

Pathohistological Assessment of the Circular Margin of Resection During Total Mesorectal Excision, Conducted on The Malignant Formations of the Rectum

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ABSTRACT

The treatment of rectum's malignant tumors still stays as difficult problem. To the difficulties associated with the extraction from the narrow space of the pelvis of the tumor, when there is an invasion of it into the mesorectal fascia, the concern of surgeons is also attached to the consequences of surgical intervention (the formation of local relapses, etc.

Keywords: process, TNM, local relapses, mesorectal fascia and so on.

INTRODUCTION

Studies have shown that the proximity of the tumor and its deposits to the mesorectal fascia has undoubted importance in the occurrence of local relapses [1, 4]. This indicator, called the "circular margin of resection," was first proposed by Professor Lidis P. Quirke. In his studies, it was found that the probability of local recurrence in CRM + positive patients is 85%, while CRM-negative only 3% [1, 7, 8].

When choosing a treatment method of cancer, one of the main tasks is to identify patients who are at high risk of local recurrence. On the way to solving this problem in recent years, the role of pathomorphologist in assessing the quality of the treatment has greatly increased [2, 3, 8]. Publications devoted to this problem make the main emphasis on an adequate assessment of the true preoperative prevalence of the tumor process. The fundamental importance are data on the involvement of the circular edge of resection or the rectal fascia of the rectum in the tumor process, which limits the mutephalic cord, as a result - individual prediction and development of a treatment plan for patients with rectal cancer. According to Nagtcegaal J and co-authors, the circular margin of resection less than or equal to 2 mm is associated with a risk of local recurrence of 16% compared to 5.8% in patients whose mesorectal tissue thickness around the tumor was large enough. In addition, with an edge less than or equal to 1

mm, the risk of developing distant metastases (37.6% versus 12.7%) increases, and life expectancy also decreases. It was shown that the prognostic significance of the involvement of the circular margin does not depend on the classification of TNM [7, 8, 9, 10].

According to Norwegian and Dutch studies on rectal cancer, it was accepted that the proximity of tumor infiltration to the mesorectal fascia less than 1 mm carries the risk of developing local relapses. Observations show that pre-operative radiochemotherapy with a CRM of less than 1 mm is not able to change the unfavorable prognosis. As you move deeper into the pelvis, the mesorectal fascia surrounding the rectum becomes thinner, and the probability of its invasion by the tumor increases. The question is whether the positivity of CRM is related to a violation of the operation's technique or to the degree of tumor infiltration is still controversial. According to randomized study in England among the 1036 patients, positive CRM was detected in 7.5% of patients after anterior resection, in 16.7% of an abdominal-perineal resection and in 31.7% of patients after Hartmann's operation. Thus, the predictive value of CRM is beyond doubt. In connection with this, a qualitatively performed MRI in the preoperative period is certainly of great interest for predicting the consequences of surgical intervention [1, 9].

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According to a study in England, it was found that between preoperative MRI data and pathological histology of the removed material, the reliability is 90% [5, 6, 8]. The aim of the research was to study some aspects of the pathohistological evaluation of the circular margin of resection in the laparoscopic and open method of total mesorectal excision.

MATERIALS AND METHODS OF RESEARCH

The study involved 103 patients with established diagnosis of malignant neoplasms of the rectum. Observations were conducted in the period from 2010 to 2015 on the basis of Clinical Hospital No.1 (Azerbaijan Medical University), as well as in the medical center ELMED. Patients were divided into 2 groups: 1) patients who underwent total open mesorectumectomy (OTME) - (n = 56); 2) patients to whom TME was performed by laparoscopic method (LTME) - (n = 47).

Before the operation all the patients were carried out the following studies: computed tomography (KT) and magnetic resonance imaging (MRI), colonoscopy, determination of CEA and C-19-9 in blood, ultrasound (ultrasound) and general clinical studies (general and biochemical blood analysis,) radiography, echocardiography. After the surgical intervention, a visual macroscopic evaluation of the remote material (quality

determination of TME) was carried out, which was subsequently sent for pathohistological examination.

RESULTS AND DISCUSSION

The long-term results of surgical treatment of rectal cancer largely depend on the level of tumor invasion, although in many respects this issue remains open. The intactness of the margins of resection (proximal, distal and circular) in the morphological study of a distant preparation is the main indicator of the radical nature of the surgical treatment of rectal cancer. In the study group (laparoscopic and open), the proximal margin of resection was intact in all observations. Only in one of 103 cases we found tumor deposits. In all other observations, regardless of the magnitude of the distal indentation and the depth of tumor invasion, the distal margin of resection was intact. In the TME group, the study of the circular margin of resection (CRM) was conducted to determine the factors influencing the CRM status and during observations at the planned morphological study, the predictive significance of this parameter from 103 patients revealed a positive circular margin of resection in (31.90% (LTM) and 33.03% (OMI)) while, in (68.1% (LTM) and 66.97% (OTME)) cases - negative.

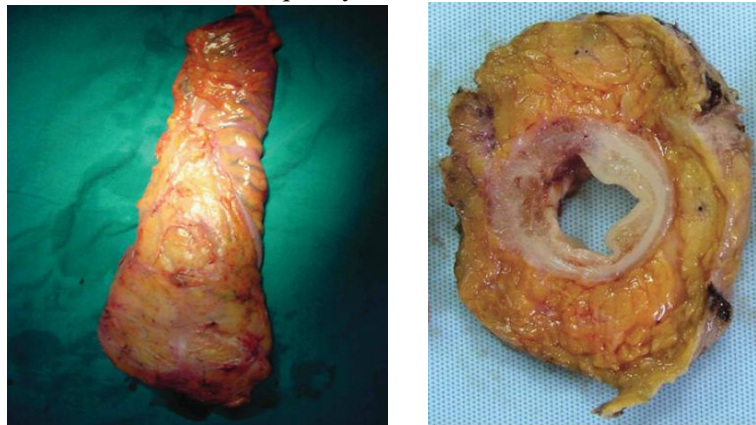


Figure 1. Mesorectumectomy with complete preservation of the mesorectal fascia.

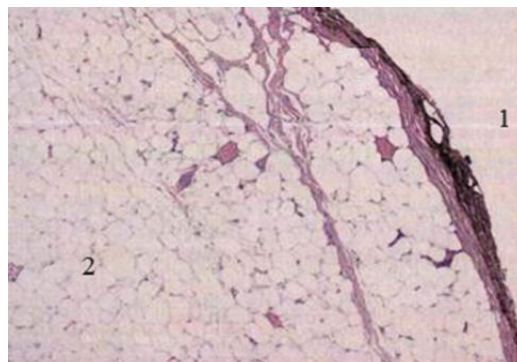


Figure 2. Same patient, intact circular resection margin. (1 - mesorectal fascia, 2 - mesorectum)

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The involvement of CRM can be due to both the prevalence of the tumor process with the tumor reaching its own fascia of the gut, and with the violation of surgical technique with damage to the mesorectal fascia. That is why with good quality of TME, the CRM state is the main prognostic criterion for the development of local relapses. In addition, the involvement of CRM may be due to various reasons, the definition of which is of fundamental importance, since each of them has a different prognostic value. In addition, the involvement of CRM may be due

to various reasons, the definition of which is of fundamental importance, since each of them has a different prognostic value. In a widespread tumor process with deep ingrowth of mesorectum (PT 3b, c, d) in 29.78% and 32.14% cases (respectively in LTTE and OTE) in the cell, the tumor was detected near or directly along the circular edge of the resection. It should be noted that, with good quality of TME, this advantage was due to the direct ingrowth of the tumor into the intestinal fascia of the gut. (Figure 3.4)



Figure3. Direct growth of tumor into its fascia (surgical clearance less than 1 mm)

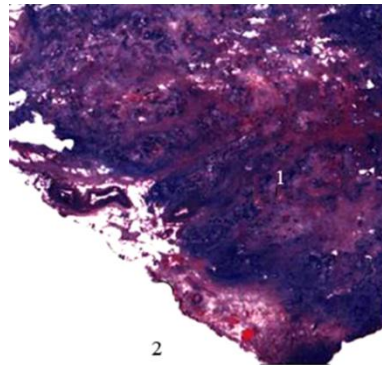


Figure4. The same patient. Histological picture (1-tumor, 2-own fascia)

In case of a violation of surgical technique and low quality of TME, the presence of a tumor in CRM was caused by damage to the intestinal

fascia of the intestine with penetration into the mesorectal tissue (Fig. 5.6)

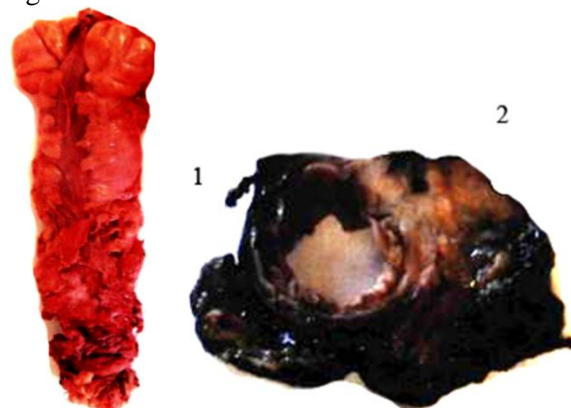


Figure5. Damage to the intestinal fascia of the intestine with penetration into the mesorectum. (Grade 1. 1 - damaged mesorectum, 2 - tumor)

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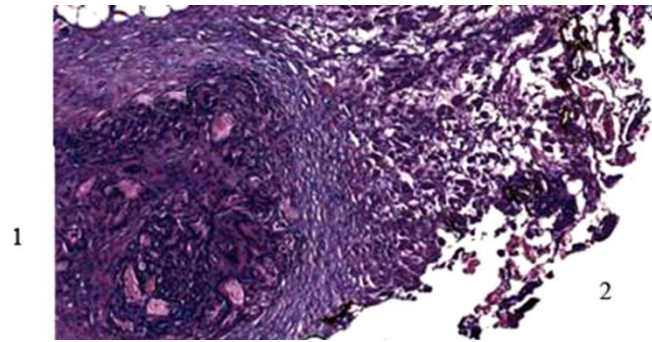


Figure6. The same patient. Histological picture.

(1 tumor, 2 - own fascia)

The spread of the tumor to the pararectal cells can occur through tumor deposits, which are determined at a different distance from the main tumor node. The presence of tumor deposits in mesorectal tissue is an unfavorable prognostic

factor of tumor progression, and their detection near the circular margin of resection significantly increases the risk of local recurrence. In our research, tumor deposits were found in 48.93% of cases (Figure 7.8)



Figure7. Presence of tumor deposits in mesorectal tissue.

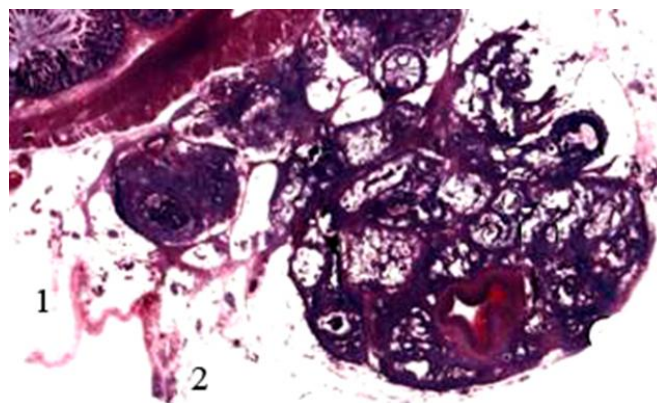


Figure8. The same patient. Histological picture. (1-deposit, 2-own fascia)

The formation of tumor deposits is associated with tumor invasion of blood vessels. The presence of tumor emboli in mesoderm cells near the CRM was found in 21.27% and 19.64% of observations. Mesorectal lymph nodes are located mainly near the intestinal fascia of the

gut. The presence of metastases in these sites can cause CRM involvement. Metastases in the lymph nodes of the mesorectum fiber located near the CRM were detected in 27.65% and 28.57% of the observations. (Fig. 9.10), Table (3)

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Table 3. Factors, influencing on the CRM-status

Factors	LTME N= 47		OTMEN=56	
	aбс	%	aбс	%
Tumordistribution	14	29,78	18	32,14
Tumordeposits	23	48,93	29	51,78
Tumoremboli	10	21,27	11	19,64
LymphonodusesGerota	13	27,65	16	28,57

LymphonodusesGerota- lymph nodes located in the mesorectum.



Figure 9. Metastases in the lymph nodes of the mesorectum

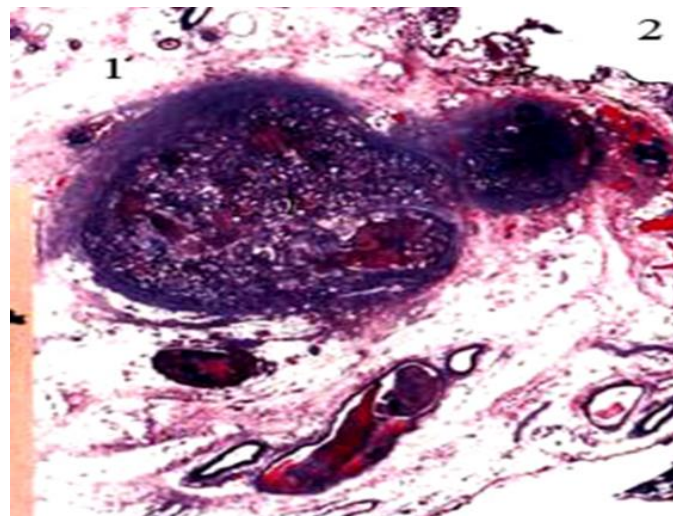


Figure 10. The same patient. Histological picture. (1-metastasis in the lymph node-mesomerectum, 2-circular margin of resection)

As a result of our research, it was found that such factors as the size and stage of the tumor, its spread and the quality of TME affect the CRM status.

RESULTS

1. There were no statistically significant differences between the CRM-status for laparoscopic and open TME.
2. As a result of local distribution of malignant colon formations, surgical clearance is positive in 29.78% and 32.14% of cases.

3. The probability of invasion by tumor deposits in LTME and OTME was 48.93% and 52.78% respectively.
4. Penetration of tumor emboli into the mesorectal fascia due to vascular invasion was observed in 21.27% and 19.64% (LTME and OTME, respectively)
5. The probability of positivity of CRM as a result of defeat of the lymph nodes Gerota was 27.65% and 28.57% respectively.

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