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Prevention of The Development of Postoperative Complications and Their Treatment in The Surgery of Duedenal Purpose

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ABSTRACT: The authors analyze various degrees of physiological anastomositis in 131 patients, and conclude that for the treatment of late anastomositis after surgical interventions on the stomach and duodenum, it is recommended to include the laser action of the anastomosis zone with two types of low-energy lasers in the complex program.

The authors argue that the combined use of low-energy laser exposure through endoscopic and percutaneous irradiation will improve the effectiveness of the treatment of late anastomositis.

KEYWORDS: Laser therapy, endoscopy, excision, probe, resection, anastomositis, ulcer, stomach, duodenum.

INTRODUCTION

Despite progress in the development of medical and endoscopic methods of treatment, surgery of ulcer in its complicated course remains a subject of interest in terms of developing or improving various options for surgical approaches, the essence of which is aimed at reducing the incidence of various postoperative complications [2,5,7,14]. This applies to both resection technologies, among which the Billroth-I or II resection options are constantly being modified, and organ-preserving interventions - ulcer excision, perforation suturing, etc. [3,8,10,12,]. In this regard, the frequency and spectrum of complications undoubtedly depend on both the operation technique and other factors: the type of suture material, the initial state of patients, and others [6,11].

Factors associated with pathology include pathological features (size and location of the ulcer, presence of perforation, local tissue inflammation, suspected malignant neoplasm, peritonitis and sepsis) [4,9]. Patient-related factors include age, gender, and comorbidities, while health-related factors include the availability of medical facilities and a trained surgeon [1]. Each factor in itself and their relationship, reflecting the surgical scope, are important when deciding on the choice of surgical strategy [13].

As a rule, postoperative anastomositis is considered as a physiological process and develops in all patients as a result of the intervention. However, it is considered physiological only in the next 5-7 days after the operation, while, according to morphological criteria, the anastomosis should be catarrhal. With the development of clinical signs of anastomosis and its duration for more than 7 days, the rehabilitation process will be lengthened, since in these cases such a complication is no longer physiological and requires additional therapeutic measures.

Aim. To improve the results of surgical treatment of patients with duodenal ulcer by introducing laser technology.

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MATERIALS AND METHODS

The satisfactory course of the early postoperative period was characterized only by mild general clinical manifestations, which generally correspond to the severity of the surgery. Intra- and postoperative measures proposed against the background of standard recommendations made it possible to increase the frequency of postoperative "physiological" anastomositis in the study group within 6-7 days after surgery from 68.5% (in 50 patients in the comparison group) to 89.7% (in 52 of 58 patients; $\chi 2 = 9.202$; df = 2; p = 0.011). The average severity of the anastomositis was verified in 19 (26%) and 6 (10.3%) patients, respectively, while a severe degree developed only in the comparison group in 4 (5.5%) patients (Table 1).

Table 1. Distribution of patients according to the clinical severity of the postoperative "physiological" anastomositis

Severity	Comparisongroup		Maingroup	
	abs	%	abs	%
Easy	50	68,5%	52	89,7%
Average	19	26,0%	6	10,3%
Heavy	4	5,5%	0	0,0%
Total	73	100,0%	58	100,0%
χ^2	9,202; df=2; p=0,011			

Accordingly, a lower incidence of clinical manifestations was noted. Thus, the phenomena of nausea were noted by 8 (11%) patients in the comparison group, while in the main group only 3 (5.2%). Intermittent vomiting was observed in 5 (6.8%) and 1 (1.7%) patients, respectively. By day 7, pain symptoms persisted in 12.3% (9) in the comparison group and in 3.4% (2) in the main group (Table 2).

Table 2. The frequency of various manifestations of anastomosis on the 7th day after surgery

Complaints	Comparisongroup		Maingroup	
	abs.	%	abs.	%
Nausea	8	11,0%	3	5,2%
Vomiting	5	6,8%	1	1,7%
Otryzhka	13	17,8%	4	6,9%
Belch	6	8,2%	2	3,4%
Pain or heaviness in the epigastrium	9	12,3%	2	3,4%
Decreasedappetite	19	26,0%	6	10,3%

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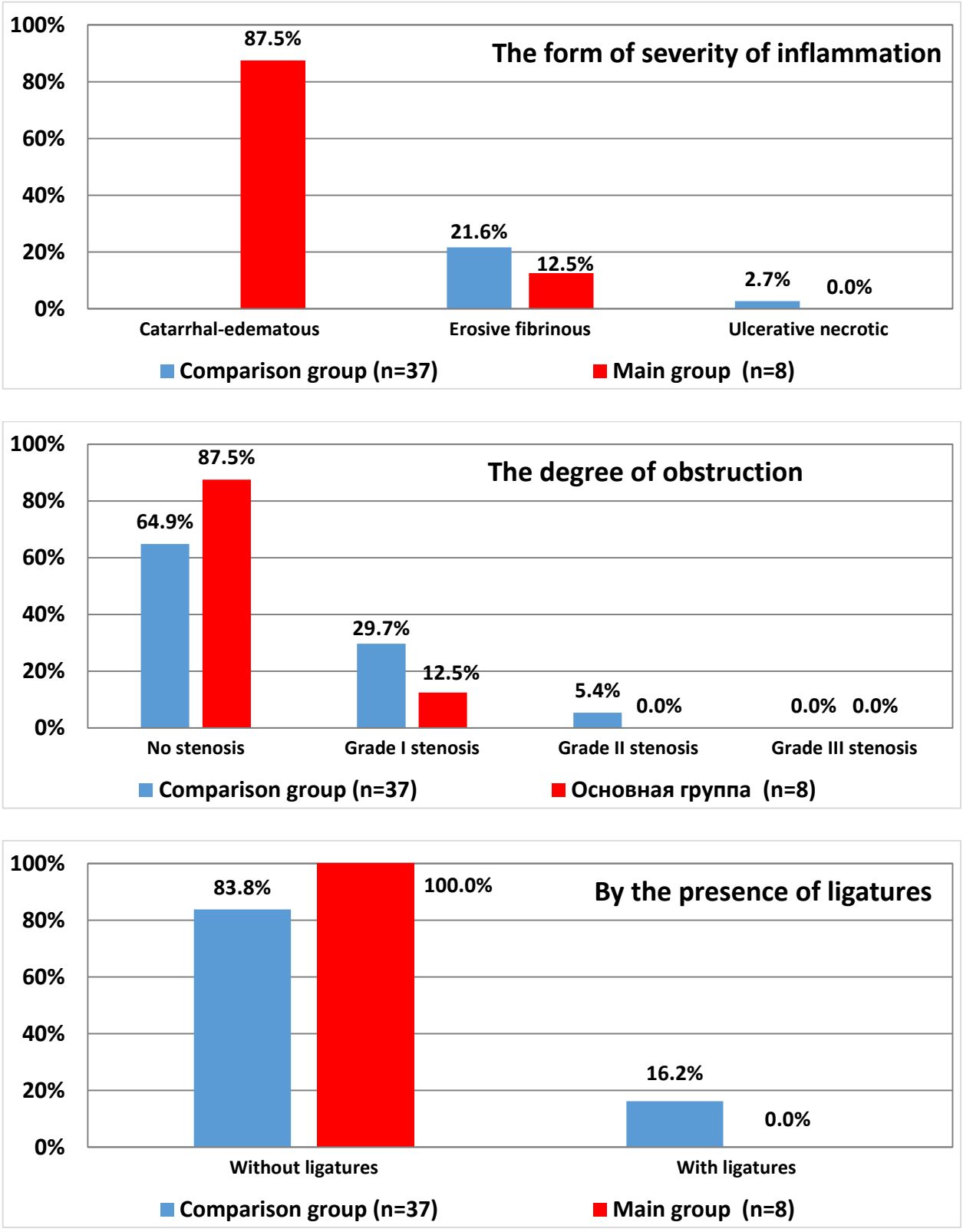
Control endoscopy on days 7-8 due to the development of a clinically significant anastomositis was performed in 37 patients in the comparison group and only 8 patients in the main group (Fig. 1).



Rice. 1. Verified form of early protracted postoperative anastomositis according to endoscopy data

RESULTS AND DISCUSSION

Most often, according to the severity of inflammation, the catarrhal-edematous degree was verified - 28 (75.7%) in the comparison group and 7 (87.5%) in the main group. In 8 (21.6%) and 1 (12.5%) cases, the erosive-fibrinous form was determined, respectively. The ulcerative-necrotic form was detected in 1 (2.7%) patient in the comparison group.

Endoscopically, 11 (29.7%) patients in the comparison group and 1 (12.5%) in the main group had first-degree stenosis of the anastomosis; second degree in 2 (5.4%) patients in the comparison group, normal patency of the anastomosis was in 24 (64.9%) and 7 (87.5%) patients. Already in the early postoperative period, in 6 (16.2% of patients in the comparison group, in the zone of inflammatory infiltration, ligatures were determined, which during this period were not subject to excision due to the risk of subsequent inconsistency of the sutures.

In general, in 6 (8.2%) patients in the comparison group (after RS according to B-I - 3; RS according to B-II - 1 and excision of the ulcer - 2) and only in 1 (1.7%) in the main group (after gastric cancer according to B-I) clinico-endoscopic development of a clinically significant anastomositis was noted in the nearest period (Table 3).

Table 3.The incidence of clinically significant anastomositis in the near future

Operationtype	Comparisongroup		Maingroup	
	abs	%	abs	%
RS according to B-I	3	11,5%	1	5,3%
RS according to B-II	1	7,7%	0	0,0%
Excisionoftheulcer	2	5,9%	0	0,0%
Total	6	8,2%	1	1,7%

All these patients underwent radiopaque examination with barium suspension. During dynamic examination, normal evacuation (45-60 minutes) after gastric cancer according to B-I was determined in 3 (18.8%) cases in the comparison group and 2 (50%) in the main group, accelerated evacuation (less than 45 minutes) in 4 (25%) and 1 (25%) patients, delayed (more than 60 minutes) in 9 (56.3%) and 1 (25%) patients (Table 4). After gastric cancer according to B-II, the norm was determined in 2 (28.6%) cases in the comparison group and 1 (50%) in the main group, accelerated evacuation in 5 (71.4%) and 1 (50%) patients. After excision of the ulcer, normal evacuation was in 5 (35.7%) in the comparison group and in 1 (50%) in the main group, accelerated evacuation in 1 (7.1%) patient in the comparison group, delayed in 8 (57.1%) and 1 (50%) patients.

Table 4. Distribution of patients by contrast evacuation time (X-ray contrast study)

Evacuationtime	Comparisongroup		Maingroup	
	abs	%	abs.	%
RS according to B-I				
Norm (45-60 min)	3	18,8%	2	50,0%
Accelerated (upto 45 min)	4	25,0%	1	25,0%
Slow motion (more than 60 min)	9	56,3%	1	25,0%
Total	16	100,0%	4	100,0%
RS according to B-II				
Norm (45-60 min)	2	28,6%	1	50,0%
Accelerated (upto 45 min)	5	71,4%	1	50,0%
Slow motion (more than 60 min)	0	0,0%	0	0,0%
Total	7	100,0%	2	100,0%
Excisionoftheulcer				
Norm (45-60 min)	5	35,7%	1	50,0%
Accelerated (upto 45 min)	1	7,1%	0	0,0%
Slow motion (more than 60 min)	8	57,1%	1	50,0%
Total	14	100,0%	2	100,0%

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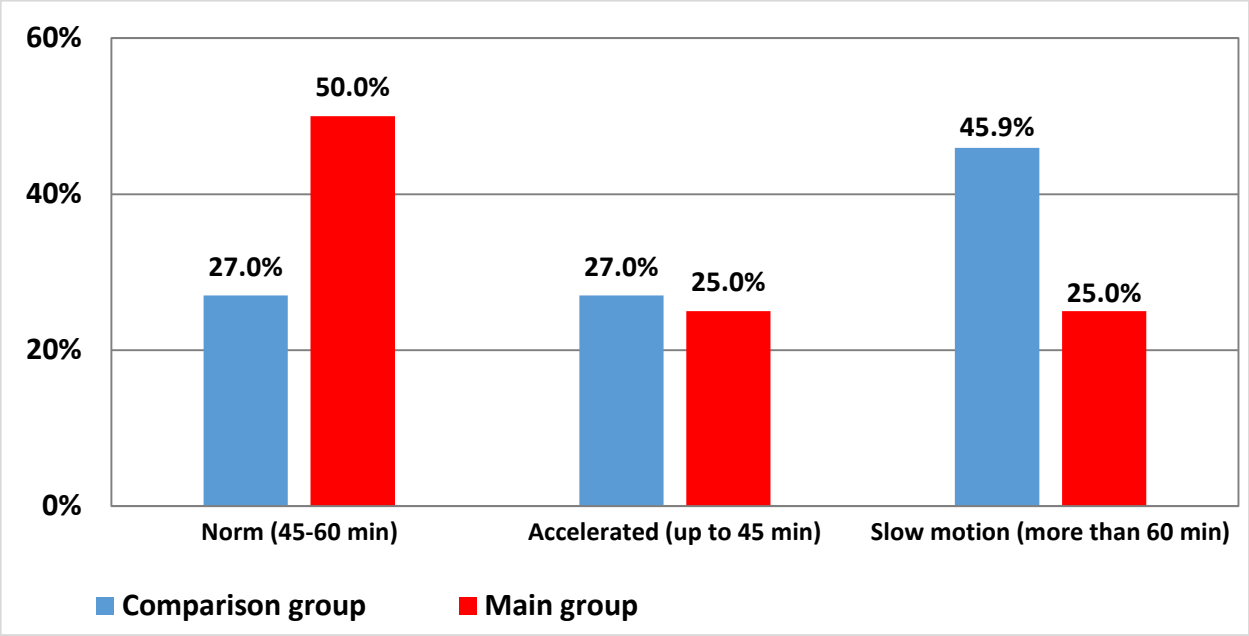
In general, for all types of operations, normal evacuation was determined in 10 (27%) cases in the comparison group and 4 (50%) in the main group, accelerated evacuation in 10 (27%) and 2 (25%) patients, delayed in 17 (45.9%) and 2 (25%) patients (Fig. 2).



Rice. 2. The summary distribution of patients by the time of evacuation of contrast (X-ray contrast study)

The dynamics also differed in the quality of postoperative rehabilitation. So, within 7 days after the operation, the clinical manifestations of the anastomosis were arrested after gastric cancer according to B-I in 10 of 26 patients (38.5%) in the comparison group and 15 (78.9%) of 19 patients in the main group. In the period of 7-10 days, regression of the anastomositis was verified in 13 (50%) and 3 (15.8%) patients, and in periods of more than 10 days in 3 (11.5%) and only 1 (5.3%) patients in the main group ($\chi 2 = 7.339$; df = 2; p = 0.026) (Table 5).

After gastric cancer according to B-II, by day 7, anastomositis was arrested in 6 of 13 patients (46.2%) in the comparison group and 9 (81.8%) of 11 patients in the main group. In the period of 7-10 days, regression of the anastomosis was verified in 6 (46.2%) and 2 (18.2%) patients, and in the period of more than 10 days in 1 (7.7%) patient in the comparison group ($\chi 2 = 3.457$; df = 2; p = 0.178; the difference was not significant).

After excision of the ulcer by day 7, anastomositis was arrested in 20 of 34 patients (58.8%) in the comparison group and 26 (92.9%) of 28 patients in the main group. In the period of 7-10 days, regression of the anastomosis was verified in 12 (35.3%) and 2 (7.1%) patients, and over 10 days in 2 (5.9%) patients in the comparison group ($\chi 2 = 9.433$; df = 2; p = 0.009).

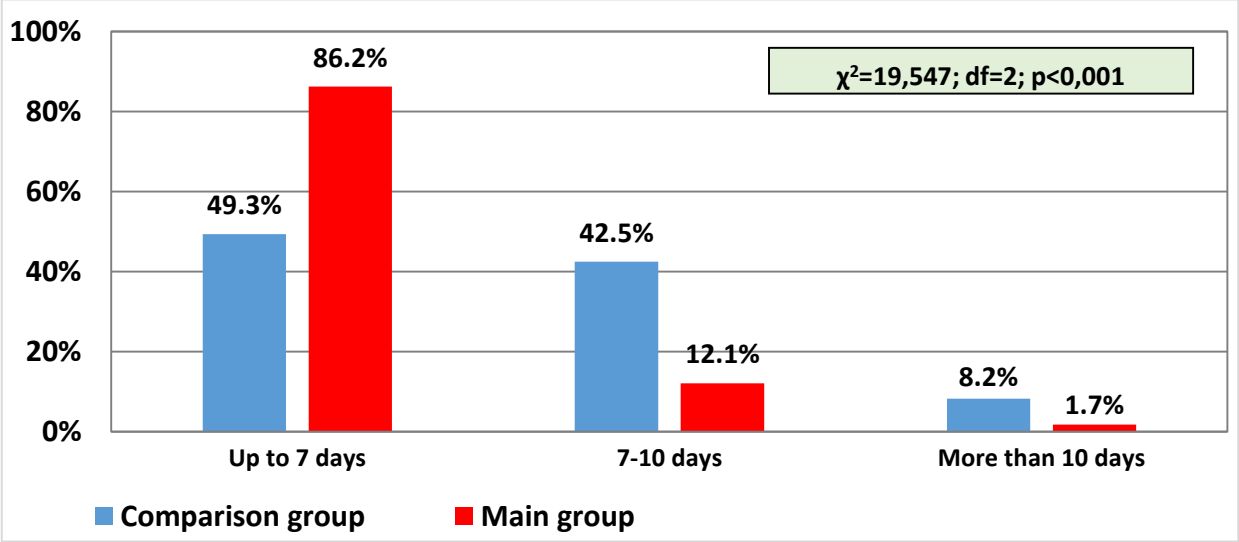
Table 5. Distribution of patients according to the timing of relief of clinical manifestations of anastomosis

Evacuationtime	Comparisongroup		Maingroup	
	abs	%	abs.	%
RS according to B-I				
Up to 7 days	10	38,5%	15	78,9%
7-10 days	13	50,0%	3	15,8%
More than 10 days	3	11,5%	1	5,3%
Total	26	100,0%	19	100,0%
χ^2	7,339; df=2; p=0,026			
RS according to B-II				
Up to 7 days	6	46,2%	9	81,8%
7-10 days	6	46,2%	2	18,2%

More than 10 days	1	7,7%	0	0,0%
Total	13	100,0%	11	100,0%
χ^2	3,457; df=2; p=0,178			
Excisionoftheulcer				
Up to 7 days	20	58,8%	26	92,9%
7-10 days	12	35,3%	2	7,1%
More than 10 days	2	5,9%	0	0,0%
Total	34	100,0%	28	100,0%
χ^2	9,433; df=2; p=0,009			

In general, for all operations, within 7 days after the intervention, the clinical manifestations of the anastomositis were arrested in 36 of 73 patients (49.3%) in the comparison group and 50 (86.2%) of 58 patients in the main group.

In the period of 7-10 days, regression of the anastomositis was verified in 31 (42.5%) and 7 (12.1%) patients, and over 10 days in 6 (8.2%) and 1 (1.7%) patients in the main group ($\chi 2 = 19.547$; df = 2; p <0.001) (Fig. 3).



Rice. 3. The summary distribution of patients according to the timing of the relief of clinical manifestations of the anastomositis

In the structure of postoperative complications, in addition to erosive anastomosis, in 9 (12.3%) patients in the comparison group and in 2 (3.4%) patients in the main group, inconsistency of the anastomosis sutures after gastric cancer according to the first Billroth method developed in 1 (1.4%) patient in the comparison group. Phenomena of gastrostasis were generally observed in 3 (4.1%) and 1 (1.7%) patients (Table 6).

Table 6. The incidence of various early postoperative complications in the compared groups

Complications	Comparisongroup		Comparisongroup	
	abs.	%	abs.	%
Anastomoticleakage	1	1,4%	0	0,0%
Anastomositis (erosiveprocess)	9	12,3%	2	3,4%
Gastrostasis	3	4,1%	1	1,7%
Bleeding	1	1,4%	0	0,0%
Acutepancreatitis	1	1,4%	0	0,0%

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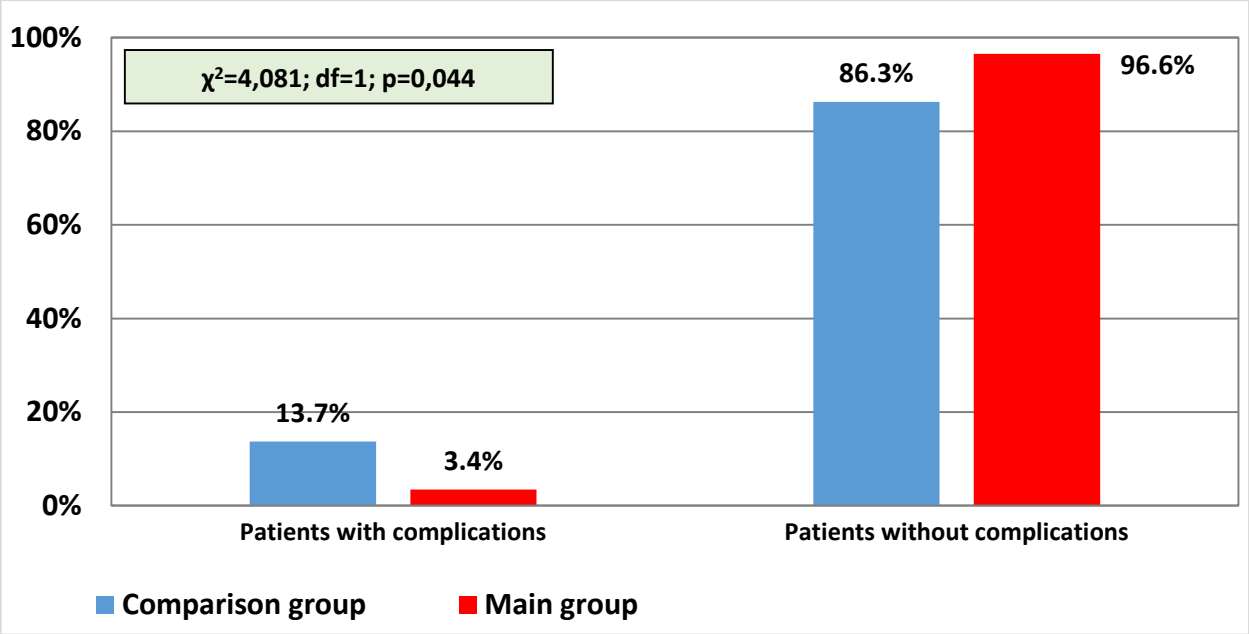
Bleeding and acute pancreatitis were noted in 1 case (1.4%) in the comparison group. In general, in the comparison group there were 10 (13.7%) patients with various complications and 63 (86.3%) were discharged without complications. In the main group, there were 2 (3.4%) patients with complications and 56 (96.6%) without complications ($\chi 2 = 4.081$; df = 1; p = 0.044) (Fig. 4).



Rice. 4. Consolidated frequency of complicated course after surgery

It should be noted that in the control group there were 2 (2.7%) with severe complications. In the case of inconsistency of the sutures, repeated intervention was required with suturing of the zone of insufficiency of the sutures, and in the case of bleeding against the background of anastomositis, endoscopic hemostasis was required.

According to clinical characteristics, the onset of regression of anastomosis manifestations in the comparison group after gastric cancer according to B-I was noted on 8.2 ± 2.6 days after surgery, in the main group on 6.3 ± 1.3 days (t = 2.74; p < 0.05). After gastric cancer according to B-II, this indicator was 8.1 ± 2.2 versus 6.1 ± 1.3 days (t = 2.36; p <0.05), after excision 7.5 ± 2.2 versus 6 , 1 ± 1.3 days (t = 3.11; p <0.05) (Table 7).

The duration of the entire hospital period after gastric cancer according to B-I was 13.0 ± 3.0 days in the comparison group, in the main group 10.5 ± 1.9 days (t = 3.45; p <0.05). After gastric cancer according to B-II, this indicator was 12.8 ± 2.1 versus 10.6 ± 1.5 days (t = 2.90; p <0.05), after excision of the ulcer - 11.6 ± 2.2 versus 9.9 ± 1.5 days (t = 3.71; p <0.05).

Table 7. Duration of various stages of the hospital period (day)

Period	Comparison group			Main group			t	
	n	M	δ	n	M	δ	Meaning	R
The beginning of the regression of the manifestations of the anastomosis (day p / o)								
RS according to B-I	26	8,19	2,56	19	6,32	2,03	- 2,74	<0,05
RS according to B-II	13	8,08	2,22	11	6,36	1,29	- 2,36	<0,05
Excisionoftheulcer	34	7,47	2,22	28	6,07	1,27	-3,11	<0,05
Duration of hospital n / o period (day n / o)								
RS according to B-I	26	11,04	2,54	19	8,53	1,58	-4,08	<0,05
RS according to B-II	13	10,92	2,36	11	8,82	1,08	-2,88	<0,05

Excisionoftheulcer	34	10,29	2,29	28	8,64	1,45	-3,45	<0,05
Duration of hospital n / o period (day n / o)								
RS according to B-I	26	1,92	0,80	19	1,95	0,71	0,11	>0,05
RS according to B-II	13	1,85	0,80	11	1,82	0,75	-0,09	>0,05
Excisionoftheulcer	34	1,32	0,53	28	1,21	0,42	-0,90	>0,05
Duration of the entire hospital period (day p / o)								
RS according to B-I	26	12,96	2,96	19	10,47	1,87	-3,45	<0,05
RS according to B-II	13	12,77	2,09	11	10,64	1,50	-2,90	<0,05
Excisionoftheulcer	34	11,62	2,23	28	9,86	1,48	-3,71	<0,05

In general, for all interventions, the duration of the period before surgery in both groups was 1.6 ± 0.7 days. The onset of regression of anastomosis manifestations in the comparison group was noted at 7.8 ± 2.4 days after surgery, in the main group at 6.2 ± 1.6 days (t = 4.64; p <0.05). The duration of the postoperative period was 10.63 ± 2.4 versus 8.9 ± 1.7 days (t = 4.88; p <0.05). The duration of the entire hospital period was 12.3 ± 2.5 days in the comparison group, and 10.5 ± 1.9 days in the main group (t = 4.64; p <0.05) (Table 8).

Table 8. Cumulative duration of various stages of the hospital period

Periods	Comparison group		Main group		t	
	M	δ	M	δ	Meaning	R
The beginning of the regression of the manifestations of the anastomosis (day p / o)	7,81	2,35	6,22	1,55	-4,64	<0,05
Duration of hospital n / o period (day n / o)	10,63	2,39	8,88	1,71	-4,88	<0,05
Duration of hospital d / o period (day n / o)	1,63	0,74	1,57	0,68	-0,49	<0,05
Duration of the entire hospital period (day p / o)	12,26	2,53	10,45	1,94	-4,64	<0,05

CONCLUSION

Thus, the inclusion in the comprehensive program of early rehabilitation after surgical treatment of complicated duodenal ulcer of the proposed method of laser exposure made it possible to reduce the incidence of clinically significant anastomositis from 8.2% (in 6 patients in the comparison group) to 1.7% (in 1 patient in the main group) and, in general, specific complications that required additional measures from 13.7% (in 10 patients) to 3.4% (in 2 patients; $\chi 2 = 4.081$; df = 1; p = 0.044), increase the proportion of the physiological course of postoperative period already by 7 days from 49.3% (36 patients) to 86.2% (in 50 patients; $\chi 2 = 19.547$; df = 2; p <0.001), and also to reduce the duration of the hospital period from 12.3 ± 2, 5 to 10.5 ± 2.0 days (t = 4.64; p <0.05).

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