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Improvement of the Method of Excision of a Perforated Duodenal Ulcer

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Annotation: Relevance. According to the summary statistics of researchers, 10-15% of the world's population suffers from duodenal ulcer (DU). Perforated duodenal ulcer (PDU) continues to occupy a leading place in the structure of frequency (10-20%) and mortality (2.0-20%). At the same time, the results of surgical treatment are not entirely satisfactory. Despite two centuries of experience in the treatment of DU, including its complication by perforation, it has allowed us to test and use all known surgical interventions in gastric surgery.

Objective. Improving the results of surgical treatment of perforated duodenal ulcers by improving pylorus-preserving methods and techniques of ulcer excision operations with duodenoplasty.

Materials. The study was conducted in the surgical department of the Clinic of the Altai State Medical Institute, in which 50 patients diagnosed with PU took part..

Results After improving the methodology and technical methods of pylorus-preserving DP, as well as diagnostic and treatment algorithms, it is possible to improve the results of surgical treatment of PDU.

Conclusion. According to the authors, the use of a new surgical method in the treatment of PDU due to the determination of the low efficiency of PDP of the Judd-Tanaka, Heineke-Mikulich and Finney type will reduce the incidence of postoperative complications and mortality and improve the long-term results of surgical treatment.

Keywords: Peptic ulcer, pyloroplasty, excision.

Introduction. Peptic ulcer of the stomach and duodenum (PUD) is one of the most common pathologies in all regions of the world. Against this background, "the problem of surgical treatment of complicated forms of PU remains highly relevant, which is associated, on the one hand, with the effectiveness of conservative and endoscopic measures, when the most severe contingent of patients is subject to surgical treatment, and on the other hand, with a high risk of developing various postoperative complications." When choosing a surgical method, we take into account many factors, the most important of which are: localization of the PDU and its complications; the time elapsed from the moment of perforation; the degree of risk of surgical intervention, which depends on age, concomitant therapeutic and combined surgical diseases, the general condition of the patient and the type of surgery, and the features of pathological changes detected during surgery. Despite the success of surgical treatment of perforated ulcer of the duodenum, the frequency of postoperative complications and mortality in the immediate postoperative period remain high. All patients underwent excision of the DDU, however, pyloro- and duodenoplasty after excision of the DDU was performed in various modifications.

As is known, gastric drainage operations (GDO) not only improve the evacuation function of the stomach (EFG), but also help to reduce the contact of food with the mucous membrane of the antral section, which leads to a decrease in the gastrin mechanism.

In the initial period of our work, when excising duodenal ulcers, we used pyloroduodenoplasty according to Finney, Heineke-Mikulich and Judd-Tanaka.

The nature of the surgical interventions we performed for perforated DDU is presented in Table 1.

As can be seen from the table below, in pyloroduodenoplasty according to Heineke-Mikulich - 14 (2.9%), a longitudinal incision along the axis of the stomach and duodenum was used, i.e. a wide pyloroduodenotomy was performed. The wound was sutured with a double row suture after excision of

the perforated ulcer. With this type of gastric drainage operation, the integrity of the pyloric sphincter is completely disrupted, which is often the cause of DGR, dumping syndrome and other disorders of the pyloric sphincter.

Table 1. The nature of the surgical interventions performed for perforated DU.

The name of the operation is excision of the PDU with:	Number of patients	
	абс	%
- Judd-Tanaka RAP	64	13,4
- RAP according to Heineke-Mikulich	14	2,9
- Finney's PDP	20	4,2
- duodenoplasty (DP)	381	79,5
Total	479	100

When excising a perforated DU and diagnosing an ulcer on the posterior wall of the duodenum, PDP according to Finney was performed - 20 (4.2%). This creates a wider outlet from the stomach, ensures adequate drainage and elimination of the pathological substrate, i.e. the perforated DU. But this is associated with the destruction of the integrity of the pyloric sphincter.

At the same time, pronounced cicatricial changes in the pyloric canal and the presence of a large inflammatory infiltrate around the ulcer often make it difficult to perform this type of plastic surgery, and conditions arise for the development of DGR, dumping syndrome and other disorders of the EPJ. Performing an operation directly in the area of cicatricial tissue can, in addition, lead to secondary scarring, deformation in the area of pyloroplasty and disruption of the EPJ, as a result of the destruction of the multifaceted function of the pyloric sphincter. In addition, this type of plastic surgery is feasible in the absence of obstacles to the free mobilization of the descending part of the duodenum and its alignment with the pyloric sphincter.

When excising a penetrating DU with PDP according to Judd-Tanaka – 64 (13.4%), excision of the ulcer of the anterior wall of the duodenum was performed with a diamond-shaped incision. In this case, along with the ulcer, the anterior semicircle of the pyloric sphincter was excised (hemipylorectomy). Plastic surgery was performed by suturing the wall of the stomach and duodenum with double-row sutures..

With this method of excision, along with the violation of the integrity of the pyloric sphincter, the circular muscles of the duodenum are destroyed to a greater extent, which also leads to the development of DGR, dumping syndrome and other disorders of the MEGF. However, in the process of further work and studying the immediate and remote results, we abandoned these operations..

The purpose of radical surgery on the stomach in case of ulcer is to influence 3 factors:

- reduction of gastric secretion (acidity and pepsin) at a sufficient level;
- removal of the ulcer as a source of complications and a focus of pathological impulses, as well as a pathomorphologically altered section of the duodenal wall;
- normalization of the MEFG and duodenum, as well as an effect on the second phase of gastric secretion (reduction of food contact with the mucous membrane of the antral section, removal of the latter section leads to a sharp decrease in gastric secretion in the second phase). With vagotomy, the first phase of gastric secretion is reduced.

In our practical work, we used the classification of V.I. Onopriyev (1995), which, although to some extent conditional, nevertheless, as a working scheme it is simple and convenient for use by a practical surgeon.

- According to the anatomical and functional features, the proximal part of the duodenum, that is, the part that is most often subjected to operations, is divided into 4 levels: the entrance (base) of the

bulb - the basal part; the body (corpus) of the bulb; the exit (apex) of the bulb - the apical part; the postbulbar part.

- Four walls were distinguished along the circumference of the duodenum: - anterior; - posterior; - lateral greater curvature; - lateral lesser curvature.
- In relation to our material and using this classification by the localization of the DU, we distinguish between ulcers located on the anterior, posterior, lateral lesser curvature, lateral greater curvature; "mirror" or "kissing" ulcers.

In recent years, during surgery for PDU, we have widely used an improved method of excision of the DU with the DP (Patent No. 2262 PV RUz.).

Method of excision of perforated duodenal ulcer with duodenoplasty.

After upper midline laparotomy, intraoperative diagnostics were performed, which consisted of a sequential examination of the duodenojejunal junction, assessment of the severity and prevalence of peritonitis, visually and by palpation, the state of the pyloroduodenal zone (ulcer localization, diameter of the ulcer perforation opening, its distance to the pyloric sphincter). In all patients, due to peritonitis after aspiration, a thorough sanitation of the abdominal cavity was performed with at least 5-7 liters of furacillin solution. After dissection of the cicatricial adhesive mantle covering the contours of the gastroduodenal complex, the level and size of the perforated ulcer, the diameter of the ulcer perforation opening and its distance to the pyloric sphincter were re-specified. Within healthy tissues, the edges of the ulcerative infiltrate are taken on holders from the lateral edges. Distal and proximal to the ulcerative infiltrate, two semicircular bordering incisions were made in the transverse direction with a sharp scalpel, cutting only the serous membrane. In this case, our goal was not only radical excision of the penetrating ulcer, but also maximum tissue preservation. Then, using an electric knife, we first dissected the distal edge of the ulcer. Through the defect, the ulcer was additionally lifted with a dissector and after a digital check of the pyloric sphincter integrity, the penetrating ulcer was excised within healthy tissues with a proximal incision with an electric knife. This resulted in less trauma to the circular muscles of the duodenum, and the integrity of the pyloric sphincter and the lateral walls of the duodenal bulb was preserved. An additional revision of the posterior wall, proximal and distal parts of the duodenum was performed. When diagnosing a posterior duodenal wall ulcer, the edges of the posterior wall ulcer were excised through the duodenal defect with an electric knife to the bottom of its crater (often penetrating into the head of the pancreas), retreating 5 mm. This technique allows avoiding injury to the pancreas. The defect on the posterior wall of the bulb was sutured with mucosal-submucosal-muscular interrupted sutures using silk threads, the edges of the posterior intestinal wall were matched and adapted. In this case, the sutures were tied after they were completely applied, having previously tightened and brought together the edges of the intestine. Thus, the bottom of the ulcer crater remains outside the intestinal tube, i.e. extraduodenization is performed without using a strand of omentum.

V.I. Onopriyev (1995) recommends using the "tunnelization" method, which has a high probability of damaging the gastroduodenal artery, terminal sections of the common bile duct, and pancreatoduodenal arteries. The defect of the posterior intestinal wall is sutured with single-row interrupted sutures. Penetrating and bleeding "mirror" ulcers are excised using a similar technique. When suturing a defect of the posterior intestinal wall using the technique of V.I. Onopriyev (1995), the edge of the omental strand on the vascular pedicle is involved in the suture line. The area of duodenoplasty has the appearance of a broken curve. In cases of functional stenosis detected before surgery, which was expressed during surgery as a spasm of the pyloric sphincter due to perifocal inflammation, pylorodilation was performed, while the diameter of the pyloric sphincter was brought to 22-24 mm. After pylorodilation, the pyloric sphincter remained in an expanded state, which is associated with the atony of its muscles.

In all cases, a nasoesophagogastroodenal tube from a disposable system for intravenous drip transfusions of blood and other fluids was left. Before the operation, a thick gastric tube was inserted

into the stomach. Before plastic surgery of the anterior wall, the distal end of a sterile tube with lateral openings up to 20 cm long was carried out in the direction of the Treitz ligament, and the proximal end was tied to a gastric tube previously brought out into the stomach. The gastric tube was removed together with the proximal end of the decompression tube at the distance we needed and fixed to the patient's nose for 2-3 days so that the microperforations were located simultaneously in the lumen of the stomach and duodenum.

Duodenoplasty. The defect on the anterior wall of the duodenum in the initial period of our work was sutured with intra-nodal separate catgut sutures in the transverse direction, over which "U"-shaped nylon sutures were applied.

Control of the tightness and patency of duodenoplasty is carried out by introducing and then aspirating 400 ml of furacillin solution through a nasogastric duodenal tube.

We present an observation.

Patient Kodirov Z., born in 1967 (I/B№392/65), was admitted to the third surgical department of the Altai State Medical Institute clinic on 7.01.2009 at 11:30 a.m., 2 hours after the perforation. From the anamnesis - suffering from ulcerative disease of the duodenum for 5 years. During the last month, a violation of the diet and emotional experience led to a complication of the disease. Plain radiography revealed pneumoperitoneum. On 7.01.2009 at 2:15 p.m. after a short preoperative preparation under endotracheal anesthesia, an upper-midline laparotomy was performed. During revision - gastric contents are determined in the abdominal cavity, fibrin threads are on the intestinal loops, the gastroduodenal junction zone is covered with a strand of the greater omentum. Thorough sanitation of the abdominal cavity with antiseptics was performed. Mobilization of the duodenal loop according to Kocher. The adhesive "mantle" covering the contours of the gastroduodenal junction was removed sharply. On the anterior wall of the duodenal bulb there is an ulcerative infiltrate 1.5 cm in diameter with a perforation opening of 5-6 mm. Within the healthy tissues, the edges of the ulcerative infiltrate are taken on holders from the lateral edges. Distal and proximal to the ulcerative infiltrate, two semicircular bordering incisions are made with a sharp scalpel, incising only the serous membrane. Then, using an electric knife, we first dissect the distal edge of the ulcer. Through the defect, the ulcer is additionally elevated with the dissector and after a digital check of the pyloric sphincter integrity, the perforating ulcer is excised within the healthy tissues with a proximal incision with an electric knife. An additional revision of the posterior wall, proximal and distal parts of the duodenum was performed. In this case, a posterior wall ulcer with a diameter of 8-10 mm penetrating into the head of the pancreas was detected. Through the duodenal defect, the edges of the posterior wall ulcer were excised with an electric knife to the bottom of its crater, retreating 5 mm from the edge of the ulcer. The defect on the posterior wall was sutured with muco-submuco-muscular interrupted sutures, using silk threads, the edges of the posterior intestinal wall were matched and adapted, thereby the bottom of the ulcer crater remained outside the intestinal tube. Due to spasm of the pyloric sphincter, due to perifocal inflammation, pylorodilation was performed, while the diameter of the pyloric sphincter was 22-24 mm. After this, the pyloric sphincter remained in an expanded state, which is associated with atony of its muscles. A nasoesophagogastruodenal tube from a disposable system was left in the lumen of the stomach and duodenum. Duodenoplasty was performed with separate serous-muscular-submucous silk sutures in the transverse direction, with the knots facing outward. In this case, the needle was inserted 5 mm from the edge of the intestinal incision, and the needle was removed 2 mm. The distance between the knots was 6-7 mm. Repeated sanitation of the abdominal cavity with antiseptics. Drainage of the abdominal cavity. Layered sutures on the wound. Aseptic dressing. Recovery.

In recent years, when localizing the pyloric ulcer on the anterior-lateral walls of the duodenal bulb, we have begun to use methods of excision of the pyloric ulcer with the DP while maintaining the integrity of the pyloric sphincter (patent No. 0128. PV RUz.).

Method of pylorus-preserving duodenoplasty for perforated duodenal ulcer.

Usage: medicine, namely surgical gastroenterology, and can be used in urgent surgery of DU.

Objective: reducing trauma and increasing the effectiveness of surgery by preserving the integrity of the "multifaceted" function of the pyloric sphincter of the stomach, as well as maximum preservation of the circular muscles and crypts of the duodenal mucosa.

The essence of the invention: with the method of pylorus-preserving duodenoplasty, there is no need for mobilization of the duodenum according to Kocher, but only a limited thorough dissection of the periulcerous adhesive "mantle" was performed by an acute method, which opens the contours of the walls, the narrowing segment and the ulcer scar zone. In this case, often after excision of the edematous, loosely connected with the duodenal wall cicatricial mantle, pathological changes are less pronounced and the surgeon opens an unchanged duodenal wall around the perforation opening. In addition, damage to the right gastroepiploic and pancreatoduodenal arteries was excluded depending on the ulcer localization. The integrity and intactness of the pyloric sphincter with its "multifaceted" functions were preserved, and the circular duodenal muscles and mucosal crypts were maximally preserved. This was achieved by precise excision of the PDU with bordering incisions in the transverse direction to the duodenal axis, which were parallel to the stomach axis with bordering incisions around the penetrating ulcer. After that, the ulcer of the anterior lateral wall of the duodenum was excised with an electric knife within the healthy tissues, then a gastric tube was brought out through the duodenal defect, to which a nasogastroduodenal tube was fixed for decompression; its proximal end was brought out through the patient's nose. The integrity of the intestinal wall was restored by duodenoplasty with single-row precision, adapting serous-muscular-submucosal interrupted sutures with knots outward. In this case, the distance between the stitches should be 0.5 cm, and the indentation from the edge of the incision should be 0.5 cm from the proximal side of the wound without capturing the tissues of the pyloric sphincter and up to 0.8-1.0 cm from the distal edge of the wound, which ensures the density of tissue contact. When tightening the knots of single-row serous-muscular-submucosal sutures over the decompression probe, physiological tightness and mechanical strength of duodenoplasty are ensured..

Example 1.

Patient Khakimov M., born in 1998 (Case Study No. 824/123), was admitted to the third surgical department of the Altai State Medical Institute clinic on 30.01.2021 at 6 a.m., 5 hours after the perforation. According to the anamnesis, he has been suffering from peptic ulcer for 4 years. During plain fluoroscopy, pneumoperitoneum was detected under the right dome of the diaphragm.

On 30.01.2021 at 9:15 a.m., after a short preoperative preparation, an upper midline laparotomy was performed under endotracheal anesthesia. During an intraoperative examination, serous-fibrinous peritonitis was found in the abdominal cavity.

*A thorough sanitation of the abdominal cavity with antiseptics was performed. During an intraoperative examination, gastric contents were determined in the abdominal cavity. Fibrin threads are present on the intestinal loops; the greater omentum is adjacent to the gastroduodenal junction. Aspiration and thorough sanitization of the abdominal cavity with antiseptics were performed. The adhesive "mantle" covering the contours of the gastroduodenal junction was removed sharply only around the perforated ulcer. An ulcerative infiltrate with a diameter of 1.25*1.6 cm and a perforation opening diameter of 5*5 mm was found on the anterior lateral wall of the duodenal bulb along its outer contour (greater curvature). Within healthy tissues, the edges of the ulcerative infiltrate were taken on holders from the lateral edges. Distal and proximal to the ulcerative infiltrate, two semicircular bordering incisions were made with a sharp scalpel, cutting only the serous membrane. Then, using an electric knife, the distal edge of the ulcer was first cut. The perforated ulcer was additionally elevated through the defect by the dissector and after a digital check of the pyloric sphincter integrity, the perforated ulcer was excised with a proximal incision using an electric knife within healthy tissues while preserving the integrity of the right gastroepiploic artery and the pyloric sphincter. An additional revision of the posterior wall, proximal and distal parts of the duodenum was*

performed. A decompression nasoesophagogastruodenal tube from a disposable system was left in the lumen of the stomach and duodenum. Duodenoplasty was performed with separate serous-muscular-submucosal precision adaptive silk sutures in the transverse direction, with the knots facing outward. The distance between the stitches was 0.5 cm, and the indentation from the edge of the incision was 0.5 cm from the proximal edge without capturing the tissues of the pyloric sphincter and up to 0.9 cm from the distal edge, which ensured the necessary density of tissue contact. Repeated sanitation of the abdominal cavity with antiseptics. Drainage of the subhepatic space and the pelvic area. Layered sutures on the wound. Aseptic dressing. Recovery.

Conclusion. Thus, the method allows for radical excision of the PDU ulcer of the anterior and anterolateral walls and excision of the edges of the ulcer of the posterior wall (i.e. the pathological focus is removed) with subsequent extraduodenization (the bottom of the ulcer crater is brought outside the intestinal tube) while maintaining the continuity of the lateral walls and the integrity of the pyloric sphincter. The operation is minimally invasive, neurovascular connections are preserved, ensuring the vital activity of the preserved parts of the stomach with its multifaceted relationships with other organs of the digestive system. Preservation of the integrity of the pyloric sphincter ensures portioned evacuation of gastric contents and prevents an increase in the number of DGR, and is also a prevention of dumping syndrome. Leaving a polyvinyl chloride tube provides decompression, thereby being a measure to prevent suture failure, and the technique of applying an intestinal suture allows restoring the lumen of the duodenum, thereby not disrupting its drainage function. In general, the developed technical methods ensured the safety of the surgical intervention. In no case, after the operation were such complications as failure of the anastomosis sutures, peritonitis, traumatic pancreatitis, damage to adjacent organs (liver, bile ducts, pancreas) observed**..**

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