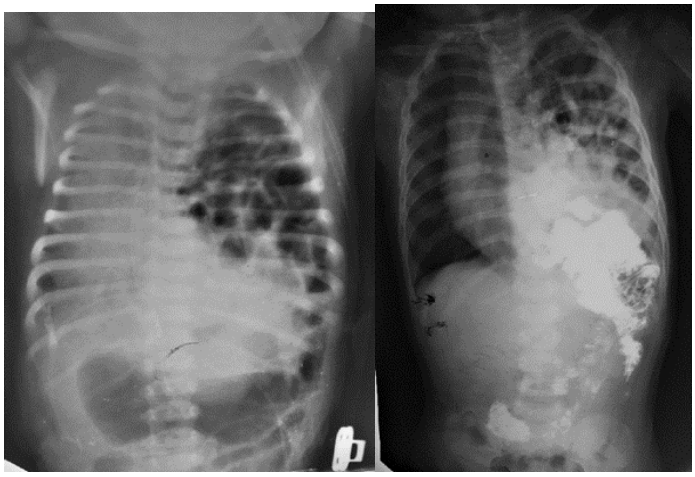
- What radiation method of research was performed?
- Was its appointment appropriate in this case?
- Was contrast material used? If you think "yes", then which one exactly?
- Are pathological changes detected? If "yes" - what exactly?
- What do the red arrows point to? What do the blue lines mean?



Situational task No. 4.

The baby is in critical condition in the neonatal intensive care unit.

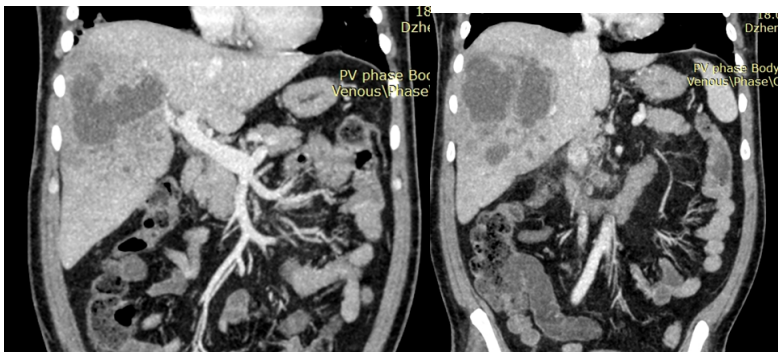
- What radiological examination was performed?
- In which projections?
- Was a contrast agent used during the study?
- If you think that "yes" - then which one? How did she get to the baby?
- Are there signs of pathology?
- Determine the most favorable diagnosis.



Situational problem No. 5.

Woman. 45 years old. She was brought to the emergency department by ambulance with whiteness in the right upper quadrant of the abdomen.

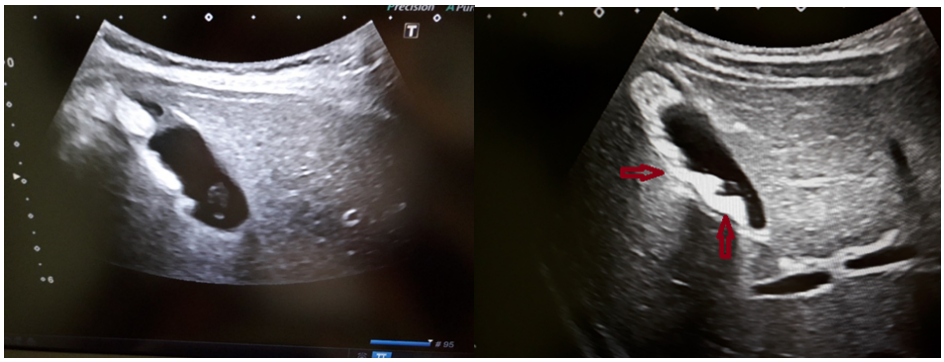
- What radiation method of research was performed?
- Was it necessary to start with it according to the modern algorithm?
- Was its appointment appropriate in this case?
- Was contrast material used? If you think "yes", then which one exactly?
- Are pathological changes detected? If "yes" - what exactly?
- What is the most beneficial diagnosis?



Situational task No. 6.

A 55-year-old woman came to the emergency department with white matter in the right upper quadrant of the abdominal cavity.

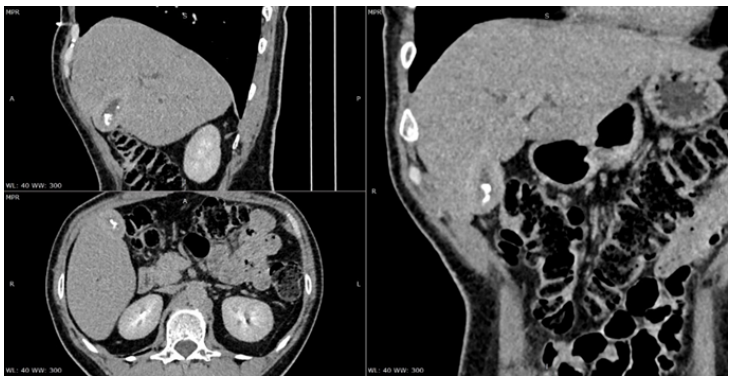
- What radiation method of research was performed?
- Is it the "Gold Standard" according to the modern algorithm?
- Was its appointment appropriate in this case?
- What do the red arrows point to?
- Are pathological changes detected? If "yes" - what exactly?
- What is the most beneficial diagnosis?



Situational task No. 4.

A 51-year-old woman was brought to the emergency department by ambulance with whiteness in the right upper quadrant of the abdomen.

- Which radiographic method is the "Gold Standard" for determining pain in the right upper quadrant of the abdominal cavity?
- What method of radiation examination was performed in this case?
- Was its appointment appropriate in this case?
- List the projections provided?
- Was contrast material used? If you think "yes", then which one exactly?
- Are pathological changes detected? If "yes" - what exactly?
- What is the most beneficial diagnosis?
-



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

Work performance methodology, performance stages:
Stage 1. analyze a series of x-rays of the digestive organs
Define:
A) research objects (divisions of the gastrointestinal tract)
B) X-ray examination stage (small or massive (tight) filling, etc.);
C) the method of X-ray examination of the digestive organs on the provided images.
Stage 2. analyze images of the esophagus
Stage 3. analyze images of the stomach and duodenum.
Stage 4. analyze X-rays of the colon.

Scheme of studying the results of radiation examination of the pharynx, esophagus, stomach and intestines.
1. Provisions of the investigated body:
2. The shape and lumen of the organ;
3. Contours of the shadow of the body;
4. Relief of the internal surface of the organ;
5. The state of the organ with double contrast in the phase of pneumorelief:
6. Attribution of observations to the state of "normal", "pathology"

4. **Summary:**

Current evaluation criteria in practical training

Rating	Evaluation criteria
Perfectly "5"	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. The test tasks are completed in full, all 100% of the answers to the questions are correct.
Fine "4"	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. The test tasks are completed in full, at least 70% of the answers to the questions are correct.
Satisfactorily "3"	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 . The testing is done in full, at least 50% of the answers are correct.
Unsatisfactorily "2"	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. Testing is done, but less than 50% of the answers are correct.

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