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Results of transanal endoscopic resections in rectal cancer

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Abstract

Introduction. Rectal cancer is the most widespread form of cancer in different countries of the world, without regard to gender, and reaches 8–9% of the total number of all cancers. It is necessary to further improve and study modern methods of both surgical and combined integrated approach to the treatment of patients with rectal cancer. Lymphatic cancer spread is one of the most important causes of local recurrence of rectal cancer and an unfavorable prognostic.

Aim of the study: to study and improve the results of treatment of patients with rectal cancer during transanal endoscopic microsurgery with staining “sentinel” lymph nodes.

Materials and methods. In the period from 2009 to 2021, 92 patients with rectal cancer were operated on at the Odessa Regional Clinical Hospital using transanal endoscopic resections. All 92 patients were divided into 2 groups. In group I, 45 patients were diagnosed stage I rectal cancer (T1-2N0M0). In group II, 47 patients were diagnosed stage II rectal cancer (T3N0M0) before surgery. In group I, a standard TEM procedure was performed. In group II, taking into account the presence of stage II RC in patients, and the high possibility of recurrence and metastasis, after performing local excision of tumors using the TEM method, we improved this method.

Results. The average time of the hospital stay was (3.4 ± 1.7) days (from 2 to 6 days). The lower edge of the tumor was at the average height of (9.5 ± 4.2) cm from the anal canal (from 5 to 18 cm), the average size of the tumor was from (2.8 ± 1.7) cm (from 1.5 to 4 cm). The average follow-up period ranged from 12 to 60 months. Recurrence of rectal cancer was found in 6 (6.5%) patients, group I.

Conclusions. One of the most important prognostic factors of the development of the RC local recurrence is the regional lymph nodes involvement. Identification and target study of the “sentinel” LN in patients with RC most likely make it possible to assess the stage of the disease and apply an adequate scheme of the complex treatment.

Key words: rectal cancer; sentinel lymphatic nodes; transanal endoscopic resection, ICG

Relevance. Rectal cancer (RC) is the most widespread form of cancer in different countries of the world, without regard to gender, and reaches 8–9% of the total number of all cancers [1, 7, 16]. Despite the early diagnosis of cancer, more than 20% of patients at the time of the disease detection already have metastases [1, 9, 13]. Besides, one third of all patients with RC, after radical treatment, have relapses of the disease [1, 4, 11]. It is necessary to further improve and study modern methods of both surgical and combined integrated approach to the treatment of patients with RC [1, 6, 10].

The possibilities of modern surgery in the treatment of patients with RC directly depend on the degree of the lymph nodes involvement [1, 12, 14]. According to recent randomized studies, the frequency of damaged lymph nodes directly depends on the size of the tumor, so metastases in the lymph nodes occur with T1 tumors in 0–12%, with T2 tumors – 12–28%, with T3 tumors – 36–79% [1, 5, 15, 16].

Lymphatic cancer spread is one of the most important causes of local recurrence of RC and an unfavorable prognostic factor [1, 2, 15]. According to some authors, in patients with RC and involvement of regional lymph nodes (LN), the five-year survival rate did not exceed 45%, while in patients with RC without LN involvement, the five-year survival rate increased to 70% [3, 10, 15].

Till now, there is no technique that definitely allows to identify regional LN involvement in patients with RC [1, 10, 13]. The LN size is the main criterion by which one can indirectly judge the metastatic involvement of LN [1, 5, 6]. At the same time, the LN size not always indicate their involvement in the tumor process or intactness [4, 12]. There are reports that LN less than 5 mm in diameter were metastatically affected in 15% of patients

[5].

For a long time, the local spread of RC was assessed according to the data of endorectal ultrasound (ERUS) of the rectum [1, 3, 6, 15]. By accuracy of assessing local tumor invasion, this study is comparable to magnetic resonance imaging (MRI) [6, 10, 16]. But MRI and ERUS as methods of preoperative staging of the tumor process of the rectum do not have the proper sensitivity and specificity in assessing regional metastasis in general and lesions of the lateral group of LN in particular [1, 6, 7], which indicates the need to search for new methods of diagnosis, identifying risk factors and unfavorable prognosis for lateral metastasis in patients with RC, as well as a more differentiated approach to the choice of treatment management [1, 10].

One of the important factors of tumor metastasis is the presence of a “sentinel” LN. Detection of the “sentinel” LN is important for diagnosing and determining the intensity of malignant growth, since the spread of most malignant neoplasms begins with involvement of the regional lymph nodes [7].

The standard method of surgical treatment of patients with rectal cancer is total mesorectumectomy (TME). This method of surgical operation provides regional control of the disease, and also reduces the frequency of local recurrences to 5% [1, 10, 14]. However, TME is associated with a long hospital stay, a long postoperative period, a high risk of intraoperative and postoperative complications, and a decrease in the quality of life of patients [9, 15].

In the 1980s, a German surgeon, professor Gerhard Buess developed a surgical technique for transanal endoscopic resection of rectal tumors. It was this operation that served as a breakthrough in the treatment of patients with rectal tumors. Performing transanal endoscopic resections in PC tumors allows reducing most complications, as well as minimizing the operational trauma [1, 9, 10].

Purpose of the study: to study and improve the results of treatment of patients with rectal cancer during transanal endoscopic microsurgery with staining “sentinel” lymph nodes.

Materials and methods. The technique of transanal endoscopic microsurgery in rectal tumors has been introduced in our clinic since 2003. In the beginning the operations were performed according to the traditional method, using an operating proctoscope. Since 2007, most TEM operations have been performed using the Karl Storz Video endoscopic stand, through a special Covidien port, which was inserted into the rectum.

In the period from 2009 to 2021, 92 patients with rectal cancer were operated on at the Odessa Regional Clinical Hospital using transanal endoscopic resections (TEM). The age of

the patients ranged from 42 to 86 years. All 92 patients were divided into 2 groups. In group I, 45 patients were diagnosed stage I rectal cancer (T1-2N0M0), while the age of those patients ranged from 42 to 86 years. In group II, 47 patients were diagnosed stage II rectal cancer (T3N0M0) before surgery. 86 patients after diagnosing rectal cancer, according to the preoperative biopsy results were required to undergo neoadjuvant chemoradiation therapy. This complex preoperative treatment made it possible to significantly reduce the size of the tumor, its invasion into the wall of the rectum, and minimize the risk of metastasis to regional “sentinel” lymph nodes.

Before surgery all patients were informed about possible intraoperative and postoperative complications, as well as the possibility of further extended radical operations. The informed consent was obtained from all the patients before the operation using the TEM technique. The patients were carefully clinically examined. The preoperative examination included: sigmoidoscopy, fibrocolonoscopy, irrigoscopy, transrectal ultrasound, multi-layer spiral CT of the chest, abdomen and pelvic organs with intravenous contrast to determine the presence of distant metastases and enlarged lymph nodes. Preoperative preparation met the standard. In order to prevent thromboembolic complications, all patients were prescribed to wear compression stockings or bandaging the lower extremities with elastic bandages, low molecular weight heparins and early activation after surgery.

All operations were performed under endotracheal anesthesia in the supine position. To perform this operation, the surgical equipment “Karl Storz TEO” was used. In group I, a standard TEM procedure was performed. A special port for electrosurgical instruments was inserted into the rectum. After carbon dioxide insufflation, the tumor resection zones were marked with an electrocoagulation hook, at least 10 mm away from the tumor edge. The resection was performed in layers, using a hook, as well as a “LigaSure” coagulator, Covidien. After resection of the tumor within intact tissues, the rectum was sanitized with Betadine solution, after which the defect of the rectum was sutured using a self-tightening thread “V-Lock”, Covidien.

In group II, taking into account the presence of stage II RC in patients, and the high possibility of recurrence and metastasis, after performing local excision of tumors using the TEM method, we improved this method. Performing the operation according to the standard TEM method, 1–2 ml of ICG stain was injected into the submucosal layer of the tumor. In 15 minutes laparoscopy was performed with the regional lymph nodes staining. For a clearer visualization of the “sentinel” lymph vessels and regional lymph nodes, the ultraviolet illumination mode was used on a video laparoscopic rack, “Karl Storz”. After a laparoscopic

removal of “sentinel” LN, their urgent histological examination was performed. If there were no cancer micrometastases in the LN, the tumor was resected using the TEM technique. In the presence of metastatic involvement of “sentinel” lymph nodes, laparoscopic or laparoscopically assisted low anterior resection of the rectum was performed, with an obligatory removal of the mesorectum and periampullary tissue – a total mesorectectomy (TME).

In group II, no cancer metastases were found in the “sentinel” LN in 29 patients; these patients underwent radical resection of the rectal tumor using the standard TEM technique. In 18 patients in this group, PC cancer metastases were found in regional LN, these patients underwent low anterior resection of the rectum with TME.

Results. All 92 patients had no purulent-septic, thromboembolic and urological complications. There were no severe intraoperative complications, and none of the patients died.

The average time of the hospital stay was (3.4 ± 1.7) days (from 2 to 6 days). The lower edge of the tumor was at the average height of (9.5 ± 4.2) cm from the anal canal (from 5 to 18 cm), the average size of the tumor was from (2.8 ± 1.7) cm (from 1.5 to 4 cm). The histological study of the removed preparations in all cases revealed that the tumor was removed within intact tissues.

At the early postoperative period, acute bleeding occurred in 4 patients of group I, which required the second surgical intervention using the TEM method; during the operation bleeding vessels were visualized, carefully coagulated and sutured. These patients were discharged from the hospital on the 7th day.

Intraoperative penetration into the abdominal cavity was in 3 (3.6%) patients when the tumor was located at a height of 13, 15 and 18 cm from the anal canal. In these patients, the defect of the intestine was sutured laparoscopically from the side of the abdominal cavity without the protective stomy. The tightness of the sutures was checked intraoperatively by the appearance of air bubbles when gas was injected into the rectum. These patients were discharged from the hospital 8–10 days after surgery. When monitoring these patients in the late postoperative period, it was found that defects in the rectum healed satisfactorily.

The average follow-up period ranged from 12 to 60 months. Recurrence of rectal cancer was found in 6 (6.5%) patients, group I. Cancer recurrence occurred in those patients who refused chemotherapy and radiotherapy. Patients with recurrences were operated on again by way of classical Low anterior resections of the rectum with total mesorectectomy.

When monitoring patients of group II at the period from 12 to 40 months, tumor

recurrence and distant metastases were not detected. The method of studying the “sentinel” LN in patients with RC has a high diagnostic value for the detection of lymphogenic metastases.

Discussion. The role of TEM in the treatment of patients with rectal cancer remains debatable, since a local tumor removal is not accompanied by lymphadenectomy [8]. In recent years, there have been reports that it is possible to perform surgery according to the TEM method in some patients with stage T2 tumor on the background of neoadjuvant radiochemotherapy [4]. The use of endoscopic ultrasound and MRI is considered a key aspect in the lymph nodes involvement detection. The results of treatment of 7378 patients with RC who underwent local resection of the rectal tumor and 36116 patients who underwent transabdominal resection of the rectum have been published [5]. The remote results (more than 10 years) in patients with Tis-1 tumor size were the same, However, in patients with T2 tumor size, the results of TEM operations were significantly worse. If patients with RC II stage received neoadjuvant chemotherapy and radiation therapy before surgery, the results after TEM and anterior rectal resections did not differ [1, 9].

The incidence of serious complications and lethality rate is much lower if local resection of the tumor using the TEM method is performed than in the case of laparoscopic resection of the anterior rectum with TME – 8.2 and 47.2% ($p = 0.01$) and 0 and 3.68 % ($p=0.01$) respectively. Besides, the stay of patients in the hospital is significantly reduced [5, 9]. So, it is very promising to expand the indications to performing operations using the TEM method in patients with stages I and II of RC [1].

In order to clarify the indications to possible TEM operations, a number of authors suggest examining the “sentinel” lymph nodes in patients with early RC in order to detect metastases [7, 11]. With this purpose radioactive technetium-99 and the stain Indocyanine green are used. To stain the lymph nodes, we used the fluorescent stain Indocyanine green, which made it possible to clearly identify the “sentinel” LN. The absence of cancer micrometastases in the regional lymph nodes is the rationale and indication to a local removal of rectal tumors using the TEM technique. Of course, it should be taken into account that the data obtained are preliminary and require more thorough confirmation [1, 15].

Conclusions. One of the most important prognostic factors of the development of the RC local recurrence is the regional lymph nodes involvement. Identification and target study of the “sentinel” LN in patients with RC most likely make it possible to assess the stage of the disease and apply an adequate scheme of the complex treatment. The technique of studying the “sentinel” LN in patients with RC has a high diagnostic value in detecting lymphogenic

metastases and allows expanding the surgical intervention to a radical volume.

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