



Long–Term Results of Pylorus–Preserving Duodenoplasty in the Surgical Treatment of Perforated Duodenal Ulcers

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ABSTRACT: The authors analyzed the results of surgical treatment of 479 patients with pyloroduodenal ulcer (PDU). Of these, 381 (79.5%) made up the main group (who underwent excision of the PDU with pylorus–preserving duodenoplasty), and 98 (20.5%) – the comparison group, i.e. control (underwent excision of PDU with pylorus–destroying pyloroduodenoplasty). In the long term after the operations performed, 310 patients were studied after excision of the PDU with pylorus–sparing PD and 82 after PDP with destruction of the integrity of the pylorus sphincter. As a result of optimization of surgical tactics and widespread use of techniques and techniques for excision of PDU with pylorus–sparing DP, excellent and good results in the main group were found in 87.7% of patients (in the control group – 64.4%). Satisfactory results in 12 (3.9%) and 9 (11.0%) patients, respectively. At the same time, unsatisfactory results decreased by 7.1% (in the control group – in 11.0%, in the study group – in 3.9%). Thus, the authors, through the widespread use of techniques and techniques for excision of PDU with pylorus–sparing PD with optimization of surgical tactics, have improved the long–term results of surgical treatment in this pathology.

KEYWORDS: Duodenoplasty, Perforation, Perforated duodenal ulcer, Peptic ulcer, Pyloroduodenoplasty.

INTRODUCTION

Treatment of patients with perforated gastroduodenal ulcer remains a difficult task of emergency abdominal surgery to date. Every year in the world up to 4 million people develop peptic ulcer disease [2, 8]. Complications of peptic ulcer (PU) develop in 10–20% of patients with gastric and duodenal ulcers [3, 4, 6]. Perforation occurs in 2–14% of patients with peptic ulcer [1, 7]. Mortality in perforated ulcer varies within 2.5–27%, and up to 70% of mortality in the population of patients with peptic ulcer is due to perforation [7, 8]. Despite advances in the diagnosis and treatment of peptic ulcer disease, this disease continues to affect an ever younger population, with no tendency to decrease in incidence [5, 8].

AIM OF THE STUDY

Improving the long–term results of surgical treatment for pyloroduodenal ulcers (PDU) by optimizing surgical tactics and using duodenal ulcer (DU) excision with pylorus–preserving duodenoplasty.

MATERIAL AND METHODS

Over the past 35 years (1986–2020), on the basis of the Department of Surgical Diseases and Urology, 782 patients with duodenal ulcer complicated by perforation were subjected to surgical treatment. Based on the goal and objectives of the study, the material of this study was only patients who underwent excision of the PDU with pylorus–destroying pyloroduodenoplasty (PDP) and pylorus–preserving duodenoplasty (DP). In this regard, patients who underwent resection of the stomach and suturing of the PDU were not subject to analysis.

The subject of our study were only 479 patients. Of these, 381 (79.5%) made up the main group, and 98 (20.5%) – the comparison group, i.e. control. The largest contingent of patients with PDU was 336 (70.1%) aged 19–44 years and 63 (13.2%) aged 45–59 years. These data indicate that the main contingent is made up of people of active and working age, which has a certain economic significance of this problem. At the age of 19 years, PDU was diagnosed in 62 (12.9%) and in 18 (3.7%) in old age, which determines not only the medical, but also the social significance of this problem. The main contingent was made up of males. Thus, men accounted for 452 (94.4%), and female patients only 27 (5.6%).



In 176 (36.7%) patients with PDU, the so-called pre-perforative state was established, which was manifested by a pain crisis during exacerbation of peptic ulcer. The leading clinical manifestations were “dagger” pain – 442 (92.3%), muscle tension – 359 (92.9%), a positive symptom of Shchetkin–Blumberg – 445 (97.1%) and the presence of an ulcer history – 408 (85, 2%). It should be noted that 71 (14.8%) patients had no previous history of ulcerative disease and had not received medical treatment for peptic ulcer disease.

There were 274 (57.2%) patients from the moment of perforation to seeking medical help and hospitalization up to 6 hours. In the next 6–12 hours 102 (21.3%), from 12 to 24 hours – 61 (12.7%). In late terms, that is, more than a day from the moment of perforation, 42 (8.8%) patients were admitted, which is shown in Figure 5.

These data indicate that the main contingent of patients with PDU was admitted to the Department of Surgery within the first 12 hours from the moment of perforation, that is, there were quite favorable conditions for performing these surgical interventions.

Despite a significant prescription (more than a day), excision of the PDU was performed in 42 (8.8%) patients. Serous peritonitis was diagnosed in 90 (18.8%) patients in the first 6 hours from the moment of perforation, in the first 6–12 hours – in 129 (26.9%) patients. Also, serous peritonitis was diagnosed within 12–24 hours in 13 (2.7%) patients, which was due to the small diameter of the perforation and covered perforation.

Serous–fibrinous peritonitis in the first 6–12 hours from the moment of perforation was diagnosed in 105 (21.9%) patients, within 6-12 hours – in 30 (6.3%) – and within more than a day in 11 (2, 3%). It should be noted that serofibrinous peritonitis was also diagnosed within 6 hours from the moment of perforation in 61 (12.7%) patients. This circumstance was due to the large diameter of the perforated hole of the duodenal ulcer (duodenal ulcer).

The presence of purulent peritonitis was diagnosed in 9 (1.9%) patients within 6–12 hours and in 31 (6.5%) patients within more than a day. This circumstance indicates that during surgery, the choice of his method depends not so much on the prevalence, but on the nature of peritonitis. In addition, the nature of peritonitis often depends on the diameter of the perforated hole of the duodenal ulcer.

Localization of the PDU on the anterior wall of the duodenum was found in 286 (59.7%) patients, along the anterolateral wall of the duodenum along its greater curvature in 68 (14.2%), along the anteromedial wall of the duodenum along its lesser curvature in 54 (11 .3%). In 43 (9.0%) patients, perforation of the DU of postbulbar localization was established. In addition, in 28 (5.8%) patients, the DU partially covered the pyloric sphincter (PS). It should be noted that perforation of the ulcer of the posterior wall of the duodenum was not established in our observations, although there were also “mirror” ulcers.

The diameter of the perforation in the studied patients was up to 0.5 cm in 193 (40.3%), 0.5–0.9 cm in 268 (55.9%) and more than 1.0 cm in 18 (3.8%). This circumstance is important in the spread of peritonitis, as well as in choosing the method of operation. From the previously given data, there is some discrepancy between the time from the onset of perforation and the nature of peritonitis. In our opinion, this was due to the diameter of the perforation of the ulcer. Therefore, in a number of cases, despite early treatment, there was a diffuse general peritonitis. Or, despite the late appeal of patients, local peritonitis is established during the operation.

Almost in 2/3 of patients – 287 (59.9%), no other complications of PU were found during surgical interventions. Along with this, in case of PDU, surgical interventions were performed with varying degrees of pyloroduodenal stenosis – in 156 (32.5%). Of these, 106 (22.1%) had compensated, 34 (7.1%) had subcompensated, and 16 (3.3%) had decompensated. The combination of PDU with penetration and localization of ulcers on the side walls of the duodenum, as well as the presence of “mirror” ulcers, was found in 17 (3.6%) patients. In addition, in 19 (2.6%) patients, PDU was combined with penetration and pyloroduodenal stenosis.

In the initial period of our work, when excising duodenal ulcers, we used pyloroduodenoplasty according to Finney, Heineke–Mikulich and Judd–Tanaka, which is presented in table 1.

Table 1. The structure of the performed surgical interventions for PDU.

Operation – excision of the PDU with:	Number of patients	
	abs	%
– PDP according to Jadd–Tanaka	64	13,4
– PDP according to Heineke–Mikulich	14	2,9
– PDP according to Finney	20	4,2
– duodenoplasty	387	79,5
Total:	479	100



As can be seen from table No. 1, in PDP according to Heineke–Mikulich – 14 (2.9%), a longitudinal incision was used along the axis of the stomach and duodenum, i.e. A wide pyloroduodenotomy was performed. The wound was sutured with a two–row suture after excision of the PDU. With this type of gastric draining operation, the integrity of the pyloric sphincter is completely violated, which is often the cause of duodenogastric reflux (DGR), dumping syndrome and other disorders of the motor–evacuation function of the stomach (MEFS).

When excising the PDU and diagnosing an ulcer on the posterior wall of the duodenum, PDP according to Finney was performed – 20 (4.2%). In this case, a wider exit from the stomach is formed, adequate drainage and elimination of the pathological substrate is ensured, i.e. PDU. But this is due to the destruction of the integrity of the pyloric sphincter.

When excising the PDU with the PDP according to Judd–Tanaka – 64 (13.4%), the ulcer of the anterior wall of the duodenum was excised with a diamond–shaped incision. At the same time, along with the ulcer, the anterior semicircle of the pyloric sphincter was excised (hemipylorotomy). The plasty was performed by suturing the wall of the stomach and duodenum with double–row sutures.

With this method of excision, along with a 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 MEFS. Therefore, in the process of further work and study of immediate and long–term results, we significantly limited the indications for these surgical techniques.

The goal of radical gastric surgery for DU is to influence 3 factors:

- decrease in gastric secretion (acidity and pepsin) at a sufficient level;
- removal of an ulcer as a source of complications and a source of pathological impulses, as well as a pathomorphologically altered section of the duodenal wall;
- normalization of MEFS and duodenum, as well as the impact on the second phase gastric secretion (reducing the contact of food with the mucous membrane of the antrum, the removal of the last section leads to a sharp decrease in gastric secretion in the II phase). With vagotomy, the 1st phase of gastric secretion decreases.

During the operation for PDU, in recent years we have widely used an improved method of excision of DU with DP.

Upon admission to the admission department of the clinic, all patients with PDU underwent general clinical blood and urine tests, a coagulogram, a blood test for the presence of hepatitis viruses, syphilis, ECG, fluorography, plain abdominal radiography, ultrasound and, if indicated, diagnostic laparoscopy.

To assess the morphofunctional state of the gastroduodenal complex after operations performed in the long term, we performed fluoroscopy of the gastrointestinal tract, esophagogastroduodenoscopy, continuous electrogastrography, continuous radiogastrography, study of the acid–producing function of the stomach by the aspiration–titration method and intragastric pH–metry, as well as morphological studies.

RESULTS

In the long term, we traced the fate of 392 former patients, which accounted for 81.8% of the total number of patients. For reasons unrelated to the surgery, 14 patients died, 52 patients due to a change of residence were taken out of sight, 21 patients for various reasons did not appear for a follow–up examination. Of the total number in the long–term period, 83 (21.2%) patients were examined in a hospital, and 309 (78.8%) – by questionnaire.

The studied patients cover a large period of time (from 1986 to 2020). With the accumulation of work experience and study of their results, we have optimized surgical tactics, improved methods and techniques for performing operations in patients with PDU. All of the above contributed to an increase in the percentage of excellent and good long–term results.

Long–term results were evaluated based on the Visick criteria, which are still used in wide clinical practice to this day. All (392) patients were subject to a questionnaire survey. Patients who did not complain were subject to outpatient examination, and those who presented were examined inpatiently. The data obtained were compared with the questionnaire and, in aggregate, the long–term results of surgical treatment were assessed.

In general, the long–term results of the operations performed were studied in 310 patients after excision of the PDU with pylorus–preserving DP, and in 82 patients after PDP with destruction of the integrity of the pyloric sphincter.

Long–term results of operated patients, depending on the method of operation, are presented in Table 2.

Table 2. Long-term results depending on the method of operation

Long-term results	PDU excision techniques with:			
	DP (n=310)		PDP (n=82)	
	abs	%	abs	%
Excellent	227	73,2	36	43,9
Good	45	14,5	17	20,7
Satisfactory	26	8,4	20	24,4
Unsatisfactory	12	3,9	9	11,0
Total:	310	100	82	100

As can be seen from table 2, excellent and good results in the main group were obtained in 272 (87.7%) cases, in the control – in 53 (64.4%). This indicates a greater effectiveness of the pylorus-preserving DP compared to the PDP, which destroy the integrity of the pyloric sphincter.

It should be noted that in both groups, these were mainly patients in whom the excision of the PDU was combined with vagotomy. They also included patients with a normal or moderate increase in gastric secretion. In addition, according to the recommendations of the attending physicians, in a timely manner, according to the scheme, they received outpatient treatment with “quadrotherapy”.

Long-term results in 46 patients were assessed by us as satisfactory. Of these, 20 (24.4%) patients in the control group and 26 (8.4%) in the study group.

Clinical and instrumental methods of research have established that the cause of satisfactory results was the diagnosis of DGR in 25 patients (in the control – 11; in the study – 14). Its frequency was almost the same in terms of 1 year or more.

DGR in the control group was diagnosed with a moderate degree – in 11 (13.4%) patients. In the main group, 14 (4.5%) DGR were diagnosed, of which 12 patients had a mild degree and 2 patients had a moderate degree.

In the control group, we diagnosed dumping syndrome in 6 patients. In the study group – 4 patients. The performance of these patients is not impaired. We explain the high percentage of cases of dumping syndrome in the control group by a violation of the obturator function of the pyloric sphincter.

Dysphagia and dyspeptic disorders were the reasons for satisfactory results in the control group in 3 patients in the study group – in 6 patients. The examination revealed certain violations that unite the cause of complaints. Patients periodically received outpatient treatment according to the scheme, and also underwent sanatorium treatment. These phenomena did not seriously affect the lives of patients, and they continued to perform their previous work.

An analysis of the results showed that the increase in the frequency of satisfactory results in this group is associated with PDPs that destroy the integrity of the pyloric sphincter.

We included 23 patients with ulcer recurrence in the group with unsatisfactory results (9 patients (11.0%) in the control group and 12 patients (3.9%) in the main group). The reasons for unsatisfactory results in the control group were also the diagnosis of severe dumping syndrome. The clinical symptoms of recurrence were confirmed by X-ray endoscopic examination data after excision of the PDU without vagotomy in 18 patients, in 3 patients after excision of the PDU with selective vagotomy (SV).

In all these patients, the primary localization wall was the anterior wall of the duodenal bulb, and the recurrent ulcer in all of them was localized on the posterior wall of the duodenum. We observed the recurrence of ulcers at a young age. It should be noted that the recurrence of ulcers occurred in patients with a long history of ulcers before surgery. The presence of a hypersecretory syndrome with a continuous type of acid formation against the background of pyloroduodenal stenosis was also established.

In patients with recurrence after excision of ulcers without intervention aimed at reducing acid production, its cause is clear. The study of the causes of recurrence of ulcers after excision of the PDU with SV allows us to conclude that the vagotomy was incomplete. pH-metric study in the postoperative period showed pH 1.7–1.9. In addition, this contingent violated the diet, were not periodically examined and did not receive timely antisecretory and eradication therapy.

Of the 19 patients with recurrent DU, only 5 patients managed to achieve a satisfactory condition after complex repeated anti-Helicobacter and antisecretory therapy. In 14 patients with recurrent DU and in 2 patients with severe dumping syndrome, conservative therapy was unsuccessful. All patients underwent reoperations – gastric resection.



CONCLUSION

As a result of the widespread use of pylorus-preserving DP techniques in the main group, excellent and good results were established in 87.7% of patients (in the control group – 64.4%) cases. Satisfactory results in 12 (3.9%) and 9 (11.0%) patients, respectively. At the same time, unsatisfactory results were reduced by 7.1% (in the control group – in 11.0%, in the study group – in 3.9%). This indicates a greater effectiveness of the pylorus-preserving DP compared to the PDP, which destroy the integrity of the pyloric sphincter.

Thus, the optimization of surgical tactics and the widespread use of methods and techniques for excision of the PDU with pylorus-preserving DP made it possible to improve the long-term results of surgical treatment for this pathology.

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Cite this Article: Botirov A.K., Izatillaev I.R., Nosirov M.M. (2022). Long-Term Results of Pylorus-Preserving Duodenoplasty in the Surgical Treatment of Perforated Duodenal Ulcers. International Journal of Current Science Research and Review, 5(9), 3697-3701