OPTIMIZATION GASTRIC DAMAGE IN MULTIPLE AND COMBINED ABDOMINAL TRAUMA

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Abstract: Abdominal trauma is one of the most severe types of injuries. Among severe injuries in peacetime, abdominal injuries account for 25%. The share ofpost-traumatic ruptures of the stomach accounts for 1% of injuries of the abdominal organs with an isolated abdominal injury and up to 6% with a combined one. These injuries are classified as severe, as they are accompanied by a lethality of up to 72%. High mortality is due mainly to the multiplicity and severity of injuries to the abdominal organs, as well as other anatomical areas.

Key words: *closed abdominal trauma, liver injury,stomach.*

Relevance. Abdominal trauma is one of the most severe types of injuries. Among severe injuries in peacetime, abdominal injuries account for 25% [1,3,5,7].

The share of post-traumatic ruptures of the stomach accounts for 1% of injuries of the abdominal organs with an isolated abdominal injury and up to 6% with a combined one [2,4,8,9] . These injuries are classified as severe, as they are accompanied by a lethality of up to 72% [6,11,14] . High mortality is due mainly to the multiplicity and severity of injuries to the abdominal organs, as well as other anatomical areas. According to the data [10,12,13] , 4 out of 11 victims died, but it should be taken into account that in their - observations, the gastric lumen was opened only in 4 people, and the rest had a stomach injury that could not be the cause of death (subserous hematoma). or serosa rupture). Injuries to the stomach are not uncommon; according to the literature, they account for 6-12% of all injuries of the abdominal organs [16,18,20,21] . The stomach is one of the most frequently damaged organs in left -sided thoracoabdominal wounds.

A complete rupture of the stomach in the clinic resembles a perforated ulcer of the stomach or duodenum, but is much more severe [15,17,19,22] . Characteristic is the presence of blood in the gastric contents, which is erupted with vomit or removed through a gastric tube [23,24,31] . However, this symptom is relatively rare. L.N. Ankin (2004) notes it only in 11% of patients. In addition, vomiting with an admixture of blood can also be observed with trauma to the pharynx, esophagus, duodenum [22,25,26] . Symptoms such as abdominal pain, tension and tenderness of the anterior abdominal wall, Blumberg-Shchetkin symptom, shortening of hepatic dullness, occur with the same frequency in intestinal injury.

There is a real danger of not recognizing gastric trauma or underestimating the severity of organ damage even during an abdominal revision. Particular attention should be paid to the lesser and greater curvature of the stomach. A subserous hematoma in any part of the stomach must be carefully opened, emptied, to make sure that there is no damage to the muscle layer and even the mucous membrane, followed by the application of gray-serous sutures. Such hematomas are often found with ball wounds of the abdomen and wounds with small fragments [28,29,30] . Identification of a wound on the anterior

wall of the stomach, penetrating into its lumen, requires a wide dissection of the gastrocolic ligament to exclude the through nature of the wound.

An adequate volume of surgical intervention in case of a rupture or injury of the stomach is suturing the wound with a double-row suture; in conditions of peritonitis, the edges of the defect are preliminarily excised [6,10,26,29] . A fresh incised wound is sutured without excision , but with obligatory ligation of bleeding vessels [27,31] . To prevent suture failure, peritonization with a pedunculated omentum is additionally used; obligatory decompression of the stomach with a nasogastric tube [22,27,30] .

Gunshot wounds can be accompanied by significant destruction of the organ, forcing the gastric wall to be excised over a considerable length during surgical treatment; in such situations, even gastric resection may be required [12,19,22] . However, it should be taken into account that the lethality with such a volume of intervention reaches 100% [1,3,7,9] . When the stomach is separated from the duodenum, some surgeons prefer resection of the organ [10] , others prefer gastroduodenoanastomosis [11,15,19] .

Closed injuries of the stomach are rare types of damage to the abdominal organs and in case of a combined injury they account for 0.5-2.4% [7,8,9] . Slightly more often (4%), stomach injuries occur with stab and gunshot wounds [26,29] . In our clinical material, gastric lesions accounted for 2.09%, of which 3.47% were closed, stab wounds - 2.28%, gunshot wounds - 0.05%. The nature of the damage is varied and depends on the type, strength and direction of the damaging agent, as well as on the filling of the stomach. With a full stomach, due to the development of strong hydrostatic pressure, more extensive damage occurs.

With bruises of the stomach wall, only hemorrhages appear in the mucous membrane, under the serous membrane, or isolated hematomas in the submucosal layer. With incomplete rupture, there is damage only to the serous or muscular membranes while maintaining the integrity of the mucosa, in the future, necrosis of the entire wall of the stomach may occur, followed by perforation. With complete ruptures, the anterior wall of the stomach along the lesser curvature and in the region of the pylorus is more often damaged. Rarely, damage to the posterior wall, separation of the cardia or separation of the stomach from the duodenum are observed. With stab and gunshot wounds, as a rule, there are through wounds of the stomach.

The clinical picture varies depending on the degree of damage to the stomach and associated damage. Bloody vomiting, symptoms identical to those of a perforated ulcer, and free gas and fluid in the abdominal cavity on ultrasound suggest gastric rupture. Contrast study of the stomach with a combined abdominal injury, as a rule, is not performed. Verification of the wound of the stomach is largely helped by laparoscopy, although if the posterior wall of the stomach is damaged, only indirect signs can be detected - hematoma of the lesser omentum, bulging of the omental sac. The outcome of damage to the stomach depends on the degree of damage, their combination and timing of surgery. From Stab-cut wounds of the stomach, patients, as a rule, do not die, mortality with complete ruptures of the stomach against the background of combined injuries reaches 21.0-42.8% if the operation was performed after 6 or more hours.

The aim of the study was to analyze the results of surgical treatment of gastric

injuries in concomitant trauma.

Material and methods. For 2018 -2022 _ _ we analyzed 57 cases of isolated (12) and combined (45) gastric injuries (Table 1).

Table 1.

The nature of the damage to the stomach

Nature of injury	Number of victims		Of them died
	Isolated	Combined	
closed injury	One	33	one
Stab wounds	Eleven	Ten	-
gunshot wounds	-	2	-
Total:	12	45	1 (1.75%)

Damage to the anterior wall of the stomach was found in 42 patients, posterior - in 4 people with thoracoabdominal wounds, both walls of the organ - in 11 victims. Injuries to the posterior wall of the stomach could be detected only if the algorithm for examining the abdominal cavity was followed, which recommended opening the omental sac and revision of the posterior wall of the stomach, the pancreas of the retroperitoneal space.

According to our observations, the most common combinations of gastric injury in blunt trauma were: skull injuries (77.8% of the musculoskeletal system (68.9%), chest

(33.3%), other abdominal organs (89.1%) , less than 8% - pelvic bones (Table 2).

Table 2.

Injuries of the stomach with closed concomitant injury

closed injury	Number of damage	AT %
Isolated damage	12	21.0
Combined with other organs:	45	89.0
Duodenum	eight	17.8
Pancreas	5	11.1
Liver	eighteen	40.0
Spleen	eleven	24.4
Intestines	twenty	44.4
Mesentery	eighteen	40.0
bile ducts	3	6.7
Scull	35	77.8
Musculoskeletal system	31	68.9
Rib cage	fifteen	33.3

♦The total number of detected injuries exceeds the absolute number of victims, since the same patient had combined and multiple injuries. Damage to one organ was in 12 cases, two - in, 18, three or more - in 27 cases.

Results and its discussion. Preoperative diagnosis of gastric injuries in blunt trauma was possible in 25.6% of cases. Most of the victims (77.4%) were operated on for other emergency indications: profuse intra-abdominal bleeding from wounds of the liver, spleen, mesentery of the small intestine or clinic of diffuse peritonitis. It becomes obvious that the diagnostic algorithm for closed injuries of the stomach, in addition to ultrasound and laparoscopy, must necessarily include X-ray and endoscopic studies. It is quite clear that these studies cannot be carried out for all victims, but where they are performed, the quality of diagnosis of gastric injuries in case of closed combined abdominal trauma will improve.

Treatment of injuries of the stomach has its own characteristics.

During the revision of the stomach, its anterior wall is examined, the nature of the wounds and the presence of subserous hematomas are determined. Damage to both walls of the stomach with penetrating wounds occurs in 1/3 of the victims. This fact is extremely important for a surgeon going to a laparotomy for a penetrating wound of the abdomen. If the anterior wall of the stomach is damaged, one should make sure that there are no

wounds on its posterior wall and, especially, in the cardiac section, for which the gastrocolic ligament is widely dissected. The walls of the stomach should be carefully examined at the places of attachment of the curvature, where adipose tissue is able to mask small penetrating wall defects. In most wounds of the stomach, they have a characteristic appearance with everted edges and often crushed mucous membranes. Hematomas are more often localized in the area of lesser curvature and omentum.

Small single wounds can be closed with purse-string or U-shaped sutures, most often surgeons use standard double-row sutures. AT in cases of gunshot wounds, especially with high-speed bullets, tissue should be excised within the boundaries of visible changes. In this case, the first row of sutures is hemostatic in nature and is applied through all layers with continuously absorbable threads. The second row consists of separate serous - muscular sutures with non-absorbable materials.

When treating large wounds of the stomach, their edges with the mucous membrane are excised and a two-story suture is applied in the transverse direction, which is especially important in the pyloric region. Indications for resection of the stomach are extremely rare, even with significant damage, it is possible to close wound defects by suturing the anterior and posterior walls. With extensive damage to the organ, when there is still a need to remove large areas that are deprived of viability, a typical resection of the stomach is shown on a scale determined by the boundaries of the damage. Segmental resections should not take place here. Of all the possible options for organ resection in emergency situations, preference should be given to the simplest and most easily performed modifications of the Billroth- II operation (Hofmeister-Finsterer, Roux).

Detected subserous hematomas should be opened, ruptures of the muscular and mucous membranes are sutured with gray -serous sutures.

In case of damage to the stomach, we performed the following surgical interventions

(Table 3).

Table 3

Types of surgical interventions

Type of operation	Qty	AT %
Stomach wound closure	27	37.5
Suturing the wound of the posterior wall (two walls)	fifteen	20.8
Pyloroplasty	3	4.2
Gastroenteroanastomosis	eight	11.1
Resection of the stomach	one	1.4
Opening and suturing of hematomas	fifteen	20.8
Gastrostomy	one	1.4
Laparoscopic operations	2	2.8
TOTAL	72	100.0

*** The total number of operations exceeds the number of victims, so several surgical procedures were performed on the same patient (for example, suturing a stomach wound + opening and suturing hematomas + pyloroplasty or gastroenteroanastomosis, etc.).**

As can be seen from the table, most of the victims underwent suturing of gastric wounds (75%). In second place in frequency was the Elimination of hematomas in case of bruising of the organ (20.8%). The performance of drainage operations in 8.8% of cases was a forced measure if there was a suspicion of the possibility of a violation of the passage of food after suturing gastric wounds located in the pyloric region, antrumectomy or resection of 1/2 of the body of the stomach took place in 1.4% with massive ruptures as a result of catatrauma. In one case, a temporary decompressive gastrostomy was placed using a Foley catheter after suturing a rupture in the cardia of the stomach. Endoscopic suturing of gastric wounds with a manual endosuture or with a stapler was possible in two patients.

We present a clinical observation.

Victim A., 45 years old. Fall from a height of 4.5 m. The condition upon entry was severe, consciousness was stunned. BP - 90/60 mm Hg. Art., heart rate 98/min. In the ICU, the central vein was catheterized, and antishock therapy was started; a nasogastric tube is installed, through which a small amount of blood and mucus is secreted; the bladder is catheterized, the urine is light. On the radiograph of the skull, a fracture of the parietal bone on the left, on the radiographs of the bones of the skeleton, a fracture of both bones of the forearm was revealed. The conclusion of the neurosurgeon - brain contusion of moderate severity. The traumatologist performed novocaine blockade of

fracture sites and temporary immobilization.

Ultrasound of the abdominal cavity revealed a large amount of free fluid (bleeding continues!).

During videolaparoscopy, up to 1 liter of liquid blood and clots were found in the abdominal cavity on the right flank, and a blood clot was fixed in the spleen area. There is a defect on the anterior wall of the stomach, it is difficult to determine its size. There were indications for emergency laparotomy.

A median laparotomy was performed. 800 ml of blood with antibiotics (tienam, 1 g) was taken from the abdominal cavity and reinfused. The spleen was crushed into two fragments at the level of its middle third, removed, the splenic tissue was implanted. There is a hematoma up to 4.0x2.0 cm in the region of the tail of the pancreas and tissue imbibition with blood. On the anterior wall of the stomach, closer to the lesser curvature, a wound with uneven edges 3.5x1.5 cm was found. The abdominal cavity is sanitized, drained.

The postoperative course is smooth. After stabilization of the patient's condition on the 6th day, bone osteosynthesis with metal plates was performed. The patient was registered on the 12th day under the supervision of a traumatologist and surgeon of the polyclinic. There are no disturbances in the passage of food from the stomach.

This observation of damage to the stomach in concomitant trauma is typical. In none of the cases analyzed by us, damage to the stomach was the cause of death. There were no complications after gastric surgery in the form of suture failure and food passage disorders.

Complications in the postoperative period occurred in 9 (15.8%) patients with rupture of all layers of the stomach. The need for relaparotomy arose in 5 people for the following indications: intestinal obstruction (2), pancreatitis (1), bleeding into the lumen of the stomach (1), failure of the sutures of the sutured wound of the stomach (1). 3 out of 5 reoperated patients died, all of them had a concomitant injury; 2 died from shock and blood loss, 1 from pancreatitis and peritonitis.

Conclusions. An adequate volume of intervention for gastric injuries is suturing the wound (rupture) with a two-row suture with preliminary ligation of the bleeding vessel and subsequent decompression of the organ through a nasogastric tube.

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