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Peculiarities of Optimizing Diagnostic and Surgical Tactics for Multiple and Combined Injuries of the Abdominal Organs in Children

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RESUME. Abdominal injuries continue to be one of the most pressing problems in surgery, traumatology and intensive care. In peacetime, abdominal injuries account for 1.5-4.4% of all injuries. The structure of injuries fluctuates due to accidents, falls from a height, natural disasters. But a significant place in this structure is occupied by the criminalization of society, which has increased in recent years.

Considering that in the diagnosis and treatment there are still complex cases that lead to certain complications, this problem remains very relevant.

KEYWORDS: surgical tactics, abdominal cavity, surgery, injuries, diagenostics, multiple and combined trauma.

Relevance. Population studies have shown that the incidence of gastric injury in children is about 1% (according to different authors, from 0% to 1.7% in the structure of closed abdominal injury [3].

Of 203 children with closed abdominal trauma, gastric rupture was observed in only one child, which is 0.5% [1]. The following frequency of damage to the hollow abdominal organs in children is indicated: stomach (5%), duodenum 12 (5%), jejunum (83%), ileum (10%), large intestine (10%) [5]. With a direct blow to the stomach, the small intestine is most often damaged - 65%, while the stomach - 2% [8].

The mechanism of closed injury of hollow organs is associated with direct compression of the organ between the spine and an external influencing object, rupture of the organ due to a direct blow to the abdomen and a sudden increase in pressure in the lumen of the organ, a gap between its fixed part and the non-fixed one [11]. In 60% of cases, rupture occurs when the stomach is full due to its distension and increased intra-abdominal pressure at the time of impact. Organ rupture is caused by acceleration and deceleration forces when the stomach is torn off at the fixation site.

Damage to the stomach in children is determined by such anatomical features as a more convex abdomen with wide protruding edges of the costal arches that are unable to protect the stomach, poorly developed muscles of the anterior abdominal wall, thinness and relaxation of its tissues [6].

Most cases of stomach injury are associated with car accidents (74%). A direct blow to the abdomen as a mechanism of injury is 10%, a fall is 8% [7,10]. Several significant factors contribute to stomach damage. When the stomach contains food masses and liquid, the likelihood of damage due to external influences increases. The significance of the injury is increased by reducing the tension of the anterior abdominal wall in children. Rupture of a hollow organ with a closed injury occurs with intraluminal pressure, which increases the resistance of the organ wall. According to Laplace's law, the transmural pressure (P) is directly proportional to the ratio between the tension (T) and the radius (R) of the curvature or bend. The formula $P=K(T/R)$ is a mathematical description of this law, where K is a geometric constant, which shows that an increase in intraluminal pressure leads to a rupture of the organ at the point of the largest radius. Therefore, the greater curvature of the stomach will be the most common area of rupture. Also, the anterior wall of the stomach is damaged more often than the posterior one. The mechanism of delayed gastric ruptures is the initial partial rupture of the layers of the organ wall, which eventually becomes full-layer [5,9].

Often, damage to the stomach is observed due to its compression between the seat belt and the spine in car accidents or in cases of sudden impact of the epigastric region on the handlebars of a bicycle. Injury in a child restrained by a seat belt occurs due to a sudden bending of the torso around the seat belt.

Purpose of the study. Improving the results of emergency surgical care for children with traumatic injuries of the abdominal organs and retroperitoneal space by improving the methods of early diagnosis, developing new medical and tactical technologies in the Ural industrial region.



Materials and research methods. Methods used: the method of theoretical analysis of literary sources and normative documentation, questioning, empirical, mathematical statistics and analytical.

Research results. In the structure of traumatic injuries of the organs of the abdominal cavity and retroperitoneal space in the group of surviving children, isolated injuries occur in 54% of children, mono-associated - in 16.8%, sex-associated - in 24.4%, multiple - in 4.8%. With fatal outcomes as a result of transport and catatrauma, polyassociated injuries prevail - 98%, with other external influences, 44% of cases belong to an isolated injury.

The informativeness of general clinical signs in closed traumatic injuries of the abdominal organs and retroperitoneal space is in the low confidence limits - 0.23-0.31 and does not allow to prove the degree of damage to internal organs and the volume of internal bleeding. The methods of ultrasound and computer scanning have informative signs of the degree of destruction of the parenchyma of the organ and the amount of hemoperitoneum in the range of 0.9-0.94, which ensures timely diagnosis of internal bleeding.

The use of a clinical triage scale for traumatic injuries of the abdominal organs and retroperitoneal space in children, based on the criteria for assessing the severity of the condition, monitoring hemodynamics, hemoglobin values, the degree of traumatic shock, the volume of blood loss, on ultrasound and CT signs of the severity of rupture of the organ and the volume of hemoperitoneum, hemorethroperitoneum, with the allocation of therapeutic and tactical groups: a stable group, which consisted of 44.6% of the victims, a conditionally stable group - 26.6% of children and an unstable group - 28.8% of patients, reduces the number of diagnostic and therapeutic and tactical errors at the stages providing qualified and specialized surgical care to children by 1.3-1.9 times.

The essence of the working classification of traumatic injuries of the abdominal organs and retroperitoneal space reflects the versatile characteristics of this type of injury in children, is based on intrascopic criteria for the severity of organ ruptures and clinical sorting of affected children into therapeutic and tactical groups. According to the classification, up to 81% of injuries of the organs of the abdominal cavity and retroperitoneal space belong to injuries of the I-III stage, accompanied by hemoperitoneum of a small and moderate degree in up to 65% of clinical cases.

The developed differentiated therapeutic tactics in children with internal bleeding in case of damage to the parenchymal organs of the abdominal cavity and retroperitoneal space, using the results of clinical sorting of children into therapeutic and tactical groups, made it possible to reduce the number of open surgical interventions by 80.2%, to apply organ-preserving surgical tactics based on conservative methods of treatment - 28.4% and laparoscopic interventions - 51.8% of children with ultrasound and CT monitoring.

The involvement of the forces and means of the territorial center for disaster medicine to provide emergency surgical, resuscitation care and evacuation of children with traumatic injuries of the abdominal cavity and retroperitoneal space to the children's surgical center is an effective system of interaction, reduces the time for obtaining an initial consultation with a specialist to 20-30 minutes, providing specialized assistance on site in 2-3 hours, in remote areas in 4-7 hours. In the work of children's advisory medical and evacuation teams, clinical triage into medical and tactical groups made it possible to objectify the criteria for the transportability of children and improve the provision of specialized care to children with traumatic injuries.

The proposed method of antiadhesion therapy in conservative and laparoscopic treatment (residual hemoperitoneum), after open surgery for traumatic injuries of the parenchymal and hollow abdominal organs reduces the risk of developing adhesive bowel disease by 6.8 times.

Output. Combined abdominal trauma is one of the most difficult problems in emergency medicine. Due to its polyvalence, it requires the involvement of many specialists - resuscitators, surgeons, neurosurgeons, traumatologists, all narrow specialists, as well as immunologists, specialists in diagnostic services, rehabilitation treatment and psychologists.

Timely determination of the nature of organ damage and the severity of the patient's condition allows timely implementation of the entire cycle of emergency treatment, including resuscitation and surgical methods.

Thus, despite the many publications devoted to the issues of TTG in children, mortality remains quite high. Until now, the issues of targeted use of ultrasound, laparoscopy and CT are controversial. There is no clear algorithm for treatment and diagnostic tactics in TTG, which dictates the need for further research.

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