



Article

The Results of Endoscopic Interventions for Superficial Neoplasms of the Upper Gastrointestinal Tract

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Abstract: The article highlights the results of endoscopic treatment of polypoid neoplasms of the upper gastrointestinal tract. A method for endoscopic removal of polyps has been proposed, which involves the use of submucosal injection of a gel substance into the base of the formation and laser excision. Analysis of the long-term results of endoscopic removal of superficial neoplasms of the upper gastrointestinal tract made it possible to determine that excision using a diode laser, due to the technical features of the method, reduced the risk of recurrence of pathology from 17.4% to 3.1%, while this trend was noted as with en bloc removal (from 5.0% to 0.9%), and with fragmented excision (from 28.0% to 7.7%), in turn, depending on the initial size of the polyps, the proportion of relapses decreased from 7.8% to 0.9% for formations up to 1 cm, from 33.3% to 4.5% for formations 1-2 cm and from 60.0% to 8.3% for formations more than 2 cm.

Keywords: polypoid neoplasms, gastrointestinal tract, endoscopic interventions, bleeding, perforation, relapse

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1. Introduction

Most of the recommendations are aimed at removing polypoid formations larger than 5 mm [7]. A biopsy cannot completely exclude dysplasia and malignancy, therefore, after complete removal of the formation, a thorough pathological examination with morphological verification and assessment of the quality of resection should be carried out [8]. Treatment methods for polypoid formations include clipping, cold excision, electrocoagulation, endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD), etc. [9]. The probability of complete removal of polyps depends on their size and the method of excision, in particular, with a diameter of 6-20 mm, this figure reaches 81.6% with cold removal and 94.1-95.5% with cold or thermal resection [10]. According to other data, the frequency of single block resections ranges from 44.5 to 63%

for EMR and from 87.9 to 96% for ESD [11]. Endoscopic submucosal dissection has a higher level of complete resection than other options, but at the same time the risk of bleeding and perforation increases [12].

Proper diagnosis and reduction of the risk of these interventions are of key importance in the endoscopic treatment of GIT surface formations [13]. The removal of such formations is associated with a considerable risk of complications and should be performed by specially trained endoscopists [14]. Among the main complications that develop both during the intervention and in the early period, bleeding and perforation are distinguished [15]. The frequency of early postmanipulation bleeding ranges from 0% to 6.3%, and perforations 0-6% [16]. The recurrence rate of polyps can reach 32.1% [17, 18].

Even after complete resection by endoscopic resection or dissection, recurrences occur in 2.4-12.2% of patients due to incomplete removal [19, 20]. Local recurrence after polyp resection occurs in 3% of cases with single block removal and in 20% with fragmentary resections [21]. There is still insufficient research to assess the advantages and disadvantages of various methods of polyp removal [22]. The issue of improving the effectiveness of endoscopic treatment of polypoid formations requires further study [23]. This applies both to the correct choice of endoscopic methods and methods of removing formations [15, 24, 25].

2. Materials and Methods of Research

The aim of this study is to reduce the risk of recurrence, bleeding and other postoperative complications after endoscopic removal of GIT polyps. For this purpose, our clinic has developed a method of endoscopic excision of GIT polyps. The main technical aspects of the method include the introduction of a gel made from Hemoben powder and 20 ml of methylene blue solution into the submucosal layer in the area of the base of the polyp with the formation of a roller. Next, the polyp is excised together with the surrounding healthy mucosal tissue to the submucosal layer by using a diode laser of the Gbox system. It should be noted that in the absence of high-energy laser equipment, the use of injection under the mucous membrane of the proposed composition of the gel composition can also be used with standard methods of cold or thermal excision.

The advantages of the method are the following factors: complete and persistent hemostasis is achieved; the risk of damage to the musculoskeletal serous layer of the stomach is prevented, thereby reducing the risk of organ perforation; the radicality of polyp removal is achieved regardless of the shape of its leg; a high-energy laser is used, which has less penetrating power compared with electrocoagulation, as well as infrared lasers.

Clinical research is based on assessing the results of treatment of superficial formations in the upper part of GIT. In the comparison group at 134 (54,5%) patients

removed – 182 and formation in the primary group 118 (55,1%) patients removed 167 formations). Patients with single entities in the comparison group was 104, in main group – 86, a unit of formation (up to 5) were 29 and 30 patients, respectively, multiple (up to 20) only 1 and 2 patients. The average size of units in the comparison group was 0.9 cm, in the main group 1.0 cm.

The morphological form during endoscopic examination was determined according to the Paris Endoscopic Classification of superficial neoplastic lesions. In most cases, polypoid formations (0-Ip, 0-Is) were removed – 170 (93.4%) in the comparison group and 149 (89.2%) in the main group. Non-polypoid slightly raised (protruding) surface formations (0-IIa) were removed in 12 (6.6%) and 18 (10.8%) cases, respectively.

Endoscopic interventions in the comparison group included cold removal with biopsy forceps, cold removal with a loop, thermal removal by electroexcision, EMR and dissection in the submucosal layer. A new method of endoscopic excision was used in the main group.

Table 1. The frequency of complications after endoscopic removal of formations (from among patients)

A Complication	Comparison Group		The Main Group	
	abs.	%	abs.	%
The bleeding	6	4,5%	1	0,8%
Perforation	1	0,7%	0	0,0%
Post-polypectomy electrocoagulation syndrome	3	2,2%	0	0,0%
Without complications	124	92,5%	117	99,2%
Total	134	100,0%	118	100,0%
The difference (χ^2)	6,578; df=1; p=0,011			

3. Results and Discussion

When analyzing the protocols of endoscopic manipulations, it was determined that in the comparison group, the proportion of performed polypectomies in a single block was 69.8%, respectively, 55 polyps were removed from fragments. In the main group, taking into account the implementation of the new excision technique, this figure was 82.6% - in a single block and 17.4% in fragments. With polyps up to 1 cm in the comparison group, 112 (75.2%) out of 149 formations were removed in a single block, whereas in the main group in 114 out of 128 cases (89.1%). For formations larger than 1 cm, this ratio was 45.5% versus 61.5%.

The most common complicating factor of endoscopic interventions in the removal of mucosal formations is bleeding. The proposed technique, due to the hemostatic component, made it possible to reduce the frequency of these manifestations. So, if we

consider only clinically significant manifestations of hemorrhagic syndrome, that is, those that required additional hemostatic measures, then at the time of manipulation there were 12 (6.6%) in the comparison group and none in the main group. In the early period after excision, delayed bleeding developed in 6 (3.3%) cases in the comparison group and only in 1 (0.6%) case in the main group.

Summarizing the frequency of clinically significant complications, which according to the Clavien-Dindo classification were assigned to grades 2, 3a and 3b, the following can be noted. Of the 134 patients in the comparison group, 6 (4.5%) showed the development of delayed bleeding, in the main group this complication was observed in 1 (0.8%) patient. Perforation after removal of the duodenal polyp in the comparison group developed 1 day after manipulation in 1 (0.7%) case. In the comparison group, 3 (2.2%) cases of postpolypectomy electrocoagulation syndrome were also noted. There were 124 (92.5%) patients in the comparison group and 117 (99.2%) in the main group without any complications (Table 1).

In our studies in the comparison group, in 57 cases it was not possible to carry out accurate morphological verification. At the same time, in the main group, due to the use of laser excision with the preliminary formation of submucosal imbibition, the proportion of morphologically unidentified variants of polyps was only 15.6%. Hyperplastic character was identified in 64.8% of cases in the comparison group and 61.7% in the main group. Fundal gland polyps accounted for 18.4% and 19.9%. The adenomatous type of polyps was determined in 16.8% and 18.4% of cases. Malignancy was determined in 4 and 6 cases.

Morphological examination revealed a different degree of dysplasia in 16.8% of cases in the comparison group and 17.7% of cases in the main group. Malignancy of formations was determined in only 10 cases (4 in the comparison group and 6 in the main group). Taking into account the verification of malignancy, surgical treatment was proposed, but the latter was performed only in 3 patients (subtotal gastric resections), the remaining patients refrained from surgery and were observed in dynamics.

In recent years, surgical endoscopy has shown trends in assessing the quality of resection. In our study, such a histological assessment has been carried out over the past 1.5 years, therefore, it was performed only in 71 patients in the main group. During morphological analysis of the edges of the resected formations, the polyp tissue was verified in 8.5% of cases, which corresponded to R1 resection, and in 91.5%, pathological tissue was not determined along the edge of resection (R0 resection). For polyps up to 1.0 cm, resection of R0 was determined in 26 out of 27 cases, R1-resection in 1 case. In polyps larger than 1.0 cm, R0 resection was performed in 88.6% of cases.

The complex of rehabilitation of patients after endoscopic excisions was equivalent in both groups. It was noted that after the introduction of the new technique, the hospital period after the intervention was reduced. Thus, 74 (55.2%) patients in the comparison

group and 82 (69.5%) in the main group were discharged at an early date (up to 3 days). 52 (38.8%) and 35 (29.7%) patients were discharged within 4-5 days, respectively, 8 (6.0%) and only 1 (0.8%) spent more than 5 days in the department ($\chi^2=8,194$; $df=2$; $p=0,017$).

Table 2. Recurrence of neoplasm development depending on the initial size of the formations (from the number of formations)

Polyp size	Comparison Group			The Main Group			χ^2 (df=1)	
	n	Recurrence	%	n	Recurrence	%	Meaning	p
Up to 1 cm	128	10	7,8%	109	1	0,9%	6,324	0,012
1,0-2,0 cm	18	6	33,3%	22	1	4,5%	5,683	0,018
>2,0 cm	5	3	60,0%	12	1	8,3%	5,236	0,023
Total	151	19	12,6%	143	3	2,1%		
Without Recurrence	151	132	87,4%	143	140	97,9%	11,663	<0,001

The average bed day after endoscopic interventions was 3.5 ± 1.2 days in the comparison group and 3.1 ± 0.9 days in the main group ($t=2.90$; $p<0.05$).

Long-term results, taking into account the first experience of clinical application of the new method, were tracked in terms from 6 to 18 months. 109 patients from the comparison group were followed up, 98 in the main group. In the comparison group, 82.6% of patients had no relapses during the control study, however, in 19 (17.4%) cases, recurrences of the development of superficial neoplasms were verified. In the main group, relapse was detected in only 3 patients.

Depending on the initial size of the removed tumors, the recurrence rate was also different. Thus, with polyps up to 1 cm in the comparison group, recurrence was determined in 7.8% of cases, in the main group in 0.9% of cases (Table 2). With polyps 1-2 cm, the recurrence rate was 33.3% versus 4.5%. For polyps over 2.0 cm - 60% and 8.3%.

Another risk factor for relapse is the option of removing the formations. In the comparison group, the proportion of relapse after removal of single blocks was 5.0% in the comparison group, 0.9% in the main group. Fragmented deletion increased these rates to 28.0% and 7.7% of cases. Accordingly, the proposed technique has improved the results of endoscopic treatment of upper GIT polyps.

5. Conclusions

Summarizing all the results of treatment, the following can be noted. If we consider all patients who were initially observed and subsequently traced in the long-term period after endoscopic interventions, the introduction of a new technique for endoscopic excision

of upper GIT polyps allowed to generally improve treatment results. In our study, we considered the results to be good, which excluded the development of immediate complications after manipulation and recurrence of polyp formation. The results were considered satisfactory if there were no recurrence of pathology, but there were any clinically significant complications resolved conservatively (postpolypectomy electrocoagulation syndrome) or repeated endoscopic intervention (delayed bleeding) (grade 2-3a according to Clavien-Dindo). The results were considered unsatisfactory when there was a complication that required emergency surgery (perforation, (grade 3b according to Clavien-Dindo) or in the long term, recurrence of neoplasm formation was noted.

If we consider the cohort of patients only followed in the long-term period, the proportion of good results in the comparison group was 73.4% (in 20 out of 109 patients), satisfactory - 8.3% (9) and unsatisfactory – 18.3% (20). In the main group, the results were good in 95.9% (in 94 out of 98 patients) of cases, satisfactory in 1.0% (1) and unsatisfactory in 3 (3.1%) of cases ($\chi^2=19.562$; $df=2$; $p<0,001$).

It should be noted that out of 10 cases with verified malignancy, 3 patients were operated on in the near future after verification of the diagnosis, 4 more patients during the next 6 months (due to the increasing emotional background due to cancer alertness), the remaining 3 patients did not have tumor recurrence in the long-term period. At the same time, these patients did not have deep tumor invasion (exclusion criteria from studies), and the results obtained from endoscopic interventions allowed them to be attributed to good (8 cases – 5 in the main group and 3 in the comparison group) and satisfactory (2 cases, 1 in each group) results.

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