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"Ukrainian Medical Stomatological Academy"

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The Head of the department
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METHODICAL INSTRUCTIONS

FOR STUDENTS` SELF-WORK

WHILE PREPARING FOR PRACTICAL LESSONS

Educational discipline	Pediatric Surgery
module №3	Urgent Pediatric Surgery
Theme of the lesson	Trauma in children: Chest injury and injury to the esophagus. Closed abdominal injury.
Course	V
Faculty	foreign students preparation

POLTAVA 2020

1. The topic basis: Relevance of the problem.

Chest injuries occur rather often, they make about 3,4% of all traumas of child's age. Identification of injury of thoracic organs is a responsible and difficult diagnostic problem in determining indications for an urgent operation.

Closed injury of parenchymatous abdominal cavity organs make about 1 to 16,2% of all traumas of child's age. .Among the traumatic injury of abdominal cavity organs a spleen is injured in half of cases. Identification of injury of abdominal cavity organs is a responsible and difficult diagnostic problem in determining indications for an urgent operation.

2. The aims of the training course:

1. To master the list of the most frequent mechanisms of injury of thoracic organs at a trauma.
2. To recognize the basic clinical manifestations of injury of thoracic organs.
3. To differentiate the injuries of thoracic organs.
4. To interpret the auxiliary methods of research (US-diagnostic, X-ray, CT).
5. To show the examination of thorax: physical examination, percussion, palpation, auscultation.
6. To identify the features of clinical course of damages of separate thoracic organs.
7. To analyse cause-effect relationships of damages of thoracic organs in patients, to ground and formulate a previous clinical diagnosis.
8. To offer the algorithm of action of doctor at the trauma of thoracic organs.
9. To interpret general principles of treatment of damages of thoracic organs, and to define indications for surgical treatment.
10. To master the list of the most frequent mechanisms of injury of abdominal cavity organs at a trauma.
11. To recognize the basic clinical manifestations of injury of hollow and parenchymatous organs.
12. To differentiate the injuries of hollow and parenchymatous organs.
13. To interpret the auxiliary methods of research (US-diagnostic, X-ray, CT, laparocentesis, laparoscopy, radioisotope scintigraphy).
14. To show the examination of abdomen: physical examination, percussion, palpation, auscultation, rectal examination.
15. To identify the features of clinical course of damages of separate abdominal cavity organs.
16. To analyse cause-effect relationships of damages of abdominal cavity organs in patients, to ground and formulate a previous clinical diagnosis.
17. To offer the algorithm of action of doctor at bleeding and tactics of treating the patient.
18. To interpret general principles of treatment of damages of abdominal cavity organs, and to define indications for surgical treatment.

3. Basic knowledge, skills, habits necessary for studying the subject (interdisciplinary integration).

Names of previous disciplines	Obtained skills
1. Anatomy	Describe the structure of the abdominal organs. To assess the features of possible variants of the anatomical structure of the abdominal cavity organs.
2. Pharmacology	To be able to determine the doses of anti-shock blood substitutes, antispasmodic and analgesic drugs depending on the age of the child, the peculiarities of treating children with polytrauma

3. physiology	. Determine the characteristics of the respiratory system in children of different ages
4. Operative surgery	To depict schematically the topography of the chest, abdominal cavity and retroperitoneal space
5.Propedeutics of childhood diseases	Be able to examine respiratory and bone systems in children.
6. Pathophysiology	Identify the main points of etiology, pathogenesis in traumatic lesions of the osseous system, thoracic and abdominal cavity in children of different ages
7.. Radiology	To make an x-ray study, to evaluate the results obtained, to determine the basic radiographic symptoms. Evaluate the data of ultrasound, computed tomography depending on the nature of the pathology
8.general surgery	Give an assessment of clinical and laboratory studies, the main symptoms in trauma to the chest and abdominal cavity.

Thereotical questions for the lesson:

1. What methods of inspection are used at the trauma of thoracic organs?
2. What are the indications for surgery at haemothorax?
3. What methods of diagnostics are used at the injury of the esophagus?
4. What are the clinical symptoms of the perforation of esophagus?
5. What X-ray method is the most informing for diagnostics of injury of the esophagus?
6. What are the basic mechanisms of damages of abdominal cavity organs?
7. Classification of traumatic damages of abdominal cavity organs.
8. Basic symptoms of damages of parenchymatous organs.
9. Basic symptoms of damages of hollow organs.
10. Which additional methods of research are the most informing at the damages of parenchymatous and hollow organs of abdominal cavity?
11. What are the indications for an urgent operation at bleeding resulting from damages of parenchymatous and hollow organs of abdominal cavity?
12. What indices of clinical and laboratory research (AP, pulse, general blood analysis and biochemical blood a analysis) testify for a hemorragic syndrome and bleeding in an abdominal cavity?
13. Name the basic clinical manifestations of bleeding from upper and lower parts of the digestive tract.
14. What are the main reasons of bleeding from the digestive system?
15. Give estimation of gastric content and emptying depending on the height of bleeding sources.
16. Give interpretation of general principles of bleeding treatment .
17. What are the features of controlling clinical course of bleeding from a
18. digestive system? Define indications for surgical treatment.
19. Formulate indications for conservative and operative treatment of bleeding from a digestive system .

4. Maintenance of the subject:

Common data of damages.

Classification:

The contusions of soft tissue of chest in children is the most frequent and easy type of trauma.

2. *Closed injury of thorax:*
   - *а) without the damage of internals;*
   - *б) with the damage of thoracic organs*;
   - *в) thoracoabdominal damages.*
3. *Opened injury of thorax:*
   - *а) without the damage of internals:*
   - *б) with the damage of internals:*
   - *в) thoracoabdominal damages.*

3. Diagnostics of damages.

A. Physical examination: percussion, palpation, auscultation.

B. X-ray methods examination: chest X-ray.

C. Diagnostical pleural puncture and determination of volume of haemothorax (small-0, 25% of the mass of the body, middle - 0,5% of the mass of the body, large > 1% of the mass of the body)

4. Clinical manifestations of injury of thoracic organs.

A. Period of acutly traumatic violations (12-48 hours) - syndrome of pleuropulmonary shock, intrapulmonic bleeding, pulmonary and pulmonary-pleura bleeding, sharp respiratory insufficiency prevail. Reasons: shock, bleeding, displacement of organs of mediastinum. Complications: haemothorax (small, middle, large), intrapulmonic haematomas which grow in size, pneumothorax, hemopneumothorax (simple, tense), flotation of mediastinum, mediastinitis and pneumoderma.

B. Early posttraumatic period (1-4 days) - syndrome of disengagement of an area of pulmonary parenchyma from the act of breathing, sharp respiratory insufficiency prevail. Reasons: a lung collapse, posttraumatic pneumothorax and atelectasiss, haemothorax, pulmonary bleeding.

C. The period of early complications (late posttraumatic period) 5-14 days. syndrome of disengagement of an area of pulmonary parenchyma from the act of breathing and pyoseptical foci, sometimes syndrome of the pulmonary and pulmonary-pleura bleeding prevail.

D. The period of late complications and consequences (in 15 days) - pyoseptical foci, syndrome of the chronic festering bronchopulmonary and pleura inflammation prevail.

5. Stages of urgent measures at the acute chest injury

№	Measures	
1	Fighting the pain syndrome	1. analgesic: Analgin 50% 0,1 for each year of life; Ketonal 2,0 mg/kg of weight; 2. Narcotic medicine: Promedol 2% for children above 3 years of age, about 0,1-0,3 mg/kg; 3. Blockades: а)blockade of intercostal nerves: 0,25% solution of Novocain, 2% solution of Lidocain б) vagosimpatical blockade: 0,25% solution of Novocain, 2% solution of Lidocain
2	Removal of respiratory insufficiency	1`.Sanation of nasopharynx and tracheobronchial tree. 2.Wet oxygen. 3.Inhalation of the aerosol with mucolytic medicine .

3	Antibacterial therapy	Antibiotics of wide spectrum of action.
4	Local therapy	Diagnostical pleura puncture in V - VI intercostals space on the front, back or middle axillary line. In case of air or blood: thoracocentesis, drainage of pleural cavity

6. Indications for surgical treatment

Presence of the profuse bleeding or repeated accumulation of blood during 1,5-2 hours in the volume exceeding middle haemothorax are indications for thoracotomy with a haemostatic purpose.

The volume of operative interference depends on the character of damage (placing a suture on a lung wound; wedge-like resection, lobectomy, placing of a suture on large bronchial tubes and vessels), possibility of videothoracoscopic operation.

At the intrapulmonic bleeding bronchoscopy is used, bronchoocclusion of partial bronchial tubes, in future removal of bronchial blocker or operation.

Injury to the esophagus.

Determination of etiologic and pathogenetic factors, features of clinical course, diagnostics and treatment.

1. Relevance of the problem.

A. Injury to the esophagus in children occurs comparatively rarely. But the seriousness of injury and complexity of treatment require quick actions of the doctor .

B. Identification of the injury to the esophagus is a responsible and difficult diagnostic problem which is facilitated by the presence of progressing pneumoderma and mediastinal process.

2. *Common data of complication.*

A. An injury to the esophagus by a foreign body is frequently insignificant.

B. Perforation of esophagus during bougienage or instrumental examination is accompanied by the symptoms of shock: a child is pale, pulse has weak filling, AP goes down.

3. Diagnostics of injury to the esophagus is based on:

A. Hystory information.

B. Patient complaints.

C. Clinical manifestations (symptoms of shock, mediastinitis, violation of breathing).

D. Instrumental methods of diagnostics (contrast study of esophagus with the X-ray contrast substance).

E. Esophagoscopy

4. Treatment consists of the following stages:

A. Antibacterial therapy.

Б. Drainage of mediastinum (top areas by Rozumovs'ky method, middle and lower areas intrapleural or extrapleural access by Nasilov method).

B. In case of a considerable injury to the esophagus placing a suture on the esophagus wound, drainage of mediastinum, and applying of gastrostomy are recommended.

Common data on damages:

A). The damages of parenchymatous organs (spleen, liver, pancreas) are accompanied with the manifestations of hemorrhagic syndrome.

B). A direct sign of damage of parenchymatous organs is accumulation of blood in an abdominal cavity. Indirect clinical symptoms of bleeding include the pallor of skin, sluggishness, dizziness, low temperature of limbs, tachycardia and loosening of pulse on peripheral vessels.

C). Differentiate the followings damages of spleen:

1). Superficial tears of capsule.

2). subcapsular haematomas.

3). Breaks of capsule and parenchyma.

4). Abruption of spleen from a vascular pedicle.

D). The closed damages of liver are divided into three groups:

1). Subcapsular haematomas.

2). Breaks of liver with the damage of the capsule.

3). Central breaks of liver.

E). Differentiate the following damages of pancreas:

1). Contusion and edema.

2). Subcapsular haematoma.

3). A superficial break with violation of safety of the capsule. 4). Deep break of the gland without the damage of its channel

5). Crushing and abruption of parts of the gland.

3. Diagnostics of damages of parenchymatous organs is based on:

1) Complaints about pain, weakness, etc.

2) History data: presence of trauma.

3) Physical examination: general symptoms of shock, intraabdomenal bleeding.

4) Additional methods of research:

A. X-ray: plain film of abdomen (accumulation of free liquid).

B). US-diagnostic (violation of integrity of organs, free liquid in an abdominal cavity).

C). Radioisotope scintigraphy (diagnostics of bleeding from parenchymatous organs).

D). Laparocentesis (finds out the presence of liquid, blood in an abdominal cavity).

E). Laparoscopy is a visual examination of abdominal cavity organs.

5. Conservative measures at the damages of abdominal cavity organs:

At the damage of parenchymatous organs

Stage	Measures	Medical measures
I	Venous access	Catheterization of peripheral or central vein (at the intensive bleeding of central vein)
II	Haemostasis	À. Endovascular: à) introduction intravenously 0,2-0,3 ml of Pituitrin, 1 ml of 12,5% solution of etamsilat, 5-10 ml of 5% solution of aminocapronic acid B. Therapeutic: Introduction intramuscularly 1 ml of etamsilat, Pituitrin Introduction intravenously 10% solution of calcium chloridum, solution of Fibrinogeni, 5% solution of aminocapronic acid, Pituitrin
III	Infusion-transfusion replacement therapy _	Transfusion of elements of blood, albumin, blood substitutes
IV	In case of the absence of effect	Surgical treatment

6. Indications for surgical treatment

1). Continuing bleeding of a threatening character, especially for patients with hemorrhagic shock

2). Bleeding which proceeds (after ineffective conservative measures.)

The recommended methods of operative intervention:

1) At the break of liver placing of suture on the wound of the liver with peritonization by omentum, or application of Katsil glue for liquidation of the wound or application of Serzhisel haemostatic net

2) At the break of spleen placing of suture on the wound of the liver with peritonization by omentum, or application of Katsil glue for liquidation of the wound or application of Serzhisel haemostatic net. Splenektomya is conducted at the damage of the gate of the spleen, its crushing, at the unsuccessful attempts of placing of a suture and pathological changes of tissue of the damaged organ.

Damage of hollow abdominal cavity organs.

1. Relevance of the problem.

The closed damages of the hollow organs make about 5 to 19% of all traumas of child's age

2. Common data on damages:

Due to its anatomical and physiological features small intestine, its proximal part near the Treyts copula and distal part of ileum in particular, are more often damaged.

The isolated breaks of stomach and colon are observed very rarely.

The most frequent mechanisms of damage:

1). Crushing (between the front abdominal wall and the spine) is a crush-trauma.

2). Abruption of the mesentery or mesenterial edge of the bowel.

3). Rupture of the superdistensional intestinal loop.

Hollow organs injuries result in peritonitis.

3. Diagnostics is based on:

A). History data : presence of trauma.

B). Complaints about pain, nausea, vomiting.

C).Clinical examination data: painful palpation, tympanic sound at percussion, Shchotkin-Blumberg symptom.

Ã). Additional methods of research:

1). plain film of abdomen (a presence of free gas is in abdominal cavity - symptom of sickle).

2). US-diagnostic

3). laparoscopy.

4. Treatment of damage of hollow abdominal cavity organs.

Penetrable damages of hollow abdominal cavity organs are an absolute indications for urgent laparatomy under the narcosis.

The followings methods of operative interventions are offered:

1). A two-row suture is placed on the wound of stomach with drainage of abdominal cavity.

2). Damage of intestine: a two-row suture is placed on the wounds, in case of abruption of the mesentery or mesenterial edge of the bowl, the bowel is resected with application of end- to-end anastomosis .

3). At the grave condition of the child, or expressed peritonitis an operation is concluded with formation of double ileostomy after Mlkulich.

4). At the penetrable wounds of colon at peritonitis an artificial anus is formed.

5. Additional materials for the self-control

Test. Entry level

1. The patient was administered to the hospital with acute pain in the left half of the chest and shortness of breath. He fell down from a height of 2.5 meters one day ago. On the chest X-Ray a fracture of VI, VII, VIII ribs is seen and a horizontal level of fluid reaching up to 4th rib. Established diagnosis - hemopneumothorax. What should be done?

A. Puncture of the pleural cavity in the second intercostal space along the left mid-clavicular line B. Puncture of the pleural cavity in the seventh intercostal space along the posterior axillary line
C. Puncture and drainage of the pleural cavity in the second intercostal space along the left mid-clavicular line
D. Puncture and drainage of the pleural cavity in the fifth intercostal space along the middle left axillaris line
E. Puncture and drainage of the pleural cavity in the seventh intercostal space along the posterior left axillaris line

2. An 8-year-old child was administered to the hospital 1 hour after the abdominal trauma. Abdomen is enlarged in volume. Tympanitis is heard on percussion of the abdomen and hepatic dullness is absent. Spread pain throughout the abdominal wall, expressed tension of the muscles of the anterior abdominal wall. What is the most likely diagnosis?
A. Damage to the hollow organ, peritonitis
B. Subcapsular hematoma of the liver
C. Rupture of the pancreas, peritonitis
D. Damage to the liver, intra-abdominal bleeding
E. Spinal cord injury

3. 3. The 16-year-old patient was administered to the department of a polytrauma in a traumatic shock. Associated thoracic and abdominal injury. Breathing is superficial, arterial pressure - 80/60. Heart rate - 115 BPM, breath rate - 42 per min. Suggest an urgent measure to correct respiratory distress.
A. Introduction of narcotic analgesics
B. Conducting of mechanical
ventilation
C. Immediate operation with blood
reinfusion D. Auxiliary ventilation
E. Introduction of central analgesics

4. A 4-year-old girl was administered to the surgical department with a closed abdominal trauma. The spleen damage was diagnosed. Splenectomy was performed. What are the consequences for a child's future?
A. Allergic reactions
B. Lack of physical development
C. Development of diabetes
D. Development of anemia
E. High probability of septic manifestations

5. A 12-year-old boy was injured in a car accident. A closed hip diaphysis fracture, contusion of the brain, multiple fractures of the ribs, hemopneumothorax and a scalp wound of the leg were observed. Which of these damages should be considered dominant?
A. Closed fragmentary fracture of the hip
diaphysis B. Multiple rib fractures and
hemopneumothorax
C. Contusion of the brain

D. Scalp wound of the leg
E. Damage is equivalent

1. Answers:
A and B. In this case, it is necessary not only puncture, but drainage of the pleural cavity.

C. This point is suitable for the puncture of the pleural cavity with the aim of aspiration of free air. The installation of drainage at this point will not provide sufficient drainage of the free liquid.
D. This point is safe for puncture and drainage of the pleural cavity, the establishment of drainage will help to evacuate as much as air and a free fluid from the pleural cavity
E. This point can be used for puncture and drainage of the pleural cavity in the presence of isolated hydrothorax
The correct answer is D

2. Answers:
A. The presence of tympanitis, the absence of liver dullness indicates free gas in the abdominal cavity that got there due to injury of the hollow organ and causes the development of peritonitis
B.C.D.E. Actually damage to the parenchymal organs has another clinical picture, although it is also possible in combination with the injury of the hollow organ. The intraoperative audit of the abdominal cavity, performed on urgent displays in connection with pneumoperitoneum, will allow the diagnosis of a final diagnosis
Correct answer: A

3. Answers:
A. The introduction of these drugs is necessary for the purpose of
anesthesia B. This trauma requires a mandatory mechanical ventilation
C. The carrying out of these measures should be carried out after the transfer of the child to the mechanical ventilation
D. These measures will be inadequate for such an injury
E. The introduction of these drugs is necessary for the purpose of
anesthesia Correct answer: B

4. Answers:
A. Not characteristic of postplenectomy
syndrome B. May have a secondary character
C. Not typical for post-placental bone syndrome
D. Not typical for post-penetrating syndrome
E. Characteristic for postplenectomy syndrome
Correct answer: E

5. Answers:
A. May condition the severity of the general condition, but it is not life-threatening
B. Life-threatening injuries, which in the first place cause the development of traumatic shock C. May condition the severity of the general condition, but is not life-threatening
D. Insignificantly affects the severity of the general condition and is not life-threatening E. Damage is not equivalent to affecting the general condition of the patient

Correct answer: B

Test. Exit level

1. A 12-year-old boy was operated due to the trauma of liver. 2 weeks after the operation a vomiting with impurities of blood appeared. What is the most likely source of bleeding?
A. Stomach ulcer
B. Ulcer of the 12th-digestive tract
C. Bleeding from the veins of the
esophagus D. Malory-Weis syndrome
E. Hemophilia

2. Child with a closed abdominal trauma with a suspicion of damage to the spleen and signs of bleeding. Which diagnosis tool will be the most informative?
A. EGDS
B. X-ray of the abdominal cavity
C. Ultrasound of the abdominal cavity D.
Scintigraphy of the abdominal cavity E.
Examination during medication sleep

3. A 9-year-old boy with a closed abdominal trauma. During examination the spleen trauma was diagnosed. What is an indication for conservative treatment?
A. Minor ruptures of parenchyma
B. Damage to another organ of the abdominal
cavity C. Stable hemodynamics
D. Presence of concomitant diseases
E. Relatively satisfactory condition

4. A 12-year-old boy was administered to an ambulance with complaints of abdominal pain, vomiting and dizziness. It was established that he fell from a tree height of 3 meters. During examination there is no liver dullness. What organ is possibly damaged?
A. Liver
B. Spleen
C. Liver and mesentery
D. Hollow organ
E. Pancreas

5. A 11-year-old child was administered to the hospital with a closed abdominal trauma. The boy fell from a height of 3 meters on the abdomen. At the examination there was a suspicion of damage to the organs of the abdominal cavity. The visual examination of the abdomen was performed in an upright position. Which of the following criteria indicates damage to the hollow organ?
A. High standing diaphragm
B. Strengthened intestinal
pneumatization C. No pneumatization
D. Free gas under the dome of the diaphragm
E. Intestinal dislocation in the lower abdominal cavity

6. A 7-month-old child fell from the dressing table. A closed abdominal trauma was been diagnosed. The ultrasound showed a suspicion of liver damage. Which of the following indicators will confirm the suspicion?
A. Reduced serum protein levels
B. Decrease of hemoglobin
level C. High leukocytosis
D. Decrease in platelet count
E. Increased transaminases

7. A patient with a closed abdominal trauma. During an ultrasound examination hematoma was found in the area of a small omentum. What organ is damaged?
A. Stomach
B. Transverse colon
C. Duodenum
D. Pancreas
E. Spleen

8. A 12-year-old boy fell from a height of 3 meters on the abdomen. Complains of abdominal pain, vomiting. At the examination there was a suspicion of bladder rupture. Which of the signs will confirm it?
A. Acute urinary retention, parevesical
hematoma
B. Pyuria, hematuria
C. Peritoneal symptoms, dullness in flat places, oliguria
D. Renal colic
E. Breakthrough of pelvic bones, acute urinary retention

10. In patient with closed abdominal trauma a ultrasound was performed. Suspicion of damage to the pancreas. Confirmation is:
A. Hematoma of the stomach
wall B. Subacute hematoma
C. Hematoma in the area of small omentum
D. Hematoma of the mesentery of the transverse
colon E. Enlarged stomach

Keys
1. Answers:
A.B.C.D. Vomiting with blood impurities is possible under these nosology's, but uncharacteristic anamnesis.
E. The emergence of vomiting with blood after 2 weeks after receiving a liver injury requiring surgical treatment is characteristic of this nosology Correct answer: E

2. Answers:
A. is indicated for bleeding from the upper digestive tract
B. is indicated in case of suspicion of damage to the hollow organ
S. is an informative screening method for estimating the source and intensity of bleeding
D. is an informative but routine method that is not logical to use in an urgent situation
E. is not an informative method for intra-abdominal bleeding

Answer: Correct answer: C

3. Answers:
A. not always accompanied by stable hemodynamics
B. is an indication for surgical treatment
C. is the main criterion for the possibility of conservative treatment
D. does not have a leading role in intra-abdominal bleeding
E. is not an objective criterion for the intensity of bleeding

Correct answer: C

4. Answers:
A, B, C, E are parenchymatous organs, for the damage which is not characteristic of the disappearance of liver dullness due to the presence of free air in the abdominal cavity.
D. The disappearance of liver dullness due to the presence of free air in the abdominal cavity is characteristic of damage to the hollow organ

Correct answer: D

5. Answers:
A. is not pathognomonic for damaging the hollow organ and is characterized by the relaxation of the diaphragm dome (trauma of the diaphragmatic nerve)
B. Not pathognomonic for damage to the hollow organ and is characteristic for paresis of the cat. C. is not pathognomonic for damaging the hollow organ and is characteristic for the violation of intestinal permeability
D. is pathognomonic for damagsng the hollow body with the release of air into a free abdominal cavity and accumulation in the most densely populated place
E. is not pathognomonic for damaging the hollow organ and is characteristic for + tissue in the upper abdominal cavity (hematoma, tumor-like formation)

Correct answer: D

6. Answers:
A, B, C, D - these changes are not specific and may be attributable to the trauma of other organs
E. is characteristic of liver injury

Correct answer: E

7. Answers:
A, B. characterized by the presence of free air in the abdominal cavity
C. is characterized by the presence of free air in the abdominal cavity and / and retroperitoneal hematoma (depending on the department of the duodenum)
D. is characteristic for damage to this body
E. characterized by the presence of free fluid (blood) in the abdominal cavity

Correct answer: D

9. Answers:
A. Used as non-invasive method for determining renal blood flow in a planned manner
B. Used to study the pathology of the ureter and bladder in a planned manner
C. Endoscopic examination of the bladder
D. X-ray contrast study of kidneys and urinary tracts, which is used both in the urgent and planned manner, including with kidney trauma

E. X-ray polypositional study of the bladder
Correct answer: D

10. Answers:
A. is characteristic for a trauma of the gastric wall
B is mainly characteristic of a kidney and duodenal injury C. is characteristic of a pancreatic injury
D. characteristic for injury of the transverse colon
E. is not typical of an injury

Correct answer: C

Situational tasks
1. 13 year old girl was hospitalized in an urgent department. At the examination after an accident after 6 hours there is cyanosis and difficulty breathing. The condition of the patient is severe, the right half of the chest lags behind in the act of breathing, intercostal intervals are enlarged to the right, with percussion box sound, absent breathing during auscultation.
1. List the methods that help to diagnose?
2. Your previous diagnosis?
3. What is emergency care?
Etalon answer:
1. X-Ray of the chest in an upright position
2. Tension right-sided pneumothorax
3. Puncture and drainage of the pleural cavity in the fifth intercostal space on the middle inguinal line to the right

2. A child of 4 years suffered a blunt injury to the chest (falling from the ladder to the asphalt). Increases suffocation, cyanosis. The left half of the chest is lagging behind in the act of breathing, with auscultation left breathing is not heeded, tone of the heart is determined in the right half of the chest. On the X-ray of the chest, the left-sided hydropneumothorax.
1. What is the previous diagnosis?
2. What kind of emergency care is needed? Etalon answer:
1. Tension right-sided pneumothorax
2. Puncture and drainage of the pleural cavity in the fifth intercostal space along the left middle axillary line

3. A 10-year-old boy was administered to the hospital 40 minutes after falling from a tree with complaints of pain in the left thigh, left forearm, chest and left hypochondrium. When examined the child is restless, pale, acrocyanosis is present, edema and deformity of the left thigh and forearm, limitation of movements in the indicated limbs, abrasions on the left half of the chest and left hypochondrium, lag in the act of breathing of the left half of the chest with the expansion of intercostal spaces, respiratory rate 50 breaths per minute, pulse - 120 beats per minute, blood pressure 80/50 mm.
1. Make a diagnosis.
2. Make a survey plan.

Etalon answer:
1. Polytrauma. Closed thoracic trauma. Tensioned left-sided pneumothorax. Spleen rupture. The fracture of the forearm and the left thigh. Traumatic shock II degree.
2. X-ray of the thoracic and abdominal cavity in the upright position, X-ray of the left leg and thigh in 2 projections, ultrasound examination of the abdominal cavity, general blood and urine analysis, determination of blood group and Rh factor, biochemical blood test (transaminases, bilirubin, protein, glucose, alpha-amylase, lipase, creatinine, urea, electrolytes), acid-alkaline state monitoring, and, if necessary, CT

4. A hospitalized 6-year-old child after an accident with a diagnosis: polytrauma, closed head trauma, contusion of the brain, closed thoracic trauma, left-sided pneumohemothorax, closed abdominal trauma, splenic rupture (wit with traumatic destruction of up to 25% of parenchyma), intraabdominal bleeding, traumatic shock II degree
1. What injuries are the dominant ones?
2. What is the surgical tactic?
Etalon answer:
1. Closed thoracic trauma, left-sided pneumohemothorax, closed abdominal trauma, splenic rupture, intraabdominal bleeding.
2. Puncture and drainage of the left pleural cavity in the 5th intercostal space on the left middle axillary line, stabilization of hemodynamics on the background of complex intensive therapy using hemostatics, somatostatin, antibiotics with clinical and laboratory and sonographic examination of the abdominal cavity in dynamics. With the progression of intraventricular hemorrhage, unstable hemodynamics - surgical treatment.

5. In the 6-year-old victim delivered 4 hours after the accident the diagnosis was established: polytrauma, closed head trauma, contusion of the brain, open thoracic trauma, penetrating wound of the abdominal cavity, anterior abdominal wall wound, eventration. After preoperative preparation for 2 hours surgical treatment was started. At the operation: damage to the sigmoid colon, up to 4 cm in length, with the transition to the transitional fold of the peritoneum and its separation from mesenterium within 3 cm with the presence of a significant amount of fecal contents in the abdominal cavity was noted.
1. What is the volume of surgical treatment?
2. What further surgical
tactics? Etalon answer:
1. Sanation of the abdominal cavity, resection of the damaged section of the sigmoid colon, colostomy above the level of bowel damage, sewing of the distal part of the sigmoid colon.
2. Treatment of fecal peritonitis on the restoration of the integrity of the digestive tract in the delayed period - in 2-3 months.
Theoretical questions
1. Define the concept of polytrauma, multiple, combined and associated trauma.

Etalon answer: The term "polytrauma" is common, it includes the following types of trauma: multiple, combined and associated. Multiple trauma includes damage to two or more internal organs in one cavity. Combined trauma includes damages of internal organs in two or more cavities or damage to the internal organs and musculoskeletal system. Associated trauma includes such injuries, which are caused by various traumatic agents: mechanical, thermal and radiation.

2. What is hemothorax – the definition, classification

Etalon answer: hemothorax - accumulation of blood in the pleural cavity as a result of damage to the blood vessels of the thoracic wall (intercostal, diaphragmatic, pulmonary).

Depending on the amount of blood in the pleural cavity (according to the X-ray examination and percussion), the hemothorax is defined as small - the level of the fluid does not reach the angle of the shoulder blade, the average level of the fluid is projected to the angle of the shoulder blade, and the large - the entire pleural cavity is filled with blood. In children, the degree of hemothorax should be determined by the amount of blood contained in the pleural cavity, in relation to the weight of the child's body. With small hemothorax, the volume of blood in the pleural cavity does not exceed 0.25% of the body weight, with an average of 0.5%, and large - more than 1%.

3. What kind of heart damage do you know and what is their mechanism of occurrence? Etalon answer:

Heart damage has several types. In the case of a closed trauma - a contusion, a slaughter and a rupture with a lesion of a pericardium, a myocardium, coronary vessels and nerves, a valve apparatus and folds. The same variants of damage occur in the case of penetrating trauma - wounded by sharp objects and firearms.

There are the following mechanisms of injury: - impulse and stroke in the chest;

- compression (when heavy objects fall, between mechanisms of heavy machinery, blockages, stamping);
- a hydraulic "explosive" effect of blood in the cells of the heart, which does not change its volume; - Decelerational trauma due to sudden inhibition of heart disease on the chest (accident);
- damage by sharp objects;
- firearms wounds.

4. What method of diagnosis is of primary importance in case of suspicion and trauma of the esophagus?

Etalon answer:

In case of suspicion and injury of the esophagus, it is necessary to perform X-ray of the esophagus with the water-soluble contrast.

5. Describe the clinical course of chest injury.

Etalon answer:

1. The period of acute traumatic disorders (12-48 hours) is dominated by: pleuro-pulmonary shock, intra-pulmonary haemorrhage, pulmonary and pulmonary-pleural bleeding, acute respiratory insufficiency. Causes: shock, bleeding, displacement of mediastinum organs. Complications: hemothorax (small, medium, large), intra-pulmonary hematomas, enlarged in size, pneumothorax, hemopneumotorax (simple, tense), flotation of the mediastinum, mediastinitis and subcutaneous emphysema.
2. Early post-traumatic period (1-4 days) - prevailing syndrome of exclusion from the act of respiration of the area of the pulmonary parenchyma, acute respiratory insufficiency. Cause: pulmonary collapse, posttraumatic pneumothorax and atelectasis, hemothorax, pulmonary hemorrhage.
3. Period of early complications (late post-traumatic period) 5-14 days. Prevailing syndrome of exclusion from the act of respiration of the pulmonary parenchyma and purulent-septic cells, sometimes a syndrome of pulmonary and pulmonary-pleural bleeding.

4. Period of late complications and consequences (after 15 days) - predominant purulent-septic cells, chronic purulent broncho-pulmonary and pleural syndrome.

6. What do you know about the types of damage to the pancreas? Etalon answer:
1. Contusion and edema.
2. Subcapsular hematoma.
3. Surface rupture with damage to integrity of the capsule.
4. Deep rupture of the gland (without damaging its duct).
5. Decomposition and separation of the area of the gland

7. What distinguishes the spleen damage?
Etalon answer:
There are the following lesions of the spleen:
1. Surface rupture of capsule.
2. Subcapsular hematomas.
3. Rupture of capsule and parenchyma.
4. Breaking the spleen from the vascular leg.

8. What is hemobilia and what methods of examination is confirmed? Etalon response:
Hemobilia is defined as the following symptoms: pain, intestinal bleeding and jaundice. The diagnosis is confirmed on the basis of data of ultrasound and CT (presence of intrahepatic hematoma), celiacography (depot of contrast agent outside the arterial bed), EGDS (blood comes from the pancreatic duct).

6. LITERATURE FOR STUDENTS

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