Theme of the lecture:

CLOSED INJURIES OF STOMACH IN CHILDREN

RELEVANCE OF THE PROBLEM

- Closed abdominal injuries are one of the most complex and alarming problems in emergency surgery, as in recent years their number has increased due to the increase in road accidents.
- The frequency of lesions of the abdominal cavity organs and retroperitoneal space in children varies within fairly wide limits, ranging from 1-5 to 20% of cases.
- To date, the lethality of children with abdominal trauma ranges from 10 to 14%. These figures are 4-6 times higher than the average lethality rates for any other injuries and according to the WHO (World Health Organization) rank 1st among all deaths in childhood.
- Abdominal trauma is more common between the ages of 5 and 12, with which boys are more likely to suffer.
- The greatest number of injuries occur in the spring and autumn months.

CLASSIFICATION

There are the following types of child injuries:

- household (55.7%),
- transport (33.3%),
- sports (7.8%),
- other (3.2%).

Mechanism of injury: damage to the internal organs of the abdominal cavity can occur with a direct, often sudden impact of a moving object on the abdomen or back, hit the abdomen or back against a stationary solid object, squeezing the stomach, and sudden inertial displacement of organs when falling from a height. In children, closed injuries predominate.

Isolated abdominal injury is 64.1% of cases, multiple - 13.5%, combined injuries - 22.4%.

With closed abdominal trauma, the leading symptoms are abdominal shock, bleeding and peritonitis, expressed in varying degrees, which gives a complex set of non-permanent symptoms and requires a doctor to be very wary when assessing the patient's condition.

In severe combined trauma, the picture of traumatic shock, which obscures the clinical symptoms of damage to internal organs, often comes to the fore.

GENERAL QUESTIONS OF THE CLINICAL PICTURE

- **The main symptoms of internal bleeding** are the patient's growing anxiety, lethargy, pallor, thirst, progressive drop in blood pressure and pulse, dullness of sound in the loins of the abdomen, bloating.
- **The main symptoms that indicate the development of peritonitis**: increased heart rate and blood pressure, nausea, vomiting, tension or stiffness of the muscles of the anterior abdominal wall, increasing irritation of the peritoneum, in some cases pneumoperitoneum.

CLASSIFICATION

According to anatomical signs, closed injuries of the abdominal cavity are divided into the following types:

1) contusion of the abdominal wall;

2) damage to the peritoneum and retroperitoneal space;

3) damage to hollow organs;

4) damage to the parenchymal organs;

5) combined damage.

ERRORS OF THE ABDOMINAL WALL

- Contusions are among the most easy damages.
- Distinguish: contusions of the abdominal wall and ruptures of the muscular aponeurotic layers with or without disturbance of large blood vessels.
- The clinic of the injury is typical: a relatively localized painful area in the abdominal wall that makes itself felt when the patient attempts to make a physical effort or a sharp movement when trying to clear his throat.
- When examining the abdominal wall, as early as the first hours after the injury, it is possible to find ecchymoses, individual spots, bruises, bruises. Sometimes such hemorrhages appear a few days after the injury, successively changing their boundaries and coloring. This is observed when traumatizing the deep layers of the abdominal wall. The contusion of the abdominal wall is less disturbing to the patient if he is resting in a lying position, with the hips brought to his stomach.

ERRORS OF THE ABDOMINAL WALL

With a rupture of the muscles or aponeurosis of the abdominal wall: three important symptoms:

- defect in the musculo-aponeurotic layer,
- a peculiarly spreading hematoma,
- signs of irritation of the peritoneum.

- Most of the hematomas are formed when a straight muscle ruptures inside its vagina. The main symptoms of abdominal muscle rupture are acute pain in the area of rupture, reflex bloating, reflex gas retention.
- In most cases, the outlook is favorable. Treatment: conservative. Surgical: when there are clinical signs of hematoma build-up, suppuration or impossibility to exclude damage to one of the internal organs.

BLOOD DIFFUSION IN THE OVERLAND SPACE

- These hemorrhages occur frequently, especially with damage to the pelvic bones and spine. They cause the "acute abdomen" syndrome, which causes surgeons to resort to laparotomy, which burdens the patient's condition.

Depending on the level of location of the hematomas relative to the spine, they are divided into three types:

1) low located in the cavity of the small pelvis and rising along the back wall of the abdomen to the IV lumbar vertebra (the clinical picture is similar to the retroperitoneal rupture of the bladder);

2) located at the level of II-V lumbar vertebrae (they are often one-sided and have a more pronounced clinic of "acute abdomen");

3) the upper, lying in the pancreas and solar plexus, between the XII thoracic and III lumbar vertebrae (these hematomas often represent complications of traumas of the parenchymal organs and are almost always accompanied by pronounced symptoms of the "acute abdomen" with peritoneal phenomena).

BLOOD DIFFUSION IN THE OVERLAND SPACE

- The clinical picture of this hemorrhage in the initial period consists of a clinical picture of shock, internal bleeding, symptoms of the "acute abdomen" and symptoms of damage to the urinary tract.
- A painful expression of the face, sometimes there is some excitement. He complains of pain in the abdomen, sometimes in the lower back. The pain is constant, without definite localization and irradiation, non-progressive, with a tendency to subside. It strengthens further in the development of intestinal paresis.
- With retroperitoneal hemorrhage, the shock is severe, prolonged, difficult to attack by antishock agents.
- Skin and mucous membranes are pale, patients are covered with cold sweat, blood pressure drops. During the first 2-3 days, hemoglobin gradually decreases.
- The tongue is often wet. The stomach almost always participates in the act of breathing. The tension of the abdominal muscles develops soon after the trauma, then by the end of the first day it subsides, giving way to the increasing bloating of the abdomen.
- The symptom of Shchetkin-Blumberg is unstable, appears immediately after an injury and later has a tendency to subside. In the sloping places of the abdomen, especially with unilateral hemorrhage, there is a dull sound that does not disappear when the patient's position changes. Then the reflex paresis of the intestine develops, which quickly progresses and lasts for 5-7 days.
- In the first hours after the injury, there is a reflex decrease in urination, hematuria associated with the microtrauma of the urinary tract, sometimes of a reflex character.

BLOOD DIFFUSION IN THE OVERLAND SPACE

Differential diagnosis

- with injuries to the internal organs of the abdomen (hollow, parenchymal), as well as urinary tract.
- with damage to the kidneys and urinary tracts, hemorrhages to the retroperitoneal space are always noted, therefore, urological methods of investigation, including radiography of the urinary tract, make it possible to carry out differential diagnostics.

Principles of treatment:

- when a patient enters the surgical department with a hemorrhage into the retroperitoneal space, it must first be taken out of shock.
- with a combination of hemorrhage in the retroperitoneal tissue with damage to the internal organs, urgent laparotomy is indicated.
- in the second period of the disease should be carried out measures to combat intestinal paresis.

CLOSED ORGAN DAMAGE

- Closed lesions of the gastrointestinal tract in children account for 5-27% of all abdominal injuries. Mortality with closed lesions of the gastrointestinal tract is about 11%.

These damages must be divided into:

- damage to the stomach and
- duodenum,
- small intestine,
- colon and
- rectum,
- bladder and
- for combined injuries.

DAMAGE TO THE STOMACH AND DUODENUM

Damage to the duodenum, especially isolated, is very rare in children, 1.3-1.6% of all injuries of the abdominal organs.

Filatov A.N. classifies them taking into account the nature, strength and direction of the injury, the presence or absence of damage to other organs:

- damage from a blow to the abdomen, from its compression, from falling from a great height;
- bruises of the stomach and duodenum without disturbing the integrity of the serous and mucous membranes;
- tears of individual shells of the walls of the stomach and duodenum;
- full wall ruptures with great force of trauma;
- crushing of the stomach and duodenum with extremely severe lesions.

DAMAGE TO THE STOMACH AND DUODENUM

- With bruises and tears of the stomach and duodenum, the victims complain of pain in the upper part of the abdomen, which is enhanced by palpation. In the absence of severe signs of perforation, shock phenomena can be sharply expressed.
- With complete gastric ruptures, the symptomatology is the same as with the perforated ulcer of the stomach and duodenum. If a large blood vessel is damaged, the bleeding from the rupture site can be so great that its symptoms predominate over the symptoms of perforation.
- It is most difficult to diagnose retroperitoneal ruptures of the duodenum, since the symptomatology is sometimes fuzzy, and only during the operation it is possible to make an accurate diagnosis.
- In the presence of signs of rupture of the stomach and duodenum, urgent surgery is indicated to restore the integrity of the walls of the injured organ. Anesthesia for intubation.

DUTIES OF A SMALL INTESTINE

Closed damages of the small intestine among closed injuries of the abdominal organs occupy one of the first places, differ in the severity of outcomes, the difficulty of diagnosis and treatment. The most frequent lesion of the small intestine is due to its considerable size, superficial position and insufficient protection by the bones of the skeleton and a layer of muscles.

There are the following types of damage to the small intestine:

1) of different size, discontinuities and complete breaks in the intestinal tube;
2) detachment of the mesentery from the intestine at various distances with a hemorrhage into the free abdominal cavity;
3) bruises with hemorrhages in the wall of the intestine and mesentery, tears of the serous cover, and sometimes also of the muscle layers.

Damage to the intestine can be diverse, multiple. However, most often damaged are those parts of the intestines that are fixed to the back wall of the abdomen.

DUTIES OF A SMALL INTESTINE

- The main symptoms of a small intestine rupture: pain in the abdominal cavity without a clear localization, varying degrees of shock, in some cases, single or multiple vomiting, pale skin, cold sweat. In the early stage, there is a bradycardia, later turning into a tachycardia, a drop in blood pressure.
- Very early there is a widespread stiffness of the muscles of the anterior abdominal wall, a positive symptom of Shchetkin-Blumberg.
- When breathing - restriction of the movement of the anterior abdominal wall. Percutally it is possible to determine the most painful area, which often coincides with the localization of damage to the intestine. Later, with percussion in the sloping places of the abdominal cavity, due to the contents of the intestine that has poured out, dullness appears.

DUTIES OF A SMALL INTESTINE

Laboratory diagnostics:

- With dynamic observation in the blood, the hemoglobin content progressively decreases, leukocytosis increases with a shift of the leukocyte formula to the left, which indicates the development of peritonitis.

Instrumental diagnostics:

- With a review of fluoroscopy in the abdominal cavity, free gas and the restriction of the mobility of the dome of the diaphragm is determined.
- In order to diagnose damage to the abdominal organs, a method such as video laparoscopy can be used.
- In unclear cases, a laparotomy is indicated, since in time unrecognized damage always leads to late intervention, which worsens the possibility of a favorable outcome of the operation.

Principles of treatment:

- When entering a surgical hospital for a patient with a rupture of the intestine, treatment should begin with anti-shock measures, administration of painkillers, cardiac.
- Laparotomy, best median, is performed under intubation anesthesia.
- The tactics of the surgeon are determined by the nature of the rupture of the intestine.
- The fight against shock and cardiac disorder continues during the operation and in the postoperative period.
- During the operation, the abdominal cavity is maximally freed from intestinal contents, sanitized.
- If there are visible signs of peritonitis, the abdominal cavity is drained.

COLON LESIONS

They occur much less frequently than damage to the small intestine, which is explained by the shorter and more protected position of the colon. Gut rupture contributes to its overflow, relaxation of the abdominal wall at the time of injury.

Pathological anatomical classification of damage to the colon (I.Ya. Deineka):

1) a bowel injury with the presence of a single small hematoma;
2) bruises of the intestine with multiple hematomas;
3) hematomas with an obstruction of the serous membrane;
4) rupture of all layers of the intestine and marginal hematoma;
5) rupture of the intestine and mesentery of the mesentery;
6) detachment of the mesentery from the intestine and necrosis of the latter;
7) rupture of all layers of the intestine with simultaneous separation from the mesentery;
8) rupture of the intestine by its circumference;
9) multiple discontinuities.

COLON LESIONS

- The clinical picture depends on the shape of the lesion. With bruises of the wall, the intestine becomes passable for the bacteria from its lumen and necrosis may occur leading to the development of peritonitis. In this category of patients, after the injury, all the phenomena can disappear, and then comes the period of imaginary well-being, which lasts from 3 to 15 days, and then develops a picture of peritonitis.
- Treatment consists of: immediate removal of the patient from shock, laparotomy. Depending on the nature of the damage and the patient's condition, the operation reduces to suturing the rupture site or removing the damaged intestine outside.

COLON LESIONS

They can be caused by different reasons:

1) falling on a sharp object by the crotch;
2) damage from the lumen of the intestine by dense or acute inclusions located in feces;
3) wounding of bone fragments with a pelvic fracture;
4) blunt trauma of the perineum.

Damage to the rectum is intra- and extraperitoneal. With intraperitoneal damage, the development of fecal peritonitis develops and only a timely operation saves the life of the patient. With extraperitoneal damage to the rectum, a small pelvic falmon can develop.

Closed injuries of the rectum may be in the form of "spontaneous" ruptures.

DAMAGE OF THE BLADDER

May be closed (or subcutaneous) and open.

Subcutaneous damage to the bladder can occur under the influence of forces acting from the outside or inside the cavity of the bladder.

The overflowing bladder protrudes above the bony bones and therefore becomes accessible to the direct effects of a traumatic force capable of causing its damage. An empty bladder is placed in a small pelvis, well protected by its bone girdle and therefore less often damaged from the outside.

If the integrity of individual layers of the wall of the bladder is broken and the urine does not flow beyond it, then such damage is called non-penetrating. If the integrity of all layers of the wall of the bladder is violated and the urine partially or completely penetrates into the surrounding tissues, then we speak of a penetrating rupture of the bladder.

DAMAGE OF THE BLADDER

With intraperitoneal rupture of the bladder, aseptic urine enters the free abdominal cavity, causing irritation of the peritoneum. In the future, when joining the infection, a clinical picture of a common peritonitis develops. When percussion of the abdominal cavity, stupidity of sound is noted in the sloping places of the abdomen, with rectal finger research - the overhanging of the vesical-rectal fold of the peritoneum due to the accumulation of urine in it.

- In the case of extraperitoneal rupture, urine pours into the peri-bubble cellulose, causing its necrosis with the development of pelvic phlegmon.

DAMAGE OF THE BLADDER

- Through injected into the bladder, a small amount of bloody urine is secreted.
- With extraperitoneal rupture of the bladder, infiltration of the inguinal and scrotal areas comes to the fore. When palpation, swelling and sharp soreness are observed.
- Subcutaneous rupture of the bladder is accompanied by pains in the lower abdomen, continuous urge to urinate. With severe pain, single drops of urine appear, colored with blood (bloody anuria).
- Subcutaneous rupture of the bladder must be differentiated with damage to the urethra.
- With any abdominal injury or fractures of pelvic bones, the presence of hematuria indicates damage to the bladder or urethra.
- With closed bladder rupture, urgent surgery is indicated. Closure of the defect in the wall of the bladder. The abdominal cavity is sewn tightly, and when peritonitis is drained.
- With an extraperitoneal rupture, the median suprapubic incision exposes the vestibular space, opens the bladder and drains it.

CLOSED DAMAGE OF PARHYCHEMATOGRAPHIC ORGANS

Injuries of the spleen

Damage to the spleen in children is often observed. According to various publications, they account for 33 to 55% of all injuries of the abdominal organs.

Closed spleen injuries are divided into:

1. Insulated Damage:

a) momentary ruptures (with a marked pattern of intra-abdominal hemorrhage);

b) two-moment breaks.

2. Multiple damages.

3. Combined damage.

According to pathoanatomical criteria, the following types of damage can be observed:

1) contusion of the spleen without damage to the capsule, without subcapsular hematoma and with the formation of subcapsular hematoma;

2) superficial capsules;

3) ruptures of the capsule and parenchyma (single and multiple, superficial and deep);

4) crushing of the spleen, detachment of a part of the spleen or the entire organ from the vascular pedicle.

INJURIES OF THE SPLEEN

- Common signs of rupture of the spleen: shock, internal bleeding. At the same time, the paleness of the skin, weakness, lethargy, sometimes excitement of the patient, vomiting, percussion dullness of sound in the sloping places of the abdomen, a symptom of "vanka-vstanka" is noted.
- With a complete rupture of the spleen, the phenomena of shock and internal bleeding come to the fore on the background of the general pallor of the skin and mucous membranes.
- It is more difficult to diagnose two-moment lacerations of the spleen, since the formed intrasplenic hematoma without the outflow of blood into the free abdominal cavity does not cause specific symptoms. Two-stage isolated lesions of the spleen are extremely rare. The general condition of the patient is improving, but the danger to his life remains the same. However, in this false phase of "enlightenment" the diagnosis of spleen damage is possible. Many patients have an increase in splenic dullness, considerable soreness in the left hypochondrium during palpation and tapping along the costal arch. In this period, a few days after the injury with resorption of the subcapsular hematoma, a subcritical sclera may appear.
- The time between the first and second phases of spleen damage is calculated in several hours or days and months. The second phase of a two-stage rupture is manifested by symptoms of internal bleeding.

INJURIES OF THE SPLEEN

- To diagnose spleen damage, ultrasound (ultrasound) and dopplerography are increasingly being used. For the diagnosis of subcapsular ruptures, selective angiography of the splenic artery is used, in which the entry of contrast medium beyond the vessels in the parenchyma of the spleen is detected. In difficult situations, laparocentesis should be resorted to using a balloon catheter.
- When establishing the diagnosis of "rupture of the spleen" the only method of treatment is urgent laparotomy or laparoscopy. If suspected of the possibility of internal bleeding due to a spleen injury, urgent laparotomy or laparoscopy is also indicated.
- Laparoscopy allows visual inspection of the abdominal cavity if bleeding is not intense. Endosurgical treatment with spontaneous hemostasis is reduced to performing various laparoscopic manipulations: aspiration of blood, drainage of the pelvic cavity. Numerous studies have shown that after a conservative treatment of spleen injuries, its function is perfectly normal.
- It is best to carry out the operation under intubation anesthesia.
- To reduce mortality, urgent hospitalization is required from the time of injury and an urgent operation in establishing a diagnosis or suspicion of rupture of the spleen.
- In children who underwent splenectomy for a spleen injury, lethality from sepsis is 58 times higher than in the general population. Therefore, in cases where splenectomy is indicated, a number of precautions should be followed to help prevent the development of post-splenectomy sepsis.

DAMAGE TO THE LIVER

The frequency of liver damage in children is 5-26% of all injuries of the abdominal organs. Up to 40% of children with severe liver injury die before admission to the hospital. Depending on the depth and extent of damage, surface abrasions and cracks, fissures of up to half the thickness of the organ, crushing and sequestration of individual segments and lobes are distinguished.

Closed liver damage. Factors contributing to liver damage when exposed to sudden external force:

1) significant weight and volume of the liver;

2) a large surface of contact with the costal arch;

3) the strength of the ligamentous apparatus, which exceeds the strength of the organ itself.

The type of liver damage depends on the mechanism of injury. GF Nikolaev gives the following classification of closed liver injuries:

I. Damage to the liver without breaking the integrity of the capsule: 1) subcapsular hematomas; 2) deep, or central, hematomas.

II. Damage to the liver, accompanied by a violation of the integrity of the capsule: 1) single and multiple cracks; 2) isolated gaps and ruptures in combination with cracks; 3) crushing or dismemberment of the liver into separate fragments; 4) ruptures and cracks in the liver, accompanied by damage to the gallbladder and large bile ducts; 5) isolated lesions of the gallbladder and extrahepatic bile ducts.

DAMAGE TO THE LIVER

- The right lobe of the liver is damaged more often, much less often the left; The clinical picture depends on the nature of damage to the hepatic parenchyma.
- For the erectile phase of shock in liver damage is characterized by restless behavior of the patient, agitation, rapid, shallow breathing, normal or high blood pressure, paleness of skin and mucous membranes. Some patients take a forced sitting position, with the change of which the pain intensifies (as with the rupture of the spleen, the symptom "vanka-vstanka").
- With continued bleeding, the torpid phase of shock develops. Patients become listless, indifferent to the surrounding, begin to yawn, ask to drink, rapid breathing, more superficial, pallor and tachycardia increase, blood pressure decreases.
- One of the leading symptoms with closed trauma of the liver is pain, which is localized in the right upper quadrant and irradiates to the right shoulder and shoulder blade, in some cases it seizes the entire abdominal cavity. The intensity and nature of the pain depends on the massive damage to the liver, the degree of shock and internal bleeding.
- The tension of the muscles of the anterior abdominal wall with isolated liver damage is noted in the right upper quadrant, rarely spilled. The latter occurs with combined injuries of the liver and other organs of the abdominal cavity.
- After 1-2 hours after a liver injury, a progressive decrease in hemoglobin and erythrocytes is noted in the blood, while leukocytosis also increases.

DAMAGE TO THE PANCREAS

- With closed abdominal injury, isolated damage to the pancreas, protected by the underlying organs of the abdominal cavity, is very rare in children, and accounts for 3-15% of all types of abdominal injuries. The pancreas is damaged mainly in the part where it "crosses" the spine. Damage to the parenchyma of the gland leads to fatty necrosis, may be accompanied by vascular thrombosis, sometimes progressing to thrombosis of the portal system, with the development of extensive necrosis of organ tissue. When joining the infection, severe forms of pancreatitis can occur.
- Laboratory blood tests: leukocytosis to 15-18 thousand with a shift of the leukocyte formula to the left; increased activity of blood amylase and alpha-amylase (diastase) of urine. There may be an increase in hyperglycemia and glucosuria. Assist in the diagnosis of ultrasound and computed tomography (CT).
- Treatment. Assign a strict bed rest, decompression of the stomach through the nasogastric tube, infusion therapy and parenteral nutrition with complete abstinence for 2-3 days from oral intake of food. The epigastric region is covered with cold. With the therapeutic and prophylactic purpose (prevention of posttraumatic pancreatitis), proteolytic enzyme inhibitors are prescribed.
- In a bright clinical picture of damage to the pancreas or the absence of the effect of conservative therapy, urgent surgical intervention (suturing of the gland capsule, economical resection, etc.) is shown. Drainage of the abdominal cavity and Winslow's opening. The postoperative period is very difficult.
- Children who have suffered a pancreatic injury are subject to follow-up, as in the late period may occur diabetes, chronic pancreatitis, post-traumatic cyst.

KIDNEY DAMAGE

Caused by strokes acting directly on the kidneys in the lumbar region, falling on the lumbar region of the heavy load, various compression, etc.

Kidney damage is divided into five groups:

1) damage to the capsule of the kidney, accompanied by large hemorrhages between the fat and fibrous capsules;
2) ruptures of the renal parenchyma, not reaching the pelvis or calyces, hematuria is insignificant or absent;
3) ruptures of the kidney parenchyma, reaching the calyx or pelvis with profuse hematuria and pericardial urogematuria, descending down to the inguinal ring and scrotum;
4) complete crushing of the kidney with significant bleeding (but may be absent) and urinary infiltration;
5) damage to the kidneys' gate, in which there may be isolated damage to the pelvis or ureter, accompanied by a slight hematuria and abundant urinary infiltration.

KIDNEY DAMAGE

- When the kidney is injured with a simultaneous rupture of the peritoneum, blood and urine pouring into the abdominal cavity cause widespread peritonitis.
- The most frequent and important sign of rupture of the kidney is hematuria (95%). It is absent only when the ureter is detached or when all the blood vessels of the kidney are completely ruptured, and also when the ureter is blocked by a blood clot. In the absence of hematuria, diagnosis is difficult.
- To clarify the diagnosis of special urological methods of research - intravenous urography, including radioisotope scanning of the kidneys.
- About 85% of cases of kidney damage are bruises and bruised wounds, which can (and should) be treated conservatively. Indications for surgery for kidney damage should be only the following situations: continuing hematuria or bleeding into the perineal area, massive parenchymal lesions, infection of paranephric fiber, obstruction of the urinary tract. In case of injury to the kidneys, the operation can be effective only if it is performed during the period of "warm ischemia", i.e., no later than 2 hours after the injury.
- If there is no sharp drop in arterial pressure urogematomes, the phenomenon of anemia does not increase, then conservative treatment is performed. In the presence of profuse hematuria with increasing anemia, urogematoma, a drop in the pulse and arterial pressure, an urgent audit of the kidney is indicated. When crushing the kidney and deep ruptures of her parenchyma, tears of the ureter or vessels, urgent nephrectomy is performed.
- In other cases, organ-preserving operations are performed.

CLOSED COMBINED DAMAGES

Closed combined lesions of the abdominal cavity, retroperitoneal space, pelvic bones, ribs are among the most serious injuries. If there are such a clinical picture consists of the sum of symptoms characteristic of each damaged organ, but the leading ones are shock, internal bleeding and peritonitis.

The treatment of closed combined injuries of the abdominal organs is only surgical.

BEAT IN THE STOMACH - SOMETIMES IT CAN BE VERY SERIOUS ...