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Analysis of complications after radical treatment of rectal cancer. VAC therapy as a new method of problem solving

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Aim. To increase the effectiveness of treatment of anastomosis leakage in patients with rectal cancer after neoadjuvant therapy. **Materials and methods.** We searched and analyzed publications in PubMed for 2015–2022, which provided data on the use of negative pressure endovacuum therapy in patients with anastomotic leakage after surgical treatment. The search queries related to the tags «rectal cancer», «postoperative complications», «anastomotic leakage», «neoadjuvant therapy», «negative pressure vacuum therapy», «endovacuum therapy». The results of treatment of patients with stage II–III rectal adenocarcinoma (T2–3N0–2M0) who underwent surgical treatment at the Pecarpathian Clinical Oncology Center of the Ivano-Frankivsk Regional Council in 2019–2022 were systematized and analyzed. The study included 97 patients with rectal cancer and no other oncological diseases. All patients received combined treatment according to international National Comprehensive Cancer Network (NCCN) guidelines. At the first stage, patients underwent preoperative telegamma therapy to TFD of 25–40 Gy, followed by restaging with magnetic resonance imaging (MRI) and surgical treatment in a standard volume with high ligation of the inferior mesenteric artery and compliance with total mesorectectomy (TME) principles. All patients underwent a preventive colostomy (ileo/transverse) and received perioperative or adjuvant chemotherapy as needed. Anastomotic leakage was diagnosed clinically, in the laboratory (C-reactive protein, procalcitonin), using a Fujinon EC 201 WL video colonoscope or a rectoscope, proctography, and pelvic MRI using a Magnetom Espree (Siemens) with a magnetic field strength of 1.5. Leakage assessment was graded according to the Clavien–Dindo scale and the leakage assessment score. **Results.** Traditional treatment of anastomotic leakage can last up to 1 year, and in 40–60% of cases satisfactory results are not achieved, which makes colostomy reversal impossible. On the basis of the Pecarpathian Clinical Oncology Center of the Ivano-Frankivsk Regional Council, the traditional treatment is applied with the use of antibiotic therapy and topical treatment; the duration of healing of the anastomotic defect is on average 4–6 months (120–180 days), and in 30–40% of cases, colostomy reversal is not achieved. The endovacuum aspiration therapy system is a new method that, even with significant defects, allows to achieve satisfactory results and improves the quality of life of patients. When using endoscopic vacuum-assisted closure (EVAC) therapy, on average, 4–5 polyurethane sponges are used and 4–5 sessions of vacuum therapy are performed with an average pressure of 70–120 mmHg, with the time for sponge replacement varying from 3–6 days. The average treatment duration is 30–60 days. Colostomy reversal is achieved in 60–70% of patients. When using stationary vacuum assisted closure (VAC) therapy systems, patients stay in the hospital for up to 30–50 days; while using new portable systems, such as Renesys Go, it is possible to treat this category of patients on an outpatient basis. **Conclusions.** Anastomotic leakage remains an urgent problem today. Neoadjuvant treatment of patients with rectal cancer has made significant progress in controlling the disease and prolonging the recurrence-free life expectancy. However, surgical treatment in compliance with the TME principles remains the gold standard. The early diagnosis and treatment of this type of anastomosis leakage not studied. Standard methods of treatment do not give satisfactory results. After all, the duration of treatment can be up to 1 year or more. And in many cases, the colostomy reversal cannot be achieved, which contributes to the lifelong disability of patients. The use of endoVAC therapy can become a new and effective way of treating anastomotic leakage and presacral abscesses with a success rate of up to 70%. Based on our study, the optimal pressure is 70–120 mmHg, with sponge replacement every 4–5 days, depending on the amount of exudate, thus it is possible to achieve granulation tissue, which contributes to reducing the speed of healing of the defect.

Key words: rectal cancer; anastomotic leakage; neoadjuvant therapy; chemoradiotherapy; negative pressure therapy.

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INTRODUCTION

Colorectal cancer remains the third leading cause of death among all cancers [1, 2]. The introduction of the concept of combined treatment using perioperative chemotherapy and telegamma therapy has significantly increased the survival rate of patients [3]. However, surgical treatment in compliance with all TME principles and high ligation of the inferior mesenteric artery is still the gold standard [1].

Anastomotic leakage after the surgical stage of treatment can occur in 0.0 to 36.3% of cases after TME [4]. Anastomotic leakage is a serious complication for patients and requires appropriate treatment.

The process of anastomosis healing is a complex, multifactorial process that goes through various stages and is primarily determined by the total amount of collagen deposition at the anastomosis site, as well as the transverse suturing of its fibers. The rate of anastomosis healing

is influenced by various factors, which are divided into systemic and local ones. Systemic factors include age, nutritional status, comorbidities, and neoadjuvant chemotherapy. While the local factors include anastomotic blood supply disorders, surgical technique violations, and preoperative telegamma therapy [5]. Anastomotic leakage remains the most threatening complication of conventional and laparoscopic colorectal surgery today, which increases the duration of hospitalization, mortality and risk of reoperation, decreases the quality of life and the length of time colostomy reversal, and sometimes disables patients [6]. Whereas subclinical recognition of anastomotic leakage (class A–B) is based mainly on non-objective criteria, so this type of complication is often diagnosed only after control examinations, in particular proctography and MRI. The incidence of anastomotic leakages varies significantly, ranging from 1 to 24%, as reported in different studies. In large colorectal centers, the incidence of leakage

ranges from 3.4–5.3% [7, 8]. Thus, the issue of treating this complication using various methods has become urgent, and although a few years ago the «watch and wait» option for small defects (up to 2 cm) was the main option, today a minimally invasive method of treatment using a complex of EVAC is increasingly being developed, which has helped to reduce the duration of anastomotic healing and the time to reverse the transversostomy [9].

MATERIALS AND METHODS

The research program was approved by the Bioethics Commission of the Ivano-Frankivsk National Medical University.

We searched and analyzed publications in PubMed for 2015–2022, which provided data on the use of negative pressure endovacuum therapy in patients with anastomotic leakage after surgical treatment. The search queries related to the tags «rectal cancer», «postoperative complications», «anastomotic leakage», «neoadjuvant therapy», «negative pressure vacuum therapy», «endovacuum therapy».

The results of treatment of patients with stage II–III rectal adenocarcinoma (T2–3N0–2M0) who underwent surgical treatment at the Precarpathian Clinical Oncology Center of the Ivano-Frankivsk Regional Council in 2019–2022 were systematized and analyzed. The study included 97 patients with rectal cancer and no other oncological diseases. All patients received combined treatment according to international NCCN guidelines. At the first stage, patients underwent preoperative telegamma therapy to TFD of 25–40 Gy, followed by restaging with MRI and surgical treatment in a standard volume with high ligation of the inferior mesenteric artery and compliance with TME principles [1]. All patients underwent a preventive colostomy (ileo/transverse) and received perioperative or adjuvant chemotherapy as needed. Anastomotic leakage was diagnosed clinically, in the laboratory (C-reactive protein, procalcitonin), using a Fujinon EC 201 WL video colonoscope or a rectoscope, proctography, and pelvic MRI using a Magnetom Espree (Siemens) with a magnetic field strength of 1.5. Leakage assessment was graded according to the Clavien-Dindo scale and the leakage assessment score. All patients gave their consent to research and processing of their personal data.

RESULTS OF THE STUDY

A large Dutch study found that stoma reversal could not be achieved in 49% of patients with anastomotic leakage [10]. Thus, there is an urgent need to study various options for treating anastomotic leakage in patients without peritonitis who underwent low anterior resection with a preventive ileo/transverse stoma.

Since the first data on wound treatment with vacuum therapy appeared in the late 1990s, this technology has covered almost all areas of surgery, providing a versatile and easy-to-use method of treating complex wounds [11].

In 2001, Weidenhagen et al. began to implement endoscopic vacuum therapy for the treatment of colorectal anastomotic leakage as a minimally invasive method of continuous and effective drainage of perianastomotic abscesses and fistulas [12].

Despite the fact that studies in the treatment of anastomotic leakage in colorectal cancer using endoscopic vacuum therapy are characterized by high success, there is a lack of data on the advantages of different methods of this type of treatment [13, 14].

In 2007, an international group for the study of rectal cancer tried to standardize this method of treatment. Types of various techniques differed depending on the location of the anastomosis, the size of the presacral abscess or the size of the defect, and the patient's clinical presentation. Nevertheless, if there is a large defect (more than 180 degrees), even for a clinically stable patient, the use of endoVAC therapy is not recommended [15, 16].

Endoscopic treatment of anastomotic leakage is based on the transanal placement of a microporous sponge directly in the anastomotic site or in the perianastomotic cavity (abscess cavity), which is connected to the mechanism that creates a constant negative pressure in the cavity. The sponge is usually changed every 2–4 days. Active drainage with constant negative pressure contributes to the reduction of the defect and leads to a decrease in local edema, which improves perfusion and promotes the rapid formation of granulation tissue [12].

Thus, endoscopic vacuum therapy has become the method of choice in the treatment of anastomotic leakage after rectal resection. Florian and other researchers reported that there was no difference in mortality when treating this complication ($p=0.624$) [17]. However, the success rate of treatment with endoscopic VAC therapy was significantly higher compared to standard treatment methods (antibiotic therapy, anti-inflammatory and topical therapy) (95.2 vs. 65.8%). The degree of anastomotic healing with the help of endoVAC therapy ranges from 56–97%. 70% of patients in this study received preoperative telegamma therapy [17].

The duration of healing of anastomotic leakage in one of the studies was 6 months in 16/30 patients (53%), while anastomotic healing within 6 months in those who did not receive neoadjuvant therapy was observed in 7 out of 8 patients (more than 90%). The anastomosis was considered intact if there were no signs of contrast extravasation during MRI or proctography.

Another multicenter study showed a success rate of 81.4% for endoVAC therapy, with an average stoma reversal rate of 66.7%. They found that various risk factors can affect the success of endoVAC therapy, such as neoadjuvant chemoradiotherapy [11].

Von Bernstorff et al. first evaluated the effect of radiation therapy on the anastomotic healing process during endoVAC therapy. The aforementioned authors reported a longer treatment duration, a greater number of sponge use, and longer time to closure of the abscess cavity [18–21].

In contrast, other researchers did not find any correlation of neoadjuvant therapy with leakage healing time and success rate [13, 22].

The overall incidence of complications associated with the use of endoVAC therapy has an average value of 11.1%. In particular, the most common complication was recurrence of presacral abscess [11].

Other researchers reported such complication as anastomotic stricture, reaching about 33%, which was eliminated by balloon dilation [13]. In some studies, the occurrence of moderate pain as a complication of endoVAC therapy was observed in 36% [5]. During the sponge replacement and migration into the abdominal cavity, another issue arose—bleeding, with an incidence not exceeding 1% [23].

Another multicenter prospective study found that when the distance from the anal sphincter to the anastomosis was 4.9–10 cm and the size of the abscess was 5–8.1 cm, an average of 7 sponges (2–34) were used with an average negative pressure of 150 mmHg, and the average healing time was 31 days (14–127 days). The success rate was 85.4% [13].

In most studies, the endoscopic vacuum device consisted of a 7×3 cm open-cell polyurethane sponge; the sponge was completely inserted into the abscess cavity using an introducer system. The end of the probe was connected to various negative pressure vacuum systems. A constant negative pressure of 120–150 mmHg was created [24].

Thus, anastomotic leakage is one of the most dangerous complications after surgical treatment of rectal cancer with TME [25].

The minimal invasiveness of endoVAC therapy is associated with low costs and low risk from the procedure itself [26]. Depending on the size of the defect, successful anastomosis

can be achieved in as many as 70–80% of cases [27]. Stoma reversal can be achieved in 63% of cases, but some data indicate a disappointing 40% success rate of treatment [13].

However, other data indicate almost 73% success rate of stoma reversal after endoVAC therapy [5].

The main advantage of this procedure is to ensure continuous drainage of the abscess cavity. The results of various studies are promising, as they allow preservation of the anastomosis compared to standard treatments, including endoscopic excision of the defect, stent placement, antibiotic therapy, and percutaneous drainage. Despite the fact that this procedure is gaining acceptance among the surgical community, the inclusion criteria and determination of effectiveness are not yet standardized and are extremely heterogeneous.

Some researchers report a success rate of endoscopic vacuum therapy from 60 to 100% and a stoma reversal rate of 31–100% [13]. The lack of standardization in the treatment of endoVAC therapy promotes further research in this area.

In a critical analysis, Andrea Vignali and Paola De Nardi prove that VAC therapy in clinically stable patients without peritonitis represents a valid alternative to the conservative approach (stoma diversion, drainage) with a relatively low rate of complications, a higher rate of stoma closure and a shorter hospital stay [28].

Leif Schiffmann, Nicole Wedermann, Frank Schwandner, Michael Gock, Ernst Klar and Florian Kühn evaluated the effect of neoadjuvant chemoradiotherapy on the healing process of anastomotic leakage during VAC therapy. According to the results of their study, there was no difference in mortality (0%), success rate (90.9% vs. 100%), or stoma closure rate (63.6% vs. 62.5%).

After neoadjuvant radiochemotherapy, patients had a significantly longer duration of VAC therapy (31.1 days vs. 15.9 days), which was associated with a higher number of sponge replacements (9.6 vs. 5.0) [29].

K. Talboom et al. in a retrospective cohort study proved that initiation of endoscopic vacuum-assisted surgical closure (EVASC) within 3 weeks is essential for the successful restoration of bowel continuity after anastomotic leakage following rectal cancer resection. EVASC has proven to be progressively successful with the introduction of highly selective diversion and early diagnosis of leaks within 2 weeks, resulting in healing and anastomotic functionality approaching 100% [30].

When analyzing the results of treatment and complications of patients with rectal adenocarcinoma at the Precarpathian Clinical Oncology Center of the Ivano-Frankivsk Regional Council, a total of 97 clinical cases were studied. Complications after surgical treatment were noted in 18.56% (18) of patients according to the Clavien-Dindo scale (Table 1) [31].

The Clavien-Dindo scale indicates that complications occur in 18.56% of cases. Among these, the most prevalent are Class A leakage at 38.89% and Class B at 11.11%. Consequently, the combined percentage of Class A-B anastomosis leakages within all complications is 9.28%.

We Performed Standard treatment which included antibiotic therapy, transrectal sanitation, abscess opening, and using the endoVAC therapy system.

Patient P., born in 1949, with a diagnosis rectal adenocarcinoma (ypT3N0M0) underwent combined treatment in the form of preoperative telegamma therapy to TFD

Table 1. Distribution of complications according to the Clavien-Dindo classification

	n	%	±m
Leakage A	7	38.89	11.49
Leakage B	2	11.11	7.41
Leakage C	2	11.11	7.41
Mesenteric/ileus	4	22.22	9.80
SSI	2	11.11	7.41
Eventeration	1	5.56	5.40

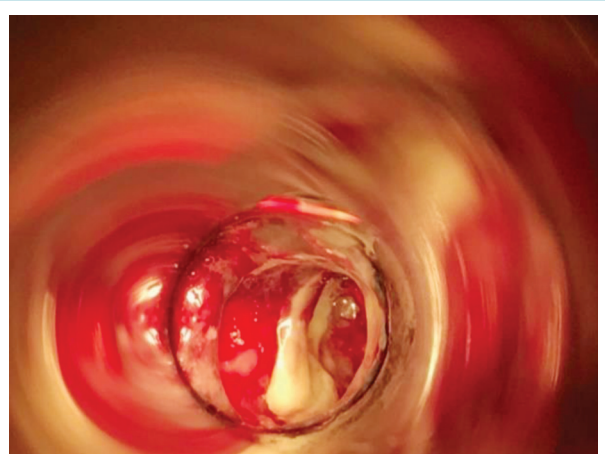


Fig. 1. Anastomotic defect with fibrin layering during rectoscopy



Fig. 2. The arrow indicates placement of the sponge in the abscess cavity due to the anastomotic defect



Fig. 3. MRI during the endoVAC therapy (the arrow indicates transrectally-endoscopically inserted polyurethane sponge endoVAC)

40 Gy, after which a low anterior resection with a preventive transversostomy was carried out. The patient had type II diabetes mellitus, insulin independent and with confirmed angiopathy; the average blood sugar level was 7–9 mmol/l, and grade II obesity. The control examination 2 months after the operation included: MRI, proctography and rectoscopy (Fig. 1), anastomotic leakage and presacral abscess measuring 6×9 cm were diagnosed, according to Clavien-Dindo classification IIIA, according to the leakage score — class B, the patient complained of purulent-fibrinous discharge from the rectum. The size of the anastomosis defect was 2.5–3 cm (Fig. 2).

The patient had transanal endoVAC sponge inserted into the paracolostomy abscess. 3 sessions were performed with the sponge changed every 4–5 days. The amount of purulent-fibrinous exudate during this period was 700 ml. A constant negative pressure of 70 mmHg was applied. In the course of endoVAC therapy, MRI monitoring, rectoscopy and proctography were performed 60 days after the diagnosis of anastomotic leakage. Stoma reversal took place 130 days after the initial surgery (Fig. 3).

Description of the device: we used the endoVAC system, which included a polyurethane sponge with a system that was connected to the Renesys Go device with a pressure of 70 mm Hg (Fig. 4).

Also, we created an alternative version of the endoVAC sponge (Fig. 5), which included an endopolyurethane sponge that was cut according to the size of the cavity. A cavity up to 0.5 cm in size was made inside the sponge into which a drainage tube with perforated holes was inserted. The sponge was sutured to the tube with Prolene 3.0 thread for fixation,

and this system (Fig. 5) was connected to the VAC-device (Renesys Go).

Patient Ya., born in 1956, diagnosed with rectal adenocarcinoma (ypT3N0M0), underwent combined treatment of preoperative telegamma therapy to TFD 40 Gy, after which a low anterior resection with a preventive transversostomy was carried out. 30 days after the operation, the patient complained of fever to 38–39 °C, pelvic pain. MRI, proctography, and rectoscopy diagnosed anastomotic leakage, a presacral abscess measuring 4×5 cm, according to the Clavien-Dindo classification IIIA, class B according to the leakage score. The size of the leakage was 2.5–3 cm. An endoVAC sponge was inserted transrectally into the paracolostomy abscess. There were 2 sessions with a change of sponge every 4–5 days. The amount of purulent-fibrinous exudate during this period was 400 ml. A constant negative pressure of 120 mmHg was applied. MRI control during the course of endoVAC therapy showed a decrease in the leakage up to 1.5–2 cm and the absence of a clinical picture of SIRS. The patient was transferred to the category of «watch and wait» patients for further closure of the transversostomy.

Patient Ya., born in 1959, with a diagnosis of rectal adenocarcinoma (ypT0N0M0). Condition after combined treatment. He received a course of telegamma therapy to TFD 60 Gy. A low anterior resection of the rectum was performed. After 2 months, an anastomotic defect was detected during a follow-up MRI examination. The patient complained of pelvic pain. Anti-inflammatory therapy, antibiotic therapy and topical treatment were performed, but the reversal of the stoma was not achieved.

In the remaining 6 patients, the average time from low anterior resection surgery to follow-up examination, MRI, and CT was 2–3 months (60–90 days). In case of class A–B leakage, traditional antibiotic therapy and anti-inflammatory therapy were performed for 3–4 weeks (21–30 days), followed by another 30–60 days of «watch and wait» tactics. And only after an additional follow-up examination without an anastomotic defect, the colostomy reversal was performed. The average time of treatment and before stoma reversal was up to 1 year (180–360 days).

DISCUSSION AND DEBATE

After searching and analyzing PubMed publications, we found that anastomotic leakage remains a rather complex issue, because despite the development and achievements of modern medicine, the introduction of minimally invasive approaches and the use of Enhanced recovery after surgery (ERAS) protocols, even in the largest colorectal centers of Europe and the United States, reaches 15–40%.

On the basis of the Precarpathian Clinical Oncology Center, the number of complications according to the Clavien-Dindo classification is 18.56%, of which the largest share are class A leakages — 38.89% and class B — 11.11%. Thus, the total number of class A–B anastomotic leakages from all complications is 9.28%. Depending on the severity of the complication, patients are classified according to the Clavien-Dindo scale. Leakages are classified into classes A–C. Whereas class C has symptoms of systemic inflammatory response syndrome (SIRS) and sepsis and patients require immediate surgical treatment, class A–B usually has no obvious symptoms and is diagnosed at later stages, during control examinations or MRI before stoma reversal. This problem remains urgent, because in addition to discomfort, disability (stoma), and economic costs (colostomy bags), patients remain uncertain about further treatment for a long time.

Traditional treatment can last up to 1 year, and 40–60% of patients do not achieve satisfactory results, which makes colostomy reversal impossible. On the basis of the Precarpathian Clinical Oncology Center of the Ivano-Frankivsk Regional Council, the traditional treatment is applied with the use of antibiotic therapy and topical treatment; the duration



Fig. 4. VAC therapy system with variable canisters, with the possibility of using variable pressure



Fig. 5. An alternative option of the endopolyurethane sponge, which is connected to the system of constant negative pressure

of healing of the anastomotic defect is on average 6 months — 1 year (180–320 days), and in 30–40% of cases, the colostomy reversal is not achieved.

The vacuum therapy system is a new method that, even with significant defects, allows to achieve satisfactory results and improves the quality of life of patients. When using VAC therapy, on average, 4–5 polyurethane sponges were used and 4–5 sessions of endoVAC therapy were performed with an average pressure of 70–120 mmHg. The duration of treatment is 30–60 days. Colostomy reversal can be achieved in 60–70% of patients. When using standard stationary VAC therapy systems, patients stay in the hospital for a long time, up to 30–50 days; while using new portable systems, such as Renesys Go, it is possible to treat this category of patients on an outpatient basis.

CONCLUSIONS

Anastomotic leakage remains an urgent problem today. The use of endoVAC therapy can become a new and effective way of treating anastomotic leakage and presacral abscesses with a success rate of up to 70%.

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Аналіз ускладнень після радикального лікування раку прямої кишки. ВАК-терапія як новий метод вирішення проблеми

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Резюме. Мета. Підвищити ефективність лікування неспроможності анастомозу після неoad'ювантної терапії у хворих на рак прямої кишки. **Матеріали і методи.** Проведено пошук та аналіз публікацій у PubMED за 2015–2022 р., у яких наводилися дані щодо використання ендовакуумної терапії негативним тиском у хворих з неспроможністю анастомозу після хірургічного лікування. Пошукові запити стосувалися тегів «рак прямої кишки», «післяопераційні ускладнення», «неспроможність анастомозу», «неoad'ювантна терапія», «вакуумна терапія негативним тиском», «ендовакуумна терапія». Систематизовано та проаналізовано результати лікування хворих з аденокарциномою прямої кишки II–III стадій (T2–3N0–2M0), яким проведено хірургічне лікування на базі Комунального некомерційного підприємства «Прикарпатського клінічного онкологічного центру Івано-Франківської обласної ради» (КНП «ПКОЦ ІФ ОР») у період з 2019 до 2022 р. У дослідженні охоплено 97 хворих з раком прямої кишки та відсутністю інших онкологічних захворювань. Усі пацієнти отримували комбіноване лікування згідно з міжнародними рекомендаціями Національної мережі багатопрофільних онкологічних закладів США (National Comprehensive Cancer Network — NCCN). Усім хворим проведено накладання превентивної колостоми (ілео/трансверзо). Пацієнти за потреби отримували періопераційну чи ад'ювантну хіміотерапію. Неспроможність анастомозу діагностували клінічно, лабораторно (С-реактивний білок, прокальцитонін), за допомогою відеоколоноскопа Fujinon EC 201 WL або ректоскопа, проктографії та магнітно-резонансної томографії органів малого таза на апараті Magnetom Espree (Siemens) за напруженістю магнітного поля 1,5. Оцінка неспроможності градіювалася за шкалою Clavien-Dindo

та шкалою оцінки неспроможності. **Результати.** Традиційне лікування неспроможності анастомозу може тривати до 1 року, а в 40–60% так і не досягає задовільних результатів, що унеможливує реверс колостоми. На базі КНП «ПКОЦІФОР» використовують традиційне лікування з використанням антибіотикотерапії та місцевого лікування, тривалість загоєння дефекту анастомозу становить у середньому 4–6 міс (120–180 днів), а в 30–40% випадків реверсу колостоми так і не вдалося досягти. Система ендовакуумної аспіраційної терапії — це новий метод, який навіть при значних вадах дозволяє досягти задовільних результатів та сприяє покращенню якості життя пацієнтів. При використанні eBAK-терапії в середньому використовували 4–5 поліуретанових губок та проводилося 4–5 сеансів вакуумної терапії із середнім тиском — 70–120 мм рт.ст., час заміни губки варіював від 3 до 6 днів. Тривалість лікування в середньому сягає 30–60 днів. Реверсу колостоми вдається досягти у 60–70% хворих. При використанні стаціонарних систем ВАК-терапії хворі тривалий час перебувають у лікарні — до 30–50 днів, з використанням нових портативних систем, таких як Renasys GO, можна лікувати цю категорію пацієнтів амбулаторно. **Висновки.** Неспроможність анастомозу залишається актуальною проблемою сьогодення. Неоад'ювантне лікування хворих на рак прямої кишки досягло значних успіхів у можливості контролю захворювання та подовження безрецидивної тривалості життя хворих. Проте золотим стандартом залишається хірургічне лікування з дотриманням принципів ТМЕ. Попри позитивний вплив неоад'ювантного лікування на біологію захворювання,

це є незадовільним фактором прогнозу хірургічних ускладнень, зокрема неспроможності анастомозу. Раннє діагностування та лікування цього виду ускладнень залишаються досі не вивченими. Стандартні методи лікування дають недостатньо задовільні результати. У багатьох випадках реверсу колостоми не вдається досягти, що призводить до пожиттєвої інвалідизації хворих. Використання ендовакуумної терапії може стати новим та ефективним способом лікування неспроможності анастомозу та пресакральних абсцесів з успішністю до 70%. На основі нашого дослідження оптимальним є використання тиску 70–120 мм рт.ст. із заміною губки кожні 4–5 днів залежно від кількості ексудату, у такий спосіб вдається досягти грануляційної тканини, що зумовлює зниження швидкості загоєння вади.

Ключові слова: рак прямої кишки; неспроможність анастомозу; неоад'ювантна терапія; хіміопроменеве лікування; терапія негативним тиском.

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