

1. Introduction

Despite the widespread introduction of new schemes of antiulcer and antihelicobacter therapy [1, 2], surgical treatment of complicated duodenal ulcers (DU) remains an urgent problem today [2, 4], which is associated with an increase in the number of complications and different views on the choice of surgical treatment [5–7]. Information on tactical approaches and results of surgical treatment of patients with a combination of complications such as bleeding (Bl) [8], perforation (P) [9], penetration (Pen), stenosis (St) in various combinations are rare in the available literature [10–12]. Despite the global trend of a slight decrease in the incidence of duodenal ulcer, there is, although insignificant, the number of patients with concomitant life-threatening combined complications [3, 7]. Therefore, postoperative mortality rates remain quite high and range from 53 % to 76 % [1, 2]. This is a very complex category of patients that requires analysis and improvement of surgical treatment tactics to achieve better results [7].

The aim of the research. Analysis of results and development of surgical tactics for the treatment of DU with multiple combined complications.

2. Materials and methods

The results of surgical treatment of patients with DU with multiple combined complications for more than 30 years, for the period from 1985 to 2020 are presented. Fisher's test was used to compare the variance in the study groups, and the mean values were calculated according to Student's test. The method of comparing the two proportions was also used. Each patient received and signed an informed consent of the state standard for the processing of personal data.

A total of 153 patients were included in the analysis, which were divided by time period into 3 periods: 1st (1983–1999) (group A) – 77 patients, 2nd (2000–2007) (group B) – 30 patients and the 3rd (2008–2020) (group C) – 46 patients. The performed operations were divided into 4 groups:

1. Organ-preserving operations based on vagotomy (OPO);
2. Organ-saving operations (OSO) – antrectomy with vagotomy;

ANALYSIS OF SURGICAL TREATMENT OF DUODENAL ULCERS WITH MULTIPLE COMBINED COMPLICATIONS

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Abstract: The aim of the research. Analysis of results and development of surgical tactics for the treatment of DU with multiple combined complications.

Materials and methods. The results of the analysis of surgical treatment of duodenal ulcers with multiple combined complications (3 and 4 combined complications) for 3 periods are presented: 1st (1983–1995) (group A) – 77 patients, 2nd (2000–2007) years (group B) – 30 patients and 3rd (2008–2020) (group C) – 46 patients.

Results. 153 patients (100 %) underwent surgery for complicated duodenal ulcer (DU), of which 130 patients (84.9 %) had a combination of three complications and 23 (15.1 %) had four complications. Bleeding complications were noted in 139 of 153 patients, accounting for 90.8 %, and ulcer perforation in 69 patients, accounting for 45.1 % of all other complications. Based on the obtained data of the analysis, there is a steady tendency to increase the proportion of organ-preserving operations (OPO) by 1.5 times (from 50.7 % to 76.2 %), reducing the number of gastrectomy (GR) by 3 times (from 14.5 % to 4.8 %) and palliative operations (PAL) 3.3 times (from 15.8 % to 4.8 %) with a relatively stable number of performed organ-saving operations (OSO): in group A – 17 (24.6 %) interventions, in group B – 4 (21.1 %), group C – 6 (14.3 %).

Conclusions. The use of modern measures of endoscopic hemostasis allowed to operate on patients in the delayed period, and their share from the second period to the third increased 2.8 times. The number of patients who underwent emergency surgery with perforation of the ulcer as one of the complications decreased in the third period compared to the second by 2.6 times, due to the widespread use of PPIs in the conservative treatment of DU. According to the results of the analysis it became known that the chosen active-individualized tactics and developed algorithms for choosing the type of surgery allowed to achieve a stable level of postoperative mortality at 8.3 %.

Keywords: complicated duodenal ulcer, perforation, bleeding, penetration, stenosis, vagotomy, gastrectomy.

3. Resection of the stomach (GR);

4. Palliative surgery (PAL) – isolated duodeno- or pyloroplasty or hemipylorotomy (without vagotomy).

A total of 153 patients (100 %) underwent surgery for complicated DU, of which 130 patients (84.9 %) had a combination of three complications and 23 (15.1 %) had four complications. Complications of bleeding were noted in 139 of 153 patients (90.8 %), and perforation of the ulcer in 69 patients (45.1 %).

3. Results

The analysis of the frequency of use of different types of surgical interventions revealed a tendency to increase the indicator OPO: in group A – 37 operations (50.7 %), in group B – 14 (63.2 %) with a clear statistically significant increase in the indicator in group C – 34 (76.2 %), comparing with group A ($p = 0.0138$, $\chi^2 = 6.099$). The number of performed OSO was relatively stable: in group A – 19 (24.6 %) interventions, in group B – 5 (21.1 %), in group C – 7 (14.3 %) ($p = 0.2903$, $\chi^2 = 1.118$). Indications for the use of GR were significantly limited, which is why in group C – 4.8 % (2) they were performed 3.1 times less than in group A – 14.5 % (11) ($p = 0.2005$, $\chi^2 = 1.638$), and with a slight decrease in the indicator in relation to group B – (5.3 %) (1) and was almost the same as in group C (4.8 %). Palliative surgery in group A was performed in 8.7 % (6) of patients with an increase in group B to 15.8 % (3) and a decrease of 3.3 times in the main group C to 4.8 % (2), comparing with group A ($p = 0.3447$, $\chi^2 = 0.893$).

The use of modern measures of endoscopic hemostasis, allowed to implement a system of preparation of patients for surgery, to operate on patients in the delayed period, and their share from the second period to the third increased 2.8 times (from 5.9 % to 16.6 %) and side of performing (in most cases) radical operations, both organ-preserving and organ-saving. This may explain the increase in the percentage of radical operations in the second and third periods compared to the first.

However, this did not include patients who underwent emergency surgery with perforation of the ulcer as one of the complications, the relative number of which decreased in the

third period (group C) compared to the second (group B) 2.6 times. This is due to the widespread use of modern PPIs in the conservative treatment of DV. With a combination of three complications, where bleeding is combined with perforation and stenosis, or bleeding is combined with perforation and penetration, surgery was an emergency. Peritonitis occurred during perforation in combination with bleeding, when they develop simultaneously, or perforation developed on the background of gastric bleeding and to some extent pronounced posthemorrhagic anemia.

It can be noted that the number of patients with a combination of complications (Bl+Pen+St) in the first period (group A) was 68.8 % (53 of 77) and was 2.6 times higher than in the second period (group B) – 26.3 % (5 out of 19). At the same time, on the contrary, there is a significant and statistically significant increase in the relative rate in the third period (group C) – 71.4 % (33 of 46) compared to the second period (group B) 2.7 times ($p=0.0025$, $\chi^2=9,113$). The rate of patients with a combination of complications (Bl+P+Pen) was the lowest in the first period of 5.8 % (4), then increased in the second period (group B) – 26.3 % (5) 4.5 times and decreased again 3.7 times to 7.1 % (3) in the third period (group C) compared with the second ($p=0.099$, $\chi^2=2.721$). The combination of three complications (Bl+P+St) was 11.5 % (15 of 130) and occurred with approximately the same frequency in the first period (group A) – 17.4 % (12 of 69) and the second period (group B) – 15.8 % (3 out of 19) with no such cases in the third period (group C). The percentage of combination complications (P+Pen+St) was the lowest in the first period (group A) – 7.3 % (5) and significantly increased 4.3 times in the second period (group B) to 31.6 % (6) ($p=0.0147$, $\chi^2=5.956$) and slightly decreased in the third period (group C) – 21.4 % (9) ($p=0.5921$, $\chi^2=0.287$) compared with group B. With a combination of four complications, (Bl+P+Pen+St) duodenal ulcers in patients with general peritonitis performed only palliative pyloroplasty; with diffuse peritonitis and in young and middle-aged patients – selective vagotomy with antrumectomy was performed; in local peritonitis, a selective vagotomy was performed with one of the types of drainage operations. The highest rate of combination of four complications (Bl+P+Pen+St) was observed in the second period (group B) – 47.8 % (11) and decreased 2.75 times in the third period (group C) ($p=0,3039$, $\chi^2=1,057$). The rate of combination of four complications in the first period (group A) was 34.8 % (8), which is 2 times more than in the third period (group C) – 17.4 % ($p=0.5488$, $\chi^2=0.359$).

5. Discussion

Analyzing the absolute number of cases of complicated DU by years and by observation periods, it should be noted the growth of the indicator in the period 1996–1999, which may be due to a number of socio-economic factors that acted in the specified period, followed by a significant decrease in the indicator. wide introduction of effective PPIs and application of eradication therapy at DU in practice of therapists and gastroenterologists. In the first period (group A) there were at duodenal ulcers 77 patients with 3 complications – 69, from 4 – 8. In the second period (group B) 30 patients with duodenal ulcer with 3 complications – 19, out of 4–11 patients. In the third period (group C) (46) with duodenal ulcers with three complications there were 42 patients, and with four – 4 patients. In duodenal ulcers, the absolute number of patients increased slightly from the second (group B) to the third period (group C) from 30 cases to 46 and decreased 2.6 times compared with group A (77). However, it should be noted that the combination of 4 complications occurred only in all groups with a decrease of more than

2 times in the third period (group C), which can be explained by the widespread introduction of antiulcer and erythematous therapy with the appointment of modern powerful PPIs in the practice of gastroenterologists and therapists who treat uncomplicated gastroduodenal ulcers.

The relative number of patients with three to four complications varied in groups. The number of patients with three complications in group C (91.3 %) compared with group B (64.7 %) increased 1.5 times and slightly (1.1 times) compared to group A (89 %). There were only 4 patients with four complications in group C. At the same time, there was an increase in this indicator in group B (35.3 %) by 3.2 times compared to the first period (group A).

In the second and third periods with complicated DU, active-individualized tactics were used, a system for predicting the risk of early recurrence of bleeding and performing emergency operations in the first 6–12 hours after hospitalization of the patient with unstable hemostasis in the ulcer was used. This system reduces the number of patients operated on at the rate of early recurrence of bleeding (emergency operations at the rate of recurrence of bleeding), in addition, effective measures of primary endoscopic hemostasis allowed to prepare the patient for surgery and shift the focus to surgery in the delayed period after anemia examination and preparation of the patient. However, it should be noted a significant increase in the percentage of operations at the height of bleeding (including the height of GIB) in the third period (group C) compared with the second period (group B) 3.6 times and with the first period (group A) 1.7 times, which confirms the meaning of the developed and applied active-individualized tactics in the combination of complications, when the risk of RBl is often high.

Based on the results of the analysis, the chosen active-individualized tactics and developed algorithms for choosing the type of surgery allowed to achieve a stable level of postoperative mortality at 8.3 % in this extremely severe group of patients. This algorithm can be applied and implemented by the surgical service throughout the country.

Study limitations. This analysis included 153 patients with surgical profile who had duodenal ulcers with three and four combined complications. Patients with one or two combined complications were not included in the analysis. The time period from 1985 to 2020.

The prospects for the further research. Based on the results of the analysis, active-individualized tactics of managing patients of this cohort were developed and implemented, which in the long run will reduce both the number of complications and the overall mortality.

6. Conclusions

1. There is a steady tendency to increase the share of OSH, a significant decrease in the number of cervical and palliative operations with a relatively stable rate of OZO.
2. The most common complication was bleeding and was noted in 90.8 % of all patients, and the second most common complication was perforation of the ulcer, which was found in 45.1 % of all other complications.
3. According to the analysis, resection techniques are practically not used in this cohort of patients, because they are traumatic and physiologically unreasonable.
4. According to the results of the analysis the developed algorithm of a choice of an operative measure allows to optimize surgical tactics at a simultaneous combination of three complications of duodenal ulcers.
5. Tactics of surgical treatment of patients with multiple combined complications of duodenal ulcers at present should be

actively – individualized, based on the implementation of the developed rational algorithm for the choice of surgical intervention.

Conflict of interests

The authors declare there is no conflict of interests.

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Received date 07.09.2021

Accepted date 19.10.2021

Published date 29.10.2021

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How to cite: Ivanchev, P., Bilyachenko, M., Kurbanov, A., Lissov, O. (2021). *Analysis of surgical treatment of duodenal ulcers with multiple combined complications. Technology transfer: innovative solutions in medicine, 10–12.* doi: <https://doi.org/10.21303/2585-6634.2021.002151>