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NEW ADVANCES IN GASTRODUODENAL ULCERS SURGERY: EVALUATION OF THE CLINICAL SUITABILITY OF AN IMPROVED ENDOSCOPIC HEMOSTASIS TECHNIQUE IN GASTRODUODENAL BLEEDINGS

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Introduction

1. Introduction

Duodenal and gastric ulcers are among the most prevalent conditions worldwide, affecting 5–10% of the general population on average [1]. Although there has been significant improvement in treating this pathology in recent decades, 10-15% of patients with peptic ulcer disease still experience various consequences, despite a significant drop in morbidity, hospitalization, and death. The most frequent consequence of gastroduodenal ulcers nowadays is bleeding, which has a 30-day death rate of up to 8.6% and an annual incidence in the general population ranging from 0.02 to 0.06% [2]. Specialists from diverse backgrounds, including as surgeons, gastroenterologists, and resuscitators, are involved in the care of this patient group. The endoscopic service is assigned

primary diagnostic priority. In most situations, endoscopic intervention serves as the main therapeutic approach for bleeding ulcerative etiology in addition to providing a topical diagnosis of the condition. Hemostasis can now be achieved by a variety of techniques, including chemical, mechanical, and physical ones, thanks to endoscopic interventions. The endoscopist's experience, specific consumables in the equipment, and other considerations all play a role in the decision of which approach to choose [3,4,5]. Despite all of these minimally invasive technologies' benefits, the issue of hemostasis technique selection and its relative efficacy in preventing hemorrhagic syndrome recurrence remains pertinent. This determines the ongoing research in this area, as new techniques are developed and combined to improve endoscopic treatment outcomes[6,7,8].

2. **Key words:** Peptic ulcer of the duodenum, stomach ulcer, endohemostas, conservative.

3. **Purpose of the study:** to employ a novel biocompatible implant to enhance the outcomes of endoscopic hemostasis in cases of gastroduodenal hemorrhage.

4. **Methods**

The paper is based on the treatment outcomes of 557 patients treated at the Republican Scientific Center for Emergency Medical Care's Andijan branch in 2020–2023 for duodenal and peptic ulcers complicated by bleeding. The groups were established in compliance with the guidelines for carrying out a prospective, controlled investigation. The complete patient sample was split into two groups upon admission for this purpose: the main group and the control group. The control group consisted of 290 patients, 48 of whom had active bleeding and received typical endoscopic hemostasis treatments, such as infiltration hemostasis; the procedure involved either a 0.1% solution of adrenaline hydrochloride or a 70% solution of ethyl alcohol. Conservative care was used in 242 of these instances to ensure that the bleeding had ceased, with endoscopy limited to the diagnostic stage. Adding a film-forming polymer based on the domestic substance "Geprocel" to the endoscopic hemostasis during active bleeding (for 46 patients) was the suggested method of treating gastroduodenal bleeding of ulcerative origin for 267 patients in the main group. This method involved the use of a special delivery device inserted into the endoscope channel for controlled administration and placement of a hemostatic agent over a bleeding erosive and ulcerative mucosal defect. The suggested approach was also put into practice together with endoscopic intervention when the bleeding stopped in 221 cases. Table 1 displays the patient distribution based on bleeding activity.

TABLE 1. Distribution of patients according to bleeding activity according to the Forrest classification (1974)

Bleeding activity according to Forrest	Groups of patients			
	Main group		Control group	
	абс.	%	абс.	%
I-A	11	4,1%	11	3,8%
I-B	28	10,5%	30	10,3%
II-A	55	20,6%	58	20,0%
II-B	76	28,5%	86	29,7%
II-C	85	31,8%	91	31,4%
III	12	4,5%	14	4,8%
Total:	267	100%	290	100%

In order to do an objective prospective controlled trial, the compared groups were dispersed taking into account comparability in all important indicators: age, sex, source, and degree of bleeding.

5. Result

When evaluating the clinical efficacy of different endohemostasis techniques, the quality of the treatment administered along with the identification of the precise percentage of inefficacy that manifests as an early hemorrhagic syndrome relapse is of utmost relevance. Currently, there is a high degree of success in achieving hemostasis without surgery in cases of peptic ulcer disease. However, the success of endoscopic procedures in particular is dependent on a number of factors, the most significant of which are the endoscopist's skill and the availability of technical support. In our investigation, endoscopic hemostasis with active bleeding was accomplished by injecting an alcohol or adrenaline solution while combining coagulation and infiltration procedures. Initially, hemostasis and hemomostasis were reached. Concurrently, a new domestic hemostatic composite based on the chemical "Geprocel" was applied to the ulcerative defect area in the main group, complementing endoscopic operations. A unique delivery tool was used to spray the polymer endoscopically in the form of a powder. In addition to improving the hemostatic action, the creation of a film over the ulcerative defect served as a barrier (protective) against the effects of digestive juice. In light of this, sophisticated conservative anti-ulcer therapy was prioritized in order to lower gastric secretion, have an anti-Helicobacter effect, etc. Each patient in the study groups got the same conservative therapy plan, which consisted of an antiulcer treatment regimen. Three (8.3%) out of the thirty-six patients in the control group who had endohemostasis during active bleeding from a duodenal ulcer experienced early recurrent bleeding. 18 of 182 cases, or 9.9%, experienced relapses upon confirmation that the bleeding had ceased. These relapses usually happened over the first three days. With the inclusion of endoscopy and the recommended technique of applying the Geprocel substance, the relapse rate in the main group was able to be lowered to 1.9% (in 3 of 188) in the subgroup with stopped bleeding and to 3.1% (in 1 of 32 patients) in the subgroup with active bleeding with endohemostasis. These values ($\chi2=9.996$; df=2; p=0.007; Table 2) were significantly better than those of the control group.

TABLE 2. Frequency of recurrent bleeding depending on the location of the ulcer

Treatment	Main group			Control group		
	quantity	relapse	%	quantity	relapse	%
Peptic ulcer of the duodenum						
Relapse after endohemostasis	32	1	3,1%	36	3	8,3%
Relapse against the backdrop of conservative tactics	156	3	1,9%	182	18	9,9%
Total	188	4	2,1%	218	21	9,6%
$\chi2$ test	9,996; df=2; p=0,007					
Stomach ulcer						
Relapse after endohemostasis	14	0	0,0%	12	1	8,3%
Relapse against the backdrop of conservative tactics	65	1	1,5%	60	4	6,7%
Total	79	1	1,3%	72	5	6,9%
$\chi2$ test	3,317; df=2; p=0,191					

Note: endohemostasis and conservative measures, such as endoscopic placement of a biocompatible implant, were used in the main group.

An additional example of the advantages of using the recommended approach was the endoscopic management of bleeding in gastrointestinal tract ulcers. Therefore, in the control group, 4 (6.7%) of 60 patients who had stopped bleeding and were undergoing conservative therapy as well as 1 (8.3%) of 12 patients who had endohemostasis and active bleeding experienced an early resumption of bleeding. The main group, on the other hand, experienced no relapses following endohemostasis,

and 1 (1.5%) of 65 patients had a relapse following application against the backdrop of halted bleeding (no significance was detected due to the small sample in the groups).

Relapses were observed in 5 (1.9%) of the main group's cases and 26 (9.0%) of the control group's cases overall. As a result, 262 (98.1%) and 264 (91.0%) of the patients (Fig. 1) did not experience recurrent bleeding.

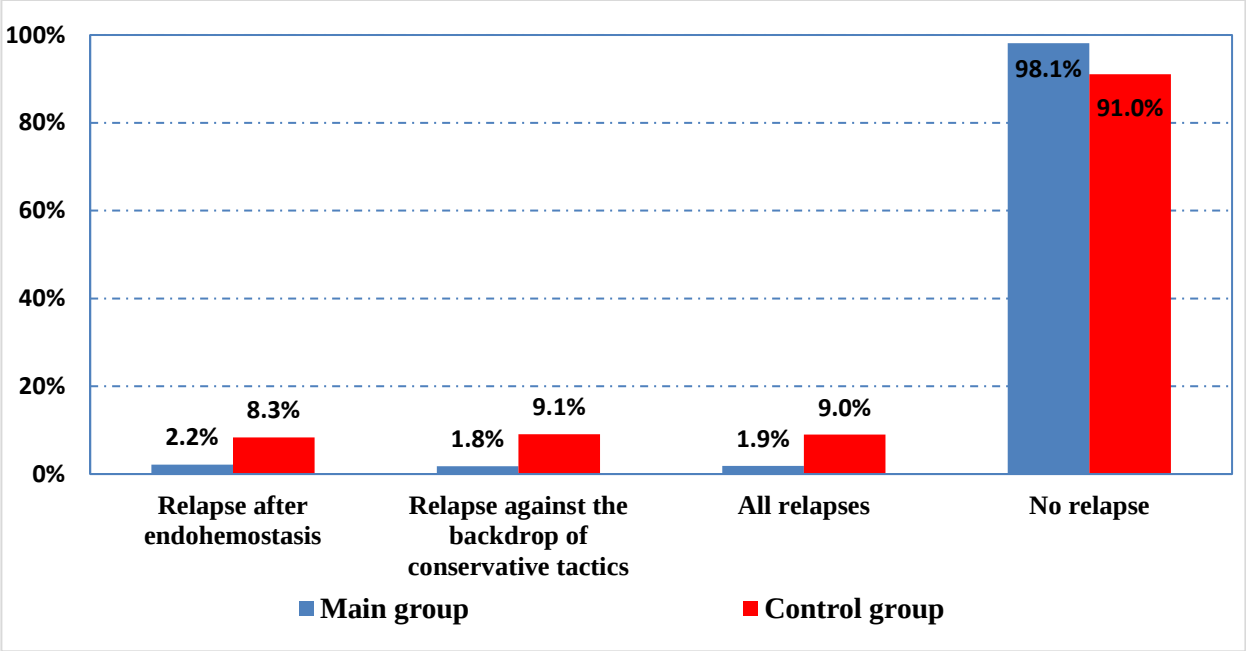

FIGURE 1. Cumulative incidence of recurrence of ulcer bleeding in comparison groups

It's interesting to examine how hemorrhagic syndrome recurrences relate to their original bleeding activity. Therefore, by examining the effectiveness of the suggested method of endoscopic hemostasis in clinical practice, it was possible to reduce the probability of relapse from a duodenal ulcer with initial activity of Forrest I from 17.9% (in 5 of 28 patients) in the control group to 4.0% (1 out of 25) in the main group. These percentages for Forrest II patients were 8.9% (16 of 180) and 20.0% (3 of 153), respectively. Forrest III did not show any recurrent bleeding in any of the ten examined patients in either group. Relapse in cases of bleeding against the background of inflammatory gastric ulcer and the first action of Forrest I was noted in 15.4% (2 out of 13 patients) of the control group and 7.1% (1 out of 14) of the main group. These percentages were 3.5% (3 out of 55) and 0% (out of 63) patients for Forrest II, respectively. Forrest III showed no evidence of recurrent bleeding in 2 of the 4 individuals who were studied (Table 3).

TABLE 3. Recurrence rate depending on bleeding activity

Bleeding activity	Main group			Control group		
	quantity	relapse	%	quantity	relapse	%
Peptic ulcer of the duodenum						
Forrest I	25	1	4,0%	28	5	17,9%
Forrest II	153	3	2,0%	180	16	8,9%
Forrest III	10	0	0,0%	10	0	0,0%
Stomach ulcer						
Forrest I	14	1	7,1%	13	2	15,4%
Forrest II	63	0	0,0%	55	3	5,5%
Forrest III	2	0	0,0%	4	0	0,0%

Forrest I, the overall relapse rate was 17.1% (7 out of 41) in the control group, 5.1% (2 out of 39) in the main group, 8.1% (19 out of 235) and 1.4% (3 out of 216) for Forrest II, and 1.4% (3 out of 216) for the main group (Fig. 2). (2). Here, the results demonstrate that covering the ulcerative defect surface with the Geprocel material enhanced the hemostatic effect while also reducing the possibility of influence-provoking factors by acting as a barrier due to the polymer's strong adhesive properties, which promoted the formation of a protective film.

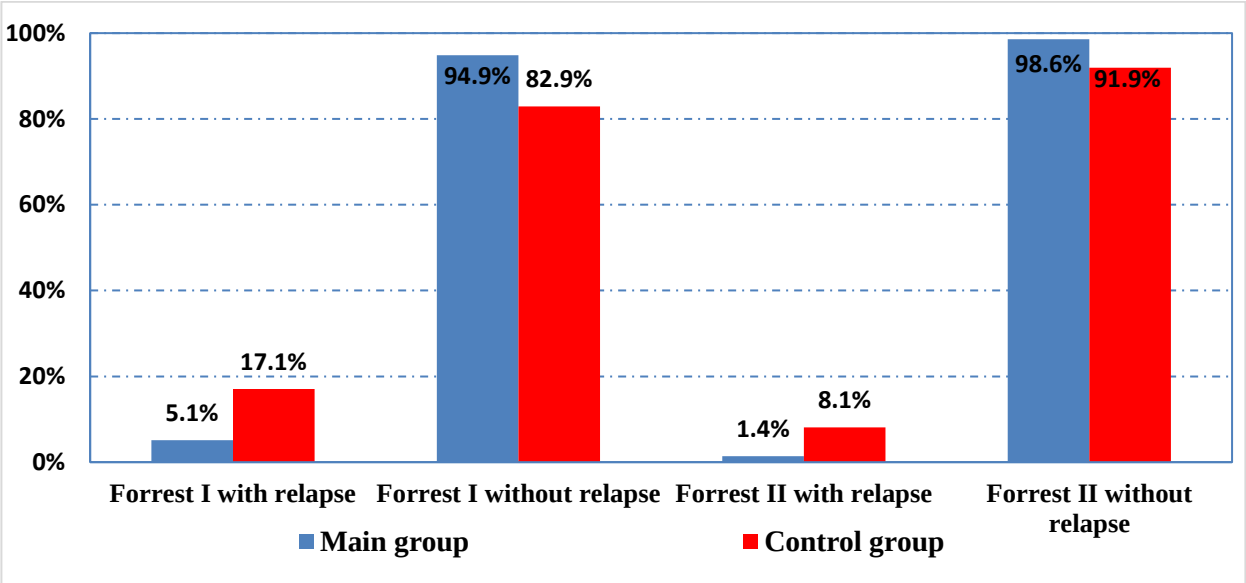

FIGURE 2. Cumulative relapse rate depending on the activity of ulcer bleeding

The necessity for surgical intervention to treat bleeding ulcers was also affected by lowering the chance of relapse. Regarding duodenal peptic ulcers in the control group, two instances necessitated surgical intervention following endohemostasis, and fourteen patients, or 7.7%, experienced recurrent episodes of bleeding in the subgroup while using conservative measures (Table 4). Of the patients in the main group, only 2 (1.3%) had surgery following spontaneous geomostasis and experienced relapse. Within the subgroup suffering from stomach ulcers, a total of 16 (7.3%) and 2 (1.1%) patients underwent surgery ($\chi 2=9.495$; df=2; p=0.009). Three patients (4.2%) in the control group and one patient (1.3%) in the main group underwent surgery for peptic ulcer relapse.

TABLE 4. Number of operated patients in comparison groups

Treatment	Main group			Control group		
	quantity	operated on	%	quantity	operated on	%
Peptic ulcer of the duodenum						
Endohemostasis	32	0	0,0%	36	2	5,6%
Conservative	156	2	1,3%	182	14	7,7%
Total	188	2	1,1%	218	16	7,3%
$\chi 2$ test	9,495; df=2; p=0,009					
Stomach ulcer						
Endohemostasis	14	0	0,0%	12	0	0,0%
Conservative	65	1	1,5%	60	3	5,0%
Total	79	1	1,3%	72	3	4,2%

Generally speaking, 2 (4.2%) patients in the control group underwent surgery following endohemostasis, and another 17 (7.0%) patients underwent conservative surgery, for a total of 19 (6.6%) patients, for all sources of bleeding. Just 3 (1.4%) of the main group's patients underwent

surgery in the subgroup when the suggested material was applied and the bleeding was controlled; the group as a whole had a 1.1% surgical treatment rate (Fig. 3).

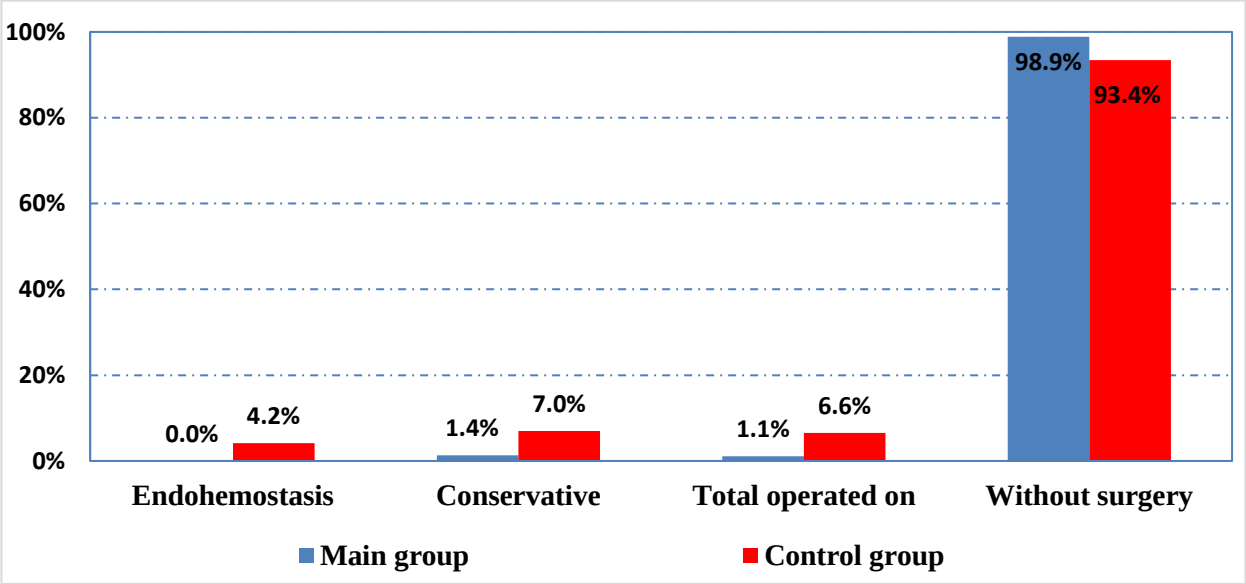

FIGURE 2. Cumulative frequency of surgical treatment in comparison groups

Three patients (1.4%) in the control group and one patient (0.5%) in the main group died in the stomach ulcer subgroup. This signal was 2.8% (2 patients) and 1.3% (1 patient) against the backdrop of stomach ulcer hemorrhage, respectively. Overall, there was no mortality in the endohemostasis subgroups; conservative measures were the cause of death for 5 (2.1%) patients in the control group and 2 (0.9%) patients in the main group. Consequently, these death rates were 1.7% and 0.7% for the groups as a whole.

6. Conclusions

The application of a composite polymer material over an ulcerative defect helps reduce the frequency of immediate relapses of hemorrhagic syndrome from 9.0% (in 26 of 290 control patients group) to 1.9% (in 5 of 267 patients in the main group; $\chi 2=13.306$; df=1; $p<0.001$), thereby reducing the need for surgical treatment from 6.6% (19 patients) to 1.1% (3 patients) ($\chi 2=10.797$; df=1; p=0.002) and, thus, the mortality rate from 1.7% (5) to 0.7% (2).

7. Data Availability Statement

All relevant data about this case report is available within the manuscript.

8. Author Contributions

Khodzhimatov Gulomidin Minkhodzhievich: Conceptualization, supervision.

Khakimov Dilshodbek Mamadalievich: Validation, visualization.

Khamdamov Khabibullo Khamdamovic: Conceptualization; data curation.

Karabaev Begzodbek Bakhodirovich: Original draft, writing, review, and editing, writing, review.

Kasimov Nosirbek Adkhamovich:Rreview and editing.

Yakhyoev Sardorbek Mamasobir ugli: Visualization; writing, review and editing.

9. Conflict of Interest

The authors have no conflicts of interest to declare.

10. Funding Information

The authors did not receive any funding for this paper.

11. Ethics Statement

Our institution does not require ethical approval for reporting individual cases or case series. Written informed consentwas obtained from the patient(s) for their anonymized information to be published in this article.

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