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EXPERIENCE OF ENDOVASCULAR EMBOLIZATION FOR RECTAL BLEEDING IN PATIENTS WITH RECTAL CANCER

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ABSTRACT — The article is devoted to the most dangerous complication of colorectal cancer — bleeding. The clinical group included 32 patients with stages 3–4 of the disease. Endovascular embolization by microspheres was performed in 18 patients. The bleeding was successfully stopped in all operated patients. When monitoring the main laboratory blood values in the postoperative period, the development of a systemic inflammatory reaction was not noted. Flexible rectosigmoidoscopy performed after endovascular embolization did not reveal a single case of necrosis of the intestinal wall above and below the tumor. In order to prevent intestinal ischemia, it is advisable to introduce microspheres in a volume of $\frac{1}{3}$ from the circulatory channel of the embolized area. Endovascular embolization by microspheres is an effective method of hemostasis in patients with colorectal cancer complicated by bleeding.

KEYWORDS — colorectal cancer, rectal cancer, rectal bleeding, endovascular embolization, endovascular hemostasis, microspheres.

INTRODUCTION

Colorectal cancer (CRC) is the second most common cause of cancer death in the United States. The incidence rate between 2012 and 2016 ranged from 30 to 45.7 per 100,000 people. Among persons younger than 50 years old, the incidence of tumors of the proximal and distal colon, as well as the rectum, increased by about 2% annually. Given the increasing incidence of CRC in younger patients, in 2018, the American Cancer Society made a qualified recommendation to reduce the age at which patients should begin CRC screening to 45 years and older. It was extrapolated that in 2020, approximately 147,950 people will be diagnosed with CRC in the US, and 53,200 will die from the disease, including 17,930 cases and 3,640 deaths among persons under the age of 50 [1].

Intestinal bleeding, as a complication of CRC, was noted in 26.8% of patients. The complication is usually associated with the breakdown of tumor tissue or germination and arrosion of intestinal wall vessels. In 21.6% of the total number of observations of occult gastrointestinal bleeding, their source is localized in the rectum, in 11% of the total number of observations, bleeding is associated with carcinoma. Profuse bleeding occurs in 2–5% of all cases of rectal cancer (RC) [2, 3, 4].

RC complicated with continued intense bleeding and pronounced anemia poses challenges for doctors of general surgical practice in preparing the patient for surgery, often with low efficiency of blood-substituting measures. Under certain circumstances you have to refuse to perform neoadjuvant exposure. Postoperative lethality and the frequency of complications in patients with RC operated at the bleeding level is higher than in those operated as planned. In primary resections with anastomosis for complicated RC, lethality varies from 4.3 to 8.9%, the frequency of postoperative complications varies from 21.7 to 89%. The five-year survival rate in these patients is 60.9% versus 74.6% in those operated in the absence of complications [5, 6].

The purpose of the work

was to summarize the experience of endovascular embolization in 18 patients with RC admitted to a general surgical hospital with bleeding.

MATERIAL AND METHODS

In clinical group there were 32 patients with RC T3–4NxM1. In our studies, we adhered to the 7th revision of the TNM tumor classification of the International Cancer Union. 16 (50.0%) men and 16 (50%) women. The age of patients ranged from 60 to 73 years, averaging 65.8 ± 3.1 years. The inclusion criteria were: the presence of a powerful collateral from the right branch of the upper rectangular artery to the lower sigmoid artery during angiography. Exclusion criteria were: signs of intestinal obstruction, history of other oncological diseases, pronounced aortic atherosclerosis, concomitant blood diseases (thrombophilia), sub- and decompensation of diseases of the cardiovascular, respiratory system, liver and urinary system.

At the first stage of treatment, hemostatic therapy was carried out for 2 hours. With continuing bleeding, a decision was made to conduct diagnostic aortography of the abdominal aorta to identify the source of bleeding. In 12 patients, contraindications to endovascular artery embolization were identified due to the features of angioarchitectonics: pronounced atherosclerotic lesion with aortic calcinosis at the site of withdrawal of the inferior mesenteric artery in 5 patients, pronounced atherosclerotic lesion of the inferior mesenteric artery with calcinosis from the mouth in 3 patients, inflection of the mouth of the lower mesenteric artery in one patient which could lead to dissection of the vessel when conducting the catheter to its distal sections, an additional vessel connecting the rectal artery basin and the sigmoid arterial arcade bearing the danger of non-target embolization of healthy organ vessels in 3 patients. Two patients refused to perform an endovascular intervention. In these patients, bleeding stop continued to be carried out by conservative means. Embolization was performed on the Philips Allura CV 20 angiographic unit. Femoral 5-6Fr introducers were used for vascular access. Selective catheterization of the inferior mesenteric and superior rectangular arteries was performed by a 4-5F catheter. As emboli, microspheres of HepaSphere of Biosphere Medical (France) were used. The choice of emboles is due to the possibility of their saturation with a cytostatic solution, which in our opinion is promising with the further development of the technique.

The volume of embolizate administered was determined according to the method we developed and was $\frac{1}{3}$ of the volume of the arterial circulator bed in the area of selective installation of the catheter for embolization. After embolization, arrest of rectal bleeding was monitored clinically and laboratory. Flexiblerectosigmoidoscopy was performed in dynamics. Attention was paid to the presence of hemostasis, superficial necrosis of the tumor, and the condition of the rectal mucosa in the immediate proximity of the tumor. After pre-surgical preparation, all patients were referred for specialized combined RC treatment.

RESULTS AND DISCUSSION

Treatment results were evaluated by the quality of hemostasis, systemic inflammatory response and rectal mucosa conditions above and below the tumor. Hemostasis was achieved in 100% of cases in all 18 patients. According to the results of flexible rectosigmoidoscopy, the intestinal mucosa above and below the tumor was unchanged. The blood hemoglobin level in the clinical group was reduced and averaged 74.1 ± 11 g/l. In the largest number of observations, blood hemoglobin was distributed in the range of 70–90 g/l

(61.1%, $n = 11$). To assess the degree of inflammation in the body, all patients had their leukocyte intoxication index (LII) determined. On the 1 and 2 day after the operation, patients' LII, compared with the initial value, was increased to 1.2 ± 0.08 and 0.99 ± 0.07 . In subsequent stages of observation, the LII decreased to normal values. A statistically significant decrease in total protein content in the blood compared to the original value was observed on days 1 and 2 after surgery. The total blood bilirubin in the first day after the operation increased, but remained within normal limits throughout the observed stage. There were no significant changes in the urea content in the blood of patients in clinical groups. By 3 days after the operation, the blood urea level decreased, probably due to infusion therapy. Thus, the study of the dynamics of laboratory indicators in patients after endovascular embolization of the tumor due to continued bleeding did not lead to a systemic inflammatory reaction.

CONCLUSION

According to the results of the postoperative observation, it can be concluded that endovascular embolization is an effective method of hemostasis in this category of patients. The intervention does not lead to complications, does not cause a systemic inflammatory reaction, does not complicate the course of the underlying disease in the early postoperative period and is easily tolerated by patients. Performing a flexible rectosigmoidoscopy after endovascular embolization did not reveal a single case of necrosis of the intestinal wall above and below the tumor. In order to prevent intestinal ischemia, it is advisable to introduce microspheres in a volume of $\frac{1}{3}$ from the circulatory channel of the embolized area.

Contributors:

Alexander Khitaryan — designed the study, performed the analysis and interpreted the results; **Alexander Murlychev** — conducted review of the literature and collected the data; **Alexey Orekhov** — performed the analysis and interpreted the results; **Sergey Kovalev** — collected the data and performed the calculations; **Vyacheslav Mikhailichenko** — performed the analysis and interpreted the results; **Dmitry Parshin** — wrote the manuscript.

REFERENCES

1. SIEGEL, R.L., MILLER, K.D., GODING SAUER, A., FEDEWA, S.A., BUTTERLY, L.F., ANDERSON, J.C., CERCEK, A., SMITH, R.A. AND JEMAL, A. Colorectal cancer statistics, 2020. *CA A Cancer J Clin.* 2020;70: 145–164. <https://doi.org/10.3322/caac.21601>.
2. MATHIS KL, PEMBERTON JH. New developments in colorectal surgery. *Current Opinion in Gastro-*

- enterology. 2015;31(1):62–68. DOI: 10.1097/mog.000000000000138.
3. **SALIANGAS, K., ECONOMOU, A., NIKOLOUDIS, N. ET AL.** Treatment of complicated colorectal cancer. Evaluation of the outcome. *Tech Coloproctol.* 2004; 8:199–201). <https://doi.org/10.1007/s10151-004-0156-3//>.
 4. **PHAM T, TRAN BA, OOI K, MYKYTOWYCZ M, McLAUGHLIN S, CROXFORD M, SKINNER I, FARAGHER I.** Super-Selective Mesenteric Embolization Provides Effective Control of Lower GI Bleeding. *Radiol Res Pract.* 2017;2017:1074804. doi: 10.1155/2017/1074804. Epub 2017 Jan 22. PMID: 28210507; PMCID: PMC5292126.
 5. **RACHAPALLI V, NAGABHUSHAN J.** Massive rectal bleeding: empiric embolization of the superior rectal artery. *ANZ J Surg.* 2018;88(1–2):116. doi: 10.1111/ans.14188. PMID: 29392904.
 6. **PARK S, KIM Y, SHIN JH, YANG WJ, NOH SY, CHU HH, CHEN CS, YOON HK.** Outcome of Rectal Arterial Embolization for Rectal Bleeding in 34 Patients: A Single-Center Retrospective Study over 20 Years. *J VascIntervRadiol.* 2020;31(4):576–583. doi: 10.1016/j.jvir.2019.05.013. Epub 2019 Sep 14. PMID: 31530489.