MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Faculty *Medicine*
Department *Surgery, Radiological Diagnostics, Radiation Medicine, Therapy and Oncology*

APPROVED BY
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"4" September **2024**

METHODOLOGICAL RECOMMENDATION FOR PRACTICAL CLASSES OF THE ACADEMIC DISCIPLINE

Faculty, course Medical 6th year

Academic discipline Surgery
(name of the discipline)

PRACTICAL CLASSES

Practical class № 13

Topic: "Abdominal injuries. Symptoms of damage to the organs of the abdominal cavity and the retroperitoneal space. Instrumental methods of diagnosis. Therapeutic and diagnostic tactics"

Approved:
At the meeting of the Department of Surgery, Radiation Diagnostics, Radiation Medicine, Therapy and Oncology of Odesa National Medical University

Odesa National Medical University
Protocol № 2 of '02' September 2024

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PRACTICAL CLASSES

Practical class № 13

Topic of practical class: "Abdominal injuries. Symptoms of damage to the organs of the abdominal cavity and the retroperitoneal space. Instrumental methods of diagnosis. Treatment and diagnostic tactics" - 6 hours

1. Relevance of the topic.

The topic relevance of practical training is due to the significant technical process, the industry development, explosions in mines, a significant increase in traffic accidents, the introduction of technology in agriculture, and the growth of criminal tension. According to official statistics in Ukraine, the frequency of abdominal injuries is 3.32 per 10,000. When the internal organs of the abdominal cavity (intestines, stomach, liver, spleen, organs of the genitourinary system) are damaged, a significant percentage of fatalities is noted among the able-bodied population.

2. Objectives:

2.1. Learning objectives:

A student of higher education must learn:

1. To identify clinical objective signs of abdominal injuries, the mechanism of injuries, main clinical symptoms, features of the course of the disease depending on the age of the victims, differential diagnosis, complications, methods of treatment and prevention. II level.
2. Basic principles of diagnosis of damage to organs of the abdominal cavity and the retroperitoneal space; gastrointestinal bleeding. II level
3. Prescribe an examination plan using laboratory, x-ray, and endoscopic examination methods. III level
4. Determine the indications for surgical intervention and theoretically know the methodology of their implementation. II level

2.2. <u>Educational objectives:</u>

Familiarize yourself with the contribution of domestic scientists to the development of abdominal surgery. Teach the student of higher education the ability to conduct preventive conversations with patients to prevent injuries in the future.

1. Formation of a professionally significant personality of the doctor.
2. Get acquainted with the contribution of domestic scientists to the development of surgery for abdominal injuries.
3. To teach the student of higher education the ability to conduct preventive conversations with patients to prevent injuries in the future.

3. Interdisciplinary integration.

№	Disciplines	To know	To be able to
1	2	3	4
Previous disciplines			
1	Anatomy, topographical anatomy, operative surgery	Anatomical data on the liver, gall bladder, spleen, pancreas, diaphragm, large and small intestines, urinary bladder, genitals.	Determine the main anatomical landmarks on the abdominal wall.
	Pathological anatomy	Patho-anatomical forms of peritonitis and bleeding into the abdominal cavity.	Recognize macroscopic characteristics of various forms of peritonitis.
	Propedeutics	Abdominal examination scheme, examination features for traumatic abdominal injuries.	To have the techniques of palpation, auscultation of the abdominal wall
	General surgery	Principles of preparing victims for surgical treatment, means of surgical infection prevention.	Prepare the patient for surgery (position on the operating table), prepare the operating field, take care of the surgical wound, change the bandage.
	Faculty surgery	Symptoms of penetrating and non-penetrating abdominal injuries.	Determine the patient's symptoms of peritonitis and bleeding into the abdominal cavity.
	Hospital surgery	Differential diagnosis of damage to various organs of the abdominal cavity.	Analyse anamnestic, clinical-instrumental and laboratory data to establish a correct diagnosis.
Intra-subject integration			
	Peritonitis	The main symptoms of peritonitis.	Distinguish localized peritonitis from general.
	Bleedings	The main symptoms of bleeding.	Distinguish peritonitis from bleeding, bleeding when the spleen and other organs are damaged.

4.Content of the class.

Diagnosis and treatment of abdominal injuries is one of the most difficult problems of emergency surgery. In the case of closed injuries of the abdomen, parenchymal organs are most often damaged: liver, spleen, less often – stomach, intestines, genitourinary organs with occurrence of intra-abdominal bleeding, hemorrhagic shock, peritonitis. Open abdominal injuries include cold or firearm injuries.

Closed abdominal injuries

All closed abdominal injuries are divided into two groups:

1) without damage to the organs of the abdominal cavity;
2) with damage to the organs of the abdominal cavity.

Injury localization:

A direct blow to the stomach most often leads to damage to the organs of the gastrointestinal tract – most often – the small intestine, less often – the large intestine, and even less often –the stomach.

With a blow to the back, the organs of the retroperitoneal space – kidneys, pancreas – are more often affected.

A blow to the area of the lower ribs – the liver or spleen is damaged.

Falling from a height onto one's feet leads to retroperitoneal hemorrhages, mesenteric ruptures and tears, intestinal ruptures.

A blow to the lower abdomen with a full bladder causes a rupture of its wall.

With isolated damage to the abdominal wall, bruises, hematomas, lacerations often occur, and in areas there are complete ruptures of the abdominal muscles.

Complaints: in the presence of intra-abdominal bleeding, patients have a positive Eleker's symptom (radiation of pain in the collarbone area), Kera's symptom (radiation of pain in the area of the right shoulder), as well as Phrenicus – a symptom of liver rupture.

Objective examination of the patient: during the examination, damage to the skin can be found - scabies, subcutaneous hematomas, subcutaneous emphysema, crepitation. In the case of intra-abdominal bleeding, pallor of the skin, frequent pulse, excitement changing to drowsiness, apathy, yawning are determined. If there is a rupture of the hollow organs, symptoms of peritoneal irritation prevail in the clinical picture - tension of the muscles of the abdominal wall, a positive Shchotkin-Blumberg symptom. Symptoms progress rapidly, abdominal pain increases, abdominal distension appears, delayed bowel movements and gases, and a pattern of peritonitis develops.

Percussion reveals a dulling of the percussion sound in the case of fluid accumulation, or, on the contrary, the absence of hepatic dullness in the case of perforation of a hollow organ. During auscultation, in the case of a closed abdominal injury, the weakening or complete absence of peristalsis, its appearance in atypical places (when the intestine is located in the pleural cavity) is noted. During a rectal or vaginal examination, it is possible to find an overhang of the pelvic peritoneum and its

tenderness, which indicates the presence of pathological contents in the pelvic cavity. The presence of blood in the ampoule of the rectum may indicate an injury to the left half of the colon.

In order to exclude injuries to the organs of the abdominal cavity and the retroperitoneal space, patients are subject to hospitalization in a surgical hospital for the purpose of dynamic observation.

If the objective examination data are uninformative, additional (instrumental) diagnostic methods are performed to confirm or rule out internal organ injuries. These include X-ray examination of abdominal organs and ultrasound examination. X-ray examination allows you to make sure of the presence or absence of free gas in the abdominal cavity or to see the displacement of abdominal organs into the pleural cavity in the event of a rupture of the diaphragm. If a bladder rupture is suspected, a cystography is performed. If there is a suspicion of rupture of the large intestine, irrigography is indicated. To rule out a rupture of the stomach and duodenum, pneumogastrography is recommended.

Urgent ultrasound examination reveals the presence of cavity structures in parenchymal organs, which indicates the development of subcapsular hematomas, as well as the presence of free fluid in the abdominal cavity. In some cases, sonography can detect signs of large damage to parenchymal organs – crushing, which will be an indication for performing urgent surgical intervention.

The next step in the differential diagnostic algorithm for abdominal trauma is laparocentesis or the “layering catheter” method. This method allows detecting the presence of pathological fluid in the abdominal cavity - blood, bile, peritoneal exudate, etc. If appropriate technical support is available, a laparoscopic examination of the organs of the abdominal cavity can be performed.

Penetrating abdominal injuries

The differential diagnosis of penetrating wounds of the abdomen does not raise doubts in the case of internal organs falling into the wound or leakage of pathological contents (urine, bile, chyme) from the wound.

Difficulties arise in the differential diagnosis of stab and blind gunshot wounds. In such cases, they begin with primary surgical treatment of the wound and revision of the wound channel. The presence of a defect in the parietal peritoneum is an absolute indication for laparotomy, a thorough revision of the abdominal organs.

Diaphragm damage:

Clinical picture:

1. Decreased respiratory excursion of the chest on the injured side.
2. Signs of lung compression on the injured side.
3. Displacement of the heart border and mediastinum in the opposite direction.
4. Perceptible peristalsis in the chest cavity.
5. On an X-ray examination, the absence of a clear line of the dome of the diaphragm and the presence of a shadow of the stomach and intestinal loops in the pleural cavity.

Treatment: Diagnosed rupture of the diaphragm is an absolute indication for surgical intervention – laparotomy or thoracotomy with suturing of the rupture of the diaphragm with a synthetic thread.

Stomach injury

The clinic of stomach damage varies depending on the degree of its damage. In case of incomplete rupture of the wall, there is pain of varying intensity in the epigastric area, vomiting with blood impurities is possible. Symptoms of peritoneal irritation are doubtful or absent.

Symptoms of a complete rupture of the stomach wall are signs of a perforated ulcer – sharp pain, cold sweat, dryness of the mucous membrane of the oral cavity, possible vomiting of blood. The abdomen does not participate in the act of breathing, it is tense, the symptoms of peritoneal irritation are determined, hepatic dullness disappears. Free gas in the subdiaphragmatic space is determined during X-ray examination of the abdominal organs.

Treatment – surgical intervention, revision of both the front and back walls of the stomach, suturing of tears after excision of crushed areas, if necessary – resection.

Duodenum damage

If the contents of the duodenum enter the abdominal cavity, symptoms of peritonitis or bleeding occur. Appear symptoms of abdominal irritation, pallor of the skin, frequent small pulse, dry tongue, and disappearance of hepatic dullness.

Treatment: operative intervention; in the case of localization of the tear on the front wall – suturing it with a double-row seam in the transverse direction. When localized on the back wall - mobilization of the duodenum according to Kocher, suturing of the defect is also performed. In the case of a significant defect, the affected part is resected with an anastomosis.

Small intestine damage

Clinical picture. The clinical picture depends on the age of the injury, the size and extent of the damage. In case of damage to the intestinal wall without a complete rupture, patients complain of moderate abdominal pain. There are no signs of peritonitis. When the mesentery ruptures, there are signs of internal bleeding.

In the event of a rupture of the intestinal wall, signs of peritonitis come to the fore. The pain is sharply expressed, sometimes there is a clinical picture of shock. Free gas is sometimes found in the subdiaphragmatic space during X-ray examination.

Treatment: Operative. In case of minor damage - hematomas, they are defecated with stitching; in the case of linear breaks, a double-row seam is applied. In case of significant damage, intestinal resection with anastomosis is performed.

Colon damage

Types:

- hematomas and deserization of the intestinal wall;
- hematomas of the mesentery;
- mesenteric ruptures;
- separation of the intestine from the mesentery;
- rupture of all membranes of the intestinal wall.

Clinical picture: If the intestinal wall is damaged and its contents enter the abdominal cavity, a clinic of peritonitis develops, characterized by severe abdominal pain, tension of the muscles of the anterior abdominal wall, positive symptoms of peritoneal irritation, sluggish peristalsis. In the case of damage to the retroperitoneal part of the large intestine, the symptoms are extremely minor – this is a mild pain in the side flanks with

radiation to the lumbar region, abdominal distension, weakened peristalsis, signs of endogenous intoxication.

Treatment: Laparotomy. Revision. Stop bleeding. Deserosed areas are sutured with grey-serous sutures. In case of significant damage, intestinal resection with colostomy removal (Hartmann's operation).

Liver damage.

Classification of liver damage.

1. Damage without breaking the integrity of the capsule.
   a) Subcapsular hematomas.
   b) Deep and central hematomas.
2. Damage with violation of the capsule integrity.
   a) Single and multiple cracks.
   b) Isolated and combined with cracks breaks.
   c) Liver crush.
   d) Liver tears with damage to the gallbladder and large bile ducts.
   e) Isolated injuries of the gallbladder and extrahepatic bile ducts.

Clinical picture: The severity of clinical manifestations depends on the degree of liver damage, volume of blood loss, shock and hepatorenal syndrome. Patients complain of general weakness, dizziness, abdominal pain, nausea. Patients are pale, tachycardia and hypotension are noted. During the physical examination, the resistance of the front abdominal wall, abdominal distention is determined. 6-8 hours after the injury, positive symptoms of peritoneal irritation are detected. From a diagnostic point of view, the ultrasound method of research, laparocentesis and laparoscopy are valuable.

Treatment: Operative. The primary task of a surgeon during an operation for liver damage is to stop bleeding, which is performed in the following ways:

1. 1. Tamponade with gauze napkins, omentum on the leg, hemostatic sponge.
2. Suturing the edges of the wound.
3. Resection of a lobe of the liver or its part.
4. Suturing the front edge of the liver along the entire length to the peritoneum (hepatopexy according to Clara).

Spleen damage

Classification

1. Obliteration of the spleen without damage to the capsule with the presence of a subcapsular hematoma.
2. Contusion and concussion of the spleen with a central hematoma with damage to the parenchyma with an intact capsule.
3. Rupture of the splenic capsule with isolated parenchyma cracks.
4. Single and multiple deep tears.
5. Crushing of the spleen.

Clinical picture: Subcapsular rupture of the spleen is the most difficult to diagnose. Patients complain of low-intensity pain in the left hypochondrium with radiation to the left shoulder and shoulder blade. Sometimes there is a subfebrile temperature, leukocytosis, anemia, intestinal paresis. The most informative diagnostic method is urgent sonography. In the case of simultaneous rupture of the capsule and parenchyma of the spleen, a picture of hemorrhagic shock and peritonitis occurs – short-term

unconsciousness, pallor of the skin, tachycardia, hypotension, defense. Sometimes when trying to turn the injured person on his back, he (due to increased pain, because blood irritates the greater surface of the peritoneum) immediately tries to take the previous position..

Treatment: Operative – splenectomy.

6. Plan and organizational structure of the class.

№ п/п	The main stages of the class, their functions and content	Educational objectives in mastery levels	Means of training and control	Materials on methodical provision of class clarity, knowledge control.	Terms (in minutes or %) of the total class time.
1.	**Preparatory** - organization of classes; - goal setting; - control of the initial level of knowledge, skills, and abilities.	II level	Advanced level tests.	A block of advanced level tests on the subject of the class.	15%.
2.	**Basic** (stages of formation of professional skills and abilities) -curation; - differential diagnosis; - formulation of a preliminary diagnosis; determination of the treatment regimen	III level	Methodical development for students, demonstration of a computer program. Work with patients: - dressing room, X-ray department, laboratory. Justification of the diagnosis.	1. Methodological developments for the teacher. 2. Scheme of medical history. 3. Tasks of test control on the topic.	75%
3.	**Final stage.** - Control of the level of professional skills and abilities; - summarizing the results of the class; - providing homework with literature.	III level	Checking the degree of mastery of practical skills. Interpretation of radiographs.	Dummies, phantoms and surgical instruments in the classroom of practical skills. A set of radiographs.	10%

6.Materials for methodical support of the class

6.1. Control materials for the preparatory stage of the class (with the provision at the end of the block of tasks of standards of answers to the II level task).

1. What X-ray symptom of rupture of an empty organ do you know?

- **Answer**: free gas in the abdominal cavity.

2. What does the positive symptom of Spizharny-Zhober indicate?
- **Answer**: about rupture or perforation of the stomach or intestines.
3. Name the methods of reliable diagnosis of bleeding in the abdominal cavity.
- **Answer**: laparocentesis, puncture of the posterior vault of the vagina or the anterior wall of the rectum, diagnostic laparoscopy.
4. Which sign is 100% evidence of penetrating abdominal injury?
- **Answer**: Prolapse through a wound of the anterior abdominal wall of the cap, or leakage of bile or intestinal contents.
5. What does the X-ray examination of intestinal injury in the chest indicate?
- **Answer**: About traumatic rupture of the diaphragm.

6.2.Materials for the methodical support of the main stage of the class:

1. Computer presentation program on the subject of the class.
2. Task of test control.
3. Situational problems on the subject of the class.

6.3.Materials for control of the final stage of the class.

1. The task of the final test control of knowledge.
2. Control of skills of learned practical skills on breadboard models and phantoms.

6.4. Materials for methodical support of self-training of higher education applicants.

1. Methodological developments for students of higher education on independent work with literature.

1. **A 30-year-old patient was brought to the hospital after a car accident with complaints of abdominal pain and weakness. During the examination: pallor of the skin, tachycardia, tension of the muscles of the anterior abdominal wall. What is the most likely injury?**
   A. Spleen rupture.
   B. Rib fracture.
   C. Acute appendicitis.
   D. Perforating ulcer.
   E. Chest injury.
2. **A 45-year-old patient complains of pain in the right hypochondrium and weakness after falling from a height. Free fluid in the abdominal cavity was detected during ultrasound. What is the most likely injury?**
   A. Liver damage.
   B. Damage to the pancreas.
   C. Kidney injury.
   D. Spleen rupture.
   E. Pelvic fracture.
3. **Which method of diagnosis is the most informative in the case of suspicion of damage to the organs of the abdominal cavity?**
   A. Ultrasound of the abdominal cavity.
   B. X-ray.
   C. MRI.
   D. ECG.
   E. Spirometry.
4. **A 40-year-old female patient was brought with a blunt abdominal injury. Tension of the muscles of the anterior abdominal wall, tachycardia, and a decrease in blood pressure were revealed. What diagnostic method will help determine the presence of internal bleeding?**

A. Echography (ultrasound).
B. Laparoscopy.
C. MRI.
D. Computerized tomography (CT).
E. Fibrogastroscopy.

5. **A 35-year-old patient after an abdominal injury complains of pain in the left half of the abdomen, weakness and dizziness. Ultrasound revealed enlargement of the spleen and the presence of free fluid. What is the most likely injury?**
A. Spleen rupture.
B. Liver damage.
C. Pancreatitis.
D. Rib fracture.
E. Acute cholecystitis.
6. **Which of the following symptoms is characteristic of damage to the retroperitoneal space?**
A. Pain in the lumbar region.
B. Skin jaundice.
C. Pain in the right hypochondrium.
D. Increased temperature.
E. Nausea and vomiting.
7. **A patient with blunt abdominal trauma has signs of hypotension and tachycardia. During the examination, an increased amount of free fluid in the abdominal cavity was revealed. What is the further treatment?**
A. Urgent laparotomy.
B. Observation and conservative treatment.
C. Prescribing antibiotics.
D. Endoscopic treatment.
E. Chemotherapy.
8. **After the accident, the patient complains of pain in the abdomen and left side, hypotension and weakness. During examination: tension of the anterior abdominal wall, tachycardia. What is the most likely injury?**
A. Spleen damage.
B. Liver damage.
C. Pancreatitis.
D. Rib fracrute.
E. Nephrocolic.
9. **After falling from a height, the patient complains of abdominal pain, weakness, dizziness. Free fluid in the abdominal cavity was detected during the CT scan. What organ can be damaged?**
A. Kidney.
B. Stomach.
C. Liver.
D. Spleen.
E. Pancreas.
10. **A patient with a blunt abdominal injury complains of weakness and pain in the left half of the abdomen. During ultrasound, the presence of free fluid in the abdominal cavity was revealed. Which method of treatment is the most effective?**
A. Urgent laparotomy.
B. Prescribing antibiotics.
C. Observation.
D. Infusion therapy.
E. Laparoscopy.
11. **The patient was taken to the hospital after a road accident with complaints of abdominal and chest pain. What diagnostic method is the fastest and most informative for detecting internal bleeding in an emergency situation?**
A. FUAT protocol (Focused Ultrasound Assessment for Trauma).

B. Computerized tomography (CT).
C. Magnetic resonance imaging (MRI).
D. Laparoscopy.
E. Esophagogastroduodenoscopy (EGDS).

12. **What is the main purpose of using the FUAT protocol in patients with abdominal trauma?**
A. Detection of free fluid in the abdominal and pleural cavities.
B. Assessment of the state of the cardiovascular system.
C. Determination of the degree of damage to internal organs.
D. Assessment of the state of the gastrointestinal tract.
E. Detection of signs of infection in the abdominal cavity.

Literature:

1. **https://www.saudedireta.com.br/catinc/tools/e_books/Oxford%20Handbook%20of%20Clinical%20Surgery,%204th%20Edition.pdf**
2. **https://www.gutenberg.org/cache/epub/17921/pg17921-images.html**
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