DOI: 10.23934/2223-9022-2019-8-1-30-34

Intraorgan use of Hemoblock for prevention and arrest of bleedings in endoscopic excision of gastric polyps

S.G. Tereshchenko*, A.V. Plotkin, L.V. Mecheva

Endoscopy department
M.F. Vladimirsky Moscow Regional Research and Clinical Institute
61/2 Shepkina St., Moscow 129110, Russian Federation

*** Contacts:** Sergey G. Tereshchenko, Dr. Med. Sci., Head of Endoscopy Department M.F. Vladimirsky Moscow Regional Research and Clinical Institute. Email: endoscopia.monika@mail.ru

INTRODUCTION Bleedings after endoscopic removal of gastric polyps continue to be a relevant issue. A technique has been developed for infiltrating the base of polyps with a new hemostatic agent Hemoblock to prevent bleedings during polypectomy.
The purpose of this study was to assess the effectiveness of this technique.

MATERIALS AND METHODS We present the results of the use of Hemoblock in 63 patients with 129 removed polyps. The results were compared with data in the control group, where 267 polyps were removed in 142 patients. In the control group, 0.9% sodium chloride solution, 5% aminocaproic acid solution were used for submucosa injection. We also compared the effectiveness of endoscopic hemostasis for bleeding that occurred after the removal of polyps in both groups. In the main group, hemostasis was performed by irrigation and infiltration with Hemoblock. In the control group the injection method (0.9% sodium chloride solution, 5% aminocaproic acid solution) and electrocoagulation were performed.

RESULTS The study showed that the use of Hemoblock during endoscopic removal of polyps for infiltration of their base provided a more effective prevention of bleeding, and with the development of bleeding from a thermal defect after polypectomy, the use of irrigation/infiltration of the same drug provides reliable hemostasis.

CONCLUSION The use of hemostatic agent Hemoblock in the endoscopic removal of gastric polyps provides prevention of bleeding and radical intervention. With the development of bleeding after polypectomy, irrigation/puncturing hemostatic agent Hemoblock allows to achieve reliable hemostasis.

Key words: endoscopic hemostasis, endoscopic polypectomy, electroexcision, electrocoagulation, hemostatic agent Hemoblock

For citation Tereshchenko S.G., Plotkin A.V., Mecheva L.V. Intraorgan use of Hemoblock for prevention and arrest of bleedings in endoscopic excision of gastric polyps. *Russian Sklifosovsky Journal of Emergency Medical Care.* 2019; 8(1): 30–34. DOI: 10.23934/2223-9022-2019-8-1-30-34 (In Russian)

Conflict of interest Authors declare lack of the conflicts of interests

Acknowledgments The study had no sponsorship

Affiliations

Sergey G. Tereshchenko	Dr. Med. Sci., Head of Endoscopy Department (“Science”), M.F. Vladimirsky Moscow Regional Research and Clinical Institute, ORCID: 0000-0002-1475-6242.
Aleksandr V. Plotkin	Dr. Med. Sci., Professor, Head of M.F. Vladimirsky Moscow Regional Research and Clinical Institute
Lyudmila V. Mecheva	Junior Researcher, M.F. Vladimirsky Moscow Regional Research and Clinical Institute, ORCID: 0000-0002-3608-0140.

INTRODUCTION

Polyps of the digestive organs are frequently revealed pretumor diseases, they should be observed over time and removed, if indicated [1, 2]. The operation of choice in this situation is endoscopic polypectomy [2–4]. This surgical intervention has objective advantages, since it eliminates the center of possible malignancy, but at the same time preserves the anatomy and function of the operated organ.

Endoscopic polypectomy is highly effective, but may be complicated by bleeding [2]. The question of its prevention and control in such cases has been repeatedly raised in clinical medicine. In order to prevent this complication, several techniques have been developed: endoscopic injection therapy with the introduction of isotonic sodium chloride solution [5] or adrenaline solution [6], fibrin glue [7], endoscopic ligature [8] and clipping [9]. In this work, a study of the intraorgan use of a new hemostatic agent Hemoblock for prevention and management of bleeding during endoscopic removal of gastric polyps was performed.

The hemostatic effect is achieved due to the formation of a clot with blood plasma proteins (mainly with albumin) by Hemoblock. Studies conducted at the laboratory of the Moscow Regional Blood Research Institute showed that the mechanism of action of Hemoblock depended mainly on the content of albumin and didn't depend on the concentration of protein containing blood clotting factors in blood plasma. At the first stage of the drug action, a polyacrylic matrix structure is formed, containing albumin molecules in the cells. Such a structure is primary, and its lifetime is short, since the polyacrylate anion does not establish strong bonds with protein molecules and is retained only due to weak interactions. However, this structure is the primary organizer of a stable complex. At the next stage, silver ions are restored by albumin molecules, forming a stable complex: polyacrylate anions form a strong bond with positively charged protein molecules. This structure is packaged in several microlayers, creating a solid polymethacrylate film on the surface of the wound. Then, the surface structure Hemoblock–protein is replaced by fibrin, and the polyacrylate matrix is plasmolyzed within a day [10].

The purpose of the study is to evaluate the effectiveness of the intraorgan use of a new hemostatic agent Hemoblock to prevent and control bleeding during endoscopic polypectomy.

MATERIAL AND METHODS

The work is based on the analysis of the results of treatment of 205 patients with single and multiple gastric polyps, where 396 polyps were removed from 2007 to 2017.

All patients underwent preoperative preparation, endoscopic surgery and postoperative monitoring. Endoscopic polypectomy was performed with electrosurgical unit *«OLYMPUS» PSD*-10 (Japan). The polyp was cut off with a diathermic loop, thrown over the peduncle or base of the polyp, in the “cutting” - “coagulation” mode.

For grasping and retrieval of excised polyp biopsy forceps, diathermic loop, Dormia basket, extractors, trap devices of different brands were used. For injection and irrigation, disposable and reusable endoscopic injectors and catheters of various manufacturers were used.

All patients were divided into 2 groups: the main group consisted of 63 patients, the control group consisted of 142 patients. The characteristics of patients by gender and age are presented in Table 1,2.

As can be seen from the data presented in Table 2, the majority of patients were over 60, women prevailed among them: 92 in the control group (64.8%) and 44 in the main group (69.8%). The distribution of polyps by location in the stomach is presented in Table 3.

The data summarized in Table 3 show that the largest number of polyps was located in the antrum of the stomach: 123 patients of the control group (46%) and 56 in the main group (43.4%), and along the greater curvature, respectively: 107 (40%) and 62 (48%). To objectify the data obtained, the removed polyps were compared in size, which is reflected in Table 4.

As follows from the Table 4, polyps from 0.5 to 1.5 cm in size were more common in this study: 191 (71.5%) in the control group, 97 (75.2%) in the main group. The average size of the removed polyp was 15.3±1.6 mm in the main group, and 15.0±1.1 mm in the control group. The number of removed polyps per patient averaged 2.2±0.6 in the main group and 1.8±0.2 in the control group. Table 5, 6 show histological characteristics of polyps and their bases.

As follows from the Table 5, the largest number of polyps were peduncular: 174 in the control group (65%) and 92 in the main group (71.3%). According to the histological classification, hyperplastic polyps prevailed: 158 in the control group (59%) and 82 in the main group (63.6%) (Table 6).

Table 1

The characteristics of patients according to gender

Patients	Control group		Main group	
	n	%	*n*	%
	142	100	63	100
Male	50	35.2	19	30.2
Female	92	64.8	44	69.8

Table 2

The characteristics of patients according to age

Age, years	Control group	Main group
	n	*n*
	142	63
30–44	6	1
45–59	34	9
60–74	85	46
over 75	17	7
Mean age	64.2±1.6	65.5±2.0

Table 3

The distribution according to the location in the stomach

Location	Control group		Main group
	n	%	*n*
Upper third of the corpus	33	12.4	13
Middle third of the corpus	46	17.2	23
Lower third of the corpus	65	24.4	37
Antrum	123	46	56
Total	267	100	129
Anterior wall	78	29.3	28
Posterior wall	60	22.4	26
Lesser curvature	22	8.3	13
Greater curvature	107	40	62
Total	267	100	129

Table 4

Sizes of excised polyps

Size, cm	Control group		Main group
	n	%	*n*
0.5–1.0	113	42.3	60
1.1–1.5	78	29.2	37
1.6–2.0	32	12	13
2–3	29	10.8	11
3–4	10	3.7	5
More than 4	5	2	3
Total	267	100	129

Table 5

The location of polyps

Type	Control group		Main group	
	n	%	*n*	%
Pedunculated	174	65	92	71.3
Sessile	93	35	37	28.7
Total	267	100	129	100

Table 6

The hystologic characteristics of polyps

Type	Control group		Main group	
	n	%	*n*	%
Hyperplastic polyps	158	59	82	63.6
Adenomatous polyps	109	41	47	36.4
Total	267	100	129	100

Table 7

The incidence of postoperative bleeding

Number of polyps	Control group, *n*=267	Main group, *n*=129
Bleeding	33 (12.3%)	8 (6.2%)
Primary endoscopic hemostasis	16 (5.9%)	7 (5.4%)
Additional hemostasis	17 (6.3%)	1 (0.4%)
Surgery	2	—
Repeated bleeding	2	1
Endoscopic hemostasis	2	1

In patients of the main group Hemoblock was injected into the base of the polyp prior to the removal. Through the injector, 3-10 ml of the drug were administered into the base until a distinct "cushion" was formed. Under submucosal administration of Hemoblock, the hydraulic compression of the polyp base vessels was accompanied by increased local thrombus formation. After creating the "cushion", the polyp was removed by electro excision or coagulation by the standard method. After the surgery, the site of the removed polyp was irrigated and/or injected by Hemoblock in order to prevent possible bleeding. With the development of bleeding, the site of the removed polyp was irrigated and/or injected by Hemoblock as well. Irrigation was performed using a catheter inserted into the endoscopic biopsy channel. The source of bleeding was irrigated from the top downward, using from 50 to 100 ml of the drug. To improve hemostasis, the bed of the removed polyp was infiltrated by endoscopic injectors. The endoscopic needle, drawn through the endoscope biopsy channel, was injected at the area of electrosurgical intervention at a maximum depth, 2-3 mm from the source of bleeding from 5–6 points. Hemoblock was administered into the wall of the stomach through an injector to form a distinct protruding roller around the source of bleeding.

In patients of the control group, the removal of polyps was performed by the same methods and electrocoagulation without applying Hemoblock. Novocaine, an isotonic solution of sodium chloride, and an aminocaproic acid solution were used for the submucosa injection. For the prevention of bleeding after polypectomy injection method and electrocoagulation were used.

RESEARCH RESULTS AND DISCUSSION

The results of treatment according to the developed method were compared with the results of the removal of gastric polyps after infiltration of the base of the polyp by the traditionally used hemostatic agents. The main group and

the control group were compared in terms of the frequency of bleeding from a thermal defect to the achievement of primary/final hemostasis, the frequency of bleeding recurrences (Table 7).

In patients of the main group and the control group with a complicated course, bleeding of medium intensity was noted. In the main group, bleeding from the bed of the removed polyp developed in 8 cases (6.2%) during endoscopic polypectomy, which was significantly less than in the comparison group, where bleeding occurred in 33 cases (12.3%).

In the main group, in the development of bleeding, irrigation and/or injecting the bed of a removed polyp had a positive result in 7 cases (5.4%), in 1 case it was necessary to perform diathermocoagulation and clipping. In the control group, primary injection hemostasis was effective in 16 patients (5.9%), and in 17 cases (6.3%) diathermocoagulation and clipping were required, which was objectively more than in the main group. In 2 patients (0.7%) of the control group with bleeding, endoscopic techniques were ineffective, which required suturing the bed of removed polyps.

Subsequently, no recurrences of bleeding from a thermal defect were noted in the main group, whereas in the control group repeated bleeding occurred in 2 patients (0.7%), and it was controlled using endoscopic injection techniques.

Thus, the use of methods for the prevention and control of bleeding during endoscopic polypectomy with the use of a new hemostatic agent Hemoblock has made it possible to objectively reduce the frequency of bleeding complicating the surgery.

CONCLUSION

Despite the achievements of operative and therapeutic endoscopy, the problem of the occurrence of bleeding of varying intensity from the zone of thermal defect in polypectomy still remains significant. Bleeding complicating the removal of gastric polyps does not always stops under the endoscopic control and in some cases requires surgical intervention, aggravating the patient's condition.

Our study summarized ten-year results of treatment of 205 patients with single and multiple polyps of the stomach, where 396 polyps were removed by methods of operational endoscopy (electroexcision, electrocoagulation) from positions prevention and control of bleeding, as complications arising during the operation and in the postoperative period.

The analysis of the results of endoscopic removal of gastric polyps after infiltration of the polyp base with Hemoblock preparations , 5% aminocaproic acid solution, 0.9% sodium chloride solution, as well as the effectiveness of hemostasis in the development of bleeding from a thermal defect after irrigation and/or infiltration by Hemoblock and others means of injection hemostasis, carried out taking into account such indicators as the occurrence of bleeding from a thermal defect, the achievement of the final stop of bleeding, recurrence of bleeding and thermal defect showed advantages of Hemoblock.

FINDINGS

1. The use of the hemostatic agent Hemoblock in the endoscopic removal of gastric polyps for endoscopic infiltration of their base before electroexcision ensures the prevention of bleeding and radicalization of the intervention.

2. The use of endoscopic irrigation/ infiltration with Hemoblock in the development of bleeding from a thermal defect allows reliable hemostasis in early and late postpolypectomy bleeding to be achieved, which reduces the number of emergency operations.

3. The method of endoscopic infiltration by the hemostatic agent Hemoblock, used both for prevention and control of bleeding during complicated gastric polypectomy, is economically beneficial, does not require additional consumables and expensive equipment, specially equipped rooms, and can be used in all endoscopic rooms and departments of surgical hospitals. All this allows us to recommend the use of hemoblock in the endoscopic removal of gastric polyps in a wide clinical practice.

REFERENCES

1. Pantsyrev Yu.M., Gallinger Yu.I. Surgical endoscopy of the gastrointestinal tract. Moscow: Meditsina Publ., 1984. 192 p. (In Russian).
2. Sinev Yu.V., Lokhotkina T.F., Volkov S.V., et al. Prevention of complications of endoscopic electroexcision benign tumors of the stomach. *Khirurgiya*. 1991; (6): 128–130. (In Russian).
3. Belonogov A.V., Zhitov D.I. Endoscopic and endosurgical methods of treatment of polyps of the stomach. *Byulleten' VSNTS SO RAMN*. 2002; (5): 76–79. (In Russian).
4. Sotnikov V.N., Sotnikov A.V., Ageykina N.V., et al. Polyposis of the stomach. Endoscopic treatment or follow-up? *Khirurgiya*. 2007; (1): 38–42. (In Russian).
5. Iishi H., Tatsuta M., Kitamura S., et al. Endoscopic resection of large sessile colorectal polyps using a submucosal saline injection technique. *Hepatogastroenterology*. 1997; 44(15): 698–702. PMID: 9222674.
6. Shirai M., Nakamura T., Matsuura A., et al. Safer colonoscopic polypectomy with local submucosal injection of hypertonic saline-epinephrine solution. *Am J Gastroenterol*. 1994; 89(3): 334–338. PMID: 8122640.
7. Friedrichs O. *Endoscopic Fibrin Gluing: Submucosal Application Against Bleeding in the Gastrointestinal Tract.* Berlin: Blackwell Verlag GmbH, 1998.
8. Brandimarte G., Tursi A. Endoscopic snare excision of large pedunculated colorectal polyps: a new, safe, and effective technique. *Endoscopy*. 2001; 33(10): 854–857. PMID: 11571681. DOI: 10.1055/s-2001-17329.
9. Iida Y., Miura S., Munemoto Y., et al. Endoscopic resection of large colorectal polyps using a clipping method. *Dis Colon Rectum.* 1994; 37(2): 179–180. PMID: 8306841.
10. Plotkin A.V., Pokrovskiy E.Zh., Voronova G.V., Menglet K.A. Evaluation of the effectiveness of the hemostatic action of the drug “Hemoblock” during abdominal and laparoscopic interventions. Multicenter clinical studies. *Vestnik sovremennoy klinicheskoy meditsiny*. 2015; 8(1): 56–61. (In Russian).

Received on 29.08.2018

Accepted on 16.10.2018