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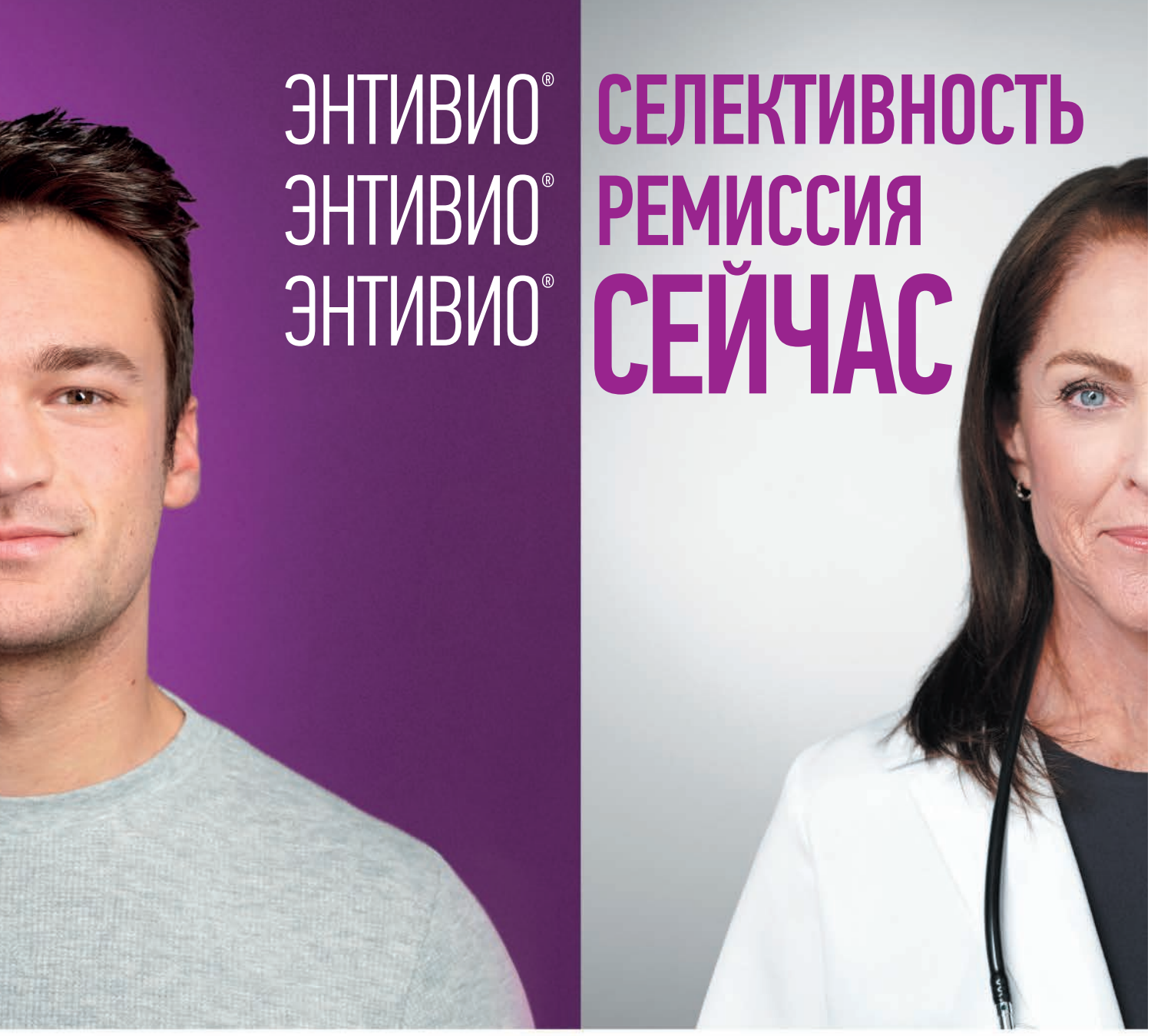

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1. Covino BG. Pharmacology of local anaesthetic agents. Br J Anaesth. 1986 Jul;58(7): 701-16.
2. Флуокортолона пивалат относится к классу сильных топических ГКС, согласно классификации Миллера-Монро (1980), с изменениями и дополнениями. Tauber U: Dermatocorticosteroids – structure, activity, pharmacokinetics. Eur J Dermatol 1994: 4: 419-429.

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Заболевания толстой кишки, заднего прохода, тазового дна и промежности являются одними из наиболее распространённых, а колопроктология — наиболее динамично развивающейся хирургической специальностью.

Колоректальный рак занимает одну из ведущих позиций в структуре онкологических заболеваний, наблюдается неуклонный рост воспалительных заболеваний кишечника, дивертикулярной болезни. Постоянно изменяются диагностические и лечебные подходы при лечении геморроидальной болезни, свищей заднего прохода, анальной трещины, анальной инконтиненции.

Колопроктологи в России, как и во всем остальном мире, интенсивно взаимодействуют с онкологами, гастроэнтерологами, общими хирургами, эндоскопистами, патофизиологами и специалистами других научно-практических направлений врачебной деятельности.

Целевой аудиторией журнала являются колопроктологи, а также врачи других специальностей, интерес которых сконцентрирован на заболеваниях толстой кишки, заднего прохода, тазового дна и промежности.

Журнал «Колопроктологии» объединяет колопроктологов России в тесном сотрудничестве с профессиональными объединениями мира и ведущими международными экспертами в области колоректальной хирургии.

В журнале публикуются оригинальные статьи, результаты фундаментальных исследований, направленные на изучение общепатологических процессов с целью улучшения лечения больных, описание клинических наблюдений, мета-анализы и обзоры литературы по широкому спектру вопросов колопроктологии, а также результаты клинических и экспериментальных исследований.

AIM AND SCOPE

The purpose of the journal *Koloproktologia* (Russian Journal of Coloproctology) is to highlight current trends and scientific achievements in colorectal surgery.

Diseases of the colon, anus, pelvic floor, and perineum are among the most common; and coloproctology is the most dynamically developing surgical specialty.

Colorectal cancer occupies one of the leading positions in the structure of oncological diseases. There is a steady increase in inflammatory bowel diseases, diverticular disease, stoma patients.

Diagnostic and treatment options for hemorrhoid disease, anal fistula, anal fissure, and anal incontinence are constantly changing.

Coloproctologists in Russia, as in the rest of the world, intensively interact with oncologists, gastroenterologists, general surgeons, endoscopists, pathophysiologists, and specialists in other scientific and practical areas of medical activity.

The target audience of the journal is coloproctologists, as well as doctors of other specialties, whose interest is focused on diseases of the colon, rectum, anus, pelvic floor and perineum.

The journal *Koloproktologia* (Russian Journal of Coloproctology) unites coloproctologists of Russia in close cooperation with professional associations of the world and leading international experts in the field of colorectal surgery.

The journal publishes original articles, the results of basic research aimed at studying general pathological processes in order to improve the treatment of patients, clinical cases, meta-analyses, and literature reviews on a wide range of coloproctology issues, as well as the results of clinical and experimental studies.

Журнал включен в перечень рецензируемых научный изданий, рекомендуемых ВАК, для публикации основных научных результатов диссертационных исследований на соискание ученой степени кандидата наук, на соискание ученой степени доктора наук по научным специальностям (№ 118 по состоянию на 24.02.2021):

- 3.1.6 — Онкология, лучевая терапия (медицинские науки);
- 3.1.9 — Хирургия (медицинские науки);
- 3.1.11 — Детская хирургия (медицинские науки);
- 3.11.25 — Лучевая диагностика (медицинские науки);
- 3.1.30 — Гастроэнтерология и диетология (медицинские науки).
- 3.3.2 — Патологическая анатомия (медицинские науки);

Приглашаем авторов публиковать различные материалы клинической направленности:

- оригинальные статьи
- обзоры
- лекции
- случаи из практики

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CLINICAL GUIDELINES

Anal Fissure

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All the authors are the members of the Russian Association of Coloproctologists.

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International Statistical Classification of Diseases and Health-related Problems: K60.0; K60.1; K60.2

Age group: **Adults**
Year of approval: **2021**

LIST OF ABBREVIATIONS

AS — Anal sphincter
MRI- magnetic resonance imaging
RCT — randomized controlled trial
US — ultrasound examination

TERMS AND DEFINITIONS

Anoderm is the epithelial lining of the anal canal, represented by a stratified squamous non-keratinized epithelium.
Anal canal is the terminal part of the digestive system, located between the lower rectum and the anus.
"Anatomical" anal canal is a zone located between the outer edge of the anus and the dentate line, 1.5–3.0 cm long.
Dentate line is a line formed by the margins of the anal valves formed by the intestinal mucosa between the Morgagni columns.
"Surgical" anal canal is the distal part of the gastrointestinal tract, including the 'anatomical' anal canal and the distal part of the rectum (from the dentate line to the anorectal ring, i.e. the attachment point of the puborectal muscle), with a length of 2.4–4 cm.
Anal fibrosis is resulting from a chronic inflammatory process, including the presence of scars in the edges and bottom of the fissure, a sentinel pile at the distal edge of the fissure, a fibrous polyp of the anal canal at its proximal margin and pectenosis.
Pectenosis is a rigid circular narrowing of the anus due to scarring of the distal margin of the internal sphincter.
Dyssynergic defecation is a disturbed coordination of the pelvic floor muscles during defecation.

1. BRIEF INFORMATION ON THE DISEASE OR CONDITION (GROUP OF DISEASES OR CONDITIONS)

1.1 Definition of the Disease or Condition (group of diseases or conditions)

Anal fissure is a linear or ellipsoid tear (ulcer) of the anoderm located within the 'anatomical' anal canal [1–6].

1.2 Etiology and Pathogenesis of the Disease or Condition (group of diseases or conditions)

Anal fissure is a polyetiological disease. Its cause is trauma of the anal canal, most often due to the constipation, frequent liquid stools or other defecation disorders [1,5,7–9].
The main pathogenetic cause of anal fissures is the presence of spasming of the internal sphincter [10–13], which occurs in response to trauma of the anoderm [7–9].

An important role is played by a predisposition to a low production of nitric oxide, which leads to an increased tone of smooth muscles [14].

It is also possible for dyssynergic defecation to influence on the internal sphincter spasming [15,16]. The predisposing factors also include the vascular factor: the inferior rectal artery does not form a wide network of vascular anastomoses along the posterior semicircle, the density of the capillary network is also significantly less here, and small arterial vessels feeding the anoderm pass through the contracted internal anal sphincter [17]. Consequently, the spasming further worsens the perfusion of the anoderm, creating unfavorable conditions for the healing of the defect [17–19].

In the anal fissure, the margins and the bottom are distinguished. An acute anal fissure (up to 2 months) has clear smooth margins without fibrous changes. At the bottom of such a fissure, there are nerve endings, which leads to a severe pain and the internal anal sphincter spasming. If the main damaging factors eliminate, an acute anal fissure heals.

With continued exposure to damaging factors, the healing process delayed. At the same time, fibrosis develops in the margins and bottom of the tear, preventing the epithelialization of the fissure: a chronic anal fissure is formed [1,5].

Pathognomonic signs of a chronic anal fissure are:

- fibrosis in the margins of the tear, as well as the presence of a fibrous polyp of the anal canal at the proximal edge of the defect and/or the presence of a sentinel pile at the distal edge of the defect;
- disease history ⩾ 2 months;
- fibers of the internal anal sphincter in the bottom of the defect.

1.3 Epidemiology of the Disease or Condition (groups of diseases or conditions)

Anal fissure is one of the most common diseases. It accounts for 10–15% of all coloproctological diseases, the incidence ranges from 20 to 23 per 1,000 adult population [20]. The disease most often develops at the age of 30–50 years, which determines its social significance. The incidence among males and females is the same [2].

1.4 Features of the Coding of Disease or Condition (group of diseases or conditions) According to the International Statistical Classification of Diseases and Health-related Problems

ICD-10 codes

Class — Diseases of the digestive system (XI):

K60.0 Acute fissure of the anus

K60.1 Chronic anal fissure

K60.2 Anal fissure, unspecified

1.5 Classification of the Disease or Condition (groups of diseases or conditions)

Anal fissure happens [21,22]:

1. By the disease time:

- Acute
- Chronic

2. By site of the tear in the anal canal:

- Posterior
- Anterior
- Lateral

3. By the spasming of the internal sphincter:

- With spasming
- Without spasming (most often occur due to the complications or are secondary manifestations of the another disease).

1.6 Clinical Picture of the Disease or Condition (group of diseases or conditions)

The main clinical manifestation of anal fissure is burning pain in the anus after defecation.

Some patients report pain during defecation and the blood discharge or blood stains on the stools or toilet paper.

A change in the pain syndrome, a decrease in its intensity, wetness, itching and persistent burning in the anus, shows a complication of the anal fissure — the blind internal anal fistula.

2. DIAGNOSIS OF THE DISEASE OR CONDITION (GROUP OF DISEASES OR CONDITIONS), MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF DIAGNOSTIC METHODS

The criterion for the diagnosis of ‘anal fissure’ is the presence of a linear or ellipsoid tear of the anoderm within the “anatomical” anal canal.

The diagnosis of 'acute anal fissure' means the presence of a linear or ellipsoid defect of the anoderm located within the 'anatomical' anal canal; the duration of the disease history is less than 2 months; and there are no fibrous changes indicating the chronic nature of the disease.

The diagnosis of 'chronic anal fissure' means the presence of a linear or ellipsoid defect of the anoderm located within the 'anatomical' anal canal; the disease history is more than 2 months; and the at least one of the symptoms of a long-term chronic process:

- scarring of the margins of the defect;
- fibrous polyp of the anal canal at the proximal edge of the defect;
- sentinel pile at the distal edge of the defect;
- fibers of the internal anal sphincter in the bottom of the defect.

In most cases, clinical examination is enough for the diagnosis of anal fissure.

At the same time, it is necessary to carry out differential diagnosis in order to exclude erosive and ulcerative lesions of the anal canal of other origin [1,21,23,24]:

- tumors of the anal canal and rectum;
- fistula-in-Ano;
- specific infections (tuberculosis, herpes virus, actinomycosis, syphilis, HIV infection);
- complications of caudal teratomas (in the presence of an opening of the primary embryonic tract);
- inflammatory bowel diseases with perianal complications;
- hemoblastoses.

Diagnosis

When formulating the diagnosis of anal fissure, it is necessary to reflect the nature of the disease, the site of defects, the presence or absence of spasming of the internal sphincter. The following are examples of diagnosis formulations:

- 'Chronic anterior anal fissure with spasming of the sphincter';
- 'Chronic posterior anal fissure without spasming of the sphincter';
- 'Acute posterior anal fissure'.

2.1 Complaints and History of the disease

Anal fissure is characterized by burning pain in the anus after defecation. Some patients may complain of pain during defecation and discharge of blood from the anus (blood blots on the stools and toilet paper) [2,23].

When asking the history of the disease, attention should be paid to the nature of pain, its duration and connection with the act of defecation. The following predisposing factors may present in the history: insufficient intake of dietary fibers, spicy, fatty and carbohydrate-rich food, constipation, and diarrhea [2,25–27].

2.2 Clinical Examination

- Physical examination is **recommended** for all patients with suspected anal fissure in order to confirm the diagnosis [1,21,23,24]:
- Visual check-up of the perianal skin and anus;
- Digital examination.

Grade of recommendation — C (Level of evidence — 4)

Comment: *the examination is carried out on a gynecological chair, in the position of the patient on his back with his legs as close to his belly as possible, and if it is impossible — in the side position.*

During visual check-up of the perineum and anus, attention should be paid to changes in the perianal skin (wetness, rashes, etc.), the shape of the anus, its gap, the presence of scarring and deformities, as well as the condition of the inguinal lymph nodes. Then, with careful spread of the anal verge, the anoderm should be examined for the presence of its defect. At the same time, the shape of the defect (linear or ellipsoid), its depth and boundaries, changes in the margins and the presence of a sentinel pile should be noted.

Digital examination for anal fissure is usually painful and may require the use of local anesthetics. During digital examination, attention should be paid to the presence of an anoderm defect and its site, the condition of the margins of the anal fissure, the presence or absence of fibrous changes in the anal canal, comorbidities of the anal canal and the low rectum (hemorrhoids, anal fistula, tumor, etc.).

It is necessary to determine the presence of clinical signs of spasming of the internal sphincter, characteristic of anal fissure — retracted and spasming distal part of the internal sphincter.

2.3 Laboratory Diagnostic Tests

There is no specific laboratory tests for the anal fissures.

Laboratory diagnostic tests should be performed before the surgery to exclude comorbidities, as well as, if necessary, for differential diagnosis.

2.4 Instrumental Diagnostic Tests

- Anoscopy, proctoscopy, and colonoscopy are **not recommended** for patients with anal fissure due to the presence of severe pain syndrome.

In order to clarify the diagnosis, it is recommended to perform the above tests in the surgery room under anesthesia, if necessary; in other cases — after pain relief [1,11,21].

Grade of recommendation — C (Level of evidence — 5)

- In patients with anal fissure in the absence of clear clinical signs of the internal sphincter spasming, according to clinical examination, it is **recommended** to study anal sphincter functions by sphincterometry to objectify the presence of the internal sphincter spasming [1,11,28–30].

Grade of recommendation — C (Level of evidence — 4)

Comment: *this method allows to evaluate the total contractile activity of the external and internal sphincters of the anus.*

The following indicators are evaluated: tone and strength of volitional contraction of the anal sphincters. The magnitude of the tonic tension characterizes the internal anal sphincter predominantly.

With volitional contraction, the contractile activity of the striated muscles of the external sphincter and pelvic floor is evaluated. Spasming of the internal sphincter is confirmed in the presence of at least one of the following manometric signs:

1. *Increase of the mean pressure in the anal canal at rest;*
2. *The presence of ultra-slow waves.*

Method: the patient is placed on the couch in the position 'lying on his/her side with his/her knees bent', the sensor is inserted into the anus to a depth of 4.0–5.0 cm. Data is recorded 3–4 minutes after the introduction of the sensor — the time required for the patient to adopt to the test and attenuation of the anal reflex caused by the introduction of the sensor.

- In patients with anal fissure, in the absence of clear clinical signs of the internal sphincter spasming according to clinical examination, it is **recommended** to check-up the sphincter functions by profilometry, while this test is a more sensitive method for diagnosing the presence of the internal sphincter spasming [1,11,29–31].

Grade of recommendation — C (Level of evidence — 3)

Comment: *profilometry is a method of assessing pressure in the lumen of a hollow organ. Anorectal profilometry provides pressure recording in different planes along the entire length of the anal canal.*

A computer program is used to graph the distribution of pressure values and calculate the maximum and the mean pressure values, as well as the asymmetry coefficient. The processing program provides for the analysis of pressure data at any level of the anal canal cross-section.

Spasming of the internal sphincter is confirmed in the presence of at least one of the following manometric signs:

1. *increase of the mean pressure in the anal canal at rest;*
2. *increase in the maximal pressure in the anal canal at rest;*
3. *the presence of ultra-slow waves.*

Method: the test is carried out in the position of the patient lying on his/her side with his/her legs bent at the knees. After preliminary calibration, the catheter is inserted into the rectum of the patient to a depth of 6 cm. The rate of fluid perfusion through the catheter is 1 ml / min. With the help of a special puller device, the catheter is pulled out of the rectum at a speed of 1 mm / sec, while the pressure is recorded throughout its movement. Data analysis is carried out using a computer program with a graph showing the distribution of pressure in the anal canal.

2.5 Other Diagnostic Tests

Additional instrumental and laboratory tests are performed for the purpose of differential diagnosis.

- For patients with anal fissure, in the absence of signs of the rectal internal sphincter spasming, according to physical and instrumental examination, and suspected presence of erosive and ulcerative lesions of the anal canal of specific etiology, as well as the development of complications, the following tests are recommended [1,21,23,24]:

1. endoanal ultrasound;
2. colonoscopy (examination level — terminal ileum).

Grade of recommendation — C (Level of evidence — 5)

3. TREATMENT, INCLUDING DRUG AND NON-DRUG THERAPY, DIET THERAPY, ANESTHESIA, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF TREATMENT METHODS

3.1 General Principles of Treatment of Acute and Chronic Anal Fissure

The treatment of acute and chronic anal fissures pursues the following objectives:

1. normalization of the stool;
2. relief of pain syndrome;
3. impact on the wound healing;
4. relaxation of the internal anal sphincter.

3.2. Treatment of Acute Anal Fissure

- Conservative treatment is **recommended** for all patients with acute anal fissure [4].

Grade of recommendation — A (Level of evidence — 1)

3.2.1. Diet Therapy and Normalization of the Gastrointestinal Tract function with the Use of Laxatives

- Patients with anal fissure are **recommended** to consume an adequate amount of fluid and dietary fibers to normalize the activity of the gastrointestinal tract and eliminate constipation. In cases where it is not possible to normalize the stool while following a diet, it is **recommended** to use laxatives in order to form a regular mushy stool in the patient [1,11,21,32–35].

Grade of recommendations — C (Level of evidence — 5)

Comment: *the diet of patients should include foods rich in dietary fiber and a large amount of liquid. It has been proven that daily intake of 25 grams of dietary fiber increases the frequency of stool in patients with chronic constipation. The use of liquids up to 1.5–2 liters per day increases the frequency of stools and reduces the need for laxatives in patients who follow a protein diet. Wheat bran, seaweed and flaxseed traditionally used in our country as a source of dietary fiber. Also, to normalize the activity of the gastrointestinal tract, drugs containing the shell of plantain seeds or polyethylene glycol, which have a high water-retaining ability, are used. They allow the patient to avoid straining during defecation. The doses of drugs are chosen individually.*

3.2.2. Conservative Treatment

- Patients with anal fissure are **recommended** to undergo conservative therapy aimed at pain relief and healing the defect [1,21,35–37].

Grade of recommendation — C (Level of evidence — 5)

Comment: *for the treatment of anal fissures, both systemic and topical agents are used in the form of gels, creams, ointments and suppositories.*

With severe pain syndrome, are used:

1. *agents from the group of propionic acid derivatives;*
2. *local anesthetics.*

The conservative treatment, including stool regulation and the use of anesthetics, can effectively cure up to 50% of patients with acute anal fissure.

As wound-healing agents, agents with anti-inflammatory, immunostimulating and analgesic effects are used. These drugs can be used both for the treatment of acute anal fissure, and as symptomatic treatment for chronic anal fissure, as well as after surgery to heal wounds. After surgery, the above drugs are used in accordance with the stage of the wound healing.

3.2.3. Non-Operative Relaxation of the Rectal Internal Sphincter

- In patients with anal fissure with the internal sphincter spasming, it is **recommended** to inject botulinum toxin type A into the internal anal sphincter [2–5,38–50].

Grade of recommendation — B (Level of evidence — 2)

Comment: *as per this technique, the drug should be injected under the visual control into the internal sphincter under application or local anesthesia in a total dosage from 10 units to 100 units [39].*

It is worth noting that at the moment there is no unified method of administration of agents for non-operative relaxation of the internal anal sphincter (different agents, injection points and their quantity, dosage of the drug), which explains the significant heterogeneity in the results of treatment of patients [3,40,41].

Administration of the agent leads to epithelialization of the anal fissure in 33–96% of patients [4,42–46]. The recurrence rate can reach 42% [4,39,42,47; however, repeated use of the agent is possible [44,45,48]. Complications after injection of botulinum toxin type A (off-label) include: hematomas, perianal thrombosis, perianal abscesses; though the morbidity does not exceed 2.2% [3]. Clinical manifestations of anal incontinence are observed in 5.1%, they disappear within up to 8 weeks [3,39,40].

3.3. Treatment of Chronic Anal Fissure

3.3.1. Conservative Treatment of Chronic Anal Fissure

- For patients with chronic anal fissure for the purpose of symptomatic therapy and if surgery is refused, conservative treatment is **recommended** in accordance with the recommendations for the treatment of acute anal fissure (see point 3.2. Treatment of Acute Anal Fissure) [2–5,12,38–50].

Grade of recommendation — B (Level of evidence — 2)

- Patients are **not recommended** to undergo conservative therapy only more than 8 weeks [51,52].

Grade of recommendation — B (Level of evidence — 2)

3.3.2. Surgery for Chronic Anal Fissure

***** Surgery is **recommended** for patients with chronic anal fissure. Surgery for a chronic anal fissure includes an excision of the fissure and various methods of relaxation of the internal sphincter. [1,4,48,53–58].

Grade of recommendation — B (Level of evidence — 2)

Comment: *the presence of fibrosis in the anal canal significantly increases the risk of recurrence.*

Fissure excision technique: the procedure should include excision along the plane of the fissure with fibrous changes within healthy tissues, with the removal of the wound margins to the perianal skin 1.5–2.0 cm from the anal verge [1]. In cases where a posterior internal fistula forms against the background of a chronic anal fissure, the surgery should be performed according to the above method and is supplemented by probing the fistula and excision on the probe.

With a transsphincter fistula, an additional internal sphincterotomy is not recommended.

- In patients with chronic anal fissure with sphincter spasming and a high risk of anal incontinence after surgery (elderly patients, multiple and complicated childbirth in the history, clinical signs of perineal descent), it is **recommended** the fissure excision in combination with non-operative relaxation of the internal sphincter with botulinum toxin type A (after excision of the fissure, 5 units of the drug are injected at 3 and 9 o'clock (10 units in total)) [59–68].

Grade of recommendation — B (Level of evidence — 2)

Comment: *after the fissure excision an injection of #botulinum toxin type A should be performed into the internal anal sphincter, according to the method developed in the RNMRC of Coloproctology, which is more effective than isolated excision of the anal fissure [60–67]. The most effective is a dose escalation of #botulinum toxin type A from 10 to 40 units [67]. In addition, the use of this drug may be recommended for the treatment of patients with a high risk of postoperative anal incontinence [68].*

- In patients with chronic anal fissure with sphincter spasming, if the fissure excision is ineffective in combination with drug relaxation of the internal sphincter, it is **recommended** combine it with lateral internal sphincterotomy [69].

Grade of recommendation — A (Level of evidence — 1)

Comment: *the technique of lateral internal closed sphincterotomy. The index finger is inserted into the anal canal. Under the digital control a narrow eye scalpel is inserted between the internal and external sphincters through the intersphincter space.*

The depth of the scalpel insertion is up to the dentate line. Dissection of the sphincter is performed in one motion, removing the scalpel outwards. The finger in the anal canal detects the presence of a dissected sphincter diastase is, which indicates a correctly performed procedure.

The technique of lateral internal open sphincterotomy. At 0.5–1.0 cm from the anal verge at 3 o'clock, according to the conventional dial, a semi-oval incision of the skin is made about 1.0 cm long. 3.0–5.0 ml of 0.5% procaine solution is injected

into the submucosal layer of the anal canal wall to detach it from the internal sphincter. With a clamp or scissors, the internal sphincter is separated from the epithelial layer of the anal canal, as well as the internal anal sphincter from the external one. The height of the dissection is limited by the dentate line. After the sphincterotomy, two stitches are applied to the skin.

Contraindications: patients with a high risk of persistent anal incontinence in the postoperative period (elderly patients, multiple and complicated childbirth in the history, clinical signs of the pelvic floor descent) [70–74].

Complications [11,75]:

- *hematomas in the area of sphincterotomy;*
- *abscesses in the area of sphincterotomy;*
- *fistulas in the area of sphincterotomy;*
- *anal Incontinence after surgery.*

Lateral internal sphincterotomy is the 'gold standard' of anal fissure treatment. The rate of fissure healing after sphincterotomy is from 88% to 100%, with the rate of anal incontinence — from 8% to 30%, with follow-up to 6 years [43,70,76–84]. Open and closed methods of lateral sphincterotomy are comparable in outcomes [47,59,69,75,85].

3.4 Prevention of Infectious Wound Complications after Surgery

- For patients, after surgery for anal fissure in the presence of large wounds and disorders of the immune status, it is **recommended** to prescribe antibacterial and antimicrobial agents acting on the intestinal flora and in soft tissues. The agents can be administered parenterally or orally [1,21].

Grade of recommendation — C (Level of evidence — 5)

4. MEDICAL REHABILITATION, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF REHABILITATION METHODS

- In all patients who have undergone surgery for anal fissure, in the postoperative period until wound healing, it is **recommended** to carry out daily dressings by cleaning wounds with antiseptic solutions and applying ointment with anti-inflammatory and wound healing effects to the wound surface to reduce the risks of inflammatory complications) [1,21].

Grade of recommendation — C (Level of evidence — 5)

- All patients who have undergone surgery for anal fissure, in the postoperative period until wound healing, are recommended to follow a diet with fibers, taking dietary fiber to form a regular soft stool [1,21].

Grade of recommendation — C (Level of evidence — 5)

- All patients who have undergone surgery for anal fissure are recommended to be under the supervision of a coloproctologist or a surgeon at their place of residence after discharge from the hospital, for the period of wound healing, to prevent recurrence and complications [1,21].

Grade of recommendation — C (Level of evidence — 5)

Comment: *the need for rehabilitation of patients is due to surgical trauma of the perianal region and anal canal. The presence of wounds in these anatomical areas and their healing by secondary tension cause the risk of infectious complications, postoperative bleeding.*

Pain syndrome of varying severity and possible violations of the functions of defecation and anal continence in the postoperative period can lead to significant social maladaptation and reduce the quality of life.

General principles of rehabilitation after surgical treatment:

- *comprehensive assessment of the patient's initial condition and formulation of the rehabilitation program;*
- *drawing up a plan of diagnostics and management necessary for rehabilitation;*
- *multidisciplinary approach for rehabilitation;*
- *monitoring the effectiveness of the management during the rehabilitation and at the end of the rehabilitation.*

Stages of rehabilitation of patients after surgery:

Stage 1 — early rehabilitation — from 4–6 to 7–10 days after surgery.

During this period, the patient is undergoing rehabilitation inpatient treatment for 3–5 days, after which further rehabilitation takes place within 7–14 days in an outpatient setting, or in a short-term hospital.

The most important task of the 1st stage of rehabilitation is to normalize the activity of the gastrointestinal tract for the normal consistency and frequency of stool. In addition, at this stage, hemostasis, wound healing and relief of postoperative pain are monitored.

The 2nd stage — from 15 to 45 days after surgery — is aimed at geometrically correct, programmable healing of wounds with the control of the gastrointestinal tract activity.

- *Diet: one of the important components of postoperative rehabilitation at an early stage is the normalization of the function of the gastrointestinal tract, aimed at eliminating constipation, the formation of a normal stool consistency. For this purpose, patients are recommended to consume an adequate amount of fluid and dietary fiber.*

Wheat bran, seaweed and flaxseed are used as a source of dietary fiber in their natural form, or in the form of dietary supplements and pharmacological drugs, which have a high water-retaining ability, which makes it possible to soften the stool, promotes regular defecation with the exception of the need for straining to empty the rectum.

- *Hemostasis control: rehabilitation measures for increased bleeding of wounds consist of their regular examination, the use of ointment compositions with a complex, including capillary strengthening effect, normalization of stool consistency with restriction of excessive straining. Various hemostatic remedies can be used, including gelatin absorbent sponges, electrocoagulation of bleeding surfaces.*
- *Relief of pain syndrome: the severity of pain depends on the extent of surgical trauma of the perianal area and anal canal, individual pain threshold, the presence of sutures on the wounds of the anal canal and perianal area. Systemic or topical drugs for pain relief are selected individually by the attending physician, depending on the degree of its intensity, as well as the severity of psycho-emotional disorders.*
- *Programmable wound healing: one of the most important aspects of postoperative recovery of patients, which allows avoiding the development of postoperative complications, is timely and topographically verified healing of wounds. Proper management of the wound healing, starting from the 2nd day after surgery until complete epithelization of wounds, implies: daily sanitation of wounds with antiseptic solutions, dressing with ointment applications (the composition of the ointment is determined by the stage of the wound process); control by a coloproctologist (digital examination is performed every two days); microbiological control (if infectious complications are suspected).*

<u>The main rehabilitation measures after surgery for the anal fissure.</u>

After discharge from the hospital it is necessary to carry out rehabilitation measures in all patients who have undergone surgery for anal fissure. Depending on the severity of functional disorders, a complex of rehabilitation measures is carried out on an outpatient basis or in an inpatient rehabilitation bed.

- *Defecation disorder: — the patient needs mechanical cleaning of the intestine:*
  - *— performing a cleansing enema;*
  - *— prescribing osmotic-type laxatives with an assessment of their effectiveness;*
  - *— mechanical removal of fecal masses under local or regional anesthesia.*
- *Pain syndrome (the intensity of the pain syndrome on the numerological assessment scale (NAS) exceeds 6 points, Appendix D):*
  - *— the use of analgesics, NSAID group administered parenterally;*
  - *— application on wound surfaces of ointment compositions, which include local anesthetic and anti-inflammatory components;*
  - *— physiotherapy (ultraviolet, enzymatic, laser, ultrasound, etc.).*
- *Control of the wound healing (if necessary, the use of local and/or systemic nonsteroidal anti-inflammatory drugs with local control of the inflammatory reaction, the need to perform microbiological control):*
  - *— treatment of wound surfaces with antiseptic solutions;*
  - *— application of ointment compositions on a water-soluble basis containing antimicrobial components;*
  - *— ointments containing antibacterial components;*
  - *— broad-spectrum antibacterial drugs in tablet form or administered parenterally;*

— *sowing of wound discharge with pronounced inflammatory changes in wounds, suspected contamination of wounds with pyogenic flora with dynamic control 5 to 7 days after the course of antibacterial therapy;*
— *physiotherapy (ultraviolet, enzymatic, laser, ultrasound, etc.).*

The objective of the 2nd stage of rehabilitation of patients who have undergone surgery for anal fissure is the final epithelization of wounds and prevention of postoperative complications.
Also, during the 2nd stage of rehabilitation, control over the consistency and frequency of stool, pain syndrome, and control of the course of the wound process remains relevant.

5. PREVENTION AND DISPENSARY SUPERVISION, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF PREVENTION METHODS

5.1 Prevention

- All patients with the appearance of the first symptoms of anal fissure are **recommended** to consult a coloproctologist to determine the preventive measures aimed at preventing the development and progression of the disease [1,21].

Grade of recommendation — C (Level of evidence — 5)
Comment: *fundamental in the prevention of anal fissure is the normalization of the activity of the gastrointestinal tract, the elimination of constipation, compliance with the hygienic regime.*
Timely diagnosis and treatment of the disease can significantly improve the prognosis and reduce the likelihood of complications.

5.2 Dispensary management

- For all patients who have undergone surgery for anal fissure, after the end of treatment and wound healing, follow-up by a coloproctologist is **recommended** once every 6 months during the first year to improve disease control and prevent recurrence [1,21].

Grade of recommendation — C (Level of evidence — 5)

6. ORGANIZATION OF MEDICAL CARE

6.1 Indications for Hospitalization in a Medical Organization

Hospitalization in a elective hospital is indicated for patients with chronic anal fissure with the sphincter spasming for surgery.
Hospitalization of patients for surgery is carried out in case of the ineffectiveness of conservative methods of treatment and the presence of fibrosis in the anal canal.
Carrying out diagnostic measures in an elective situation at the stage of diagnosis can be performed on an outpatient basis. It is advisable to carry out surgery in coloproctology unit. Surgery can also be carried out in a one-day hospital.

6.2 Indications for the Patient Discharge from the Medical Organization

In case of elective hospitalization for chronic anal fissure, the patient can be discharged, depending on type of surgery, on the 3–5 days after surgery.
The indication for discharge is:

1. uncomplicated early postoperative period (absence of dysuria, bleeding, etc.);
2. absence of infectious complications;
3. controlled pain syndrome with the possibility of its relief with oral medications on an outpatient basis;
4. the possibility of independent defecation after radical surgery (discharge is recommended after the first stool);
5. the patient's ability (for patients with disabilities) to independently continue the conservative treatment under the supervision of a regional coloproctologist.

7. ADDITIONAL INFORMATION (INCLUDING FACTORS AFFECTING THE OUTCOME OF THE DISEASE OR CONDITION)

Negatively affect the outcome:
1 infectious complications;
2. stool disorder (diarrhea or constipation);
3. non-compliance by the patient with the restrictive regime and dietary recommendations.

Criteria for assessing the quality of medical care

№	Quality Criteria	Level of evidence	Grade of recommendation
1	The patient's complaints and history were collected	2	A
2	A clinical examination was performed	2	A
	Patients with anal fissure, in the absence of clear clinical signs of the internal sphincter spasming according to clinical examination, underwent asphincterometry and/or profilometry.	4	C
3	For patients with anal fissure, in the absence of signs of the internal sphincter spasming, according to clinical and instrumental examination, and suspicion of erosive and ulcerative lesions of the anal canal of specific etiology, as well as the development of complications, it is recommended to perform by endoanal ultrasound and/or colonoscopy.	5	C
4	Conservative treatment of acute anal fissure was performed (taking into account the specific clinical situation).	2	B
5	Surgery for the chronic anal fissure was performed (taking into account the specific clinical situation, the ineffectiveness of conservative therapy, the presence of the internal sphincter spasming, fibrosis in the anal canal).	2	A
9	Absence of anal incontinence because of surgery.	1	A
10	Relief of pain after surgery for medical reasons.	2	A

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REFERENCES

1. Shelygyn Yu.A., Blagodarny L.A. Handbook of coloproctology. M., Literra, 2014, 608 p. (in Russ.).
2. Wienert V, Raulf F, Mlitz H. Anal fissure: Symptoms, diagnosis and therapies. 2017, Springer. p. 63.
3. Bobkiewicz A, Francuzik W, Krokowicz L, et al. Botulinum Toxin Injection for Treatment of Chronic Anal Fissure: Is There Any Dose-Dependent Efficiency? A Meta-Analysis. *World J Surg*. 2016;40(12):3064–3072.
4. Nelson RL, Thomas K, Morgan J, et al. Non surgical therapy for anal fissure. *Cochrane Database Syst. Rev.* 2012;2:CD003431.
5. Stewart DBSr, Gaertner W, Glasgow S, et al. Clinical practice guideline for the management of anal fissures. *Dis Colon Rectum*. 2017;60(1):7–14.
6. Sajid MS, Hunte S, Hippolyte S, et al. Comparison of surgical vs chemical sphincterotomy using botulinum toxin for the treatment of chronic anal fissure: a meta-analysis. *Colorectal Dis*. 2008;10:547–552.
7. Felt-Bersma RJ, Han-Geurts IJ. Anal Fissure, in Anorectal Disorders. *Elsevier*. 2019; pp. 65–80.
8. Higuero T. Update on the management of anal fissure. *Journal of visceral surgery*. 2015;152(2):37–43.
9. Beaty JS, Shashidharan M. Anal Fissure. *Clin Colon Rectal Surg*. 2016;29(1):30–37.
10. Bailey HR, Beck DE, Billingham RP, et al. A study to determine the nitroglycerin ointment dose and dosing interval that best promote the healing of chronic anal fissures. *Dis Colon Rectum*. 2002;45(9):1192–1199.
11. Zharkov E.E. Complex treatment of chronic anal fissure. A abstract diss. cand. med. sciences. 2009; M., 113 p. (in Russ.).
12. Nelson R. A systematic review of medical therapy for anal fissure. *Dis Colon Rectum*. 2004;47(4):422–431. DOI: 10.1007/s10350-003-0079-5
13. Van Outryve M. Physiopathology of the anal fissure. *Acta Chir Belg*. 2006;106(5):517–518. DOI: 10.1080/00015458.2006.11679942
14. Lund JN. Nitric oxide deficiency in the internal anal sphincter of patients with chronic anal fissure. *Int J Colorectal Dis*. 2006;21(7):673–675. DOI: 10.1007/s00384-005-0757-y
15. Opazo A, Aguirre E, Saldana E, et al. Patterns of impaired internal anal sphincter activity in patients with anal fissure. *Colorectal Dis*. 2013;15(4):492–499. DOI: 10.1111/codi.12095
16. Van Meegdenburg MM, Trzpis M, Heineman E, et al. Increased anal basal pressure in chronic anal fissures may be caused by overreaction of the anal-external sphincter continence reflex. *Med Hypotheses*. 2016;94:25–29. DOI: 10.1016/j.mehy.2016.06.005
17. Klosterhalfen B, Vogel P, Rixen H, et al. Topography of the inferior rectal artery: a possible cause of chronic, primary anal fissure. *Dis Colon Rectum*. 1989;32(1):43–52. DOI: 10.1007/BF02554725
18. Lund JN, Binch C, McGrath J, et al. Topographical distribution of blood supply to the anal canal. *Br J Surg*. 1999. 86(4):496–498. DOI: 10.1046/j.1365-2168.1999.01026.x
19. Schouten WR, Briel JW, Auwerda JJ. Relationship between anal pressure and anodermal blood flow. The vascular pathogenesis of anal fissures. *Dis Colon Rectum*. 1994;37(7):664–669. DOI: 10.1007/BF02054409
20. Nekhrikova S.V., Titov A.Yu., Kashnikov V.N. et al. Outpatient treatment of patients with diseases of the anal canal and perianal region. *Dokazatel'naya gastroenterologia*. 2019;8(3):27–37. (in Russ.).
21. Vorobiev G.I. Fundamentals of Coloproctology. Rostov-on-Don, 2001; 413 p. (in Russ.).
22. Vorobiev G.I., Shelygin Yu.A., Podmarenkova L.F. et al. The role of profilometry in the choice of anal fissure treatment method. *Koloproktologia*. 2008;3:14–17. (in Russ.).
23. Kuehn HG, Gebbensleben O, Hilger Y, et al. Relationship between anal symptoms and anal findings. *Int J Med Sci*. 2009;6(2):77–84. DOI: 10.7150/ijms.6.77
24. Titov A.Yu., Zharkov E.E., Vardanyan A.V. et al. Differential diagnostic criteria for erosive and ulcerative lesions of the

anal canal and perianal skin. *Koloproktologia*. 2012;3:3–10. (in Russ.).
25. Erel S, Adahan D, Kismet K, et al. Risk factors special to eastern culture for the development of anal fissure. *Bratisl Lek Listy*. 2009;110(11):710–712.
26. Jensen SL. Diet and other risk factors for fissure-in-ano. Prospective case control study. *Dis Colon Rectum*. 1988;31(10):770–773. DOI: 10.1007/BF02560104
27. Gupta PJ. Consumption of red-hot chili pepper increases symptoms in patients with acute anal fissures. *Ann Ital Chir*. 2008;79(5):347–351.
28. Shelygin Yu.A., Fomenko O.Yu., Titov A.Yu. et al. Sphincterometric indicators in the anal canal are normal. *Koloproktologia*. 2016;2:32–36. (in Russ.).
29. Santander C, Gisbert JP, Moreno-Otero R, et al. Usefulness of manometry to select patients with anal fissure for controlled anal dilatation. *Rev Esp Enferm Dig*. 2010;102(12):691–697. DOI: 10.4321/s1130-01082010001200003
30. Simkovic D, Smejkal K, Siroky M, et al. Importance of the anorectal manometry in chronic anal fissure. *Acta Medica (Hradec Kralove)*. 2001;44(3):105–107.
31. Opazo A, Aguirre E, Saldaña E et al. Patterns of impaired Internal anal sphincter activity in patients with anal fissure. *Colorectal Dis*. 2013 Apr;15(4):492–499. DOI: 10.1111/codi.12095.
32. Arroyo A, Montes E, Calderon T, et al. Treatment algorithm for anal fissure. Consensus document of the Spanish Association of Coloproctology and the Coloproctology Division of the Spanish Association of Surgeons. *Cir Esp*. 2018;96(5):260–267. DOI: 10.1016/j.ciresp.2018.02.007
33. Ramkumar D, Rao SS. Efficacy and safety of traditional medical therapies for chronic constipation: systematic review. *Am J Gastroenterol*. 2005;100(4):936–971. DOI: 10.1111/j.1572-0241.2005.40925.x
34. Bahrami, HR, Hamedi S, Salari R, et al. Herbal Medicines for the Management of Irritable Bowel Syndrome: A Systematic Review. *Electron Physician*. 2016;8(8):2719–2725. DOI: 10.19082/2719
35. Gupta P. Randomized, controlled study comparing sitz-bath and no-sitz-bath treatments in patients with acute anal fissures. *ANZ J Surg*. 2006;76:718–721. DOI: 10.1111/j.1445-2197.2006.03838.x
36. Gough MJ, Lewis A. The conservative treatment of fissure-in- ano. *Br J Surg*. 1983;70:175–176. DOI: 10.1002/bjs.1800700312
37. Jensen SL. Treatment of first episodes of acute anal fissure: prospective randomised study of lignocaine ointment versus hydrocortisone ointment or warm sitz baths plus bran. *Br Med J (Clin Res Ed)*. 1986;292:1167–1169. DOI: 10.1136/bmj.292.6529.1167
38. Tkalich O.V., Zharkov E.E., Ponomarenko A.A. et al. Modern methods of medication relaxation of the internal sphincter in patients with chronic anal fissure. *Khirurg*. 2019;3(8):26–42. (in Russ.).
39. Sahebally SM, Meshkat B, Walsh SR, et al. Botulinum toxin injection vs topical nitrates for chronic anal fissure: an updated systematic review and meta-analysis of randomized controlled trials. *Colorectal Dis*. 2018;20(1):6–15. DOI: 10.1111/codi.13969
40. Dat A, Chin M, Skinner S, et al. Botulinum toxin therapy for chronic anal fissures: where are we at currently? *ANZ J Surg*. 2017;87(9):E70–E73. DOI: 10.1111/ans.13329
41. Lin JX, Krishna S, Sua B, et al. Optimal Dosing of Botulinum Toxin for Treatment of Chronic Anal Fissure: A Systematic Review and Meta-Analysis. *Dis Colon Rectum*. 2016;59(9):886–894. DOI: 10.1097/DCR.0000000000000612
42. Berkel AE, Rosman C, Koop R, et al. Isosorbide dinitrate ointment vs botulinum toxin A (Dysport) as the primary treatment for chronic anal fissure: a randomized multicentre study. *Colorectal Dis*. 2014;16(10):360–366. DOI: 10.1111/codi.12615
43. Arroyo A, Perez F, Serrano P, et al. Surgical versus chemical (botulinum toxin) sphincterotomy for chronic anal fissure: long-term results of a prospective randomized clinical and manometric study. *Am J Surg*. 2005;189(4):429–434. DOI: 10.1016/j.amjsurg.2004.06.045
44. Colak T, Ipek T, Kanik A, et al. A randomized trial of botulinum toxin vs lidocain pomade for chronic anal fissure. *Acta Gastroenterol Belg*. 2002;65(4):187–190.
45. Brisinda G, Cadeddu F, Brandara F, et al. Randomized clinical trial comparing botulinum toxin injections with 0.2 per cent nitroglycerin ointment for chronic anal fissure. *Br J Surg*. 2007;94(2):162–167. DOI: 10.1002/bjs.5514
46. Khan MI. Comparing the efficacy of botulinum toxin injection and lateral internal sphincterotomy for chronic anal fissure. *KJMS*. 2016;9(1):6.
47. Khryukin R.Yu., Kostarev I.V., Arslanbekova K.I. et al. Botulinum toxin type A and lateral subcutaneous sphincterotomy in the treatment of chronic anal fissure with sphincter spasm. What to choose? (systematic review and meta-analysis). *Koloproktologia*. 2020;19(2):113–128. DOI: 10.33878/2073-7556-2020-19-2-113-128 (in Russ.).
48. Minguez M, Herreros B, Espi A, et al. Long-term follow-up (42 months) of chronic anal fissure after healing with botulinum toxin. *Gastroenterology*. 2002;123(1):112–117. DOI: 10.1053/gast.2002.34219
49. Adamova Z, Slovacek V, Bar T et al. Anal fissure. *Cas Lek Cesk*. 2015;154(1):11–13.
50. Jahnny B, Ashurst JV. Anal fissures. In: Stat Pearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2021 Jan. 2020 Dec 5.
51. Shelygin Yu.A., Podmarenkova L.F., Zharkov E.E. Possibilities of medication relaxation of the internal sphincter in patients with chronic anal fissure. *Rossiiskii jurnal gastroenterologii, gepatologii, koloproctologii*. 2005:2;87. (in Russ.).
52. Gagliardi G, Pascariello A, Altomare DF, et al. Optimal treatment duration of glyceryl trinitrate for chronic anal fissure: results of a prospective randomized multicenter trial. *Tech Coloproctol*. 2010 Sep;14(3):241–248. DOI: 10.1007/s10151-010-0604-1
53. Gupta PJ, Hypertrophied anal papillae and fibrous anal polyps, should they be removed during anal fissure surgery? *World J Gastroenterol*. 2004;10(16): p. 2412-2414. DOI: 10.3748/wjg.v10.i16.2412
54. Gupta PJ. A study of the symptomatology of hypertrophied anal papillae and fibrous anal polyps. *Bratisl Lek Listy*. 2005;106(1):30–33.
55. Brisinda G, Maria G, Sganga G, et al. Effectiveness of higher doses of botulinum toxin to induce healing in patients with chronic anal fissures. *Surgery*. 2002;131(2):179–184. DOI: 10.1067/msy.2002.119314
56. Lysy J, Israelit-Yatzkan Y, Sestiery-Ittah M, et al. Topical nitrates potentiate the effect of botulinum toxin in the treatment of patients with refractory anal fissure. *Gut*. 2001;48:221–224.

57. Blagodarny L.A., Poletov N.N., Zharkov E.E. Surgical methods of relaxation of the internal sphincter in patients with anal fissure. *Koloproktologia*. 2007;4:43–47. (in Russ.).
58. Shelygin Yu.A., Frolov S.A., Orlova L.P. et al. Immediate results of complex treatment of chronic anal fissure. *Koloproktologia*. 2010;1:4–9. (in Russ.).
59. Arroyo A, Pérez F, Serrano P, et al. Open versus closed lateral sphincterotomy performed as an outpatient procedure under local anesthesia for chronic anal fissure: prospective randomized study of clinical and manometric long-term results. *J Am Coll Surg*. 2004;199:361–367.
60. Renzi A, Izzo D, Di Sarno G, et al. Clinical, manometric, and ultrasonographic results of pneumatic balloon dilatation vs. lateral internal sphincterotomy for chronic anal fissure: a prospective, randomized, controlled trial. *Dis Colon Rectum*. 2008;51:121–127.
61. Багдасарян С.Л. Хирургическое лечение анальной трещины с пневмодивульсией анального сфинктера. М., 2010; 89 с. / Baghdasaryan S.L. Surgical treatment of anal fissure with pneumodivulsion of the anal sphincter. M., 2010; 89 p.
62. Baraza W, Boereboom C, Shorthouse A, et al. The long-term efficacy of fissurectomy and botulinum toxin injection for chronic anal fissure in females. *Dis Colon Rectum*. 2008;51:236– 243.
63. Scholz T, Hetzer FH, Dindo D, et al. Long-term follow-up after combined fissurectomy and Botox injection for chronic anal fissures. *Int J Colorectal Dis*. 22:1077–1081.
64. Lindsey I, Cunningham C, Jones OM, et al. Fissurectomy-botulinum toxin: a novel sphincter-sparing procedure for medically resistant chronic anal fissure. *Dis Colon Rectum*. 2004;47:1947– 1952.
65. Arthur JD, Makin CA, El-Sayed TY, et al. A pilot comparative study of fissurectomy/diltiazem and fissurectomy/botulinum toxin in the treatment of chronic anal fissure. *Tech Coloproctol*. 2008;12(4):331–336.
66. Ebinger SM, Hardt J, Warschkow R, et al. Operative and medical treatment of chronic anal fissures-a review and network meta-analysis of randomized controlled trials. *J Gastroenterol*. 2017;52(6):663–676. DOI: 10.1007/s00535-017-1335-0
67. Tkalich O.V., Ponomarenko A.A., Fomenko O.Yu., et al. The treatment of chronic anal fissures with fissure excision and botulinym toxin type A (ISRCTN97413456). *Koloprodtologia*. 2020;19(1):80–99. DOI: 10.33878/2073-7556-2020-19-1-80-99 (in Russ.).
68. Shelygin Yu.A., Tkalich O.V., Ponomarenko A.A., et al. Follow-up results of combination treatment of chronic anal fissure. International. *Journal of Pharmaceutical Research*. 2020;12:2:244–249. DOI: 10.31838/ijpr/2020.SP2.040
69. Nelson RL, Chattopadhyay A, Brooks W, et al. Operative procedures for fissure in ano. *Cochrane Database Syst Rev*. 2011;11:CD002199.
70. Brown CJ, Dubreuil D, Santoro L, et al. Lateral internal sphincterotomy is superior to topical nitroglycerin for healing chronic anal fissure and does not compromise long-term fecal continence: six-year follow-up of a multicenter, randomized, controlled trial. *Dis Colon Rectum*. 2007;50:442–448.
71. Hyman N. Incontinence after lateral internal sphincterotomy: a prospective study and quality of life assessment. *Dis Colon Rectum*. 2004;47:35–38. DOI: 10.1007/s10350-003-0002-0
72. Ortiz H, Marzo J, Armendariz P, et al. Quality of life assessment in patients with chronic anal fissure after lateral internal sphincterotomy. *Br J Surg*. 2005;92:881–885.
73. Menteş BB, Tezcaner T, Yilmaz U, et al. Results of lateral internal sphincterotomy for chronic anal fissure with particular reference to quality of life. *Dis Colon Rectum*. 2006;49:1045–1051.
74. Shelygin Yu.A., Frolov S.A., Orlova L.P. et al. Anal incontinence in patients who underwent excision of the anal fissure in combination with lateral subcutaneous sphincterotomy. *Koloproktologia*. 2008;3:18–24. (in Russ.).
75. Wiley M, Day P, Rieger N, et al. Open vs. closed lateral internal sphincterotomy for idiopathic fissure-in-ano: a prospective, randomized, controlled trial. *Dis Colon Rectum*. 2004;47:847–852.
76. Iswariah H, Stephens J, Rieger N, et al. Randomized prospective controlled trial of lateral internal sphincterotomy versus injection of botulinum toxin for the treatment of idiopathic fissure in ano. *ANZ J Surg*. 2005;75:553–555.
77. Katsinelos P, Papaziogas B, Koutelidakis I, et al. Topical 0.5% nifedipine vs. lateral internal sphincterotomy for the treatment of chronic anal fissure: long-term follow-up. *Int J Colorectal Dis*. 2006;21:179–183.
78. Davies I, Dafydd L, Davies L, et al. Long-term outcomes after lateral anal sphincterotomy for anal fissure: a retrospective cohort study. *Surg Today*. 2014;44:1032–1039.
79. De Rosa M, Cestaro G, Vitiello C, et al. Conservative versus surgical treatment for chronic anal idiopathic fissure: a prospective randomized trial. *Updates Surg*. 2013;65:197–200.
80. Sileri P, Stolfi VM, Franceschilli L, et al. Conservative and surgical treatment of chronic anal fissure: prospective longer-term results. *J Gastrointest Surg*. 2010;14:773–780.
81. Valizadeh N, Jalaly NY, Hassanzadeh M, et al. Botulinum toxin injection versus lateral internal sphincterotomy for the treatment of chronic anal fissure: randomized prospective controlled trial. *Langenbecks Arch Surg*. 2012;397:1093–1098.
82. Menteş BB, Irkörücü O, Akin M, et al. Comparison of botulinum toxin injection and lateral internal sphincterotomy for the treatment of chronic anal fissure. *Dis Colon Rectum*. 2003;46:232–237.40.
83. Nasr M, Ezzat H, Elsebae M. Botulinum toxin injection versus lateral internal sphincterotomy in the treatment of chronic anal fissure: a randomized controlled trial. *World J Surg*. 2010;34:2730–2734.
84. Gandomkar H, Zeinoddini A, Heidari R et al. Partial lateral internal sphincterotomy versus combined botulinum toxin a injection and topical diltiazem in the treatment of chronic anal fissure: a randomized clinical trial. *Dis Colon Rectum*. 2015;58:228–234.
85. Murad-Regadas SM, Fernandes GO, Regadas FS, et al. How much of the internal sphincter may be divided during lateral sphincterotomy for chronic anal fissure in women? Morphologic and functional evaluation after sphincterotomy. *Dis Colon Rectum*. 2013;56:645–651.

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New morphological risk factors for metastasis to regional lymph nodes in rectal cancer with invasion into the submucosa

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ABSTRACT *AIM: to assess prognostic significance of pathologic features of T1 rectal carcinoma in relation to regional lymph nodes involvement (N+).*

MATERIAL AND METHODS: removed specimens (n = 66) after rectal resection for carcinoma pT1 were studied. Following prognosticators were evaluated: depth of submucosal invasion, grade of differentiation, lymphovascular invasion (LVI), tumor budding (Bd), poorly differentiated clusters (PDC) of tumor and rupture of cancer glands (CGR).

RESULTS: lymph nodes metastases were found in 13 (19.7%) specimens. LVI was associated lymphatic spread in great possibility OR 38.0 95% CI 2.1-670 (p < 0.0001). Tumor budding of high grade (Bd3) OR 6.2 95% CI 1.2-31 (p < 0.0001) and poorly differentiated clusters (p = 0,03) also increased risk of lymph node metastases. Depth of submucosal invasion, grade of differentiation, and rupture of cancer glands failed to demonstrate significant association with N+. Logistic regression analysis allowed to determine LVI as independent prognostic factor of lymph node tumor involvement.

CONCLUSION: lymphovascular invasion, tumor budding and poorly differentiated clusters of tumor are the risk factors of T1 rectal carcinoma lymph node metastases.

KEYWORDS: *rectal adenocarcinoma T1, lymph node metastases, morphological predictors of metastasis (lymphovascular invasion, tumor budding, poorly differentiated clusters, rupture of tumor glands)*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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INTRODUCTION

Surgery for rectal adenocarcinoma with invasion limited by the submucosal layer (T1) currently varies from local excision to radical surgery.

The potential risk of metastases to the lymph nodes in T1 tumors, according to various trials, ranges from 6.3% [1] to 17% [2], which is confirmed by the worst results of local excision in relation to local recurrence (~10%), compared with curative surgery (~3%) [3]. Preoperative detection of rectal cancer metastases in regional lymph nodes is not accurate enough: sensitivity 53% and specificity 77% with endorectal ultrasound [4], and 54% and 59% with pelvic MRI, respectively [5].

Recently, the main predictors of lymph nodes involvement in CRC T1, used in scientific research and practical work, are the morphological features of the tumor, determined after its local excision.

According to the guidelines of the European Association for Endoscopic Surgery (EAES) for local excision of early rectal cancer, histological features associated with a high risk of metastases to lymph nodes are: poor tumor differentiation, lymphovascular and venous invasion and foci of dedifferentiation [6]. In the latest version of the NCCN recommendations [7], a high

risk of lymph node lesion is due to a tumor size exceeding 3 cm, deep invasion of the submucosa (sm3), lymphovascular invasion (LVI) and poor tumor differentiation (G3).

The most unequivocal opinion on this risk factor has developed in relation to poor differentiation of tumor and mucous forms of colorectal cancer (CRC), which are currently a contraindication for local excision of the tumor [2,8–10].

The depth of tumor invasion into the submucosal considered as one of the main predictors of metastatic disease in CRC T1. For practical use the Kikuchi classifications [11] for sessile and flat neoplasms and the Haggitt classification, for neoplasms on the pedicle are recommended [12]. According to these classifications, the depth of invasion into the submucosal layer is determined. According to most authors, it directly affects the incidence of lymph node involvement, up to 20% when the tumor involves the submucosal layer [1–4,8,9]. A lymphovascular invasion is associated with the depth of tumor invasion into the submucosal layer (Fig.1), which increases the chances of regional lymph nodes lesion by 4–6 times [8,9].

Since the use of existing morphological features of the tumor and their use in practice has limitations, in recent decades, new predictors of the tumor metastatic potential have been worked out, allowing more accurately selecting patients with a low risk of lymph node involvement, who can avoid major radical surgery and possible complications. The existing practice of selecting patients for subsequent salvage surgery, in accordance with the JSCCR criteria included in a number of clinical guidelines, is not always justified, and, apparently, it is necessary to create a certain algorithm for using morphological risk factors taking into account clinical data for the selection of patients with high and low risk of metastases.

Several histological features of the tumor proposed as additional predictors, which are believed to reflect its biological aggressiveness and metastatic potential.

One of these most well-studied features is tumor budding (Bd), which is a phenomenon of single tumor cells or small (⩽ 4 cells) clusters in the area of the invasive tumor front (Fig. 2), which is recognized as an independent unfavorable prognostic marker for any (T1–4) primary tumor [13]. This phenomenon is considered as a histological manifestation of impaired adhesion and differentiation of epithelial cells, as well as epithelial-mesenchymal transition (EMT). Currently, the methodology for determining and calculating Bd has been standardized and validated by the International Tumor Budding Consensus Conference, which makes it possible to widely apply this parameter in routine practice and scientific research [14].

It should be noted that the determination of the degree of differentiation of the tumor, in accordance with the accepted criteria (WHO), is carried out without taking into account less differentiated tumor structures, mainly located in the area of tumor invasion. Ueno, H. et al. described such structures as poorly differentiated clusters (PDC) consisting of 5 or more tumor cells that do not form glandular structures (Fig. 3).

According to the results of the studies, PDC, largely than the degree of glandular differentiation, is an indicator of the biological aggressiveness of the tumor in CRC [15].

Another potential predictor of metastases to regional lymph nodes in T1 CRC is a recently proposed histological feature in the form of rupture of tumor glands (cancer gland rupture — CGR), which is a violation of the integrity and continuity of the epithelial lining of tumor glands located along the invasive tumor front (Fig. 4). This histological feature is proposed to improve the selection of patients with a high

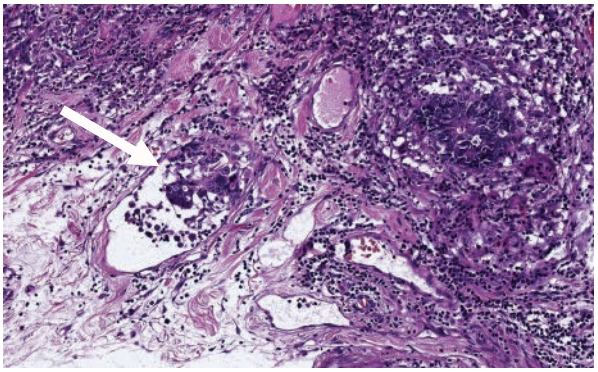

Figure 1. *Lymphovascular invasion: tumor cells in the lumen of the vessel (arrow). Staining with hematoxylin and eosin ×100*

risk of lymph node metastases after endoscopic removal of early CRC [16].

Despite the fact that there is a group of validated and recommended predictors for practical use to assess the risk of metastases in CRC T1, the results of their use are quite contradictory and ambiguous. Many researchers emphasize the need for further investigation of existing features and the search for new objective predictors of metastatic disease.

In this regard, the aim of the study was to evaluate the prognostic value of the main unfavorable predictors and their correlation with to regional lymph nodes metastases in rectal cancer pT1.

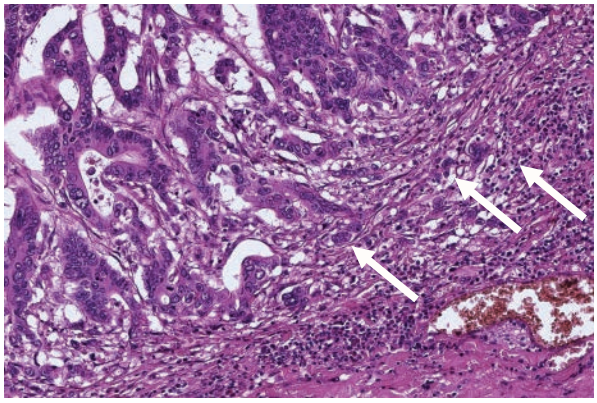

Figure 2A. *Tumor "budding": A — Bd1 (single isolated cells along the invasive edge of the tumor — arrows). Staining with hematoxylin and eosin. ×200*

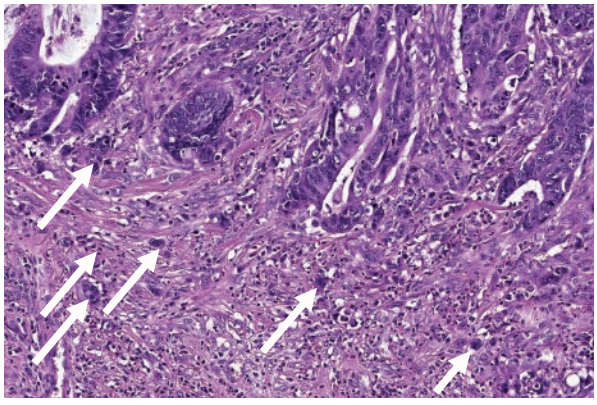

Figure 2Б. *Tumor "budding": Б — Bd2 (isolated cells along the invasive tumor edge — arrows). Staining with hematoxylin and eosin. ×200*

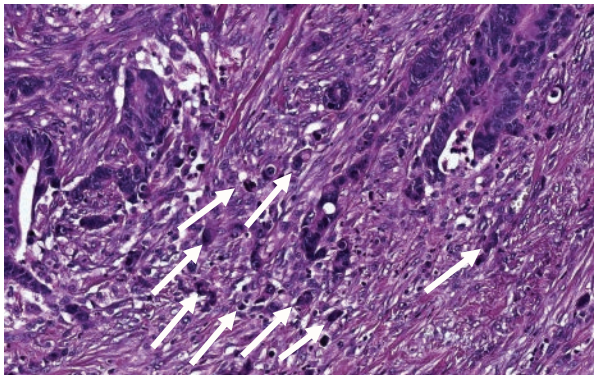

Figure 2B. *Tumor "budding": B — Bd3 (multiple isolated cells along the invasive edge of the tumor — arrows). Staining with hematoxylin and eosin. ×200*

MATERIAL AND METHODS

The material for the single-center study was rectal specimens removed during radical procedures for cancer in 2016–2020. The selection criterion was the presence of rectal adenocarcinoma with invasion limited to the submucosal layer. It should be noted that in 10 cases, radical surgery was performed after local excision of the rectal tumor: in 9 patients with transanal endomicrosurgery and in one case by endoscopic submucosal dissection. The decision to perform radical 'salvage surgery' in these patients was made after an oncological MDT based on the available clinical guidelines [18] and the

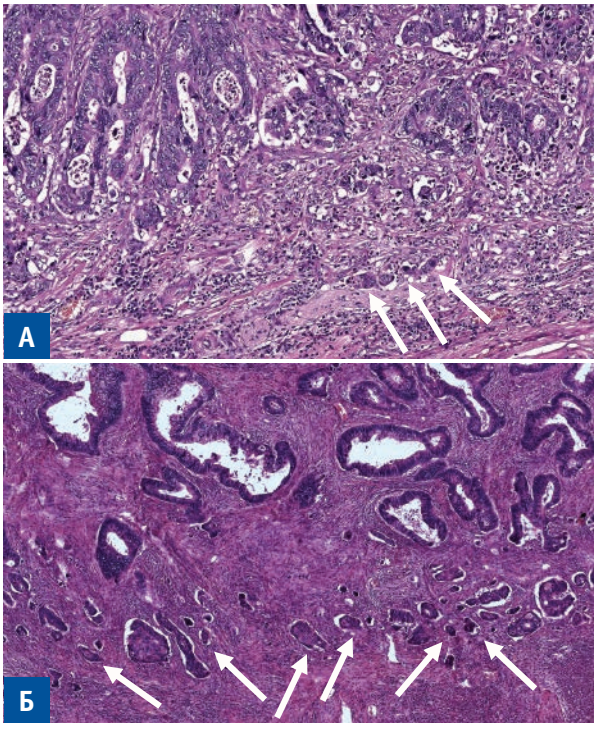

Figure 3. *Poorly differentiated clusters along the invasive edge of the tumor (arrows): A — PDC1 (single); Б — PDC3 (more than 10). Staining with hematoxylin and eosin. ×100*

patients' preferences. In the other cases, the surgery with total or partial mesorectal excision was the primary method of treatment. The study did not include patients who underwent neoadjuvant therapy, patients with distant metastases and other histological variants of the tumor. The clinical and morphological characteristics of the study material are presented in Table 1.

The rectal specimens were fixed in a 10% solution of neutral formalin for 48 hours, after which they were examined on serial cross-sections. After local excision, the specimens were stretched on a plate and fixed in a 10% neutral formalin solution for 12 hours, after which they were cut into parallel slices of 3 mm thick with the margins of the resection marked. All the removed tumors were studied totally. The histological processing of the tumor tissue was carried out according to a generally accepted technique in a Leica ASP 6025 histoprocessor; then it was poured into a paraplast; 3 microns thick slices were cut, which were stained with hematoxylin and eosin.

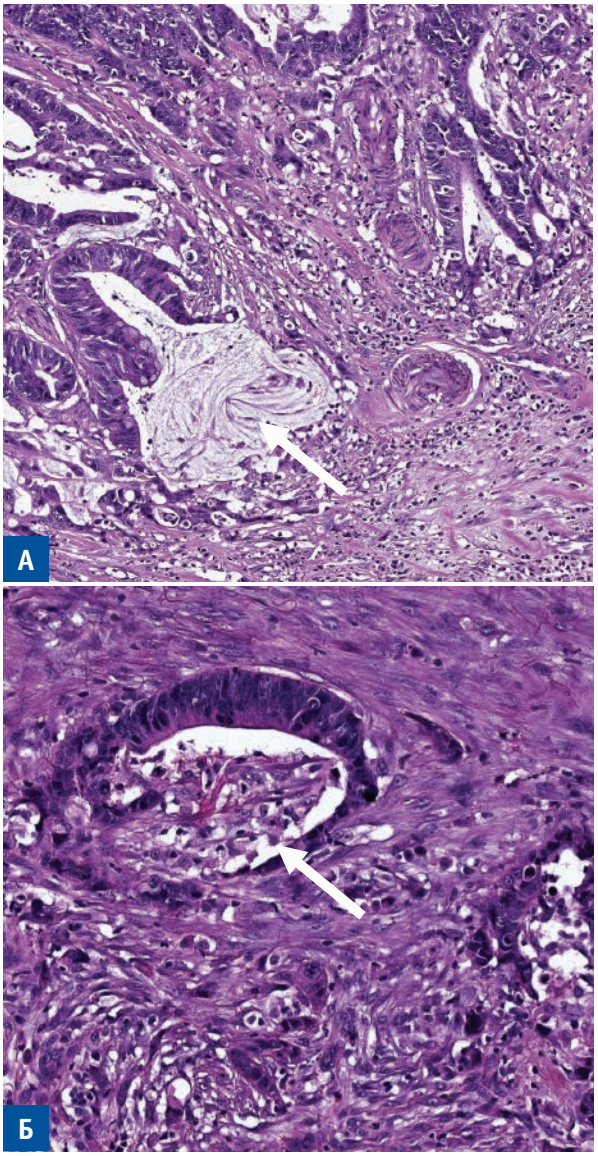

Figure 4. *Rupture of tumor glands — CGR1: А — rupture of the gland with accumulation of mucus; Б — rupture of the gland with accumulation of detritus (arrows). Staining with hematoxylin and eosin. ×200*

The obtained tumor slices were examined in a light microscope to assess the main histological parameters. The morphometric studies were performed on the digital images of the tumor slices obtained by scanning with an x20 magnification.

For more accurate determination of lymphovascular invasion, Bd and PDC, the selected tumor slices were additionally stained by immunohistochemical method in the Ventana Bench Mark Ultra immunohistosteiner, using the Ultra View Universal DAB Detection Kit (Ventana — Roche Diagnostics) with antibodies to SC8/18 (clone B22.1&B23.1, Roche Diagnostics), CD31 (clone JC70, Cell Marque, dilution 1:100), in accordance with the recommended protocols.

To assess the depth of tumor invasion into the submucosal layer, the Kikuchi subclassification was used (sm1 — invasion to a depth of 0.2–0.3 mm, sm2 — invasion to 2/3 of the submucosal layer and sm3 — invasion to the entire thickness of the submucosal layer) for flat neoplasms [11] and the Haggitt classification for polypoid tumors on the pedicle (level 1–4: level 1 — invasion into the 'head' of the polyp; level 2 — tumor germination to the border with unchanged mucosa; level 3 — invasion into the 'leg' of the polyp, level 4 — invasion into the submucosal layer of the intestinal wall) [12].

The differentiation and the degree of malignancy of the tumor (G) were determined in accordance with the criteria of the WHO classification of gastrointestinal tumors (5th ed., 2019) [19]. Tumor staging was carried out in accordance with the TNM classification (7th ed.) [20].

Tumor budding (Bd) was assessed by the invasive edge of the tumor in accordance with the

Table 1. *Clinical and pathomorphological characteristics of patients and the frequency of lesions of regional lymph nodes*

	***n* (%)**	**N1–2 (%)**	***P***
N patients	**66 (100.0%)**	**13 (19.7%)**	**–**
Number of patients with tumor T1N1-2	13 (19.7%)	–	–
Gender			
Male	28 (42.4%)	5 (7.6%)	1.0
Female	38 (57.6%)	8 (12.1%)	
Age (years)	62.0 (22–80)		
< 62 years	32 (51.5%)	6 (9.1%)	1.0
⩾ 62 years	34 (54.5%)	7 (10.6%)	
Distance from the anal verge, cm			
0–6	18 (27.3%)	4 (6.1%)	0.68
7–12	26 (39.4%)	6 (9.1%)	
13–15	22 (33.3%)	3 (4.5%)	
Surgery			
Anterior rectal resection	21 (31.8%)	4 (6.1%)	0.8
Anterior rectal resection with total mesorectal excision	32 (48.5%)	6 (9.1%)	
Intrasphincteric resection	6 (9.1%)	2 (3.0%)	
Abdominoperineal resection	1 (1.5%)	1 (1.5%)	
Coloprotectomy + TME*	6 (9.1%)	–	
pT1			
sm1	15 (22.7%)	3 (4.5%)	1.0
sm2-3	51 (77.3%)	10 (15.2%)	
Lymph nodes in the specimen 23 ± 9.8			
< 23	34 (54.5%)	5 (7.6%)	0.36
⩾ 23	32 (51.5%)	8 (12.1%)	
Tumor differentiation (G)			
G1-2	63 (95.5%)	11 (16.7%)	0.09
G3	3 (4.5%)	2 (3.0%)	
Macroscopic form			
plaque-shaped or flat-raised	20 (30.3%)	3 (4.5%)	0.73
exophytic	46 (69.7%)	10 (15.2%)	
Lymphovascular invasion (LVI)			
LVI+	35 (53.0%)	13 (19.7%)	< 0.0001
LVI–	31 (47.0%)	0	
Tumor Budding (Bd)			
Bd1 (0–4)	16 (24.2%)	1 (1.5%)	0.03
Bd2 (5–9)	14 (21.2%)	1 (1.5%)	
Bd3 (10 or more)	36 (54.5%)	11 (16.7%)	
Poorly differentiated tumor clusters (PDCG)			
PDC1	28 (42.4%)	1 (1.5%)	0.01
PDC2	16 (24.2%)	4 (6.1%)	
PDC3	22 (33.3%)	8 (12.1%)	
Rupture of cancer glands (CGR)			
CGR0	18 (27.3%)	3 (4.5%)	1.0
CGR1	48 (72.7%)	10 (15.2%)	

**in 4 cases, colproctectomy was performed for rectal cancer with inflammatory bowel diseases, in 2cases — against the background of adenomatous polyposis syndrome.*

 # the specimens removed after colproctectomy are excluded from the analysis

recommendations of the ITBCC (2016): the presence of single cells or groups/clusters of cells (up to four cells) along the invasive edge of the tumor at the site of their greatest accumulation (hotspot method) on an area of 0.785 mm^2 (lens ×20). The severity of Bd was assessed using the three-stage JSCCR system [17] included in the recommendations (ITBCC) [14]: 0–4 'budding' — low degree of budding (Bd 1); 5–9 'budding' — medium degree of budding (Bd 2); 10 or more 'budding' — high degree of budding (Bd 3).

Poorly differentiated clusters (PDC) were determined in accordance with the criteria of Ueno, H.: clusters of ⩾ 5 tumor cells without glandular structures. To assess the presence of PDC, the entire tumor, including the invasive margin, was examined on the slices stained with hematoxylin and eosin at low magnification of the microscope. After determining the area with the largest number of PDC (hotspot method), a quantitative calculation was performed with an ×20 magnification. Tumors with the number of clusters < 5, from 5 to 9 and > 10 were classified as G1, G2 and G3, respectively [15].

Tumor gland ruptures (cancer gland rupture — CGR) were evaluated by histology of the slices stained with hematoxylin and eosin (H&E), including tumor sites with the greatest depth of invasion.

The presence of CGR was defined as the focal or partial absence of epithelial cells that make up the cancerous gland located along the invasive edge of the tumor (with C-shaped structures with flattening and dissociation of cells), regardless of the concomitant inflammatory or stromal reaction, as well as mucus accumulation or the presence of an abscess. A case with the presence of at least one glandular structure corresponding to these criteria was considered CGR-positive [16].

Lymphovascular invasion was determined in the presence of tumor cells in the lumen of small vessels limited by the endothelial layer [21].

Statistical Analysis

The clinical and morphological characteristics of the patients and removed specimens were entered into the database on the EXCEL for Windows platform. The normality of the distribution was checked using the Kolmogorov method. Continuous variables with non-Gaussian distribution were described by median and amplitude.

The medians were compared using the Mann-Whitney test. The variation series with Gaussian distribution was characterized by the mean and standard deviation. The mean values were compared using an unpaired t-test. Categorical variables were compared using the χ^2 test (more than two degrees of freedom), binary variables were compared using the Fisher's exact test. The odds ratio (OR) at 95% coincidence interval (95% CI) was calculated for risk factors in a univariate analysis. The value of $p < 0.05$ was considered significant. The significant risk factors were included in the logistic regression in order to identify an independent predictor of lymph node metastases. The statistical analysis was performed using software SPSS 22.0 (Chicago, Ill.) and GraphPadPrism 6.0 (LaJolla, CA).

RESULTS

The study included 66 rectal specimens removed during radical procedures for cancer with morphologically verified adenocarcinoma pT1 (Table 1). The mean number of examined lymph nodes relevant to the rectum was 23.0±9.8. During the morphology, metastases in pararectal lymph nodes were detected in 13 (19.7%) cases. At the same time, there was one affected node (N1a) in 5 (7.5%) specimens: T1sm1N1a $n = 2$, T1sm3N1a $n = 3$; in 4 (6.1%) specimens, 2–3 metastases in lymph nodes (N1b) were detected at the depth of invasion of T1sm3. In two (3.0%) cases, 5 affected lymph nodes (N2a) were found — pT1sm2N2a and pT1sm3N2a. In two cases, with the depth of invasion of the tumor pT1sm2 and pT1sm3, metastases were found in 7 and 13 lymph nodes (N2a), respectively. Despite the fact that metastases to mesorectal lymph nodes were detected with deep invasion of the tumor into the submucosal layer 3 times more often (4.5% at T1sm1 vs 15.2% at T1sm2-3), these differences are not significant ($p = 1.0$). Also, the differences ($p = 0.73$) in the rate of lymph node

lesions in high grade adenocarcinoma (G3 — 2 cases 3%) and low grade (G1-G2 — 11 cases 16.7%) are not significant.

With a high degree of reliability in the presence of lymphovascular invasion (Fig. 1), were detected metastases in the lymph nodes of mesorectum: OR 38.0 95%, CI 2.1–670 ($p < 0.0001$).

The tumor budding of high degree — Bd3 (Fig. 2) was significantly more often detected in the tumors with metastases in the mesorectal lymph nodes: OR 6.2, CI 1.2–31 ($p < 0.0001$).

Poorly differentiated tumor clusters (PDC) (Fig. 3) were also significantly associated with metastases in mesorectal lymph nodes ($p = 0.03$). Noteworthy is the fact that when combining the degrees of PDC, the differences, unlike tumor budding, were identical: PDC G1 vs. PDC G2-3, OR 4.5 CI 1.2–16 ($p = 0.02$), PDC G1-2 vs. PDC G3, OR 4.5 CI 1.2–16 ($p = 0.02$) (Fig. 3).

The presence of the cancer glands rupture CGR (Fig. 4) was detected in most of the cases (10 of 13) with metastases in the lymph nodes, but no reliable correlation with the rate of metastases of rectal cancer T1 in the lymph nodes of mesorectum was obtained ($p = 1.0$).

In a logistic regression model, the only independent risk factor for metastasis to regional lymph nodes was lymphovascular invasion (LVI) — $p < 0.0001$.

DISCUSSION

The development of endoscopic technologies allows for organ-preserving treatment in patients with CRC T1. For rectal tumors, the problem of organ-preserving treatment is particularly relevant, which is associated with the inevitable negative consequences of radical procedures: low anterior resection syndrome, genitourinary disorders, temporary or permanent colostomy.

The main problem after local excision of the tumor remains the assessment of the condition and probability of regional lymph nodes lesions to determine the indications for additional surgery in a particular patient. To solve this problem, an active search is being done for morphological risk factors for metastases, which make it possible to identify tumors with a high and low risk of metastatic disease.

Recently, the main predictors of lymph nodes metastases recommended for practical use are the depth of tumor invasion into the submucosal layer, the degree of differentiation (including special forms — signet-ring cell and mucinous adenocarcinoma), the presence of lymphovascular invasion, and tumor budding Bd. Additional surgery is recommended in the presence of one or more unfavorable morphological predictors of a high risk of metastatic disease, detected during histology of a tumor removed locally [6,7,22].

However, despite a large number of studies on these morphological predictors, their prognostic value is still ambiguous, due to the problem of reproducibility and the assessment methods used, as well as the level of sensitivity and specificity of each. In addition, most studies are devoted to the search of these predictors in groups of patients with CRC, while studies on the risk factors for metastases in early rectal cancer have been done much less.

In this study, an assessment of the main predictors of metastatic disease used and new poorly studied morphological features for the risk of metastases in rectal adenocarcinoma T1 was carried out.

Of the selected 66 cases of rectal adenocarcinoma pT1, metastases were detected in 13 (19.7%) cases, which is comparable with the rate of metastatic disease according to the previous studies [23,27,29]. It should be noted that lymph node metastases were detected in most cases with deep invasion into the submucosal layer of sm2-3 — 10 (15.2%) versus sm1-3 (4.5%). However, this difference had no significance ($p = 1.0$). The depth of invasion into the submucosal layer remains one of the main practice parameters, determining the risk of lymph node metastases. However, in a number of studies, the prognostic value of this feature is interpreted ambiguously [8,17,26–28]. Moreover, the exact threshold value of the depth of invasion, the so-called 'N0 Threshold' for early rectal cancer, which determines the risk of metastases, has not been determined now. The values given in a wide range from 200 to 1500 microns

[6]. The most commonly used threshold value of the depth of invasion is 1,000 microns (1 mm), exceeding which significantly increases the risk of metastases (relative risk 5.2 at 95% CI 1.8–15.4). This parameter showed high sensitivity (96.7%), but low specificity (24.1%), which can lead to a large number of patients with exceeded indications for salvage surgery after local excision of the primary tumor [23].

The degree of tumor differentiation was not significantly associated with the rate of metastatic disease (p = 0.73), which may be due to a small number of cases of G3 adenocarcinoma (n = 2) in the group with metastases. A small number of adenocarcinomas G3 has the following explanation: the routine practice in the Center includes pre-op histological confirmation of a rectal tumor. Cases of suspected malignancy in the polyp, which, with the development of special endoscopic methods (high-resolution endoscopy, chromoendoscopy, examination in the spectrum close to infrared), has been the subject of discussion in recent years. The presence of histology after biopsy leads to the exclusion of patients with low-grade and mucus-producing tumors, which led to the selection of mainly G1-2 adenocarcinoma for the study.

It should be noted that in most cases, CRC has the structure of a high or moderate differentiated adenocarcinoma, and only in 5–10% of cases there is a low differentiation of adenocarcinoma or undifferentiated cancer [6]. The unfavorable prognostic value of high grade adenocarcinoma, including mucinous and cricoid cell cancers, is well known, especially when the tumor is localized in the rectum. However, given the rate of their occurrence, this feature can be used only in a small number of cases of CRC T1.

In addition, when analyzing and comparing the data of the studies, one should take into account the fact that there are different approaches to determining high grade adenocarcinoma: by the least differentiated component of the tumor, regardless of its volume, which is recommended for assessing local excision, and by the predominant component in the tumor after radical surgery [26,27]. There are also differences between the WHO classification and the JSCCR: according to the JSCCR criteria, G2-G3 adenocarcinomas are included in the high grade category, i.e. moderate and low-grade adenocarcinoma, and according to the WHO criteria, adenocarcinoma G2 refers to a low grade tumor [19,22]. Despite the fact that low tumor differentiation is cited in many studies as a significant risk factor for metastases, at the same time, there is a low reproducibility of this feature among pathologists and the need to develop more objective criteria for its assessment [15,23,26,27].

Such features like Bd and PDC showed a significant correlation with metastases to mesorectal lymph nodes (p = 0.03 and p = 0.01, respectively). According to the data obtained, Bd2 and Bd3 are associated with a high risk of lymph node metastases in early CRC [6,8,9,13,14,30]. In the study, we obtained a significant prognostic value only for the Bd3 (high grade), which was determined in the majority of cases — 11 (16.7%), with metastases to lymph nodes, which does not contradict the available published data. The absence of a prognostic value of Bd2 in the studied group may be due to a small number of cases.

For PDC, a significant correlation with lymph node metastases was observed both when using a three-stage PDC1, PDC2, PDC3 assessment, and regardless of the quantitative value/Grade. Such results are consistent with the data of the previous studies. Despite the fact that the determination of the number of PDC in the proposed by Ueno H. system, by analogy with Bd, should be carried out according to the three-stage PDC1-3 system, in a large number of the studies devoted to the study of this feature, a binary (yes/no) evaluation system was used (especially for local excision), which also showed that the presence of PDC, regardless of their number, is a predictor of metastases to lymph nodes [12,25,26]. It should be noted that the morphological assessment of the PDC demonstrated a fairly high rate of coincidences and low variability between pathologists with the values of the coefficient k (interobserver variability /agreement — kappa statistics) equal to 0.51 (Ueno, 2014) — 0.82 (Konishi, 2018) [25].

The phenomenon of rupture of tumor glands — CGR is a new histological feature proposed as a potential risk factor for lymph nodes metastases in CRC T1.

The first study (Oishi et al., 2020) showed that CGR has a predictive value with high sensitivity (100%), but low specificity (25%) and is closely related to the depth of tumor invasion into the submucosal layer ($p < 0.001$). The method proposed by the authors for assessing this is simple and well reproducible in tumor slices stained with hematoxylin and eosin (coefficient k with values 0.61–0.80) [16].

In the study, we found this feature in 10 out of 13 cases with lymph node metastases (76.9%), but we did not get a significant association of CGR with the rate of metastatic disease ($p = 1.0$), which is most likely due to the insufficient statistical power of the study. Nevertheless, the differences obtained, albeit statistically unreliable, indicate the need for further study.

Lymphovascular invasion is a universal unfavorable prognostic feature for cancer of any site and prevalence. Recently, a vascular (lymphovascular and venous) invasion is considered an important prognostic feature that affects the determination of treatment approach in patients with CRC stage I-II.

The results of the study showed a high degree of reliability in detecting metastases in regional lymph nodes in the presence of lymphovascular invasion (LVI): OR 38.0 95% CI 2.1–670 ($p < 0.0001$).

In the logistic regression model, lymphovascular invasion (LVI) turned out to be the only independent risk factor for metastases to regional lymph nodes — $p < 0.0001$. It can be stated that in the absence of LVI, metastatic lymph node lesion was not detected (pN0). The strong prognostic value of LVI has been determined in a large number of studies that have shown that invasion of lymphatic vessels is the most significant predictor of metastases to lymph nodes [8–10,21–23,27]. At the same time, it is noted that the diagnosis of lymphovascular invasion is associated with a large variability of results among pathologists, demonstrating low values of the coefficient $k = 0.28–0.30$, the value of which improved somewhat when using an additional immunohistochemical method for detecting vessels with a panendothelic marker CD31 and a marker of lymphatic vessels D2-40 [23,27].

Thus, according to the results of the study, lymphovascular invasion, tumor budding, and the presence of poorly differentiated clusters turned out to be the most significant predictors of metastases in rectal adenocarcinoma T1. Detecting lymphovascular invasion is mandatory in the histology of CRC, especially in early T1 cancer, and reflects the quality of morphology. It should be noted that LVI, despite the difficulties in detecting, was an independent predictor of metastatic lymph node lesion in almost all the previous studies, while the prognostic value of the remaining features was ambiguous.

The ITBCC recommendations (2016) emphasize that Bd is an independent predictor of metastases to regional lymph nodes in CRC T1, the prognostic value of which is equivalent to the degree of differentiation of the tumor, vascular and perineural invasion. Its definition should be included in the overall assessment of the clinical and morphological characteristics of the tumor that determine the treatment approach of patients [14]. However, the introduction of the definition of this feature into practice has identified a number of problems, such as its reproducibility and accuracy of assessment, the role of the immunohistochemical method in the detection of Bd, the study of the biological nature and relationship with PDC. It is assumed that Bd and PDC are associated with EMT and have a similar biology. Therefore, a number of studies have attempted to jointly calculate these parameters as a manifestation of one phenomenon, since the separation of these features by a threshold value of 5 tumor cells (Bd ⩽ 4 cells; PDC ⩾ 5 cells) is quite arbitrary [28,29].

At the same time, taking into account the data of the other studies on the prognostic value of PDC and the results obtained by us, it is necessary to further study this and standardize the assessment methodology. Perhaps, PDC can serve as an additional or alternative Bd feature,

in cases where its assessment is difficult or the 'budding' of the tumor is not detected. Apparently, tumor budding, PDC, and, probably, cancer glands rupture, represent the structures of the so-called poorly differentiated component of the tumor, which is detected mainly by the invasive front, and, in accordance with the existing concept, reflects the process of tumor dedifferentiation and epithelial-mesenchymal transition, being an indicator of its biological aggressiveness.

The results of this and the previous studies indicate a large variability in the prognostic value of the main morphological risk factors for metastases used today. Moreover, the results of meta-analyses and reviews of the main used predictors of lymph node metastasis in CRC T1 have shown that none of the currently used morphological features has sufficient sensitivity and specificity to accurately determine the risk of metastasis and cannot be used independently [23,27–29].

Apparently, it is necessary to search for a set of the most significant predictors of metastases and create an algorithm for its application, which will allow more accurate selection of patients with a high risk of metastases in rectal cancer T1 for subsequent additional treatment.

CONCLUSION

According to the results of the study, lymphovascular invasion (LVI), tumor budding (Bd) and poorly differentiated clusters (PDC) were the most significant predictors of metastases in the rectal adenocarcinoma T1. The obtained results indicate the expediency of including the Bd assessment in the protocol of pathomorphological examination as an additional predictor. It is necessary to further study the prognostic value of PDC in order to standardize the methodology for practical use, as well as to study the prognostic value of the depth of invasion and differentiation of adenocarcinoma in order to create a histological model for more accurate selection of patients with a high risk of metastases of rectal adenocarcinoma T1, who need additional surgery.

AUTHORS CONTRIBUTION

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REFERENCES

1. Yamamoto S, Watanabe M, Hasegawa H, Baba H, et al. The risk of lymph node metastasis in T1 colorectal carcinoma. *Hepatogastroenterology*. 2004;51(58):998–1000.

2. Tateishi Y, Nakanishi Y, Taniguchi H, et al. Pathological prognostic factors predicting lymph node metastasis in submucosal invasive (T1) colorectal carcinoma. *Mod Pathol*. 2010 Aug;23(8):1068–72.

3. Sajid MS, Farag S, Leung P, et al. Systematic review and meta-analysis of published trials comparing the effectiveness of transanal endoscopic microsurgery and radical resection in the management of early rectal cancer. *Colorectal Dis*. 2014 Jan;16(1):2–14.

4. Akasu T, Kondo H, Moriya Y, et al. Endorectal ultrasonography and treatment of early stage rectal cancer. *World J Surg*. 2000;24(9):1061–8.

5. Bipat S, Glas AS, Slors FJ, Zwinderman AH, et al. Rectal cancer: local staging and assessment of lymph node involvement with endoluminal US, CT, and MR imaging — a meta-analysis. *Radiology*. 2004;232(3):773–83.

6. Morino M, Risio M, Bach S, et al. Early rectal cancer: the European Association for Endoscopic Surgery (EAES) clinical consensus conference. *Surgical Endoscopy*. 2015;29(4):755–773.

7. Yunghuyn Hwang, Yong Sik Yoon,Jun Woo Bong et al. Long-term Transanal Excision Outcomes in Patients With T1 Rectal Cancer: Comparative Analysis

of Radical Resection. *Annals of Coloproctology*. August 2019;35(4):194–201. DOI:10.3393/ac.2018.10.18. NCCN Guidelines, version 1.2021. https://www.nccn.org/professionals/physician_gls/pdf/rectal.pdf

8. Beaton C, Twine CP, Williams GL, Radcliffe AG. Systematic review and meta-analysis of histopathological factors influencing the risk of lymph node metastasis in early colorectal cancer. *Colorectal Dis*. 2013 Jul;15(7):788–97.

9. Ha RK, Han KS, Sohn DK, Kim BC, et al. Histopathologic risk factors for lymph node metastasis in patients with T1 colorectal cancer. *Ann Surg Treat Res*. 2017 Nov;93(5):266–271

10. Chernyshov S.V., Shelygin Yu.A., Kashnikov V.N., Mainovskaya O.A., et al. Risk factors of regional lymph node metastases in pT1 colorectal cancer. *Khirurgiya*. 2018;(8):4–9. (in Russ.). https://doi.org/10.17116/hirurgia20180824

11. Kikuchi R, Takano M, Takagi K, et al. Management of early invasive colorectal cancer. Risk of recurrence and clinical guidelines. *Dis Colon Rectum*. 1995;38(12):1286–95.

12. Haggitt RC, Glotzbach RE, Soffer EE, Wruble LD. Prognostic factors in colorectal carcinomas arising in adenomas: implications for lesions removed by endoscopic polypectomy. *Gastroenterology*. 1985;89(2):328–36.

13. Ueno H, Murphy J, Jass JR, et al. Tumour 'budding' as an index to estimate the potential of aggressiveness in rectal cancer. *Histopathology*. 2002;40:127–132.

14. Lugli A, Kirsch R, Ajioka Y et al. Recommendations for reporting tumor budding in colorectal cancer based on the International Tumor Budding Consensus Conference (ITBCC) 2016. *Mod Pathol*. 2017 Sep;30(9):1299–1311.

15. Ueno H, Kajiwara Y, Shimazaki H. et al. New criteria for histologic grading of colorectal cancer. *Am J Surg Pathol*. 2012;36:193–201.

16. Oishi K, Ito T, Sakonishi D, Uchida K, Sekine M, et al. Cancer gland rupture as a potential risk factor for lymph node metastasis in early colorectal adenocarcinoma with deep submucosal invasion. *Histopathology*. 2020 Mar;76(4):603–612.

17. Cracco N, Todaro V, Pedrazzi G, et al. The risk of lymph node metastasis in T1 colorectal cancer: new parameters to assess the degree of submucosal invasion. *Int J Colorectal Dis*. 202;36(1):41–45.

18. Clinical guidelines. Rectal cancer. 2018; p. 56. https://oncology-association.ru/wp-content/uploads/2020/09/rak_prjamoj_kishki.pdf

19. WHO Classification of Tumors Editorial Board. Digestive system Tumours. 5th.ed. Lyon (France): International agency for Research on Cancer; 2019.

20. Sobin LH, Gospodarowicz MK, Wittekind C. TNM Classification of Malignant Tumours, 7th Edition. 2009; p.310.

21. Okabe S, Shia J, Nash G et al. Lymph node metastasis in T1 adenocarcinoma of the colon and rectum. *J Gastrointest Surg*. 2004;8:1032–1039; discussion 1039-1040.

22. Watanabe T, Muro K, Ajioka Y., Hashiguchi Y, et al. Japanese Society for Cancer of the Colon and Rectum (JSCCR)guidelines 2016 for the treatment of colorectal cancer. *Int J ClinOncol*. 2018;23:1–34.

23. Bosch SL, Teerenstra S, JHW de Wilt, Cunningham C, et al. Predicting lymph node metastasis in pT1 colorectal cancer: a systematic review of risk factors providing rationale for therapy decisions. *Endoscopy*. 2013;45:827–834.

24. Quirke Ph, Risio M, Lambert R, L von Karsa, et al. Quality assurance in pathology in colorectal cancer screening and diagnosis—European recommendations. *Virchows Arch*. 2011;458:1–19.

25. Shivji S, Conner JR, Barresi V, Kirsch R. Poorly differentiated clusters in colorectal cancer: a current review and implications for future practice. *Histopathology*. 2020;77(3):351–368.

26. Barresi V, Branca G, Ieni A, Reggiani Bonetti L, et al. Poorly differentiated clusters (PDCs) as a novel histological predictor of nodal metastases in pT1 colorectal cancer. *Virchows Arch*. 2014;464:655-662.

27. Brockmoeller SF, West NP. Predicting systemic spread in early colorectal cancer: Can we do better? *World J Gastroenterol*. 2019;25(23):2887–2897.

28. Backes Y, Elias SG, Groen JN, Schwartz MP, et al. Histologic Factors Associated With Need for

Surgery in Patients With Pedunculated T1 Colorectal Carcinomas. *Gastroenterology*. 2018;154:1647–1659.

29. Haddad TS, Lugli A, Aherne S, Barresi V, et al. Improving tumor budding reporting in colorectal cancer: a Delphi consensus study. *Virchows Archiv*. March, 2021. https://doi.org/10.1007/s00428-021-03059-9

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Computer tomography in diagnostics and treatment of inflammatory complications of diverticular disease of the colon

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ABSTRACT *AIM: to evaluate the role of computed tomography (CT) in the treatment and diagnostic algorithm in patients with complicated diverticular disease (CDD).*

PATIENTS AND METHODS: during the period from 2014 to 2020, 165 hospitalized patients with complications of CDD included in the study. Fifteen (9.1%) patients were hospitalized for elective indications and 150 (90.9%) as emergencies. The indications for hospitalization were inflammatory complications of CDD. Computed tomography with intravenous contrast was performed in 89 (53.9%) patients. The study was performed on a 64-slice CT "Philips Brilliance 64" with intravenous bolus injection of a low-osmolar iodine-containing contrast agent. The absence of the CT in the remaining patients is due to the presence of classical symptoms of acute diverticulitis with a previously verified diagnosis of CDD, the presence of an informative transabdominal ultrasound, as well as the refusal of patients from CT.

RESULTS: the CT allowed to verify the presence of diverticula in the patients, to reveal the distinctive CT signs and pathognomonic symptoms of inflammatory complications of CDD, as well as to establish the severity of the complications that occurred. The specific signs of the destruction of the diverticulum and the complications developed were abdominal mass, abscess, peritonitis, and fistula. Besides the diagnostic value, CT scan permitted to choose the treatment approach and to clarify indications for surgery. Besides that, some CDD complications revealed by CT were considered as a predictor of ineffectiveness of conservative treatment, which requires surgery.

CONCLUSION: CT is a valuable diagnostic method for CDD which allows to determine timely the clinical form of inflammatory complication, to find out indications for surgery and to predict high risk of recurrence.

KEYWORDS: *complicated forms of colonic diverticular disease, CT-diagnostics, predictors of recurrence*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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INTRODUCTION

Diverticular colon disease is one of the most common diseases in Western civilization.

It is distinguished by a variety of manifestations from the asymptomatic to complicated forms requiring urgent surgery. Thus, up to 20% of patients with diverticular disease suffer from acute diverticulitis, which, as a result of inflammatory destruction of the diverticulum, can be complicated by peritonitis, abscess or fistula [1].

Complicated diverticular disease (CDD) becomes an often cause of hospitalization of patients for emergency indications in urgent surgery or coloproctology units, where complex, often multistage surgical approach is carried out.

Thus, the widespread prevalence of the disease, severe complications requiring urgent surgery with long-term postoperative rehabilitation of

patients, determines the need for early diagnosis and timely treatment.

Currently, computed tomography (CT) of the abdomen and pelvis with intravenous contrast is considered abroad as an effective method of visual assessment of diverticular inflammation, which allows not only to verify the presence of acute diverticulitis, but also to determine the clinical form of an inflammatory complication, to make differential diagnosis, and in the presence of complications such as perforation and abscess, to choose the treatment [2–4]. At the same time, the sensitivity of CT in diverticular inflammation varies from 79% to 99% [3,5].

In the Russian literature, the issue of CT in the presence of a clinical picture of CDD remains debatable [6]. The issue has not been resolved as to whether it is advisable to perform CT of the abdomen to clarify the diagnosis during the initial treatment. Predictors have been reported that are highly likely to indicate acute diverticulitis, such as pain in the left iliac region, which increases with movement, the patient's age is over 50 years old, episodes of acute diverticulitis in the history, pain during palpation in the lower abdomen, elevated levels of C-reactive protein (above 50 mg/l), absence of vomiting [7]. The authors of the study state that if these signs are present in the clinical picture, additional visualization can be excluded. In other studies, on the contrary, it is claimed that the accuracy of the diagnosis of acute diverticulitis based on clinical evaluation alone is low, with sensitivity of 64% and 68% [8,9]. Therefore, most authors prefer CT when diagnosing acute inflammatory CDD [5, 10, 11], which is due to the possibility of the method not only to detect diverticula, but also to determine with a high degree of reliability the form of inflammatory CDD complications, and to differentiate diverticular disease with other intestinal diseases [12].

AIM

To evaluate the role of computed tomography in the treatment and diagnostic algorithm for CDD.

PATIENTS AND METHODS

In 2014–2020, 165 patients with CDD were on inpatient treatment in the coloproctology unit of the RCH of the Health Ministry of the Republic of Tatarstan. At the same time, 7 (4.2%) of them were hospitalized for this reason repeatedly. There were 55 males (33.3%) and 110 females (66.7%). The age was 26–91 (60.8 ± 11.1) years.

Fifteen (9.1%) patients were hospitalized as elective, while 150 (90.9%) — for emergency indications. The reason for hospitalization of the patients in the surgery unit was: acute diverticulitis — 78 (47.3%), including 58 — with primary attack, 20 — with recurrent diverticulitis; abdominal mass — 31 (18.8%); colonic bleeding — 28 (17%); abdominal or mesocolon abscess — 15 (9.1%); perforation of the diverticulum, complicated by peritonitis — 6 (3.6%); colovesical fistula — 4 (2.4%); stricture of the sigmoid colon, complicated by chronic 2 (1.2%) or acute 1 (0.6%) intestinal obstruction. One patient had recurrent colonic bleeding (inpatient treatment was carried out 4 times).

CT with intravenous contrast was performed in 89 (53.9%) patients during primary hospitalization in the coloproctology unit.

In the remaining group of the patients, CT was not carried out, which was due to the presence of classical symptoms of diverticulitis with a previously verified diagnosis of CDD, as well as the presence of an informative, non-doubtful conclusion of transabdominal ultrasound. Two patients categorically refused CT due to the fear of radiation exposure. In the group of the patients with colonic bleeding, colonoscopy was the primary diagnostic method.

The study was performed on a 64-slice computer tomograph 'Philips Brilliance 64' using intravenous nonionic low-osmolar iodine-containing contrast agent (yopromide, yoversol, yogexol).

In case of suspicion of an acute surgical situation that developed as a result of CDD, CT was performed directly upon admission of the patient to the clinic. Thirty minutes before the study, the patient drank 500 ml of water with a water-soluble radiopaque drug.

In elective patients CT was performed on an empty stomach, without bowel cleansing. On the eve of the test, the patient drank 250 ml of water with a water-soluble iodine-containing contrast agent and another 250 ml 30 minutes before the study. If an internal fistula of diverticular origin was suspected, 150 ml of a weak solution of a water-soluble radiopaque enema was used.

RESULTS AND DISCUSSION

The distribution by groups of the patients, in whom CT was used in the diagnosis, taking into account the form of inflammatory complications and the treatment performed, is shown in Table 1. In one patient with chronic recurrent diverticulitis, CT did not reveal signs of diverticula; so the diagnosis was verified by barium enema and intraoperatively.

CT in the patients with various variants of CDD allowed to identify characteristic CT signs of acute diverticulitis, diverticular destruction, infiltration, abscess, stricture and fistula of diverticular origin.

In acute diverticulitis, computer tomograms along the circumference of the intestinal wall featured various-sized baggy protrusions with fuzzy contours, as well as thickening of the walls of the affected segment of the colon with narrowing of its lumen (Fig. 1). Thickening of the colon walls, reaching 4 mm or more, was detected in 82 (92.1%) patients, while the length of the inflammatory segment of the colon varied from 20 to 56 mm.

According to Kandagatla, P.G., Stefanou, A.G. (2018), the length of the inflammatory lesion of the intestinal wall of over 5 cm in CDD increases the likelihood of the disease recurrence [13].

Signs of the spread of inflammation beyond the diverticulum with the abdominal mass on CT are inflammatory changes in pericolic fat, manifested by unevenness, heaviness of its structure due to many layers of fluid against the background of edema of adipose tissue as a result of inflammatory changes in diverticula, the so-called 'dirty fat' [2,5] (Fig. 2).

A formidable CDD is the perforation of the diverticulum with the abscess or peritonitis (depending on the site of the diverticulum). Signs of destruction of the diverticulum according to CT data were infiltration of pericolic fat with the inclusion of gas bubbles or accumulation of contrast agent outside the intestinal lumen. With the destruction of the diverticulum located along the mesenteric side of the intestine, the entry of intestinal microflora and gas more often occurs in the mesenteric fat. At the same time, the clinical manifestations of the resulting complication may be devoid of the classic signs of peritonitis. On CT scan, swelling of the root of the mesentery of the colon can be observed, as well as the so-called 'comma' symptom [2, 14] — thickening and accumulation of fluid in the fascia of the left lateral canal or the retrocolic fascia (Fig. 3).

During the perforation of the diverticulum with an abscess, a cavity with the level of liquid and gas in the mesentery or pericolic tissue, or in various parts of the peritoneal cavity, was visualized on the CT scan.

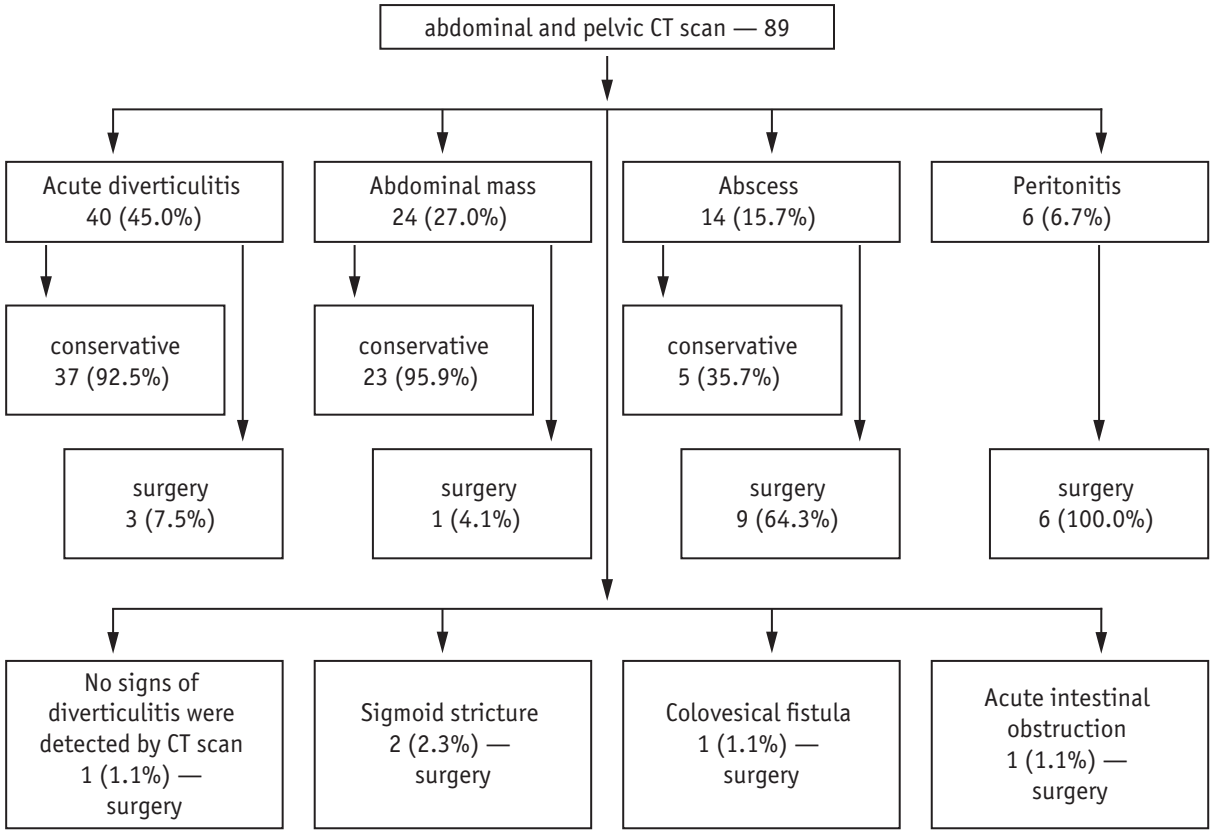
We identified abscesses in 14 patients. At the same time, in 5 (35.7%) of them, the size of the abscess was no more than 30 mm, and in 9 (64.3%) patients, the size of the liquid collection exceeded this parameter, reaching 121 × 95 × 60 mm in one case (Fig. 4–5).

With diverticular peritonitis, CT scans showed accumulations of free fluid near the affected segment of the colon, in the pelvis, in various parts of the peritoneal cavity, as well as inflammatory infiltration of pericolic fat with gas bubbles, gas accumulation in the abdomen under the anterior abdominal wall (on axial view).

In the presence of a colovesical fistula, direct (gas bubbles in the lumen of the bladder) and indirect (thickening, deformation of the bladder wall) signs of pathological communication between organs were detected (Fig. 6).

Also, we studied the results of an alternative method in the diagnosis of acute CDD complications — transabdominal sonography. We used transabdominal ultrasound as a first-line diagnostic method in all the patients with suspected CDD. The undoubted advantage of the method is its high availability, safety and low

Table 1. *CDD and approach in the group of patients with abdominal and pelvic CT scan*



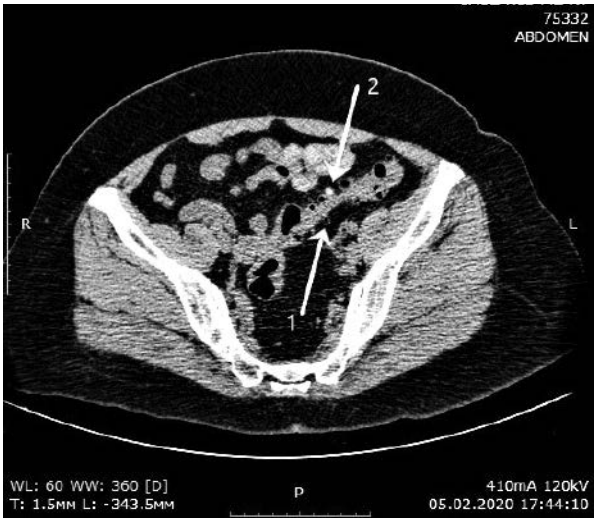


Figure 1. *CT of patient J, 53 years old. Axial section. Diverticular disease of the left colon complicated by diverticulitis. Multiple diverticula with thickened walls filled with air (arrow 1) and coprolites (arrow 2).*

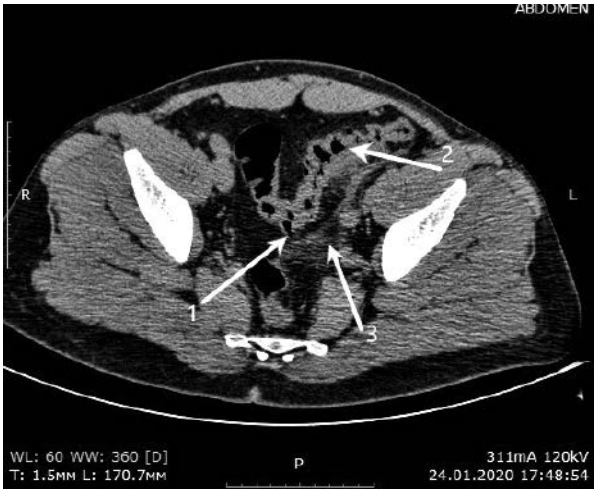


Figure 2. *CT of patient K., 42 years old. Diverticular disease of the sigmoid colon complicated by diverticulitis. Diverticulum of the sigmoid colon (arrow 1), significant thickening of the walls of the sigmoid colon, narrowing of its lumen (arrow 2), infiltration of pericolic fat (arrow 3).*

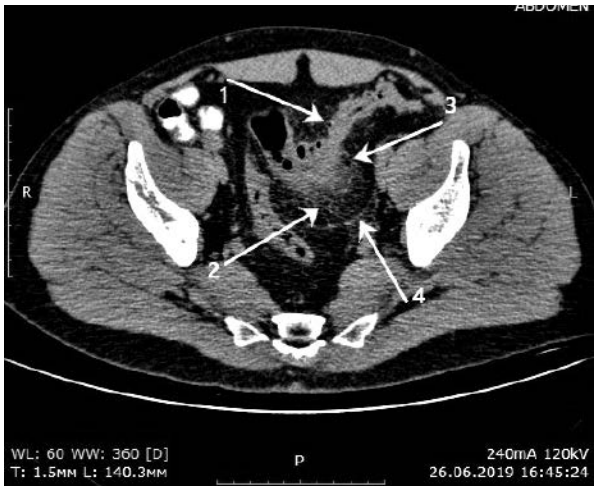


Figure 3. *CT of patient B., 64 years old. Diverticular disease of the sigmoid colon complicated by diverticulitis. Multiple diverticula of the sigmoid colon (arrow 1). Stranding of paracolic fat (arrow 2). Gas outside the intestinal lumen (arrow 3). Thickening of the mesenteric root of the sigmoid colon and f. retrocolica (arrow 4).*

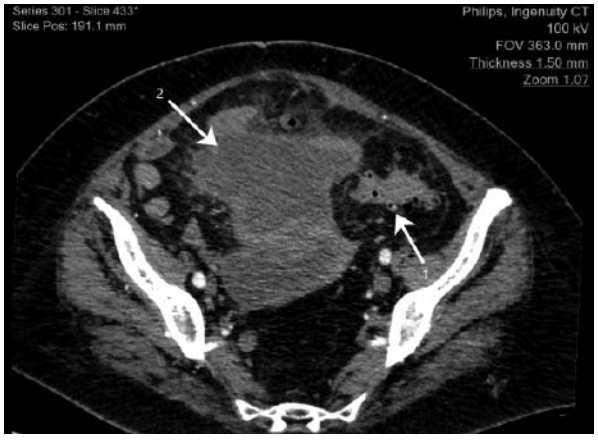


Figure 4. *CT of patient A., 62 years old. Diverticular disease of the sigmoid colon, pelvic abscess. Diverticulum of the sigmoid colon (arrow 1). Large abscess of the pelvis 121×95×60 mm (arrow 2).*

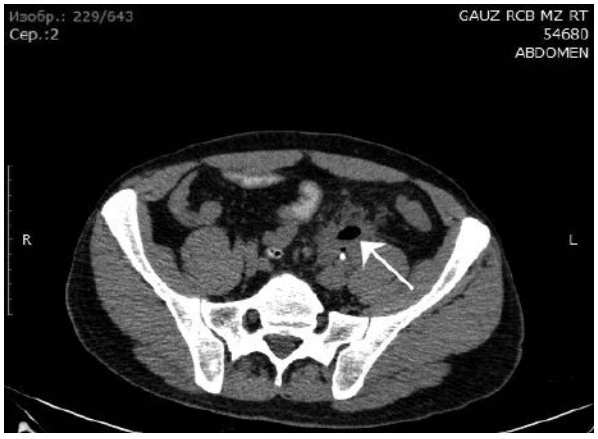


Figure 5. *CT of patient X., 41 years old. Diverticular disease of the sigmoid colon complicated by pericolic abscess with horizontal fluid level (arrow).*

cost. In addition to imaging the diverticula themselves, we noted sonographic signs of diverticulitis: thickening of the colon wall and infiltrative changes in . Only in 2 out of 4 cases, ultrasound examination revealed signs of perforation of the diverticulum — the presence of air bubbles in the thickness of the infiltrated mesentery of the colon. The comparison of these methods of imaging in the diagnosis of CDD is of considerable clinical interest. However, it requires a more detailed analysis and deserves a special study.

The treatment of the patients with CDD was carried out in accordance with the national clinical guidelines [15]. The conservative treatment based on a combination of mesalazine and rifaximin was started in all the patients with acute diverticulitis, acute abdominal mass and pericolic abscess of small size (⩽ 3 cm) detected on CT scan. The conservative treatment was effective in 65 (98.4%) patients of this group.

Twenty-four (26.9%) patients were operated on. Indications for emergency surgery were perforated diverticulitis complicated by abscess — 9 (37.5%), peritonitis — 6 (25%), acute intestinal obstruction — 1 (4.2%). Indications for elective surgery included: often recurrent attacks — 4 (16.6%), failure of conservative treatment — 1 (4.2%), colon stricture with chronic obstruction — 2 (8.3%), colovesical fistula — 1 (4.2%).

Minimally invasive procedures — abscess drainage under ultrasound navigation were performed in 4 (16.7%) patients. Laparotomy

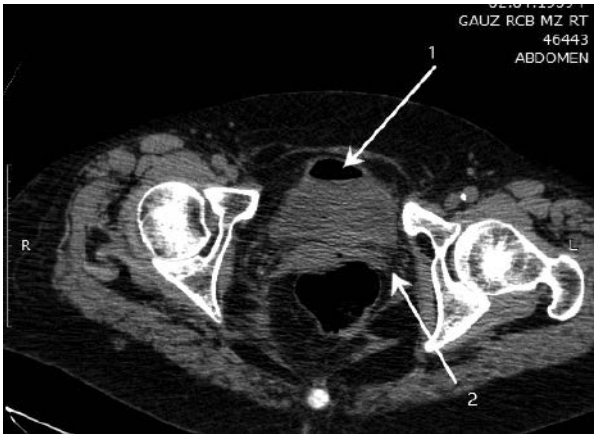


Figure 6. *CT of patient B. 58 years old. Diverticular disease complicated by colo-vesical fistula (arrow 1). Infiltration of the pericolic fat (arrow 2).*

was used in the remaining 20 (83.3%) patients with CDD. At the same time, sigmoid resection was performed in 14 (58.3%), left hemicolectomy — in 3 (12.5%) patients. In 2 (8.3%) patients with perforated diverticulitis complicated by the Douglas space abscess, a combined surgery was performed: resection of the sigmoid in combination with intraperitoneal anterior rectal resection due to the involvement of its wall in the abscess capsule. In 1 (4.2%) case, a right hemicolectomy was performed in a patient with inflammation of the diverticulum of the cecum with pericolic mass. In 10 (50%) cases, the resection was followed by colorectal anastomosis performed using an invagination technique in 7 patients, or using the traditional hand-sewn double-row anatomosis in 3 patients. Ten (41.6%) patients were operated on in two stages, followed by stoma takedown. Reconstructive procedures were performed 3–4 months after the relief of the inflammatory process with bowel hand-sewn double-row anastomosis in 6 (60.0%) patients, as well as by the invagination method in 4 (40.0%).

No postoperative mortality occurred. Postoperative complications developed in 4 (16.7%) patients: intraperitoneal hematoma (1), wound seroma (1), cubital vein phlebitis (1), acute jejunal ulcer (1). In the latter case, relaparotomy was required.

In 5 (21.3%) patients with abdominal mass, a relapse of the disease occurred during the year, in connection with which 3 patients were hospitalized again; and the conservative treatment was repeated. In the 2 remaining cases, due to the pericolic abscesses with signs of local peritonitis, the Hartmann's procedure was performed for urgent indications. It should be noted that at the initial admission of these patients, according to the CT data, signs of destruction (microperforation) of the diverticulum were detected. On CT scan, the same signs were noted in 2 (8.3%) patients, who were re-admitted and effectively treated conservatively.

However, one of them was hospitalized for the third time after 3 months due to a recurrent diverticulitis, complicated by perforation of the diverticulum and generalized peritonitis, which required emergency surgery. These cases confirm the opinion that the destruction of the diverticulum can be considered as a predictor of the failure of conservative treatment [4].

The effective drainage of the abscess under ultrasound navigation is also not an argument in favor of refusing surgery during the stabilization of the patient's condition, which is confirmed by the recurrence of this complication. Of the 4 patients, one was hospitalized again; the abscess was re-drained by ultrasound navigation; but the patient categorically refused the elective surgery. In another case, the patient was operated on after 2 months due to perforation of the diverticulum and the peritonitis. Sigmoid resection was performed; descendostomy was applied, followed by stoma takedown later. Follow-up of the 2 remaining patients allows to state the transition of the inflammatory process into a chronic one, with the preservation of complaints of abdominal pain syndrome, subfebrile fever, as well as an increased level of laboratory markers of inflammation.

CONCLUSION

Computed tomography is an effective diagnostic method for the CCD, which allows identification of a clinical form of an inflammatory complication, determining indications for surgery and predicting the likelihood of recurrence.

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REFERENCES

1. Timerbulatov M.V., Kulyapin A.V., Lopatin D.V. et al. Diagnostic tactics in the management of patients with diverticular disease complicated by perforated diverticulitis in 15 years. *Koloproktologia*. 2018;2:85–88. (In Russ.). DOI: 10.33878/2073-7556-2018-0-2-85-88.

2. Minordi LM, Larosa L, Berte G, et al. CT of the acute colonic diverticulitis: a pictorial essay. *Diagnostic and interventional radiology*. 2020;26(6):546–551. DOI: 10.5152/dir.2020.19645.

3. Sartelli M, Moore FA, Ansaloni L, et al. A proposal for a CT driven classification of left colon acute diverticulitis. *World journal of emergency surgery*. 2015; 10, 3. DOI: 10.1186/1749-7922-10-3.

4. Poletti PA, Platon A, Rutschmann O, et al. Acute left colonic diverticulitis: can CT findings be used to predict recurrence? *American Journal of Roentgenology*. 2004;182(5):1159–65. DOI: 10.2214/ajr.182.5.1821159. PMID: 1510011.

5. Destigter KK, & Keating DP. Imaging update: acute colonic diverticulitis. *Clinics in colon and rectal surgery*. 2009;22(3):147–155. DOI: 10.1055/s-0029-1236158.

6. Korneva E.P., Rostovtsev M.V., Nudnov N.V. et al. Possibilities of CT in the diagnosis of complications of intestinal diverticulosis (clinical observation). *Medical Visualization*. 2019;3:54–65. (In Russ.). DOI: 10.24835/1607-0763-2019-3-54-65.

7. Andeweg CS, Knobben L, Hendriks JC, et al. How to diagnose acute left-sided colonic diverticulitis: proposal for a clinical scoring system. *Annals of surgery*. 2011;253(5):940–946. DOI: 10.1097/SLA.0b013e3182113614.

8. Karidis NP, Dimitroulis D, Kouraklis G. The role of abdominal imaging in cases with a high probability of acute left-sided colonic diverticulitis based on a clinical scoring system. *Annals of surgery*.2013;258(2):14. DOI: 10.1097/SLA.0b013e31829c7a9d.

9. Toorenvliet BR, Bakker RFR., Breslau PJ, et al. Colonic diverticulitis: a prospective analysis of diagnostic accuracy and clinical decision-making. *Colorectal Disease*. 2010;12(3):179–186. DOI: 10.1111/j.1463-1318.2009.01778.x

10. Kaiser AM, Jiang JK, Lake JP, et al. The management of complicated diverticulitis and the role of computed tomography. *American Journal of Gastroenterology*. 2005;100(4):910–917. DOI: 10.1111/j.1572-0241.2005.41154.x

11. Baker M.E. Imaging and interventional techniques in acute left sided diverticulitis. *Journal of Gastrointestinal Surgery*. 2008;12(8):1314–1317. DOI: 10.1007/s11605-008-0490-2

12. Belov D.M., Zarodnyuk I.V., Mikhalchenko V.A.etal. Computed tomography diagnostic of inflammatory complications of colon diverticulitis (review). *Koloproktologia*. 2016;4:60–68. (In Russ.).

13. Kandagatla PG, Stefanou AJ. Current Status of the Radiologic Assessment of Diverticular Disease. *Clinics in colon and rectal surgery*. 2018;31(4):217–220. DOI: 10.1055/s-0037-1607466

14. Pereira JM, Sirlin CB, Pinto PS, et al. Disproportionate fat stranding: a helpful CT sign in patients with acute abdominal pain. *Radiographics*. 2004;24(3):703–15. DOI: 10.1148/rg.243035084.

15. Ardatskaya M.D., Achkasov S.I., Veselov V.V. et al. Clinical guidelines. Diverticular disease. *Koloproktologia*. 2021;20(3):10–27. (in Russ.). DOI: 10.33878/2073-7556-2021-20-3-10-27

https://doi.org/10.33878/2073-7556-2021-20-4-42-48

Толстокишечный инвагинационный анастомоз в хирургии осложненных форм дивертикулярной болезни ободочной кишки

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РЕЗЮМЕ *ЦЕЛЬ ИССЛЕДОВАНИЯ: оценить перспективы использования колоректального инвагинационного анастомоза при осложненных формах дивертикулярной болезни ободочной кишки (ДБОК).*

ПАЦИЕНТЫ И МЕТОДЫ: за период с 2014 по 2020 гг. колоректальный инвагинационный анастомоз использован в лечении 42 пациентов: у 18 пациентов с ДБОК и у 25 пациентов при реконструктивно-восстановительной операции, ранее перенесших операцию Гартмана по поводу колоректального рака. Группу сравнения составили 24 пациента с ДБОК и 20 пациентов, ранее перенесших операцию Гартмана по поводу колоректального рака, анастомоз у которых наложен традиционным двухрядным кишечным швом. Все пациенты оперированы открытым доступом, при этом первичный анастомоз выполнен 20 (47,6%) пациентам, а 22 (52,4%) пациентам группы непрерывность кишечника была восстановлена в ходе реконструктивно-восстановительного этапа лечения.

РЕЗУЛЬТАТЫ: в группе пациентов, перенесших резекцию ободочной кишки с формированием инвагинационного анастомоза, несостоятельности анастомоза не было. При этом наличие единичных мелких дивертикулов диаметром 2–3 мм рядом с зоной формирования анастомоза не служило поводом для расширения объема резекции. В группе сравнения у 13 (54,2%) пациентов в ходе формирования площадок для анастомоза выявлены мелкие формирующиеся дивертикулы, что потребовало расширения объема резекции. В этой группе несостоятельность анастомоза возникла у 2 (6,8%) пациентов с дивертикулярной болезнью, что потребовало выполнения релапаротомии с разобщением анастомоза.

ЗАКЛЮЧЕНИЕ: применение колоректального инвагинационного анастомоза оправдано при восстановлении непрерывности кишечника у пациентов с осложненными формами дивертикулярной болезни ободочной кишки, так как способно снизить риск развития несостоятельности анастомоза, а также избежать расширения границ резекции.

КЛЮЧЕВЫЕ СЛОВА: *осложненные формы дивертикулярной болезни ободочной кишки, хирургическое лечение ДБОК, несостоятельность анастомоза, инвагинационный колоректальный анастомоз*

КОНФЛИКТ ИНТЕРЕСОВ: *Авторы заявляют об отсутствии конфликта интересов.*

ИССЛЕДОВАНИЕ НЕ ИМЕЛО ИСТОЧНИКА ФИНАНСИРОВАНИЯ.

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Colonic invagination anastomosis in surgery of complicated forms of diverticular disease

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ABSTRACT *AIM: to evaluate the prospects of using a colorectal invaginated anastomosis in patients with complicated diverticular disease (CDD).*

PATIENTS AND METHODS: during the period from 2014 to 2020, colorectal invaginated anastomosis, was used in 42 patients: 18 patients with CDD and 20 patients with colorectal cancer for stoma closure after Hartmann's procedure. The comparison group consisted of 24 patients with CDD and 20 patients with colorectal cancer for stoma closure after Hartmann's procedure: colorectal anastomosis was created here using traditional double-row hand-sewn technique. All patients underwent surgery with open access, while the primary anastomosis was performed in 20 (47.6%) patients, and in 22 (52.4%) patients of the group underwent stoma takedown.
RESULTS: no anastomosis leakage developed in the main group. Moreover, the presence of single small diverticula with a diameter of 2–3 mm near the area of the anastomosis was not an indication to extend the resection borders. In the control group, in 13 (54.2%) patients, small diverticula were detected in the anastomosis are as well and required to expand the proximal border of resection. In this group, anastomosis leakage occurred in 2 (6.8%) patients with diverticular disease and required Hartmann's procedure.
CONCLUSION: the colorectal invaginated anastomosis is justified for patients with CDD during stoma takedown because it minimizes the risk of anastomosis leakage.

KEYWORDS: *complicated diverticular disease, anastomosis leakage, colorectal invaginated anastomosis*

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ВВЕДЕНИЕ

Дивертикулярная болезнь ободочной кишки (ДБОК) — широко распространенное заболевание с высокой вероятностью развития осложнений, требующих хирургической коррекции [1,2]. Спектр клинических проявлений ДБОК варьируется от бессимптомного дивертикулёза до острых воспалительных осложнений или профузных толстокишечных кровотечений. При этом до 30% пациентов, поступивших в стационар с клиникой осложнённого дивертикулита [3–6], нуждаются в хирургическом лечении уже при поступлении, а летальность может достигать 18% [3,4]. Согласно национальным клиническим рекомендациям Российской гастроэнтерологической Ассоциации и Ассоциации колопроктологов России по диагностике и лечению взрослых больных дивертикулярной болезнью ободочной кишки, основной методикой оперативного лечения осложнений ДБОК остаётся резекция толстой кишки в различном объеме с наложением первичного анастомоза или выведением стомы с последующим её закрытием [7]. При выполнении как неотложных оперативных вмешательств с первичным анастомозом, так и отсроченных и плановых операций по поводу осложнений ДБОК особого внимания заслуживает этап формирования анастомоза. Во время ургентного вмешательства информации о протяженности поражения кишки дивертикулами недостаточно, а в ходе плановых первичных или восстановительных операций производят удаление наибольшей концентрации дивертикулов, отдельные же дивертикулы в проксимальных отделах кишки не рассматриваются в качестве повода к расширению этого объёма [8], что, безусловно, увеличивает риск несостоятельности анастомоза в результате возможного попадания дивертикула в зону его формирования [9].

В этой связи меры, направленные на предотвращение несостоятельности анастомоза, представляют большой интерес. Ранее, во избежание данного осложнения, разработаны различные техники формирования толстокишечного анастомоза, как, например, компрессионный анастомоз с биофрагментируемым кольцом Valtrac (BAR) [10,11]. К тому же предложены методики поддержки зоны анастомоза: дополнительное прошивание анастомоза снаружи [10], декомпрессия анастомоза трансанальной трубкой [10], внутрипросветное укрепление анастомоза биоразлагаемым покрытием C-seal [12], применение биоклея [10].

Одним из способов укрепления межкишечного соустья является формирование инвагинационного анастомоза. Впервые применение инвагинационного анастомоза описал Maylard A.E. в 1913 году. Он выполнил тонкотолстокишечный анастомоз, погрузив подвздошную кишку в продольный разрез ободочной кишки [13]. Колоректальный инвагинационный

анастомоз начали применять позднее. Так в 1950 году о применении колоректального анастомоза сообщил Prioleau W.H., а в 1966 — Ferarra B.E., который использовал погружной толсто-толстокишечный анастомоз в качестве метода, позволяющего избежать такого осложнения как стриктура анастомоза [13, 14]. На сегодняшний день известны различные методики формирования инвагинационного (дупликатурного) толсто-толстокишечного анастомоза «конец-в-конец». Бондарь Г.В. и Кравцова В.Н. в 1981 году разработали способ формирования инвагинационного толсто-толстокишечного анастомоза «конец-в-конец» [15], при котором для погружения анастомоза в отводящую кишку рассекают её стенку до подслизистого слоя с последующим формированием передней губы анастомоза. В 1987 году основатель казанской хирургической школы онкологов Сигал М.З. в соавторстве с Рамазановым М.Р. предложили другой способ формирования инвагинационного толстокишечного анастомоза «конец-в-конец», не предусматривающий рассечение стенок анастомоза. Предварительно, перед конструированием анастомоза авторы проводили ангиотензометрию для обеспечения формирования анастомоза в условиях адекватной гемоциркуляции. Зона анастомоза располагалась между двумя сохраненными крайними прямыми сосудами [16]. При этом в процессе формирования анастомоза купол приводящей петли инвагинируют в отводящую петлю. Анастомоз вворачивается внутрь кишечника изоперистальтически. Данные исследований по применению погружного анастомоза в колоректальной хирургии отражают эффективность этой техники в предотвращении осложнений [17–20]. С учетом доминирования в России левостороннего поражения ободочной кишки дивертикулами, так называемого «западного» типа дивертикулёза [7,21], резекция в объёме сигмовидной ободочной кишки или левосторонней гемиколэктомии предусматривает создание колоректального анастомоза [22].

ЦЕЛЬ ИССЛЕДОВАНИЯ

Оценка эффективности использования колоректального инвагинационного анастомоза при осложненных формах дивертикулярной болезни ободочной кишки (ДБОК).

ПАЦИЕНТЫ И МЕТОДЫ

Нами использована модификация инвагинационного толстокишечного анастомоза «конец-в-конец», предложенная Сигалом М.З. и Рамазановым М.З. [17]. Формирование анастомоза происходило в несколько этапов. Первый этап — наложение первого ряда узловых серозно-мышечных швов задней губы, отступя 15–20 мм от резекционных линий (Рис. 1).

Затем наложение второго ряда слизисто-серозных швов задней губы с переходом на переднюю губу анастомозируемых сегментов кишок (Рис. 2).

В нашем варианте для этого использовали непрерывный обвивной шов рассасывающейся нитью (4/00) с атравматической иглой. Мы отказались от наложения боковых (на брыжеечном и противобрыжеечном краях) швов, фиксирующих дистальную петлю и расширяющих её просвет в ходе инвагинации проксимальной петли. Третий этап — купол проксимальной петли инвагинируется в отводящую петлю (Рис. 3).

Четвертый — накладывается последний ряд серозно-мышечных швов на переднюю стенку анастомоза на уровне первого ряда задней стенки с сохранением прямых сосудов в области брыжеечного края кишки. Завершенный вид инвагинационного колоректального анастомоза представлен на рисунке 4.

Таким образом, анастомоз формируется в зоне адекватной гемоциркуляции, что является одним из гарантов жизнеспособности анастомоза в послеоперационном периоде. Возможность применения погружного инвагинационного анастомоза ограничивалась низким расположением уровня культи прямой кишки, а также преобладанием диаметра анастомозируемого сегмента ободочной кишки, связанного с индивидуальными особенностями анатомии.

Ретроспективное исследование основано на анализе результатов хирургического лечения 87 пациентов колопроктологического отделения РКБ М3 РТ в период с 2014 по 2020 гг. Мужчин было 32 (36,8%), женщин — 55 (63,2%). Возраст пациентов составил от 36 до 84 лет. Средний возраст — 58,6 ± 6,4 лет. За указанный период колоректальный инвагинационный анастомоз использован в лечении 42 пациентов (группа А): 18 пациентов с ДБОК и 25 онкопациентов после обструктивной резекции, анастомоз у которых наложен в ходе реконструктивной колопластики. Группу сравнения (группу В) составили 44 пациента: 24 — с ДБОК и 20 онкопациентов после обструктивной резекции, анастомоз у которых наложен традиционным двухрядным кишечным швом.

Таким образом, в исследование вошли 42 (48,3%) пациента с ДБОК. Показаниями к первичным оперативным вмешательствам у них были: сформировавшийся после перфорации дивертикула абсцесс брюшной полости, толстокишечно-мочепузырный свищ, толстокишечно-вагинальный свищ, стриктура кишки, хроническое рецидивирующее течение дивертикулярной болезни со значительным снижением качества жизни и отсутствием эффекта от консервативной терапии. При этом по неотложным показаниям оперированы 4 (9,5%) пациента с ДБОК, в плановом

порядке — 38 (90,5%). Все пациенты оперированы открытым лапаратомным доступом с формированием первичного анастомоза — 20 (47,6%), а у 22 (52,4%) пациентов после ранее перенесенных вмешательств с наложением колостомы протяженность кишечника восстановлена в ходе реконструктивно-восстановительного этапа лечения.

В исследование вошли также 45 (51,7%) пациентов после обструктивной резекции (рак сигмовидной кишки, ректосигмоидного отдела, а также опухолевого поражения верхне-ампулярного отдела прямой кишки), поступившие на реконструктивно-восстановительный этап. Колоректальный анастомоз во всех наблюдениях наложен в ходе восстановительного вмешательства открытым лапаротомным доступом.

При плановых первичных оперативных вмешательствах в предоперационном периоде проводили оценку протяженности поражения кишки дивертикулами. С этой целью выполняли ирригоскопию с двойным контрастированием на цифровом рентгеновском оборудовании. У пациентов, перенесших операцию типа Гартмана по поводу ДБОК, также проводили ирригоскопию через колостому, а при длинной культе — проктографию для уточнения количества и локализации резидуальных дивертикулов, удаление которых целесообразно в ходе реконструктивно-восстановительного вмешательства. У пациентов, перенесших обструктивную резекцию сигмовидной кишки, проводили стандартное онкообследование с эндоскопическим осмотром оставшихся отделов толстой кишки и культи прямой кишки на предмет резидуальной опухоли или новообразований толстой кишки другой локализации.

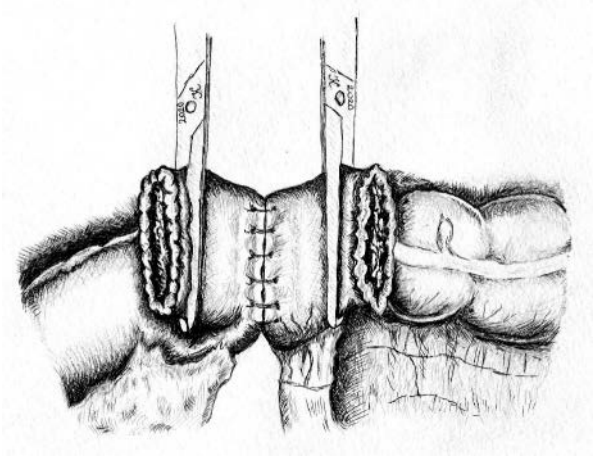

Рисунок 1. *Первый этап формирования колоректального инвагинационного анастомоза*
Figure 1. *First stage of formation of invagination colorectal anastomosis*

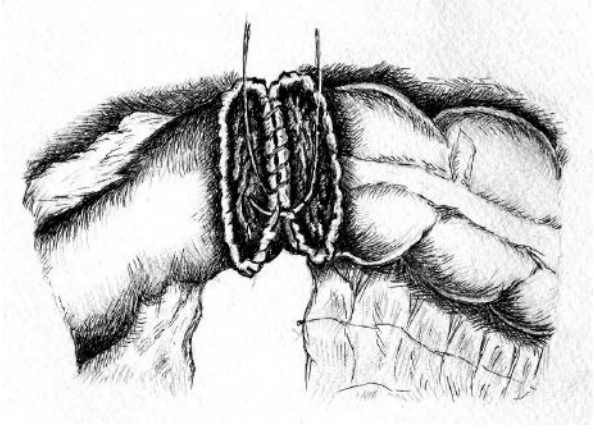

Рисунок 2. *Второй этап формирования инвагинационного колоректального анастомоза*
Figure 2. *Second stage of formation of invagination colorectal anastomosis*

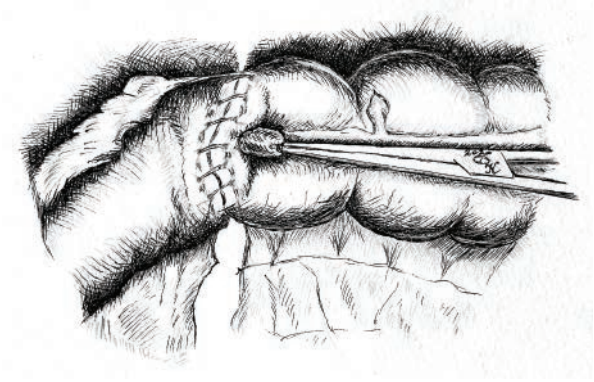

Рисунок 3. *Третий этап формирования инвагинационного колоректального анастомоза*
Figure 3. *Third stage of formation of invagination colorectal anastomosis*

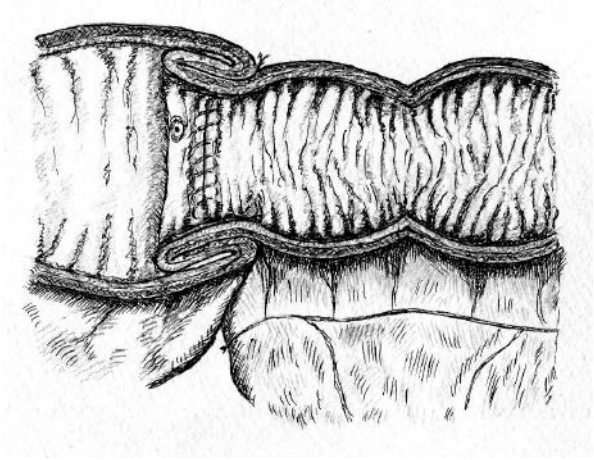

Рисунок 4. *Окончательный вид инвагинационного колоректального анастомоза*
Figure 4. *Final view of invagination colorectal anastomosis*

РЕЗУЛЬТАТЫ

В нашем исследовании преобладал так называемый «западный» тип дивертикулёза, при котором преимущественно поражаются левые отделы ободочной кишки. При этом у 30 (71,4%) пациентов дивертикулы располагались в сигмовидной кишке, у 11 (26,2%) пациентов наблюдалось левостороннее поражение, а у 1 (2,4%) пациента — тотальное поражение ободочной кишки. В группе сравнения у 13 (54,2%) пациентов в ходе формирования площадок для анастомоза выявлены мелкие формирующиеся дивертикулы, визуализировать которые при предварительном ирригографическом исследовании не удалось, что потребовало расширения объема резекции. У 5 (27,8%) пациентов группы А в инвагинируемом сегменте отмечена вероятность сохранения формирующихся дивертикулов. Расширения объема резекции не проводилось.

В группе сравнения несостоятельность анастомоза возникла у 2 (6,8%) пациентов с ДБОК: в одном наблюдении после резекции сигмовидной кишки с наложением десцендоректоанастомоза, в другом — после устранения десцендостомы, резекции сегмента нисходящей ободочной кишки с десцендоректоанастомозом на 7 и на 10 сутки послеоперационного периода, соответственно. Пациенты были повторно оперированы, в объеме разобщения анастомоза, санации и дренирования брюшной полости. Пациенты выписаны с рекомендациями проведения реконструктивно — восстановительной операции через 6 месяцев. Другие осложнения этой группы — гематомы малого таза и брюшной полости у 4 (9,1%) пациентов успешно дренированы под УЗИ-навигацией. Серома послеоперационной раны — у 1 (2,3%) однократно пунктирована.

В группе пациентов, перенесших резекцию ободочной кишки с формированием инвагинационного анастомоза, несостоятельности анастомоза не наблюдали. В этой группе в раннем послеоперационном периоде возникло лишь одно осложнение, носившее специфический характер — анастомозит, явления которого разрешились после консервативных мероприятий. Количество койко-дней в исследуемой группе — 11 ± 2,1, в группе сравнения — 13,8 ± 5,1 ($p < 0,05$).

ОБСУЖДЕНИЕ

Профилактика несостоятельности анастомоза является одной из наиболее актуальных проблем современной колоректальной хирургии, в особенности при операциях по поводу осложненных форм дивертикулярной болезни. Это обусловлено особенностями анатомии и ангиоархитектоники толстой кишки, и, в частности, наличием в большей части случаев в линии анастомоза дивертикулов. Относительно простая и доступная методика инвагинационного колоректального анастомоза позволяет нивелировать риски, связанные с наличием изменений стенки толстой кишки, обусловленными дивертикулярной болезнью. Интерес к этой методике при хирургическом лечении осложнений ДБОК кроется в возможности отграничения дивертикулов от брюшной полости стенкой прямой кишки в случае попадания их в линию анастомоза или нахождения в непосредственной близости от нее. Кроме того, плотное прилегание серозных оболочек приводящего и отводящего отделов анастомозируемых кишок способствует быстрому их слипанию. Разумеется, формирование дупликатуры кишечной стенки при погружной методике может быть эффективной лишь при небольших дивертикулах в зоне анастомоза. В нашем исследовании у пациентов с колоректальным инвагинационным анастомозом не было выявлено ни одного случая несостоятельности анастомоза, как после операций по поводу ДБОК, так и у пациентов с онкологическими заболеваниями. В то время, как у 2 из 44 пациентов с классическим ручным колоректальным анастомозом развилась несостоятельность анастомоза. Несмотря на ретроспективный характер исследования, наши данные позволяют говорить о преимуществах формирования инвагинационного колоректального анастомоза и необходимости дальнейшего его изучения и внедрения в клиническую практику.

ЗАКЛЮЧЕНИЕ

Применение колоректального инвагинационного анастомоза оправдано при восстановлении непрерывности кишечника у пациентов с осложненными формами дивертикулярной болезни ободочной кишки, так как снижает риск развития несостоятельности анастомоза.

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ЛИТЕРАТУРА

1. Swanson SM, Strate LL. Acute Colonic Diverticulitis. *Annals of internal medicine*. 2018;168(9):65–80. DOI: 10.7326/AITC201805010
2. Земляной В.П., Сигуа Б.В., Никифоренко А.В. и соавт. Особенности хирургического лечения поздних осложнений дивертикулярной болезни ободочной кишки. *Вестник Северо-Западного государственного медицинского университета им. И.И. Мечникова*. 2017;2(9):121–124. DOI: 10.17816/mechnikov201792121-124
3. Lanas A, Abad-Baroja D, Lanas-Gimeno A. Progress and challenges in the management of diverticular disease: which treatment? *Therapeutic advances in gastroenterology*. 2018;11:1–21. DOI: 10.1177/1756284818789055
4. Маскин С.С., Карсанов А.М., Климович И.Н. и соавт. Эпидемиология и принципы диагностики воспалительных осложнений дивертикулярной болезни. *Колопроктология*. 2016;1:58–64. DOI: 10.33878/2073-7556-2016-0-1-58-64
5. Куляпин А.В., Тимербулатов М.В., Гайнутдинов Ф.М. и соавт. Осложнения дивертикулеза толстой кишки, опыт лечения. *Бюллетень ВСНЦ СО РАМН*. 2007;4:112–113.
6. Тимербулатов В.М., Тимербулатов М.В., Мехдиев Д.И. и соавт. Дивертикулярная болезнь ободочной кишки. *М.: Медицинская книга, Москва*.2016, с. 19.
7. Ивашкин В.Т., Шелыгин Ю.А., Ачкасов С.И. и соавт. Рекомендации Российской гастроэнтерологической ассоциации и Ассоциации колопроктологов России по диагностике и лечению взрослых больных дивертикулярной болезнью ободочной кишки. *Российский журнал гастроэнтерологии, гепатологии, колопроктологии*. 2016;26(1):65–80. DOI: 10.22416/1382-4376-2016-26-1-65-80
8. Holmer C, Kreis ME. Diverticular disease — choice of surgical procedure. *Chir Z Für Alle Geb Oper Medizen*. 2014;85(4):308–313. DOI: 10.1007/s00104-013-2621-x
9. Neale, Jeffrey A. Surgical Management of Diverticular Disease in the Elective Setting. *Clinics in colon and rectal surgery*.2018;31(4):236–242. DOI: 10.1055/s-0037-1607962
10. Ho, Yik Hong, Mohamed Ahmed Tawfik Ashour. Techniques for colorectal anastomosis. *World journal of gastroenterology*. 2010;16(13):1610–1621. DOI: 10.3748/wjg.v16.i13.1610
11. Hardy TG, Pace WG, Maney JW. et al. (1985). A biofragmentable ring for sutureless bowel anastomosis. An experimental study. *Diseases of the colon and rectum*. 1985;28(7):484–490.
12. Morks, Annelien N et al. The C-seal: a biofragmentable drain protecting the stapled colorectal anastomosis from leakage. *Journal of visualized experiments*. 2010;45(2223):1–4. DOI: 10.3791/2223
13. Linn BS. et al. Intestinal anastomosis by invagination: a historical review of a "new" technic with controlled study of its potential. *Annals of surgery*. 1968;167(3):393–398. DOI: 10.1097/00000658-196803000-00013
14. Ferrara BE. Colorectal anastomosis by invagination. *Diseases of the Colon & Rectum*. 1966;9(2):113–115.
15. Бондарь Г.В., Кравцова В.Н. Способ формирования толстотолстокишечного анастомоза. Донецкий медицинский институт им. М.Горького. Патент № SU 1 034 718 A1 СССР. МПК[51]A61B 17/00. №3288232 Заявл.18.05. 1981. Опубл.15.08.1983
16. Сигал М.З., Рамазанов М.Р. О методике межкишечных анастомозов «конец-в-конец». *Вестник хирургии*.1987;9(139):119–121.
17. Шарипов Х.Ю., Курбонов К.М., Назаров Х.Ш. и соавт. Инвагинационные анастомозы в хирургии толстой кишки. *Вестник Авиценны*. 2010;1(42):30–33. DOI: 10.25005/2074-0581-2010-12-1-30-33
18. Bara T. Et al. Telescopic anastomosis in colorectal surgery. *Chirurgia*. 2006;101(6):647–649.
19. Burson L.C., Berliner S.D., Strauss R.J. et al. Telescoping anastomosis of the colon: a comparative study. *Diseases of the Colon & Rectum*.1979;22(2):111–116. DOI: 10.1007/BF02586775
20. Леонов В.В., Шальков Ю.Л., Леонов А.В. и соавт. Опыт оценки заживления погружных толстокишечных анастомозов в хирургическом стационаре. *Кубанский научный медицинский вестник*. 2014;1:115–117. DOI: 10.25207/1608-6228-2014-1-115-117
21. Карпухин О.Ю., Панкратова Ю.С., Черкашина М.И. и соавт. Осложненный дивертикулит: тактика, диагностика, лечение. *Колопроктология*. 2018;2:68–72. DOI: 10.33878/2073-7556-2018-0-2-68-72
22. Ардатская М.Д., Ачкасов С.И., Веселов В.В., и соавт. Клинические рекомендации. Дивертикулярная болезнь. *Колопроктология*. 2021;20(3):10–27. DOI: 10.33878/2073-7556-2021-20-3-10-27

REFERENCES

1. Swanson SM, Strate LL. Acute Colonic Diverticulitis. *Annals of internal medicine*. 2018;168(9):65–80. DOI: 10.7326/AITC201805010
2. Zemlyanoy V.P., Sigua B.V., Nikiforenko A.V. et al. Features of colon diverticulosis late complications surgical treatment. *North-Western State Medical university named after I.I. Mechnikov*. 2017;9(2):121–124. (in Russ.). DOI: 10.17816/mechnikov201792121-124
3. Lanas A, Abad-Baroja D, Lanas-Gimeno A. Progress and challenges in the management of diverticular disease: which treatment? *Therapeutic advances in gastroenterology*. 2018;11:1–21. DOI: 10.1177/1756284818789055
4. Maskin S.S., Karsanov A.M., Klimovich I.N. et al. Epidemiology and principles of diagnosis of inflammatory complications of diverticular disease. *Koloproktologia*. 2016;1:58–64. (In Russ.). DOI: 10.33878/2073-7556-2016-0-1-58-64
5. Kulyapin A.V., Timerbulatov M.V., Gainutdinov F.M. et al. Complications of diverticulosis of the colon, the experience of treating. *Byulleten' VSNTs SO RAMN*. 2007;4:112–113. (in Russ.).
6. Timerbulatov V.M. Timerbulatov V.M., Mehdiyev, D. I. et al. Diverticular disease of the colon. *M: Meditsinskaya kniga, Moscow*. 2016; p. 19. (in Russ.).
7. Ivashkin V.T., Shelygin Yu.A., Achkasov S.I. et al. Diagnostics and treatment of diverticular disease of the colon: guidelines of the Russian gastroenterological Association and Russian Association of Coloproctology. *Russian Journal of Gastroenterology, Hepatology, Coloproctology*. 2016;26(1):65–80. (In Russ.). DOI: 10.22416/1382-4376-2016-26-1-65-80
8. Holmer C, Kreis ME. Diverticulardisease — choice of surgical procedure. *Chir Z Für Alle Geb Oper Medizen*. 2014;85(4):308–313. DOI: 10.1007/s00104-013-2621-x
9. Neale, Jeffrey A. Surgical Management of Diverticular Disease in the Elective Setting. *Clinics in colon and rectal surgery*.2018;31(4):236–242. DOI: 10.1055/s-0037-1607962
10. Ho, Yik Hong, Mohamed Ahmed Tawfik Ashour. Techniques for colorectal anastomosis. *World journal of gastroenterology*. 2010;16(13):1610–1621. DOI: 10.3748/wjg. v16.i13.1610
11. Hardy TG, Pace WG, Maney JW. et al. (1985). A biofragmentable ring for sutureless bowel anastomosis. An experimental study. *Diseases of the colon and rectum*. 1985;28(7):484–490.
12. Morks, Annelien N et al. The C-seal: a biofragmentable drain protecting the stapled colorectal anastomosis from leakage. *Journal of visualized experiments*.2010;45(2223):1–4. DOI: 10.3791/2223
13. Linn BS. et al. Intestinal anastomosis by invagination: a historical review of a "new" technic with controlled study of its potential. *Annals of surgery*. 1968;167(3):393–398. DOI: 10.1097/00000658-196803000-00013
14. Ferrara BE. Colorectal anastomosis by invagination. *Diseases of the Colon & Rectum*. 1966;9(2):113–115.
15. Bondar G.V., Kravtsova V.N. Method of forming colic-colic anastomosis. USSR Patent no. SU 1 034 718 A1, 1983. (in Russ.).
16. Segal M.Z., Ramazanov M.R. About the method of end-to-end inter-intestinal anastomoses. *Grekov's Bulletin of Surgery*. 1987;139(9):119–121. (in Russ.).
17. Sharipov H.Yu., Kurbonov K.M., Nazarov H.Sh. et al. Invagination anastomoses in surgery of large intestine. *Avicenna Bulletin*. 2010;42(1):30–33. (In Russ.). DOI: 10.25005/2074-0581-2010-12-1-30-33
18. Bara T. Et al. Telescopic anastomosis in colorectal surgery. *Chirurgia*. 2006;101(6):647–649.
19. Burson L.C., Berliner S.D., Strauss R.J. et al. Telescoping anastomosis of the colon: a comparative study. *Diseases of the Colon & Rectum*. 1979;22(2):111–116. DOI: 10.1007/BF02586775
20. Leonov V.V., Shalkov Y.L., Leonov A.V. et al. Evaluation of submerged healing of colonic anastomoses in surgical hospital. *Kuban Scientific Medical Bulletin*. 2014;1:115–117. (in Russ.). DOI: 10.25207/1608-6228-2014-1-115-117
21. Karpukhin O.Yu., Pankratova Yu.S., Cherkashina M.I. et al. Complicated diverticulitis: management, diagnosis, treatment. *Koloproktologia*. 2018;2:68–72. (In Russ.). DOI: 10.33878/2073-7556-2018-0-2-68-72
22. Ardatskaya M.D., Achkasov S.I., Veselov V.V. et al. Clinical guidelines. Diverticular desease. *Koloproktologia*. 2021;20(3):10–27. (in Russ.). DOI: 10.33878/2073-7556-2021-20-3-10-27

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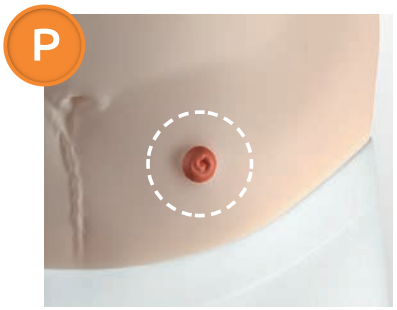

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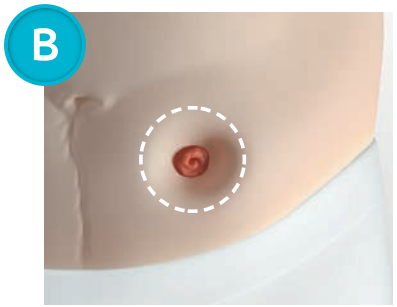

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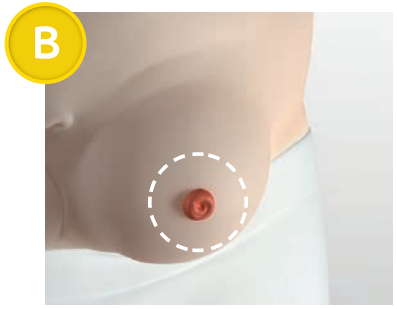

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Комментарии редколлегии к статье

Толстокишечный инвагинационный анастомоз в хирургии осложненных форм дивертикулярной болезни ободочной кишки

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Проблема несостоятельности толстокишечных анастомозов по-прежнему остается одной из ведущих в колоректальной хирургии.

При дивертикулярной болезни она стоит более остро. Так, по данным современного нидерландского исследования DIRECT [1], частота несостоятельности толстокишечных анастомозов при плановых вмешательствах по поводу дивертикулярной болезни достигала 15%. Этот показатель почти вдвое превышает частоту несостоятельности при формировании илеотрансверзоанастомозов (8,1%) по результатам общеевропейского аудита в 2015 году [2], и сопоставим с таковой при формировании низких колоректальных анастомозов (17,5-22,5%) [3-5].

Причиной столь высокой частоты осложнений со стороны анастомозов не являются особенности кишечного шва или способа формирования толстокишечных соустий. Этот факт находит подтверждение и в статье Панкратовой Ю.С., в которой достоверной связи между несостоятельностью и методикой формирования анастомоза выявлено не было.

Ранее было достоверно установлено, что причиной несостоятельности и анастомозитов являются особенности специфических изменений стенки толстой кишки при дивертикулярной болезни, диктующие особые правила определения границ резекции толстой кишки [6]. Среди них были выделены следующие [7]:

1. включение в границы резекции всех отделов с воспалительными изменениями в стенке кишки;
2. исключение из зоны формирования анастомоза участков кишки с дивертикулами;
3. включение в границы резекции всех отделов с невоспалительными специфическими утолщением и деформацией мышечного слоя.

Эти положения нашли отражение в Российских клинических рекомендациях по дивертикулярной болезни [8].

С точки зрения авторов, именно формирование инвагинационного анастомоза позволяет избежать расширения объема резекции ободочной кишки в проксимальном направлении за счёт того, что дивертикулы в области кишечного шва располагаются внутри образованной «манжетки». Данное утверждение представляет большой интерес, и способ имеет перспективы применения. Тем не менее, небольшое число клинических наблюдений и дизайн исследования не позволяют в настоящее время рекомендовать метод к широкому использованию. Опубликованные результаты следует рассматривать в качестве пилотных, а применение инвагинационного анастомоза по методу Сигала-Рамазанова при хирургических вмешательствах по поводу дивертикулярной болезни требует дальнейшего изучения в рамках рандомизированного исследования.

Редколлегия журнала «Колопроктология»

ЛИТЕРАТУРА

1. Bolkenstein HE, Consten ECJ, van der Palen J, van de Wall BJM, Broeders IAMJ, Bemelman WA, Lange JF, Boermeester MA, Draaisma WA; Dutch Diverticular Disease (3D) Collaborative Study Group. Long-term Outcome of Surgery Versus Conservative Management for Recurrent and Ongoing Complaints After an Episode of Diverticulitis: 5-year Follow-up Results of a Multicenter Randomized Controlled Trial (DIRECT-Trial). *Ann Surg*. 2019 Apr;269(4):612-620. DOI: 10.1097/SLA.0000000000003033. PMID: 30247329.

2. 2015 European Society of Coloproctology collaborating group. The relationship between method of anastomosis and anastomotic failure after right hemicolectomy and ileo-caecal resection: an international snapshot audit. *Colorectal Dis*. 2017 Mar 6. DOI: 10.1111/codi.13646. Epub ahead of print. PMID: 28263043.

3. Vallance A, Wexner S, Berho M, Cahill R, et al. A collaborative review of the current concepts and challenges of anastomotic leaks in colorectal surgery. *Colorectal Dis*. 2017 Jan;19(1):01–012. DOI: 10.1111/codi.13534. PMID: 27671222.

4. Alekseev M.V., Rybakov E.G., Shelygin Yu.A., et al. A Study investigating the perfusion of colorectal anastomoses using FLuorescence AnGiography: results of FLAG randomized trial. *Colorectal Disease*. 2020;22(9):1147–1153. DOI: 10.1111/codi.15037

5. Алексеев М.В., Шелыгин Ю.А., Рыбаков Е.Г. Может ли флуоресцентная ангиография снизить частоту несостоятельности толстокишечных анастомозов (метаанализ). *Колопроктология*. 2019;4(18):139–150.

6. Ачкасов С.И. Хирургическая тактика при восстановительном лечении осложненного дивертикулеза ободочной кишки. Автореферат канд. мед. наук. М., 1992; 24 с.

7. Саламов К.Н., Воробьев Г.И., Ачкасов С.И., Москалёв А.И., и соавт. Определение границ резекции ободочной кишки при дивертикулезе. *Хирургия*. 2001;1:80–86.

8. Ардатская М.Д., Ачкасов С.И., Веселов В.В. и соавт. Дивертикулярная болезнь. *Колопроктология*. 2021;20(3):10–27. https://doi.org/10.33878/2073-7556-2021-20-3-10-27

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Laparoscopic right colectomy with intracorporeal ileotransverse anastomosis (results of the pilot study)

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ABSTRACT *AIM: to evaluate the safety of intra- and extracorporeal ileotransverse anastomosis in laparoscopic right hemicolectomy.*

PATIENTS AND METHODS: a pilot «case-control» study included two groups of patients, who underwent laparoscopic right colectomy according to a standardized technique. An intracorporeal anastomosis (IA) was formed in the main group (n = 20), in the control group — extracorporeal anastomosis (EA) (n = 18).

RESULTS: in main group the postoperative complications rate was 20%, in the control group — 28% (p = 0.71). The postoperative hospital stay in the main group was significantly less than in control (5.0 vs 7.3 days) (p < 0.001).

CONCLUSION: the postoperative complications rate in both groups was not significant, but postoperative hospital stay was shorter in IA group. A randomized controlled trial is required.

KEYWORDS: *laparoscopic right hemicolectomy, intracorporeal anastomosis, colon cancer*

CONFLICTS OF INTERESTS: *The authors declare no conflicts of interest.*

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INTRODUCTION

The surgery is the main approach for colon cancer.

In recent years, clinical trials and new protocols for the management of patients after elective colon resections are being developed and edited in order to shorten the rehabilitation period [1].

Taking into account the development of technologies and the experience accumulated in world practice, when choosing the method of surgery, preference is currently given to the minimal invasive and traumatic methods. Within the framework of this concept, laparoscopic access is the 'gold standard' in the treatment of localized colorectal cancer (CRC) [2]. It is worth noting that the technique of laparoscopic surgery, including the method of forming an anastomosis, is continuously modified. The formation of an intracorporeal anastomosis allows the surgeon to choose the method of the specimen extraction [3].

To date, there are quite a large number of articles in the world literature devoted to the study of the advantages and disadvantages of intracorporeal ileotransverse anastomosis (ITA) in laparoscopic right hemicolectomy (LRH).

However, papers on pubmed.ncbi.nlm.nih.gov, overwhelmingly represent a series of clinical cases.

Along with this, on clinicaltrials.gov only 6 randomized controlled trials (RCTs) have been registered; all of them are at various stages.

In addition, in the available literature, we found two meta-analyses.

In one of them, published by Emile, S. et al. (2019), intracorporeal ITA (iITA) performed in 2,123 patients with LRH was compared with extracorporeal (eITA), which was formed in 2,327 cases.

The advantages of iITA over eITA were demonstrated, consisting in a significant decrease in the incidence of the surgical site infection — OR = 1.69, 95% CI 1.4–2.6, $p = 0.002$, anastomosis leakage — OR = 1.95, 95% CI 1.4–2.7, $p = 0.003$, as well as the rate of postoperative hernias — OR = 3.14, 95% CI 1.85–5.33, $p < 0.001$ [4].

A year later, in 2020, Selve M. et al. published a meta-analysis that included 3,699 patients and 24 publications. It was shown that along with a decrease in the rate of in the surgical site infection — OR = 0.526 ($p = 0.006$), there was a faster recovery of gastrointestinal tract function, early gas discharge — OR = –0.46 ($p = 0.02$); stool — OR = –0.48 ($p < 0.001$), as well as a reduction in the time of the patient's hospital stay — OR = –0.35 ($p < 0.001$) [5].

It is worth noting that both meta-analyses turned out to be comparable not only in terms of results, but also in terms of the quality of the included data. However, each meta-analysis included only one RCT while the rest of the studies were retrospective series of cases. Therefore, there was a high probability of a bias.

Taking into account the limited number and quality of studies, we initiated a pilot study focused on the safety of intra- and extracorporeal ITA after LRH.

PATIENTS AND METHODS

The pilot study was a prospective 'case-control' type.

It included adult patients who gave their consent to participate in the study, who were scheduled for LRH for right colon cancer.

The study did not include patients with locally advanced cancer and carcinomatosis at the stage of preoperative check-up.

Patients whose carcinomatosis was detected intraoperatively were excluded as well, or a decision was made avoid ITA. Patients who refused to participate in the study at any of its stages were also excluded.

All the patients underwent standard LRH, taking into account the site of the primary tumor and oncological principles.

In the main group, after removal of the right colon, iITA of the 'side-to-side' type was done. To form an anastomosis, 3 cassettes for the endoscopic staplers were used. With their help, the crossing of the intestine was carried out within the designated borders. The next stage was ileo- and colostomy.

A stapler was inserted through the holes into the lumen and anastomosis was created. After that, the 'technological' hole was intracorporeally sutured with absorbable double-row suture. An additional nodal reinforcing suture was applied to the corner of the stapler line. The macro-specimen was extracted through Pfannenstiel incision.

In the control group patients, eITA was formed according to the hand-sewn 'end-to-end' type using a double-row suture. This type of anastomosis is performed most often in the Center and is accepted here as the standard for LRH. The macro-specimen was extracted from the abdominal cavity through paraumbilical minilaparotomy.

As part of the study, iITA was performed by five surgeons with sufficient experience in laparoscopic surgery for colorectal cancer.

Statistical processing of the data obtained was carried out using GraphPad Prism 9 software.

The parametric data were compared using the Student t-test, while nonparametric data were compared using the Mann-Whitney U-test; and the rate characteristics were compared using χ^2 with Yates correction.

From September 2020 to February 2021, 38 patients meeting the selection criteria were included in the study.

The main group with iITA included 20 patients; and the control group with eITA included 18 patients. Both groups were homogenous in gender, age, body mass index (BMI), ASA status and the comorbidities (Table 1).

Table 1. *Characteristics of patient*

Parameter	Intracorporeal Anastomosis (*n* = 20)	Extracorporeal Anastomosis (*n* = 18)	*p*
Gender (m/f)	5/15	4/14	0.59*
Age (years)	67 ± 12.1	68.4 ± 9.5	0.68**
BMI (kg/m²)	25.3 ± 3.5	27.3 ± 3.4	0.07**
ASA I/II/III	10/8/2	12/5/1	0.57***
Comorbidities, %	65%	72%	0.64*

** U-test; ** t-test; *** χ^2 с поправкой Yates *** χ^2 adjusted by Yates*

Table 2. *The incidence of postoperative complications in the groups according to the Clavien–Dindo scale*

Clavien–Dindo	Intracorporeal Anastomosis (*n* = 20)	Extracorporeal Anastomosis (*n* = 18)	*p*
Degree I	1 (5%)	1 (5.5%)	
Degree II	2 (10%)	3 (17%)	
Degree III	1 (5%)	1 (5.5%)	
Degree IV	0	0	
Degree V	0	0	
TOTAL	4 (20%)	5 (28%)	*p* = 0.71*

** χ^2 adjusted by Yates*

Table 3. *Operation time, creation of anastomosis and postoperative hospital stay*

Duration	Intracorporeal Anastomosis (*n* = 20)	Extracorporeal Anastomosis (*n* = 18)	p
Operative time, minutes	225 ± 60	166 ± 32	0.0007**
Anastomosis formation, min.	50 (45; 70)	45 (40; 60)	0.06*
Postoperative hospital stay	5 ± 0.8	7.3 ± 1.05	*p* < 0.001**

** U-test; ** t-test*

RESULTS

Analyzing the iITA and eITA groups by the rate of complications, no significant differences were obtained. So, in the main group they occurred in 20%; in controls — in 28% of cases ($p = 0.71$). It is important to note that there was no leakage in both groups (Table 2).

We evaluated the hospital stay after surgery. The patients left the clinic after their condition met the discharge criteria (80 or more points on the Bartel scale; the severity of pain syndrome was less than 3 points by VAS) [6].

It turned out that in the main group, the hospital stay was significantly less — 5.0 versus 7.3 days ($p < 0.001$).

LRH with iITA was significantly longer than eITA — 225 vs 166 minutes ($p = 0.0007$). The time spent for iITA, was 5 minutes longer than eITA. However, these differences are not significant ($p = 0.06$) (Table 3).

DISCUSSION

Despite the large number of studies devoted to the iITA in LRH, the question of its advantages and disadvantages remains open. The reason for

Table 4. *Incidence of incisional ventral hernia*

Study	Incisional hernias, % (number of patients)		Observation period	*p*
	Pfannenstiel	Median minilaparotomy		
DeSouza A., 2011 (*n* = 512)	0 (*n* = 119)	23.2 (*n* = 56)	17.5 months	< 0.0001
Lee L., 2012 (*n* = 99)	0 (*n* = 24)	29 (*n* = 68)	28.2 months	0.02
Samia H., 2013 (*n* = 480)	3.8 (*n* = 26)	8.9 (*n* = 305)	3.5 years	< 0.01
Lee L., 2017 (*n* = 5447)	0 0.9 (*n* = 956)	10.6 (*n* = 3177)	17.3–42 months	< 0.001
Widmar M., 2020 (*n* = 164)	3 (*n* = 67)	19 (*n* = 97)	14 months	0.007

this is the insufficient number of RCTs, which does not allow to approve the issue, to determine the place of iITA in colorectal surgery.

One of the main disadvantages of the intracorporeal anastomosis, in comparison with extracorporeal one, is the high 'cost'. Thus, the need to use at least 3 cassettes for laparoscopic stapler in routine practice, at first glance, does not seem fully justified, given the existing possibility of forming an extracorporeal anastomosis hand-sewn.

On the other hand, it should be borne in mind that the cost of cassettes for the device is not the only component of the total cost of the treatment. So, in addition to the cost of consumables used directly for the surgery, at least the costs associated with a longer stay of the patient in the hospital after surgery are included in the latter [7].

Another aspect that should be considered when describing the advantages and disadvantages of iITA is the method of extracting a specimen.

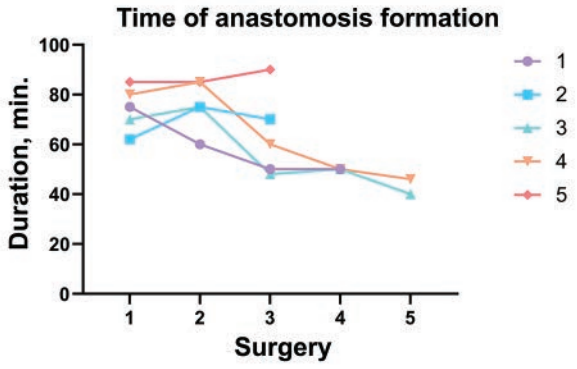

Figure 1. *Time of anastomosis formation. 1,2,3,4,5 — the number of the surgeon who performed the IA*

Thus, during the eITA formation the limited mobility of the transverse colon dictates the need for the minilaparotomic incision in the paraumbilical area or higher.

On the contrary, performing the anastomosis intracorporeally makes it possible to extract the specimen through a transverse Pfannenstiel incision in the hypogastric area, which, according to a number of studies, is associated with a decrease in the rate of post-op ventral hernias [8–12] (Table 4).

Thus, the absence of the need for patients to subsequently seek medical help in order to perform hernioplasty, potentially also reduces the cost of treatment, and in general the burden on the healthcare system.

Discussing the potential advantages of using the iITA technique, it is worth mentioning the NOSE (Natural Orifice Specimen Extraction) technology, in which the macro-specimen is removed through natural openings, which provides maximal cosmetic effect. Most often, the extraction of the specimen is carried out through the colpotomy opening [13]; and there are fewer reports of a transanal method [14].

Referring to this study, it can be noticed that with each subsequent procedure, surgeons reduce the time spent on the intracorporeal anastomosis. The small number of cases does not allow to state this categorically. Nevertheless, it is possible to trace the trend to accelerate this stage as experience accumulates (Fig. 1). A similar pattern is noted by other authors who have extensive experience in the iITA [15].

The potential disadvantages of the intracorporeal technique for the formation of ITA can also include the need to work on the opened lumen of the intestine in the conditions of pneumoperitoneum. However, we found no differences in the rate of surgical site infection during the iITA formation in comparison with eITA — 4 (20.0%) and 5 (28.0%) cases (p = 0.71), which correlates with the literature data [4, 5].

Thus, it is obvious that there is a need for RCT, the purpose of which would be to compare iITA and eITA in terms of safety, the quality of life, and economic efficiency. This study was initiated in the Center and registered on the portal ClinicalTrials.gov (Identification number: NCT05026268).

CONCLUSIONS

The results of the pilot study demonstrated that the iITA is not associated with an increase in the postoperative complications. However, it reduces the post-op hospital stay.

The less injury of the mini-laparotomy incision in the hypogastrium, in comparison with the traditional paraumbilical access, apparently causes a better recovery and early discharge from the hospital.

Nevertheless, to confirm the results previously obtained in the pilot study, a randomized clinical trial is required for a more balanced approach to choosing the method of ITA during LRH.

AUTHORS CONTRIBUTION

Concept and design of the study: *Oleg I. Sushkov, Evgeniy S. Surovegin*

Processing of the material: *Ekaterina M. Romanova*

Writing of the text and statistical data processing: *Ekaterina M. Romanova, Evgeniy S. Surovegin*

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REFERENCES

1. Achkasov S.I., Surovegin E.S., Sushkov O.I., et al. Results of the implementation of the enchanced recovery program in coloproctology. *Koloproktologia*. 2018;(2):32–38. (In Russ.). https://doi.org/10.33878/2073-7556-2018-0-2-32-38

2. Association of Oncologists of Russia, Russian society of clinical oncology. Russian colorectal cancer society. Russian Association of Coloproctology. Clinical guidance «Malignant neoplasms of colon and rectosigmoid». 2020. (in Russ.). https://cr.minzdrav.gov.ru/recomend/396_1

3. Veldkamp R., Kuhry E., Hop W.C. et al. Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomized trial. *Lancent Oncol*. 2005;6(7):477–84

4. Emile S, Elfeki H, Shalaby M, et al. Intracorporeal versus extracorporeal anastomosis in minimally invasive right colectomy: an updated systematic review and meta-analysis. *Tech Coloproctol*. 2019 Nov;23(11):1023–1035. DOI: 10.1007/s10151-019-02079-7. Epub 2019 Oct 23. PMID: 31646396

5. Selvy M, Mattevi C, Slim K, et al. Intra-versus extracorporeal anastomosis in laparoscopic right colectomy: a meta-analysis of 3699 patients. *Int J Colorectal Dis*. 2020 Sep;35(9):1673–1680. DOI: 10.1007/s00384-020-03675-y. Epub 2020 Jul 21. PMID: 32691134.

6. Mahoney F, Barthel D. Functional evaluation: the Barthel Index. *Md Med J*. 1965;14:61–65.

7. Rai M, Goyal R, Chapter 33 — Pharmacoeconomics in Healthcare, Editor(s): Vohora D., Singh G., Pharmaceutical Medicine and Translational Clinical Research, Academic Press, 2018; pp. 465-472, ISBN 9780128021033, DOI:10.1016/B978-0-12-802103-3.00034-1.

8. DeSouza A, Domajnko B, Park J, et al. Incisional hernia, midline versus low transverse incision: what is the ideal incision for specimen extraction and hand-assisted laparoscopy? *Surg Endosc*. 2011 Apr;25(4):1031–6. DOI: 10.1007/s00464-010-1309-2. Epub 2010 Aug 25. PMID: 20737171.

9. Lee L, Mappin-Kasirer B, Sender Liberman A, et al. High incidence of symptomatic incisional hernia after midline extraction inlaparoscopic colon resection. *Surg Endosc*. 2012 Nov;26(11):3180–5. DOI: 10.1007/s00464-012-2311-7. Epub 2012 May 12. PMID: 22580878.

10. Samia H, Lawrence J, Nobel T. Extraction site

location and incisional hernias after laparoscopic colorectal surgery: Should we be avoiding the midline? *American journal of surgery*. 2013; 205. 10.1016/j.amjsurg.2013.01.006.
11. Lee L, Abou-Khalil M, Liberman S, et al. Incidence of incisional hernia in the specimen extraction site for laparoscopic colorectal surgery: systematic review and meta-analysis. *Surg Endosc*. 2017 Dec;31(12):5083–5093. DOI: 10.1007/s00464-017-5573-2. Epub 2017 Apr 25. PMID: 28444496.
12. Widmar M, Aggarwal P, Keskin M, et al. Intracorporeal Anastomoses in Minimally Invasive Right Colectomies Are Associated With Fewer Incisional Hernias and Shorter Length of Stay. *Dis Colon Rectum*. 2020 May;63(5):685–692. DOI: 10.1097/DCR.0000000000001612. PMID: 32168093; PMCID: PMC7148181.
13. Park S, Choi S, Kim J, et al. Natural orifice specimen extraction versus conventionallaparoscopically assisted right hemicolectomy. *Br J Surg*. 2011;98: 710–5
14. Cheng C, Hsu R, Chern Y. et al. Minimally invasive right colectomy with transrectal natural orifice extraction: could this be the next step forward? *Tech Coloproctol*. 24, 1197–1205 (2020). https://doi.org/10.1007/s10151-020-02282-x
15. Melnikov P.V., Chernikovskiy I.L., Kanner D.Yu. et al. The safety of intracorporeal anastomoses after right colectomy during the learning curve. *Tazovaya Khirurgiya i Onkologiya = Pelvic Surgery and Oncology*. 2020;10(1):37–42. (In Russ.)

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Are there any advantages of 3D laparoscopic technologies in surgery for rectocele and rectal prolapse?

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ABSTRACT *AIM: to assess results of 3D laparoscopic ventral mesh rectopexy versus traditional 2D laparoscopy for rectocele and rectal prolapse.*

PATIENTS AND METHODS: a prospective randomized study (NCT 04817150) included patients aged 18 to 70 years who underwent laparoscopic ventral mesh rectopexy for rectocele and/or rectal prolapse. The assessment included operation time, intraoperative blood loss, complications rate and their severity by Clavien-Dindo scale, the pain intensity by VAS, the volume of the fluid collection in the implant site 2–3 days and 2–3 weeks after the procedure. The surgeon's comfort and ergonomics when using 3D systems was evaluated using POMS questionnaire. The late results were assessed by recurrence rate, functional results — by Cleveland Clinic Constipation scale score, Incontinence scale score, P-Qol, and PGII.

RESULTS: the study included 29 patients of the main and 32 patients of the control group. The follow-up was 21 ± 20.3 months. One complication developed in the control group (p = 1.0). The operation time in the main group was 74.1 ± 14 minutes (87.1 ± 24.3 minutes in controls, p = 0.01). The intraoperative blood loss was 19.8 ± 9.6 ml in the main group (55 ± 39.2 ml in controls, p = 0.001). The pain intensity was significantly lower in the main group (18.0 vs 22.5 points, p = 0.03). The volume of fluid collection 2–3 after surgery mesh site was 21.2 ± 9.7 cm^3 in the main group (30.7 ± 25.6 cm^3 in the control group, p = 0.02). The POMS scale assessment for a surgeon in the main group was 56.4 ± 33.5 points (87.3 ± 30.8 points in the control group). A follow-up examination 12 months postop revealed no recurrence in both groups (p = 1.0). The main and the control group showed no significant differences in functional outcomes.

CONCLUSIONS: the use of 3D laparoscopic ventral mesh rectopexy for rectocele and rectal prolapse is comparable in late results with traditional laparoscopic procedure. However, it takes less operation time, lower pain intensity, less intraoperative blood loss, smaller fluid collection at mesh site, better comfort and ergonomics for surgeon.

KEYWORDS: *rectocele, rectal prolapse, 3D laparoscopy, ventral mesh rectopexy*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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INTRODUCTION

Due to the worldwide increase in life expectancy of the population, as well as increased requirements for its quality, the problem of pelvic prolapse, and in particular, rectocele, is becoming more and more urgent. According to epidemiology, various degrees of pelvic prolapse of some compartments can be detected in 41–50% of females during gynecological check-up; however, clinical symptoms are detected only in 3% of them.

Among the subgroup of patients who underwent hysterectomy, the risk of rectocele requiring surgery is already about 12.6% [1,2]; and in the presence of clinical symptoms of posterior

compartment prolapse, every 5th woman has a risk of being operated by the age of 80 [1]. It is expected that due to the increasing trend towards an increase in life expectancy, by 2050 the incidence of pelvic organ prolapse (POP) will be 46% of the female population [3]. The treatment of pelvic organ prolapse undoubtedly requires a comprehensive and multidisciplinary approach, the interaction of gynecologists, urologists and colorectal surgeons. An important role in treatment approach for these patients is also assigned to specialists in instrumental diagnostics [4,5].

To date, a significant number of studies have been done, which have demonstrated the advantages of transabdominal laparoscopic and robotic access in the treatment of rectocele and rectal prolapse, in comparison with perineal access [6–8]. The most common transabdominal surgery used to correct severe rectocele, especially in combination with apical pelvic prolapse, as well as to eliminate full-layer prolapse and intussusception of the rectum, is laparoscopic ventral rectopexy with a mesh implant. This technique was first proposed by the Belgian surgeon A. D'Hoore in 2004 as a technique that allows the correction of rectal prolapse without increasing the incidence of obstructive defecation and *de novo* constipation syndrome by limiting the area of tissue dissection along the rectum exclusively by its anterior surface and, as a consequence, preserving the autonomous innervation of the bowel walls [9]. The essence of the method consists in dissection in the area of the rectovaginal septum from the deepest point of the rectovaginal recess along the rectovaginal fascia to the level of the pelvic floor muscles, followed by the installation of a mesh implant in the form of a ribbon and fixing its opposite end to the anterior longitudinal ligament of the spine in the area of the sacrum cape, as shown in Figure 1. The technique is recognized as a low-traumatic, effective, having a low recurrence rate, and is used everywhere.

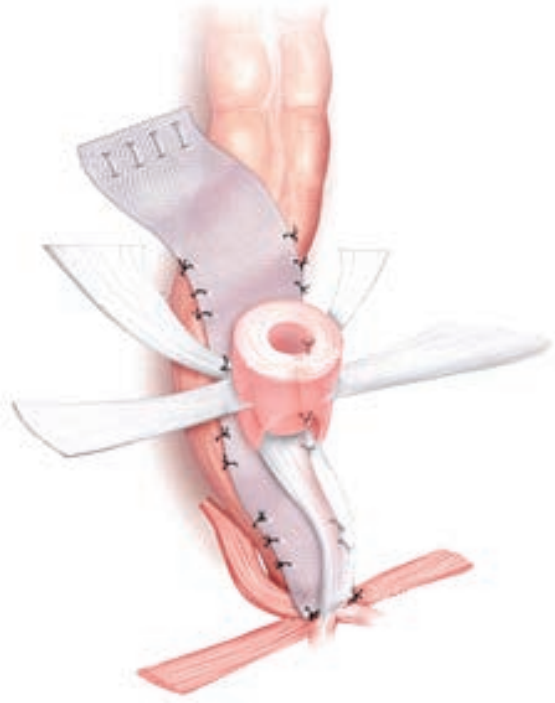

Figure 1. *Schematic representation of the mesh position during laparoscopic ventralmesh rectopexy*

According to the literature, laparoscopic ventral rectopexy is a highly effective procedure for anatomical correction of posterior pelvic prolapse, has a low risk of complications and a short recovery [10–26].

However, performing this procedure involves a rather long learning curve for the surgeon due to the technical complexity of tissue dissection in the limited spaces of the pelvis and the need to apply low endocorporal sutures to fix the mesh to the pelvic floor muscles and mesorectal fascia on the anterior surface of the rectum.

In this connection, since the first robotic rectopexy was performed in 2004, the research has been actively conducted to study the advantages of the new high-tech access [27,28]. According to a number of randomized trials, robotic access has an efficiency comparable to laparoscopic one in restoring the anatomical interposition of the pelvic organs. Among the advantages of robotic ventral rectopexy, the authors highlight a less intraoperative blood loss, better visual control in the limited anatomical spaces of the pelvis and greater ergonomics for the surgeon [27–33] (Table 1).

However, the disadvantages of this technique include the high cost of equipment, the need for a complete reorganization of the surgery room, as well as a longer operation time, which, in addition to the early outcomes, is also

Table 1. *Studies of laparoscopic and robotic-assisted ventral mesh rectopexy*

Studies, Authors	Year	Number of patients, total (robotic/ laparoscopic subgroups)	Recurrence of abs., robotic / laparoscopic subgroups	Operation time excluding docking, min, robotic/ laparoscopic subgroups	Complications, *n* (%)	Observation period, months
Makela-Kaikkonen et al. [29]	2016	30 (16/14)	0/0	202/195	5 (31)/1 (7)	3
Mehmood et al. [30]	2014	51 (17/34)	0/0	138/115	0/6 (17)	12
Makela-Kaikkonen et al. [31]	2014	40 (20/20)	1/1	231/234	2 (10)/1 (5)	3
Mantoo et al. [32]	2013	118 (44/74)	3/6	191/163	5 (11)/15 (20)	16
Faucheron et al. [33]	2016	20 (10/10)	0/0	94/52,5	0/1 (10)	1

reflected in the 'cost-effectiveness' ratio due to the longer work of the entire operating team to perform a single procedure [29–33].

At the time of writing this article, we have not found any reports in the Russian and foreign literature about the use of laparoscopic ventral rectopexy with a mesh implant using 3D equipment. The undoubted advantage of this access is a three-dimensional image of the surgical field, which allows precise differentiation and dissection of tissues and the detection of anatomical landmarks — hypogastric nerves, right ureter, right common and internal iliac arteries, median sacral artery and vein, longitudinal ligament of the sacrum. In addition, more precise manipulations in the confined space of the pelvis provide thorough hemostasis, which generally creates conditions for safer performance of all stages of the procedure in comparison with traditional laparoscopic access. The 3D system makes it possible to reduce the operation time at a significantly lower cost of equipment and the absence of time spent on 'docking' a robotic installation in comparison with robotic procedure.

AIM

The aim of the study is to compare the early and late results of the use of 3D and traditional 2D laparoscopic ventral mesh rectopexy in the treatment of patients with rectocele and rectal prolapse.

PATIENTS AND METHODS

The study is a randomized prospective comparative study *(NCT 04817150)* in the main (29 patients) and control (32 patients) groups, which included patients aged 18–70 years, who underwent laparoscopic surgery for rectocele and/or rectal prolapse in 2015–2020.

The inclusion criteria are:

— Rectocele of the 3rd degree (according to the Russian classification [34]) and the 3rd-4th stages according to POP-Q [35] and/or rectal prolapse;
— Female gender;
— Age between 18 and 70 years.

The exclusion criteria are:

— severe and decompensated comorbidities (class III-IV according to ASA [American Society of Anesthesiologists]),
— oncological, hematological diseases, inflammatory bowel disease and inflammatory disease of pelvic organs,
— pregnancy.

The patients were randomly assigned to 2 groups: the main group (3D laparoscopic correction, 29 women) and the control group (2D laparoscopy, 32 women). For the distribution, the method of simple fixed randomization using computer random number generation was used. All the procedures were performed by one surgeon, whose experience had been over 50 laparoscopic rectopexies by the time the study began.

Table 2. *Preoperative characteristics of patients*

Clinical groups	Main group — 3D laparoscopic rectopexy (*n* = 29)	Control group — 2D laparoscopic rectopexy (*n* = 32)	Statistical Differences
Age, years, Me [Q_1;Q_2]	58 [50;63]	57 [48;62.5]	$p = 0.47$
Number of births, abs., Me [Q_1;Q_2]	3 [2;4]	2 [1;3]	$p = 0.123$
BMI, kg/m^2, Me [Q_1;Q_2]	30.2 [25.1;32.2]	30.4 [28.6;32.3]	$p = 0.31$
Menstrual pause, abs. (%)	16 (55.2%)	19 (59.4%)	$p = 0.741$
Surgeries on the pelvic organs and anorectal area in the anamnesis	4 extirpations of the uterus with appendages, 12 CS, 3 hemorrhoidectomies 2 posterior colporraphy, 1 sphincterolevatoroplasty	6 hysterectomies, 10 CS, 1 anterior colporraphy 4 hemorrhoidectomies	–
Duration of symptoms, years, Me [Q_1;Q_2]	8 [5;10]	8.5 [5;11.5]	$p = 0.58$
Total points as per Cleveland Clinic Constipation score (max — 30), Me [Q_1;Q_2]	13 [10;19]	11 [9;18,5] 11 [9;18.5]	$p = 0.58$
Total points as per Incontinence score (max — 20), Me [Q_1;Q_2]	2 [1;3]	1 [0;3]	$p = 0.066$
Stress urinary incontinence, abs. (%)	8 (27.6%)	9 (28.1%)	$p = 0.96$
Total points as per P-Qol scale (max — 115), Me [Q_1;Q_2]	55 [49;71]	65.5 [56;71]	$p = 0.06$

*Note: *The differences are significant at $p \leq 0.05$.*

For three-dimensional visualization in the main group, surgery was performed using the Olympus VISERA ELITE II system (Olympus Corporation, Japan).

Preoperative check-up included a standard clinical examination, examination in a gynecological chair, as well as functional Valsalva tests, cough, examination in a squatting position, staging of pelvic prolapse according to the POP-Q system, tonoperineometry, anoscopy, colonoscopy, defecography, as well as transperineal, transvaginal and transrectal ultrasound in the search of defects in the pelvic floor muscles and anal sphincter.

The severity of clinical symptoms and their impact on quality of life were assessed using the Prolapse-Quality of Life questionnaire [36] before surgery and at a follow-up 12 months after the surgery.

The patients were also surveyed according to the Cleveland Clinic Constipation Scoring System and Wexner's anal Incontinence scale at similar time [37].

When performing the surgery, its duration, the intraoperative blood loss, complications and their severity on the Clavien-Dindo scale were recorded. In the early postoperative period, the severity of the pain syndrome was assessed according to the VAS, 24 hours after the end of the procedure, and the patients' need for narcotic and non-narcotic analgesics.

It seems extremely important to assess the site of the installed mesh, as well as the state of the rectovaginal space at the mesh site.

The size of this space is directly related to the volume of fluid collection due to the tissue reaction to the mesh, the anatomical installation of the mesh, its adequate fixation to the

mesorectum and pelvic floor muscles, as well as the presence of postoperative seroma or hematoma.

To assess this, we used transvaginal ultrasound examination with a convex sensor on the 3rd day after the surgery.

This test was also repeated during a follow-up control in 2–3 weeks after laparoscopic rectopexy was performed.

Another question of the study was the evaluation of the convenience and ergonomics of the surgeon when using 3D systems. To determine the degree of complexity of the procedure for an experienced endoscopic surgeon, we selected a validated questionnaire — the POMS (Profile of Mood States) fatigue and psychoemotional state assessment scale [38], consisting of 65 questions with answer options on a five-point Likert scale from 'not at all' to 'very much'. The operating surgeon was asked to fill out a questionnaire immediately after performing each procedure within the framework of this study to determine the degree of fatigue and strain after performing ventral mesh rectopexy by traditional laparoscopic access and using 3D systems.

All the data obtained were collected and structured into one database using the MS Excel 12 program (MicroSoft, USA). A descriptive and comparative statistical analysis was carried out using the software SPSS Statistic 26.0 (IBM, USA) and Statistica 10.0 (StatSoft, USA). At the first stage, all quantitative data were checked for compliance with the normal distribution law (NDL) using the Shapiro-Wilk test, since the volumes of all samples were less than 50 (the main group $n = 29$, the control group $n = 32$). In the cases where the sample comply with the NDL (when the significance level was $p > 0.05$), the description was planned to be carried out in the form of a mean and standard deviation (M ± SD), and the comparison of independent (between the study groups) and dependent samples (before/after the study in the same group) was carried out using the Student's-test.

In the cases where the sample did not comply with the NDL (significance level $p < 0.05$), the description was planned to be carried out in the form of median, 25% and 75% quartiles (Me [Q1;Q2]), and the comparison of independent (between the study groups) and dependent (before/after the study in the same group) samples was carried out using the Mann-Whitney test. Absolute (quantity) and relative (percent) data were used to describe categorical (nominal) data, and the χ^2-Pearson test was used to compare them. In the comparative analysis, significant differences between the study groups were considered when the significance level of P was less than 0.05 ($p < 0.05$). The preoperative characteristics of the patients are presented in Table 2.

The age of the patients in the study groups was 55.3 ± 10.3 years (32–70 years, 58 [49;63]), the number of births was 2.4 ± 1.4 (0–5 births, 2 [1;3]), the average BMI was 29.26 ± 4.49 kg/m^2 (18.1–36 kg/m^2, 30.4 [28.2;32.3]). Previously performed surgical procedures were in 36% of the patients who underwent cesarean section, 16.4% underwent hysterectomy, 11.5% underwent hemorrhoidectomy, 4.9% underwent colporrhaphy, and 1.6% underwent sphincterolevatoroplasty for grade 3 perineal rupture.

The duration of existing symptoms of pelvic prolapse was 8.16 ± 4.0 years (2–20 years, 8 [5;11]). The score on the Cleveland Clinic Constipation scale among patients — 13,8 ± 5,7 (6–28, 12 [9;19]) points, stress urinary incontinence was observed in 27.9% of patients.

The total score on the P-Qol scale before surgery was 61.7 ± 15.2 points (25–100, 63 [50;71]).

There were no significant differences in baseline parameters among the patients, in all cases $p > 0.05$.

After discharge from the hospital, the patients were at follow-up 121 ± 20.3 months.

In 12 months after the surgery, the patients underwent a control clinical assessment, during which the anatomical and functional results of the surgery were evaluated.

At the same time, the stage of prolapse according to POP-Q, repeated questionnaires on the CCCS, Wexner Incontinence scale, P-QOL, the presence of stress urinary incontinence and the patient's overall satisfaction with treatment according to the PGII (Patient Global

Impression of Improvement) questionnaire were taken into account [39].

The correction of rectocele was considered successful if it was detected during control on a gynecological chair with functional tests in the early postoperative period of the degree of POP 0–1 according to POP-Q. With a degree of POP-Q ⩾ 2, the correction was considered unsuccessful.

Anatomical relapse was defined as the omission of the pelvic organs POP-Q ⩾ 2 during a control examination on a gynecological chair in 12 months after.

Since, according to the developed design of the study, all the surgeries were performed in the same unit by the same surgeon, in order to improve the quality of the data obtained. Also, the assessment of early and late results of the surgery was carried out by two blinded specialists.

Operative Technique

All the procedures were performed under general anesthesia in the spinal position in the Trendelenburg position. The bladder was catheterized with a Foley catheter. The surgeon was located at the head end of the operating table on the left, the assistant — at the head end on the right, as shown in Figure 2. Then 5 trocars were installed: 10 mm paraumbilical, 12 mm in the right hypogastric area and 3–5 mm trocars in the left hypogastric area, as shown in Figure 3.

Stage I. After an overview laparoscopy, the sigmoid colon was removed to the left with an atraumatic clamp through the left lateral port, and a J-shaped dissection of the parietal peritoneum was performed from the projection area of the longitudinal presacral ligament at the level of the sacrum cape to the deepest point of the Douglas pouch by monopolar coagulation (Fig. 4). After that, anatomical landmarks of dissection were visualized: hypogastric nerves, right ureter, right common and internal iliac arteries, median sacral artery and vein, and the longitudinal ligament of the sacrum were identified. In the area of the rectal-uterine pouch, dissection was performed in the plane of the rectovaginal space along the anterior surface of the rectum to the level of levators. Additional control of the level of dissection and integrity of the vaginal mucosa and rectum was carried out using digital rectal and vaginal examinations by a third assistant.

Stage II. A prolenemesh 3 × 20 cm, was inserted into the abdominal cavity. The mesh was fixed with an endogerniostapler to the levators for the convenience of further application of intracorporal sutures (Fig.5). Then the lateral margins of the mesh were fixed along the anterior surface of the rectum to the mesorectal fascia with a continuous suture with a 2–0 PDS thread at one end (Fig.6).

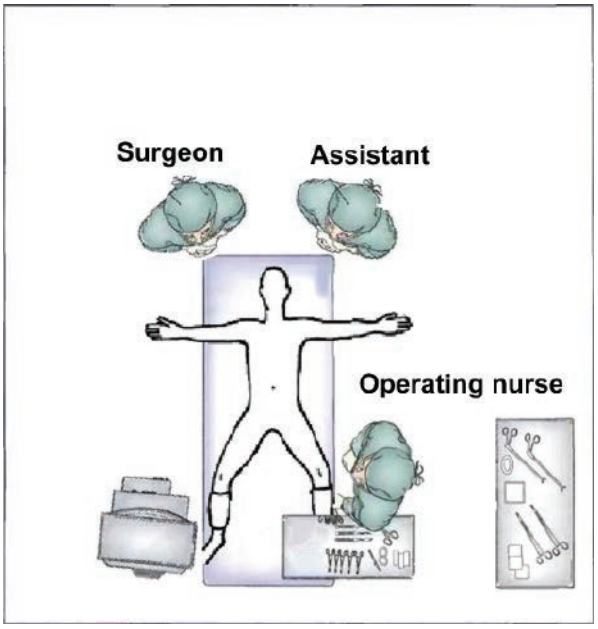

Figure 2. *Patient position and the location of the operating team*

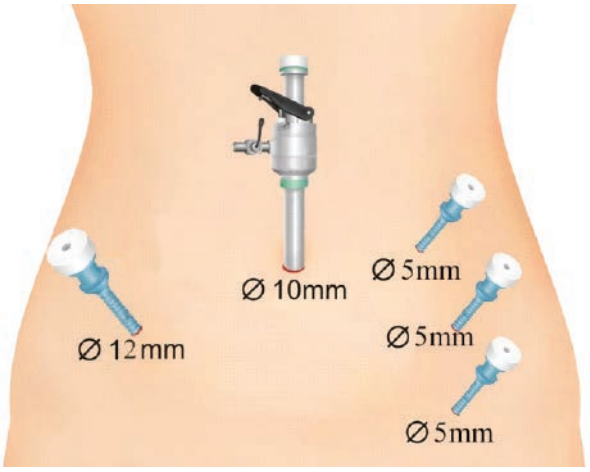

Figure 3. *Port sites on the anterior abdominal wall*

After fixation, the third assistant additionally performed digital control of the integrity of the mucosa of the rectum and vagina.
Stage III. The opposite end of the mesh was fixed to the longitudinal ligament of the sacrum with two separate sutures of 2–0 without tension (Fig. 7).
Stage IV. The peritoneum was sutured with a continuous absorbable suture over a mesh implant (Fig. 8).
No drainages were used as a standard.
For three-dimensional visualization in the main group, surgical procedure was performed using the Olympus VISERA ELITE II system (Olympus Corporation, Japan).

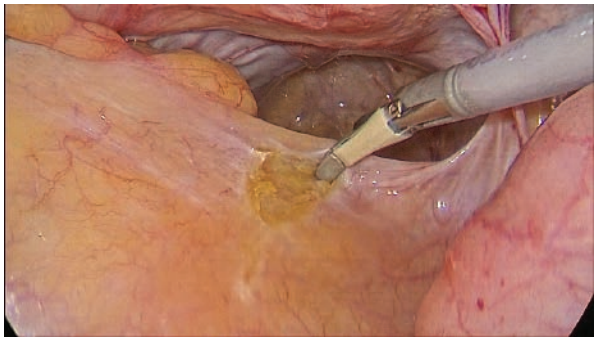

Figure 4. *Intraoperative photo: the beginning of the parietal peritoneum opening in the region of the sacral promontory*

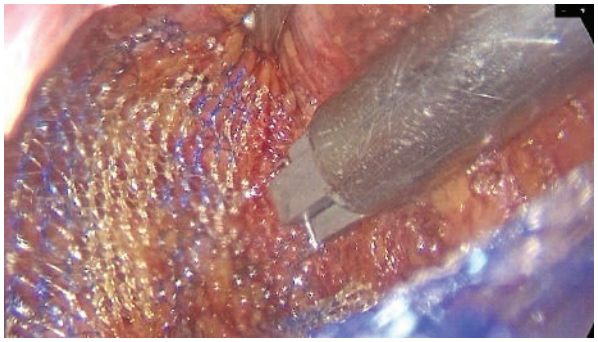

Figure 5. *Fixation of the implant to the levators using an endostepler*

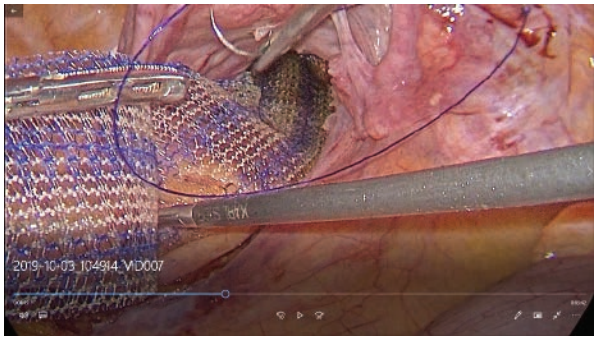

Figure 6. *The mesh implant is positioned as required, its lateral edges are fixed to the mesorectal fascia along the anterior surface of the rectum with absorbable suture material*

RESULTS

Eighty-seven operated patients in 2015–2020 were included in the study.
Of these, 24 patients were excluded according to the criteria, and 2 refused to participate. As a result, 61 patients underwent the randomization: 29 were randomly assigned to the main group, and 32 to the control group, as shown in the CONSORT (Consolidated Standards of Reporting Trials) diagram (Fig. 9) [40]. At the follow-up stage, there was no dropout of the patients. Thus, the present study includes the data on the treatment of 61 patients. The follow-up period for the patients was 1.75 ± 1.69 (0–7.1 [0;3]) years.
The operative time in the main group was 74.1 ± 14.0 minutes vs87.1 ± 24.3 minutes in the controls.
The intraoperative blood loss in the main group was 19.8 ± 9.6 ml, in the control one– 55.0 ± 39.2 ml.

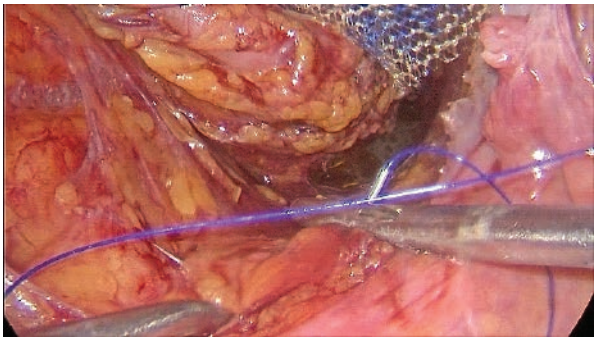

Figure 7. *Mesh fixation to the longitudinal sacral ligament with a non-absorbable suture*

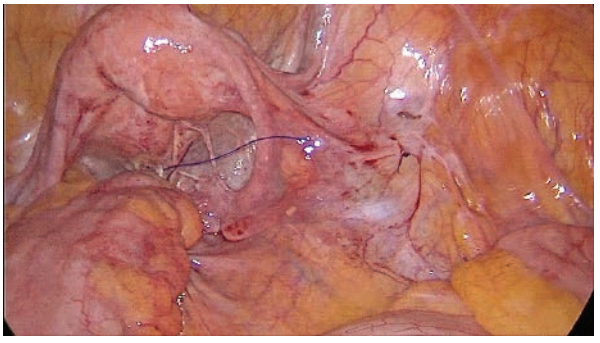

Figure 8. *Peritonization is performed*

Table 4 shows the medial values, 25% and 75% quartiles, since the sample data did not comply with the NDL according to the Shapiro-Wilk test. According to the Mann-Whitney test, there were no significant differences in the hospital stay between the groups ($p > 0.05$). The early results of surgery of the patients are summarized in Table 3.

According to the results of transvaginal ultrasound 2–3 days after rectopexy, a volume of the fluid collection at the mesh site in the main group was 21.2 ± 9.7 (3–115) cm^3, and in the control group — 30.7 ± 25.6 cm^3 (5–120).

With control ultrasound within 2–3 weeks from the moment of the surgery, the volume of the

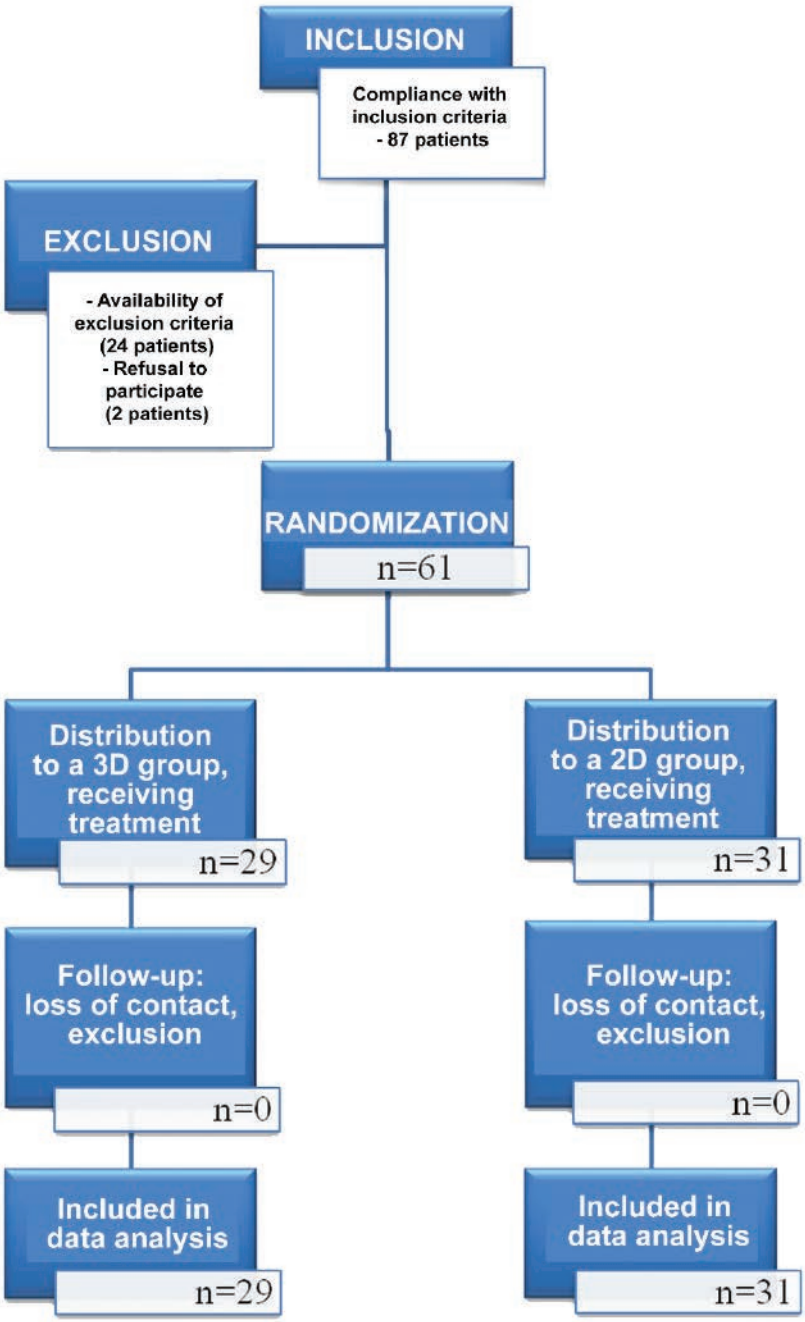

Figure 9. *CONSORT diagram*

Table 3. *Early results of laparoscopic 3D and 2D ventral rectopexy*

	Main group — 3D laparoscopic rectopexy (*n* = 29)	Control group — 2D laparoscopic rectopexy (*n* = 32)	Statistical differences
Operative time, min., Me [Q_1;Q_2]	70 [63;80]	80.5 [69;96]	***p = 0.01****
Blood loss, ml., Me [Q_1;Q_2]	15 [15;30]	50 [17.5;90]	***p = 0.001****
Hospital stay, days, Me [Q_1;Q_2]	4 [3;6]	5 [4;6.5]	*p* = 0.35
Pain intensity by VAS 24 hours after surgery, Me [Q_1;Q_2]	18 [11;31]	22.5 [8.5;37.5]	***p = 0.03****
Transvaginal ultrasound, volume of fluid collection at mesh site on 2nd-3rd days after surgery, cm^3, Me [Q_1;Q_2]	20 [14;29.3]	15.5 [8;56]	***p = 0.02****
Transvaginal ultrasound, volume of fluid collectionin2-3 weeks after surgery, cm^3 Me [Q_1;Q_2]	6 [2;8]	5.5 [2.3;10.5]	*p* = 0.27
Complications requiring reoperation	–	–	***p = 1.0***
Complications, abs. (%)	–	1 (3.1%) case of rectovaginal septum hematoma	***p = 1.0***
Points on POMS scale immediately after surgery (max — 160), Me [Q_1;Q_2]	48 [26;93]	74 [65.5;96.5]	***p = 0.004****

*Note: *The differences are significant at p < 0.05 according to the Mann-Whitney test for independent samples.*

fluid collection decreased, 5.4 ± 3.6 cm^3 and 6.7 ± 5.3 cm^3 in the main and control groups, respectively. Since the samples did not comply with the NDL according to the Shapiro-Wilk test, the medial and quartile data were presented in Table 3. There were no complications requiring re-operation among patients in both groups. In the early postoperative period, 1 patient of the control group was found to have a hematoma in the site of the rectovaginal septum, which was successfully evacuated by aspiration (grade 3a according to the Clavien-Dindo classification).

According to the results obtained, the score on the fatigue scale for the surgeon after traditional laparoscopic rectopexy was 87.3 ± 30.8 (57–160) points, whereas after the surgery using 3D equipment, the average score was 56.4 ± 33.5 (14–117).

We explain such differences by the lower psycho-emotional stress of the surgeon in visual control and convenience of basic surgical maneuvers when using 3D laparoscopy.

It was found that in 12 months after surgery, there was no anatomical recurrence among the patients of both groups. When studying the functional results, it was revealed that according to the Cleveland Clinic constipation scale, there was a significant decrease in the symptoms of obstructive defecation in both groups as well: 14.3 ± 3.5 points before surgery and 6.8 ± 1.3 in the main group, and 13.5 ± 4.2 points versus 7.1 ± 1.8 in the control group. According to the Mann-Whitney test for dependent samples, the differences before/after were significant in both groups $p < 0.05$ in each case. The patients noted a significant improvement in the quality of life, which is reflected in the P-Qol questionnaire: 5.6 ± 4.1 in the main group and 6.1 ± 5.1 in the control group after surgery vs 57.9 ± 25.3 and 65.1 ± 29.3 before surgery, respectively (according to the Mann-Whitney test for dependent

Table 4. *Late results of laparoscopic 3D and 2D ventral mesh rectopexy (follow-up 21.0 ± 20.3 months).*

	Main group — 3D laparoscopic rectopexy (*n* = 29)	Control group — 2D laparoscopic rectopexy (*n* = 32)	Statistical differences
Recurrence after 12 months according to POP-Q, abs. (%)	0	0	–
Cleveland Clinic Constipation scale score after surgery (max — 30), Me [Q_1;Q_2]	7 [6;8]	8 [7;8]	$p = 0.42$
Incontinence scale score (max — 20), Me [Q_1;Q_2]	0 [0;1]	1 [0;1]	$p = 0.06$
Stress urinary incontinence, % (abs.)	3.5% (1)	9.4% (3)	$p = 0.35$
P-Qol score (max — 115) after 12 months, Me [Q_1;Q_2]	6 [1;9]	4 [2;11.5]	$p = 0.64$
PGII (Patient Global Impression of Improvement), Me [Q_1;Q_2]	1 [1;1]	1 [1;2]	$p = 0.4$

*Note: *The differences are statistically significant at $p \leq 0.05$.*

samples, the differences before/after were significant in both groups $p < 0.05$ in each case).

DISCUSSION

Laparoscopic ventral rectopexy is currently a widespread type of surgery in the correction of posterior compartment prolapse, as indirectly evidenced by a large number of studies on the effectiveness and safety of this surgery, as well as comparing its results with other methods of correction of POP [4, 8–31].

The D'Hoore procedure includes dissection of tissues in the rectovaginal septum from the deepest point of the rectovaginal pouch along the rectovaginal fascia to the level of the pelvic floor muscles, followed by the ribbon mesh and fixing its opposite end to the anterior longitudinal ligament of the spine in the area of the promontorium.

Recently the widespread implementation of robotic surgery into practice took place.

The evaluation of the 'cost–effectiveness' ratio was not the purpose of this study. However, it is known that robotic rectopexy in comparison with laparoscopic surgery is more expensive due to the high cost of re-equipment of the operating room, as well as a longer operation time, and, accordingly, the labor costs of the entire operating team for the treatment of one patient.

The use of 3D laparoscopy makes it possible to realize the advantages of robotic surgery, such as a better visual control in narrow spaces of the pelvis, providing more accurate dissection along with a lower risk of injury to anatomical structures and small blood vessels, without significantly increasing economic costs.

Another advantage of using 3D laparoscopy from the point of view of the healthcare system is the issue of the learning curve for the surgeon. The use of robotic surgical systems implies special training not only for the operating surgeon, but also for the entire team. On the contrary, the use of 3D laparoscopy does not require special training of a surgeon who has the skills of laparoscopic procedures.

At the time of writing this article, there were no trials in the available literature on laparoscopic ventral rectopexy using 3D equipment. The study included 61 patients with severe rectocele and/or rectal prolapse. These patients consisted the main group (29 patients) and the control one (32 patients). The follow-up period was 21.0 ± 20.3 months. One of the indications for choosing the laparoscopic method for rectocele was the absence of severe defects in the patient of the 3rd level of fixation of the pelvic organs according to De Lancey, that is, the absence of changes in the anatomy of the perineum, since transabdominal techniques do not imply correction of these defects.

The study showed significant advantages of using 3D laparoscopy in reducing the time of a procedure, the intraoperative blood loss, and the postoperative pain intensity. The operative time in the main group was 74.1 ± 14.0 minutes, while in the control group — 87.1 ± 24.3 minutes. The intraoperative blood loss in the 3D laparoscopy group was 19.8 ± 9.6 ml, in the group of traditional 2D laparoscopy — 55.0 ± 39.2 ml. The three-dimensional image allowed the surgeon to perform maneuvers with a better visual control and convenience of basic techniques, which indirectly affected the precision of the installation and fixation of the mesh. The assessment of the trauma of the procedure was carried out indirectly by the severity of the pain syndrome according to the VAS in 24 hours after the surgery. The mean pain intensity in the 3D laparoscopy group was 18 mm, in the subgroup of traditional 2D laparoscopy — 22.5 mm.

The important question of the postoperative follow-up was the assessment of the rectovaginal space and the mesh site fluid collection, the hematomas and seromas here revealed by ultrasound on the 2nd-3rd days after rectopexy. The volume of fluid collection in the mesh site in the main group was 21.2 ± 9.7 (3–115) cm^3 vs 30.7 ± 25.6 (5–120) cm^3. With ultrasound control 2–3 weeks later from the moment of surgery, the volume of the fluid collection decreased, amounting to 5.4 ± 3.6 cm^3 and 6.7 ± 5.3 cm^3 in the main and control groups, respectively. The volume of the fluid collection in the mesh site indirectly indicates the accuracy of tissue dissection and the physiology of the mesh installation and reflects the result of the most technically difficult stage of the procedure — separation of the rectovaginal septum.

The ergonomics of the surgeon and better conditions for visual control also affected the psycho-emotional strain and fatigue.

The score on the POMS scale for a surgeon after traditional rectopexy was 87.3 ± 30.8 points, whereas after surgery using 3D equipment it was 56.4 ± 33.5.

With the identical technique of procedure, there were no significant differences in the functional results of the surgery. At a follow-up after 12 months, no anatomical recurrence was detected among the patients of both groups. According to the Cleveland Clinic constipation scale, a significant decrease in obstructive symptoms was observed in both groups: 14.3 ± 3.5 points before surgery and 6.8 ± 1.3 in the main group, and 13.5 ± 4.2 points vs 7.1 ± 1.8 in the control group.

The patients noted a significant improvement in the quality of life, which is reflected in the P-Qol questionnaire: 5.6 ± 4.1 in the main group vs 6.1 ± 5.1 in the controls after surgery vs 57.9 ± 25.3 and 65.1 ± 29.3 before the surgery. We considered a follow-up 1 year after the surgery to be an adequate follow-up for this comparative study.

Thus, the use of 3D laparoscopy makes the procedure of ventral mesh rectopexy less traumatic compared to traditional 2D laparoscopy, which is reflected by the intraoperative blood loss, the operative time, and a lower postoperative pain intensity.

These factors make it possible to achieve a more physiological laying of the mesh, which is indirectly evidenced by a decrease in the volume of the fluid collection in the mesh site.

CONCLUSIONS

The use of 3D laparoscopy when performing ventral mesh rectopexy in patients with rectocele and/or rectal prolapse is comparable in late anatomical and functional results with traditional laparoscopic technique.

However, with regard to the surgical injury, the first one has better results due to more accurate visual control of anatomical landmarks in the confined spaces of the pelvis, more precise dissection, which is confirmed by a decrease in the operative time, a lower postoperative pain, a less intraoperative blood loss.

The decrease in the degree of injury to anatomical structures and the physiology of mesh position indirectly allows to judge the decrease in tissue reaction, expressed in the volume fluid collection at the mesh site.

The advantages of 3D laparoscopy can also include greater convenience and ergonomics of work for the surgeon, reflected in the reduction of fatigue on the POMS scale after the surgery, with a slight increase in the economic costs of installing and using the necessary 3D equipment.

AUTHORS CONTRIBUTION

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REFERENCES

1. Wu JM, Matthews CA, Conover MM, Pate V, et al. Lifetime risk of stress urinary incontinence or pelvic organ prolapse surgery. *Obstetrics and gynecology*. 2014;123:1201–6.
2. Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States, 2003. *Obstetrics and gynecology*. 2007;110:1091–5.
3. Wu JM, Hundley AF, Fulton RG, Myers ER. Forecasting the prevalence of pelvic floor disorders in U.S. Women: 2010 to 2050. *Obstet Gynecol*. 2009 Dec;114(6):1278–83.
4. Fomenko O.Yu., Shelygin Yu.A., Poryadin G.V., Titov A.Yu. et al. Functional state of the pelvic floor muscles in patients with the pelvic prolapse. *Koloproktologia*. 2017;2:55–61. (in Russ.). DOI: 10.33878/2073-7556-2017-0-2-55-61
5. Goncharova E.P., Zarodnyuk I.V. MRI defectography in pelvic floor descent syndrome (review). *Koloproktologia*. 2020;1(19):117–130.(in Russ.). DOI: 10.33878/2073-7556-2020-19-1-117-130
6. Maher C, Feiner B, Baessler K, Christmann-Schmid C, et al. Surgery for women with apical vaginal prolapse. *Cochrane Database of Systematic Reviews*. 2016, Issue 10. Art. No.: CD012376. DOI: 10.1002/14651858.CD012376.
7. Rosamilia LA, Dwyer PL, Alvarez J, Chao F, et al. Randomised controlled trial of posthysterectomy vaginal vault prolapse treatment with extraperitoneal vaginal uterosacralligament suspension with anterior mesh reinforcement vs sacrocolpopexy (open/laparoscopic). *International Urogynecology Journal*. 2012;23:S151.
8. Rondini C, Braun H, Alvarez J, Urzúa MJ, et al. High uterosacral vault suspension vs Sacrocolpopexy for treating apical defects: a randomized controlled trial with twelve months follow-up. *International Urogynecology Journal*. 2015;26(8):1131–8.
9. D'Hoore A, Cadoni R, Penninckx F (2004) Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. *Br J Surg*. 91(11):1500–1505.
10. Boons P, Collinson R, Cunningham C, Lindsey I Laparoscopic ventral rectopexy for external rectal prolapse improves constipation and avoids de novo constipation. *Colorectal Dis*. 2010;12(6):526–532. https://doi.org/10.1111/j.1463-1318.2009.01859 .x
11. Wijffels N, Cunningham C, Dixon A, Greenslade G,

et al. Laparoscopic ventral rectopexy for external rectal prolapse is safe and effective in the elderly. Does this make perineal procedures obsolete? *Colorectal Dis*. 2011;13(5):561–566. https://doi.org/10.1111 /j.1463-1318.2010.02242 .x
12. Faucheron JL, Voirin D, Riboud R, Waroquet PA, et al. Laparoscopic anterior rectopexy to the promontory for full-thickness rectal prolapse in 175 consecutive patients: short- and longterm follow-up. *Dis Colon Rectum*. 2012;55:660–665
13. Formijne Jonkers HA, Maya A, Draaisma WA, Bemelman WA, et al. Laparoscopic resection rectopexy versus laparoscopic ventral rectopexy for complete rectal prolapse. *Tech Coloproctol*. 2014;18(7):641–646. https://doi.org/10.1007/s1015 1-014-1122-3
14. Mehmood RK, Parker J, Bhuvimanian L, Qasem E, et al. Short-term outcome oflaparoscopic versus robotic ventral mesh rectopexy for full-thickness rectal prolapse. Is robotic superior? *Int J Colorectal Dis*. 2014;29(9):1113–1118. https://doi.org/10.1007/s0038 4-014-1937-4
15. Bjerke T, Mynster T. Laparoscopic ventral rectopexy in an elderly population with external rectal prolapse: clinical and anal manometric results. *Int J Colorectal Dis*. 2014;29(10):1257–1262. https://doi.org/10.1007/ s0038 4-014-1960-5
16. Randall J, Smyth E, McCarthy K, Dixon AR. Outcome oflaparoscopic ventral mesh rectopexy for external rectal prolapse. *Colorectal Dis*. 2014;16(11):914–919. https ://doi.org/10.1111/codi.12741
17. Gosselink MP, Joshi H, Adusumilli S, van Onkelen RS, et al. Laparoscopic ventral rectopexy for faecal incontinence: equivalent benefit is seen in internal and external rectal prolapse. *J Gastrointest Surg*. 2015;19(3):558–563. https://doi.org/10.1007/s1160 5-014-2696-9
18. Consten EC, van Iersel JJ, Verheijen PM, Broeders IA, et al. Long-term outcome after laparoscopic ventral mesh rectopexy: an observational study of 919 consecutive patients. *Ann Surg*. 2015;262(5):742–747. https://doi.org/10.1097/sla.00000 00000 00140 1 discussion 747–748
19. Chandra A, Kumar S, Maurya AP, Gupta V, et al. Laparoscopic ventral mesh rectopexy for complete rectal prolapse: a retrospective study evaluating outcomes in North Indian population. *World J Gastrointest Surg*. 2016;8(4):321–325. https://doi.org/10.4240/ wjgs.v8.i4.321
20. Rautio T, Makela-Kaikkonen J, Vaarala M, Kairaluoma M, et al. Laparoscopic ventral rectopexy in male patients with external rectal prolapse is associated with a high reoperation rate. *Tech Coloproctol*. 2016;20(10):715–720. https://doi.org/10.1007/s10151-016-1528-1
21. Lundby L, Iversen LH, Buntzen S, Wara P, et al. Bowel function after laparoscopic posterior sutured rectopexy versus ventral mesh rectopexy for rectal prolapse: a double-blind, randomised single-centre study. *Lancet Gastroenterol Hepatol*. 2016;1(4):291–297. https://doi.org/10.1016/S2468-1253(16)30085-1 Surgical Endoscopy (2019) 33:2444–2455 2455
22. Emile SH, Elbanna H, Youssef M, Thabet W, et al. Laparoscopic ventral mesh rectopexy vs Delorme's operation in management of complete rectal prolapse: a prospective randomized study. *Colorectal Dis*. 2017;19(1):50–57. https://doi.org/10.1111/codi.13399
23. Luglio G, Tarquini R, Giglio MC, Sollazzo V, et al. Ventral mesh rectopexy versus conventional suture technique: a single-institutional experience. *Aging Clin Exp Res*. 2017;29(Suppl 1):79–82. https://doi. org/10.1007/s4052 0-016-0672-9
24. Fu CW, Stevenson AR. Risk factors for recurrence after laparoscopic ventral rectopexy. *Dis Colon Rectum*. 2017;60(2):178–186. https://doi.org/10.1097/ DCR.00000 00000 00071 0
25. Madbouly KM, Youssef M. Laparoscopic ventral rectopexy versuslaparoscopic wells rectopexy for complete rectal prolapse: long-term results. *J Laparoendosc Adv Surg Tech A*. 2018;28(1):1–6. https://doi.org/10.1089/ lap.2017.0012
26. Chandra A, Singh P, Kumar S, Chopra N, et al. Laparoscopic ventral rectopexy: a viable option in procidentia with redundant sigmoid—an Indian perspective. *J Minim Access Surg*. 2018;14(4):304–310. https://doi.org/10.4103/jmas.jmas_106_17
27. Munz Y, Moorthy K, Kudchadkar R, et al. Robotic assisted rectopexy. *Am J Surg*. 2004;187:88–92.
28. Ayav A, Bresler L, Hubert J, Brunaud L, et al. Robotic-assisted pelvic organ prolapse surgery. *Surg Endosc*. 2005;19:1200–3.
29. Makela-Kaikkonen J, et al. Robot-assisted versus laparoscopic ventral rectopexy for external, internal rectal prolapse and enterocele: a randomised controlled trial. *Colorectal Dis*. 2016;18(10):1010–1015.
30. Mehmood RK, et al. Short-term outcome of laparoscopic versus robotic ventral mesh rectopexy for full-thickness rectal prolapse. Is robotic superior? *Int J Colorectal Dis*. 2014;29(9):1113–1118
31. Makela-Kaikkonen J, et al. Robotic-assisted and laparoscopic ventral rectopexy in the treatment of rectal prolapse: a matched-pairs study of operative details and complications. *Tech Coloproctol*. 2014;18(2):151–155
32. Mantoo S, et al. Is robotic-assisted ventral mesh rectopexy superior to laparoscopic ventral mesh rectopexy in the management of obstructed defaecation? *Colorectal Dis*. 2013;15(8):e469–e475
33. Faucheron JL, et al. Day case robotic ventral rectopexy compared with day case laparoscopic ventral rectopexy: a prospective study. *Tech Coloproctol*. 2016;20(10):695–700.

34. Vorobiev G.I. Osnovy koloproktologii. M.: MIA. 2006; pp. 193–208. (in Russ.).
35. Persu C, Chapple CR, Cauni V, Gutue S, et al. "Pelvic Organ Prolapse Quantification System (POP–Q) — a new era in pelvic prolapse staging". *Journal of Medicine and Life*. 2011;4(1):75–81. PMID 21505577.
36. Digesu GA, Khullar V, Cardozo L, Robinson D, et al. P-QOL: a validated questionnaire to assess the symptoms and quality oflife of women with urogenital prolapse. *Int Urogynecol J*. 2005;16:176–181; DOI 10.1007/s00192-004-1225-x.
37. Sohl W, Wexner SD. Pelvic Floor Dysfunction Springer, London. 2008; Chapter 14-2, pp. 353-357,
38. Andrade E, Arce C, Torrado J, Garrido J, et al. Factor structure and invariance of the POMS Mood State Questionnaire in Spanish. *Span J Psychol*. 2010;13(1):444–452 22.]
39. Srikrishna S, Robinson D, Cardozo. Validation of the patient global impression of improvement (PGI-I) for urogenital prolapse. *Int Urogynecol J Pelvic Floor Dysfunct*. 2010;21:523–8.
40. Schulz KF, Altman DG, Moher D; CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMJ*. 2010 Mar 23;340:c332.

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The effectiveness of combined topical product with fluocortolone pivalate and lidocaine for hemorrhoids: results of a multicenter observational study

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ABSTRACT *AIM: to assess the changes in hemorrhoids symptoms and satisfaction with treatment against the background of treatment with a combined topical product Relief® Pro.*

PATIENTS AND METHODS: multicenter prospective non-interventional cohort study was done in 13 clinical centers in Russia. The study included patients aged 18 to 65 years with acute hemorrhoids of stages 1–2 treated with the combined product Relief® Pro (rectal suppositories, cream or a combination thereof). The follow-up period was up to 14 days (in the case of 2 visits to the clinical center after receiving the initial data). The analysis was performed on the basis of data obtained at Visit 2 (5–7 days of therapy) and Visit 3 (10–14 days of therapy) vs the initial data (Visit 1). Following criteria were used: the severity of hemorrhoid symptoms on the Sodergren scale, the severity of hemorrhoid symptoms (pain, bleeding, itching, edema, the presence of discharge, a feeling of discomfort), the size of the largest hemorrhoid node, the satisfaction of the doctor and the patient with treatment, assessment of the patient's adherence to recommendations for lifestyle changes and treatment, evaluation of the use of the drug Relief® were evaluated as endpoints About the treatment process and patient preferences regarding the dosage form of the prescribed drug. In addition, adverse events were evaluated.

RESULTS: the study included 1000 patients aged 18 to 65 years (men — 54.5%, women — 45.5%) Patients had grade 1 acute hemorrhoids (330 patients), grade 2 acute hemorrhoids (345 patients) and exacerbation of chronic hemorrhoids (325 patients). The drug Relief® Pro rectal cream was used by 333 patients; suppositories — 383 patients; joint therapy with both dosage forms — 284 patients. During follow-up (visits 2 and 3), positive dynamics was observed in patients — a decrease in the severity of hemorrhoid symptoms both during objective examination and according to patient questionnaires. So, according to the patients' estimates, the use of Relief® Pro, regardless of the form, led to a decrease in the severity or disappearance of the main symptoms of hemorrhoids — bleeding, itching, edema, the presence of discharge, discomfort already by Visit 2 and in almost all patients by the end of observation.

A similar change of the symptoms due the digital examination: by day 5–7, the severity of edema and bleeding in the perianal region, bleeding decreased. About 96% of patients and about 97% of doctors were satisfied with the treatment. Application of both forms of Relief® The ABM was characterized by good tolerability: there were no adverse events associated, according to the researcher, with the studied drug.

CONCLUSIONS: combined topical product Relief® Pro is effective for hemorrhoids.

KEYWORDS: *hemorrhoids, observational study, lidocaine, fluocortolone pivalate, Relief Pro*

CONFLICTS OF INTERESTS: *the study was organized and financed by Bayer Company*

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KEY THESES

What is already known about the subject?

- Modern algorithms for the treatment of hemorrhoids recommend symptomatic treatment with topical combined medications. However, their clinical efficacy may vary depending on the dosage form or dosage of active substances in a particular drug.
- One of the combined drugs used in the treatment of acute hemorrhoids, which includes GCS (fluocortolone pivalate) and a local anesthetic (lidocaine hydrochloride), is Relief® Pro. The drug has been approved for medical use since 1986 and is currently used in various countries around the world.

Relief® Pro has been the subject of a number of studies. However, there were no data on the use of the drug Relief® Pro in a large number of patients in real clinical practice.

What is new in this study?

- Data on the efficacy and safety of a combined drug containing flucortolone pivalate and lidocaine in the form of rectal cream and suppositories in patients with acute hemorrhoids of the 1–2 degree obtained from real practice.

How can this affect clinical practice?

- The results of this study confirm the significant efficacy and safety of the Relief® Pro both as a rectal cream and as suppositories, as well as their combinations for the treatment of acute hemorrhoids and exacerbation of chronic hemorrhoids.

INTRODUCTION

Hemorrhoids are one of the most common human diseases and the most common reason for contacting a coloproctologist.

The prevalence of the disease in the Russia is 130–145 people per 1,000 adult population (13.0–14.5%), and its specific weight in the structure of coloproctological diseases ranges from 34% to 41% [1–5,18]. This pathology is equally common in men and women. It is known that the incidence of hemorrhoidal disease increases with age [6] and is most often observed between 30 and 60 years. However, it can develop at any age, even in childhood [7].

Risk factors for the development of hemorrhoids traditionally include chronic constipation, pregnancy, heredity, high socio-economic status, chronic diarrhea, malignant colorectal tumors, liver diseases, obesity, increased resting pressure of the anal canal, decreased rectal muscle tone, condition after rectal surgery, and episiotomy [8,9]. The modern style of life is accompanied by increased physical inactivity.

Forced prolonged sitting (at the computer in the office and at home, driving a car, etc.) is accompanied by stagnation of blood circulation in the pelvic organs, and primarily in the rectum.

This in turn leads to an increase in the incidence of hemorrhoids, which increasingly affects people of young age [1–5].

According to the clinical guidelines of the Association of Coloproctologists of Russia [18], diet treatment, conservative treatment, minimally invasive and incisional surgery and their combinations are used for the hemorrhoids, depending on the stages.

Elimination of constipation due to the inclusion of a sufficient amount of dietary fiber and water in the diet is the most important and necessary condition for the successful treatment of hemorrhoids. At the same time, conservative treatment aimed only at normalizing the activity of the gastrointestinal tract is not an independent effective method of treating hemorrhoids.

Conservative drug treatment should include oral and topical medications. Oral administration of rutoside, diosmin, centella asiatica, flavonoids, plant extracts reduce the fragility of capillaries and improves microcirculation in venous insufficiency [10].

Topical drugs with analgesic and anti-inflammatory effect provide rapid relief of the main symptoms of hemorrhoids — discomfort, itching, pain and bleeding.

Despite the increasing use of surgical techniques for the treatment of hemorrhoids, topical drugs are used in clinical practice as symptomatic agents.

Invasive treatments such as sclerotreatment, coagulation, ligation of nodes and incisional surgery

are recommended in situations where hemorrhoid symptoms affect the patient's quality of life [8,9]. Each case of hemorrhoidal disease is polyetiological, usually has a chronic character and often requires an individual treatment regimen.

The main objectives of local treatment are to relieve the symptoms of the disease and return the patient to normal life. Drugs for symptomatic local treatment of hemorrhoids are indicated at all stages. Such drugs include steroid and nonsteroidal anti-inflammatory drugs, local anesthetics, astringents and emollients or combinations thereof [9]. Most of them help the patient maintain personal hygiene and relieve itching and pain. The most commonly used forms of drugs in proctology are creams and ointments for the perianal and anal areas and rectal administration, as well as rectal candles.

Topical drugs for the treatment of hemorrhoid symptoms, including pain and itching, often contain local anesthetics, which for a certain time provide local loss of sensitivity (anesthesia) in the area of application of the drug.

Benzidamine and lidocaine are among the most commonly used topical anesthetics in proctology [1–3,18].

Some topical antihemorrhoidal drugs contain steroids, which have anti-inflammatory, anti-allergic and antipruritic effects.

Steroids diffuse into cells and bind to steroid receptors in the cytoplasm, forming a steroid-receptor complex [11]. The activated complex binds to specific DNA sequences and modifies gene transcription, which ultimately affects the synthesis of inflammatory mediators [12]. As a result, capillary dilation, intercellular edema and tissue infiltration decrease, capillary proliferation is suppressed [13].

Currently, local antihemorrhoidal drugs containing fixed combinations of steroids (hydrocortisone, fluorocortolone) and local anesthetic (cinchocaine, lidocaine) have been widely used in clinical practice. Such combinations quickly and effectively relieve symptoms and improve the quality of life of patients [15–17]. Since the mechanism of action of steroids is realized through gene expression and suppression of the synthesis of cellular proteins, their effect cannot occur instantly. And in this case, a combination with a fast-acting local anesthetic is important, which provides relief of pain and itching immediately after application.

In addition to the dual mechanism of action, combined drugs have another important advantage: it is easier for the patient to use 1 combined agent, rather than each of them separately, which facilitates compliance with the treatment regimen. In addition, a fixed combination of active ingredients guarantees the use of components in the required proportions and dosages.

Description of the Study

A prospective multicenter non-interventional study was conducted to evaluate the effectiveness of one of the drugs for local hemorrhoid treatment — a fixed combination of fluocortolona pivalate and lidocaine — and other aspects of the treatment of hemorrhoidal disease.

The study was conducted in the period from November 2018 to October 2019 in 13 clinical centers located in 8 cities of the Russian Federation: Moscow, St. Petersburg, Yaroslavl, Smolensk, Rostov-on-Don, Astrakhan, Ryazan, Kursk. 44 coloproctologists participated in the study.

GOALS AND OBJECTIVES

The main purpose of the study was to evaluate effect of the use of 2 dosage forms (rectal cream and rectal suppositories) of the combined drug Relief® Pro (fluocortolona pivalate + lidocaine) in real clinical practice.

To achieve this goal, the following parameters were studied: the dynamics of the main symptoms of hemorrhoids during the treatment; the change in the size of the largest hemorrhoid node during treatment; patients' compliance to the doctor's recommendations; satisfaction of the doctor and the patient with the treatment with Relief® Pro; patients' preferences regarding the dosage form of the prescribed drug and the consumer properties of these dosage forms.

Design

This was a prospective multicenter non-interventional cohort study involving patients with acute hemorrhoids of the 1–2 degree or exacerbation of chronic hemorrhoids, to whom the attending

Table 1. *Demographic indicators (n = 1000)*

Demographic indicators	The value of the indicator in different subgroups of treatment		
	Relief® Pro cream (*n* = 333)	Relief® Pro suppositories (*n* = 383)	Relief® Pro cream + suppositories (*n* = 284)
Gender			
Male, *n* (%)	183 (55.0%)	217 (56.7%)	145 (51.1%)
Female, *n* (%)	150 (45.0%)	166 (43.3%)	139 (48.9%)
Age, years			
Mean	40.7 ± 10.8	41.8 ± 11.1	41.4 ± 10.7
Median	39	41	40
Minimum — Maximum	19–65	20–66	18–65
Height, cm			
Mean	171.4 ± 8.8	172.7 ± 8.8	172.2 ± 8.2
Median	172	174	173
Minimum — Maximum	150–197	150–196	150–192
Body weight, kg			
Mean	74.2 ± 13.7	76.9 ± 13.7	75.3 ± 13.5
Median	74	78	75
Minimum — Maximum	48–120	49–130	50–125

physician, as part of routine clinical practice, prescribed a fixed combination drug containing fluocortolone pivalate and lidocaine for local treatment.

The patient independently decided whether to follow the doctor's prescription and follow other recommendations (lifestyle changes, diet, etc.). The patient could change his mind (for example, in a pharmacy) and buy another available drug(s) or even ignore all prescriptions and recommendations of the doctor, completely refusing treatment. If the patient decided not to use the prescribed drug, no further information about the patient was collected.

Patients were included in the study at the initial treatment if they met the inclusion criteria and signed an informed consent (Visit 1). It was assumed that after the first visit, the patient would come for follow-up examinations twice within the next 10–14 days: Follow-up Visit 2 (Day 5–7) and Follow-up Visit 3 (Day 10–14).

The non-interventional design of the study was chosen as the most suitable for evaluating the effectiveness of the Relief® Pro in modern real clinical practice. Unlike interventional studies, the design of non-interventional (observational) clinical trials does not provide for randomization and 'blinding', and the selection of patients is not based on strict inclusion/non-inclusion criteria. Such a design also has certain limitations (for example, it is impossible to compare it with another drug). However, taking into account the objectives of this study, this methodology allowed to obtain a sufficient data of interest.

All the data obtained during the study were obtained from a set of manipulations performed by a doctor during a standard coloprotological appointment and examination.

In addition, at each visit, additional information was collected from patients in the form of filling out a questionnaire or providing data from the patient's diary — 'Patient Reported Outcome' (PRO).

Study Population

1,001 patients were included in the study, 1 patient dropped out at the screening stage, 1,000 patients completed the study — 545 (54.5%) men and 455 (45.5%) women aged 18 to 65 years.

For each participant of the study, the dosage form, dose and dosage regimen of the drug Relief® Pro was selected in accordance with the approved instructions for medical use and taking into account the indications, as well as based on the personal preferences of the research doctor or the preferences of the patient.

The decision on the appointment of treatment was made before the patient was included in the study.

To analyze the data, patients were divided into subgroups according to the prescribed dosage form of the drug — cream, suppositories or a

Table 2. *Data on the distribution of diagnoses and forms of hemorrhoids, initial data*

Data on the initial pathology	The value of the indicator in different subgroups of treatment		
	Relief® Pro cream (*n* = 333)	Relief® Pro suppositories (*n* = 383)	Relief® Pro cream + suppositories (*n* = 284)
Diagnosis			
Acute hemorrhoids of the 1 degree — Node thrombosis without inflammatory reaction, frequency (%)	152 (45.6%)	134 (35%)	44 (15.5%)
Acute hemorrhoids of the 2nd degree — Thrombosis of nodes with their inflammation, frequency (%)	145 (43.5%)	67 (17.5%)	133 (46.8%)
Exacerbation of chronic hemorrhoids, frequency (%)	36 (10.8%)	182 (47.5%)	107 (37.7%)
The form of hemorrhoids			
Internal hemorrhoids, frequency (%)	5 (1.5%)	253 (66.1%)	24 (8.5%)
External hemorrhoids, frequency (%)	318 (95.5%)	58 (15.1%)	137 (48.2%)
Combined hemorrhoids, frequency (%)	10 (3%)	72 (18.8%)	123 (43.3%)

combination thereof. The patients in the subgroups were comparable in age, height and weight (Table 1).

The patients were diagnosed with acute hemorrhoids of the 1–2 degree (with thrombosis of external/internal/external + internal nodes, including cases of bleeding) in accordance with the Goligher classification of acute hemorrhoids — with acute hemorrhoids of the 1st degree (330 patients), 2nd degree (345 patients) and exacerbation of chronic hemorrhoids (325 patients) (Table 2).

Groups of patients who used different dosage forms of Relief® Pro were not statistically balanced in terms of diagnosis and form of the disease: patients with nodular thrombosis without an inflammatory reaction (acute hemorrhoids of the 1st degree) were most often prescribed Relief® Pro cream (*n* = 152, 46.1%), less often — Relief® Pro suppositories (*n* = 134, 40.6%); patients with nodular thrombosis with their inflammation (acute hemorrhoids of the 2nd degree) were more often prescribed Relief® Pro cream (*n* = 145, 42.0%) or a combination of Relief® Pro cream + suppositories (*n* = 133, 38.6%); patients with exacerbation of chronic hemorrhoids were more often prescribed Relief® Pro suppositories (*n* = 182, 56%), less often — a combination of Relief® Pro cream + suppositories (*n* = 107, 32.9%).

It is obvious that the prescription of a particular dosage form of the drug Relief® Pro was carried out depending on the form of hemorrhoids: the external form of hemorrhoids was more often treated with Relief® Pro cream (*n* = 318, 62.0%); the internal form — with Relief® Pro suppositories (*n* = 253, 89.7%); the combined form — with a combination of Relief® Pro cream + suppositories (*n* = 123, 60%).

The study did not include patients with at least one of the following conditions/states: the participation of the patient in research programs involving manipulations that go beyond routine clinical practice; acute hemorrhoids of the 3d degree, contraindications to the use of the drug Relief® Pro listed in the approved instructions for medical use, in the presence of anemia and/or severe/profuse bleeding from hemorrhoids; after surgery in the perianal area (in anamnesis); concomitant treatment with antibacterial drugs, anticoagulants and antiplatelet agents, antitumor drugs and/or immunosuppressors; in the case of inflammatory bowel diseases, severe or acute liver disease; colorectal cancer, purulent-inflammatory diseases of the perianal area or anal canal.

PATIENTS AND METHODS

The study included patients who were prescribed the drug Relief® Pro as part of routine clinical practice in one or both dosage forms:

- Rectal cream: 1 mg/g of Fluocortolone + 20 mg/g of Lidocaine
- Rectal suppositories: 1 mg of Fluocortolone + 40 mg of Lidocaine

For each participant in the study, the dosage form, dose and dosage regimen of the drug Relief® Pro

Table 3. *The occurrence of some of the most common risk factors in the medical history of patients (n = 1000)*

Presence of a risk factor	The value of the indicator in different subgroups of treatment		
	Relief® Pro cream (*n* = 333)	Relief® Pro suppositories (*n* = 383)	Relief® Pro cream + suppositories (*n* = 284)
Risk factors: Family anamnesis			
Yes, *n* (%)	90 (27.0%)	151 (39.4%)	36 (12.7%)
No, *n* (%)	243 (73.0%)	232 (60.6%)	248 (87,3%)
Risk factors: Sedentary work			
Yes, *n* (%)	185 (55.6%)	188 (49.1%)	157 (55.3%)
No, *n* (%)	148 (44.4%)	195 (50.9%)	127 (44.7%)
Risk factors: Work associated with heavy physical exertion			
Yes, *n* (%)	54 (16.2%)	52 (13.6%)	74 (26.1%)
No, *n* (%)	279 (83.8%)	331 (86.4%)	210 (73.9%)
Risk factors: Constipation			
Yes, *n* (%)	145 (43.5%)	223 (58.2%)	108 (38.0%)
No, *n* (%)	188 (56.5%)	160 (41.8%)	176 (62.0%)

Table 4. *Occurrence of more than one risk factor in the medical history of patients (n = 1000)*

Number of risk factors per patient	Number of patients, *n* (%)			
	Total number (*n* = 1,000)	Relief® Pro cream (*n* = 333)	Relief® Pro suppositories (*n* = 383)	Relief® Pro cream + suppositories (*n* = 284)
2	434 (43.4%)	153 (45.9%)	196 (51.2%)	85 (29.9%)
3	103 (10.3%)	13 (3.9%)	53 (13.8%)	37 (13%)
4	29 (2.9%)	2 (0.6%)	16 (4.2%)	11 (3.9%)
5	2 (0.2%)	0 (0%)	0 (0%)	2 (0.7%)
6	1 (0.1%)	1 (0.3%)	0 (0%)	0 (0%)

was selected in accordance with the approved instructions for medical use and taking into account the indications, as well as based on the personal preferences of the doctor or the preferences of the patient. The decision on the appointment of treatment was made before the patient was included in the study.

The study examined the indicators obtained by the doctor during the examination and interview of the patient at the visit, as well as those obtained from the patient's diaries: the dynamics of the severity of hemorrhoid symptoms on the Sodergren scale, the dynamics of the main symptoms of hemorrhoids (pain, bleeding, itching, edema, the presence of discharge, a feeling of discomfort) on the 4-point Likert scale (1 point — 'Absent', 2 points — 'Minimum', 3 points — 'Moderate' and 4 points — 'Very strong'), the change in the size of the largest hemorrhoid node compared to the initial values, the assessment of patient and researcher satisfaction with the treatment with the drug Relief® Pro, the severity of pain (VAS), the time of onset and duration of the analgesic effect after the first use of the drug. The consumer properties of both forms of the drug were also evaluated. The researchers also assessed the patients' adherence to recommendations to reduce the impact of risk factors (lifestyle changes, diet, etc.) and treatment.

Statistical Processing

Epidemiological statistical methods were used to analyze the data obtained. Interval (quantitative) data were described using: arithmetic mean, standard deviation, median, lower (25.0%) and upper (75.0%) quartiles, minimum, maximum and coefficient of variation.

To compare quantitative data distributed according to the normal distribution law, standard parametric criteria were used: Student's t-test for dependent/independent samples, analysis of variance (ANOVA) for independent samples.

To compare quantitative data distributed according to a law other than normal, standard nonparametric criteria were used: H-Kruskal-Wallis test, U-Mann-Whitney test, T-Wilcoxon test.

Table 5. *Some indicators of patients' lifestyle (n = 1000)*

Life style	The value of the indicator in different subgroups of treatment		
	Relief® Pro cream (*n* = 333)	Relief® Pro suppositories (*n* = 383)	Relief® Pro cream + suppositories (*n* = 284)
Eating habits (Fast food)			
Yes, *n* (%)	68 (20.4%)	99 (25.8%)	47 (16.5%)
No, *n* (%)	265 (79.6%)	284 (74.2%)	237 (83.5%)
Eating habits (Spicy food)			
Yes, *n* (%)	95 (28.5%)	147 (38,4%)	95 (33,5%)
No, *n* (%)	238 (71.5%)	236 (61.6%)	189 (66.5%)
Physical activity level			
Low, *n* (%)	93 (27.9%)	142 (37.1%)	48 (16.9%)
Average, *n* (%)	201 (60.4%)	204 (53.3%)	193 (68%)
High, *n* (%)	39 (11.7%)	37 (9.7%)	43 (15.1%)

Verification of compliance with the normal distribution law was carried out using the Shapiro-Wilk criterion. Multiple comparisons were carried out using the Benyamini-Yekutili correction.

RESULTS

Assessment of the Initial Data

The data obtained from the questionnaires made it possible to characterize the population of the patients with acute hemorrhoids according to such indicators as risk factors for the development of the disease and lifestyle.

It was found that the most common risk factors for the development of the disease were sedentary work (53.0%), constipation (47.6%), family history of disease (27.7%), as well as work associated with heavy physical exertion (18.0%). Risk factors such as obesity (7.6%), chronic diarrhea (0.6%), etc. (6.2%) were less common in the population. In the female population of the patients (*n* = 455), an anamnestic risk factor for hemorrhoids was additionally assessed, such as pregnancy (10.3%), childbirth (14.1%) and the postpartum period (4.4%).

In the study, it was possible to obtain data characterizing the patient population by the 'lifestyle' indicator (alcohol consumption, physical activity level, eating habits and frequency of meals). However, it was not possible to establish a relationship between lifestyle indicators and the outcome of treatment: the differences in the incidence of response distribution between the subgroups of the patients were random and were probably related to the individual characteristics of the patients.

During a local control, digital examination and instrumental confirmation of the diagnosis were carried out as part of routine coloproctological practice. According to the results of the digital examination (Table 6) at the inclusion visit, it was found that in the subgroups of the Relief® Pro cream and Relief® Pro cream + suppositories treatment, the largest hemorrhoid node was external — in 98.5% and 78.2% of the patients, respectively. At the same time, in 72.6% of patients from the Relief® Pro suppositories subgroup, the largest node was internal. It was found that the most frequent location of such nodes on the conventional clock face (regardless of shape) was localization at 3 o'clock (18.7% of patients), 7 o'clock (23.6% of patients) and 11 o'clock (15.7% of patients) of the conventional clock face, which is consistent with the literature data. The size of the largest hemorrhoid node before the treatment was 13.9 ± 4.7 mm in the Relief® Pro cream subgroup, 15.2 ± 5.2 mm in the Relief® Pro suppositories sub group, and 18.8 ± 5.5 mm in the Relief® Pro cream + suppositories subgroup. It is noteworthy that the size of the largest hemorrhoid node (average ± SD and median) in the Relief® Pro cream + suppositories treatment subgroup was significantly larger than in the other two groups.

According to the results of the digital examination, the initial severity of hemorrhoid symptoms such as edema and bleeding in the perianal area (in points on the Likert scale) averaged 2.8 ± 0.7 points (moderate) and 2.1 ± 0.8 points (minimum), respectively, in the population.

Table 6. *Finger examination data, initial data (n = 1000)*

Indicator	The value of the indicator in different subgroups of treatment		
	Relief® Pro cream (*n* = 333)	**Relief® Pro suppositories (*n* = 383)**	**Relief® Pro cream + suppositories (*n* = 284)**
Site of the largest hemorrhoid node			
Internal, *n* (%)	5 (1.5%)	278 (72.6%)	62 (21.8%)
External, *n* (%)	328 (98,5%) 328 (98.5%)	105 (27.4%)	222 (78.2%)
The size of the largest hemorrhoid node, mm			
Arithmetic mean	13.9 ± 4.7	15.2 ± 5.2	18.8 ± 5.5
Median	13	14	20
Minimum–Maximum	5–30	1–40	1–50
The severity of edema in the perianal area, distribution of responses on the Likert scale			
Absent, *n* (%)	35 (10.5%)	12 (3.1%)	15 (5.3%)
Minimum, *n* (%)	61 (18.3%)	47 (12.3%)	26 (9.2%)
Moderate, *n* (%)	222 (66.7%)	291 (76%)	197 (69,4%)
Very strong, *n* (%)	15 (4.5%)	33 (8.6%)	46 (16.2%)
The degree of bleeding in the perianal area, the istribution of responses on the Likert scale			
Absent, *n* (%)	129 (38.7%)	90 (23.5%)	96 (33.8%)
Minimum, *n* (%)	76 (22.8%)	130 (33.9%)	93 (32.7%)
Moderate, *n* (%)	128 (38.4%)	162 (42.3%)	94 (33.1%)
Very strong, *n* (%)	0 (0%)	1 (0.3%)	1 (0.4%)

According to the patients' diaries, the median pain at the start of the study in all subgroups of the treatment was 7 points (on a 10-point VAS scale). The severity of hemorrhoid symptoms before the start of the treatment on average in the population (in points on the Likert scale) was: bleeding — 2.2 ± 0.9 points (minimum), the severity of discharge — 2.2 ± 0.8 points (minimum), the severity of itching — 2.7 ± 0.7 points (moderate), the severity of edema — 2.9 ± 0.7 points (moderate), the severity of discomfort — 3.2 ± 0.5 points (moderate).

Individual data on the severity of the main symptoms of hemorrhoids assessed by the patient are presented in Table 7. According to these data, at the start of the study (Visit 1), the total amount of Sodergren scores in the Relief® Pro cream treatment subgroup was significantly lower compared to the other two subgroups ($p < 0.001$).

According to the information received from the study participants, some patients reported no bleeding, a significant part were the patients with minimal and moderate severity of bleeding (according to the Likert scale), in rare cases, the participants assessed the severity of their symptom as very strong (mainly in the Relief® Pro cream + suppositories subgroup). The median severity of bleeding before the start of the treatment was 3 points in the Relief® Pro suppositories subgroup and 2 points in the other two subgroups of the treatment.

The median severity of itching at the start of the study was 3 points on the Likert scale in all subgroups of the treatment. This symptom was present in the majority of the patients (91.0% in the Relief® Pro cream subgroup, 98.7% in the Relief® Pro suppositories subgroup, 78.2% in the Relief® Pro cream + suppositories subgroup). Moderate itching was most often detected in all subgroups of the treatment.

Moderate severity of edema was detected in the majority of the patients at the start of the study (more than 60% in the Relief® Pro cream subgroup, more than 70% in the Relief® Pro suppositories subgroup and more than 40% in the Relief® Pro cream + suppositories subgroup). For the patients with very pronounced edema, the combined treatment was prescribed most often (about 40% of the patients) in the Relief® Pro cream + suppositories subgroup.

The median indicator of the abundance of discharge before the start of the treatment was 3 points on the Likert scale in the Relief® Pro suppositories subgroup and 2 points in the other two

Table 7. *Dynamics of assessing the severity of hemorrhoidal disease on the Sodergren scale: data obtained during a standardized patient survey*

Indicator	The total amount of points on the Sodergren scale			Change relative to the baseline	
	Visit 1 (Day 1)	Visit 2 (Day 5–7)	Visit 3 (Day 10–14)	Visit 2 — Visit 1	Visit 3 — Visit 1
Relief® Pro cream (*n* = 333)					
N	333	332	312	332	312
Mean ± SD	**3.74 ± 3.19**	**0.50 ± 1.40**	**0.05 ± 0.47**	–3.24 ± 3.16	–3.60 ± 3.10
Relief® Pro suppositories (*n* = 383)					
N	383	383	379	383	379
Среднее ± SD Mean ± SD	**5.05 ± 3.23**	**0.53 ± 1.31**	**0.05 ± 0.46**	–4.53 ± 3.23	–4.97 ± 3.13
Relief® Pro cream + suppositories (*n* = 284)					
N	284	284	263	284	263
Mean ± SD	**5.53 ± 3.12**	**1.67 ± 2.07**	**0.22 ± 1.13**	–3.86 ± 2.85	–4.86 ± 2.70

subgroups of the treatment. In most patients, in their opinion, the severity of the symptom was moderate, minimal, or the symptom was absent.

The overwhelming majority of the patients regarded the severity of discomfort as moderate or very severe.

The greatest feeling of discomfort at the beginning of the study was experienced by the patients from the Relief® Pro cream + suppositories subgroup (4 points on the Likert scale compared to 3 points in the other two subgroups of the treatment).

In addition to the local treatment of hemorrhoids with Relief® Pro, half of the patients (49.7%) used concomitant treatment. At the same time, bioflavonoids were among the most commonly taken drugs. So, drugs of this group were taken by: 120 (36.0%) patients of the Relief® Pro cream subgroup; 137 patients (35.8%) of the Relief® Pro suppositories subgroup, and 194 patients (68.3%) of the Relief® Pro cream + suppositories subgroup. Laxatives and proton pump inhibitors are also commonly taken medications. It is obvious that the main amount of drugs was taken by the patients or recommended by a doctor in connection with the underlying disease.

Assessment of the Treatment Effectiveness

The effectiveness of the studied treatment was evaluated in all the patients who used the Relief® Pro during the study at least once. Already by the second visit (day 5–7) in all the treatment subgroups, according to the patients' estimates, there was a significant change in the severity of hemorrhoidal disease on the Sodergren scale compared to the initial values and remained until the end of observation ($p < 0.001$). Thus, the average change in the indicator of the total sum of Sodergren scores relative to the the baseline level in the Relief® Pro cream treatment subgroup was: — 3.24 ± 3.16 at Visit 2 and — 3.60 ± 3.10 at Visit 3; in the Relief® Pro suppositories subgroup — 4.53 ± 3.23 and — 4.97 ± 3.13 at Visit 3; in the Relief® Pro cream + suppositories subgroup — 3.86 ± 2.85 at Visit 2 and — 4.86 ± 2.70 at Visit 3 (Table 7).

It is noteworthy that the intergroup differences in the value of this indicator, which occurred before the start of the treatment with the studied drug, were also manifested at observation Visits 2 and 3. In this regard, it was assumed that the differences are due to the form and degree of hemorrhoids, as well as the individual characteristics of the patients included in the study. At the same time, despite the detected intergroup differences, in all the subgroups of the treatment, there was a positive change of a decrease in the severity of hemorrhoids on the Sodergren scale, compared with the initial values.

According to the patients' estimates, the use of the studied drug Relief® Pro, regardless of the dosage form, led to a significant decrease in the severity or disappearance of the main symptoms of hemorrhoids — bleeding, itching, edema, the presence of discharge, discomfort by Visit 2 and in almost all the patients — by the end of observation at visit 3 (Fig. 1–3). The assessment of symptoms in points was — at Visit 2: discomfort 2.2 ± 0.6 points, edema 2.1 ± 0.7 points, itching 1.9 ± 0.6

points, the presence of discharge 1.5 ± 0.6, bleeding 1.5 ± 0.6 points on the Likert scale; assessment at Visit 3: discomfort 1.4 ± 0.6 points, edema 1.3 ± 0.5 points, itching 1.2 ± 0.4 points, the presence of discharge 1.0 ± 0.2 points, bleeding 1.0 ± 0.2 points on the Likert scale.

A similar pattern was observed with respect to the symptoms assessed by the medical researcher during the digital examination: these symptoms disappeared or their intensity was minimized in most patients by Visit 2 (on average, in the population, edema in the perianal area — 82.3%, bleeding — 98.3%) and in almost all the patients — by Visit 3 (edema in the perianal area — 98.4%, bleeding — 99.8%). At Visit 2, the severity of edema in the perianal area was 2 ± 0.6 points on the Likert scale (minimum), at Visit 3–1.2 ± 0.5 points (absent); the severity of bleeding at Visit 2 was 1.4 ± 0.5 points (absent or minimum), at Visit 3–1.0 ± 0.2 points (absent) (the data are presented for the general population) (Figure 2, 3).

The presented data demonstrate that in all the subgroups of the treatment, without exception, there was a positive trend in the severity of all the assessed symptoms.

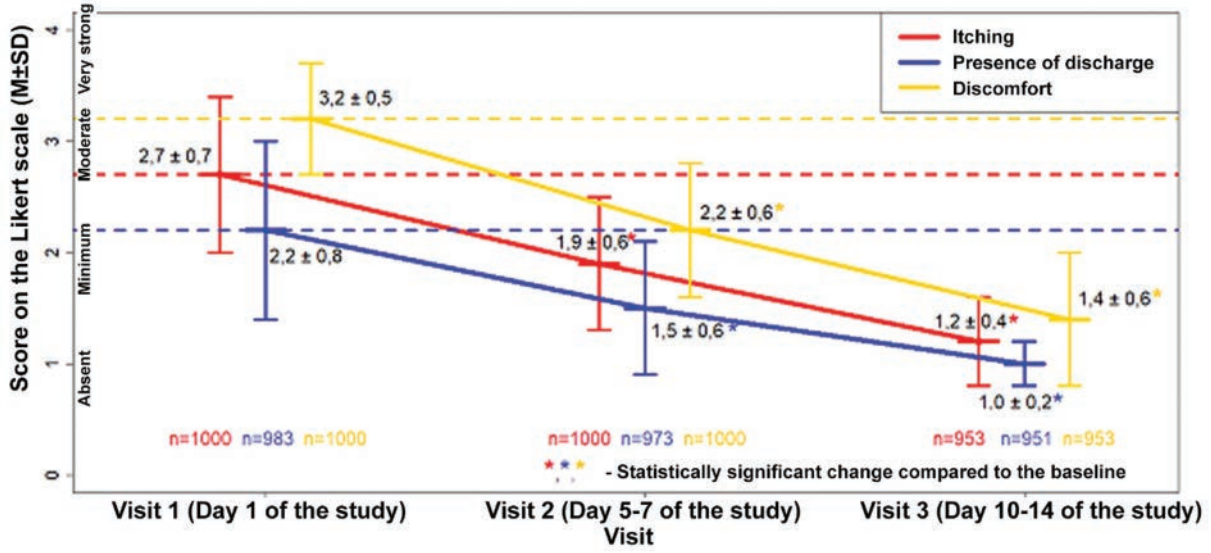


Figure 1. *Dynamics of the severity of the main symptoms of hemorrhoids: Itching, the presence of discharge, Discomfort, according to the patient's assessment (n = 1000)*

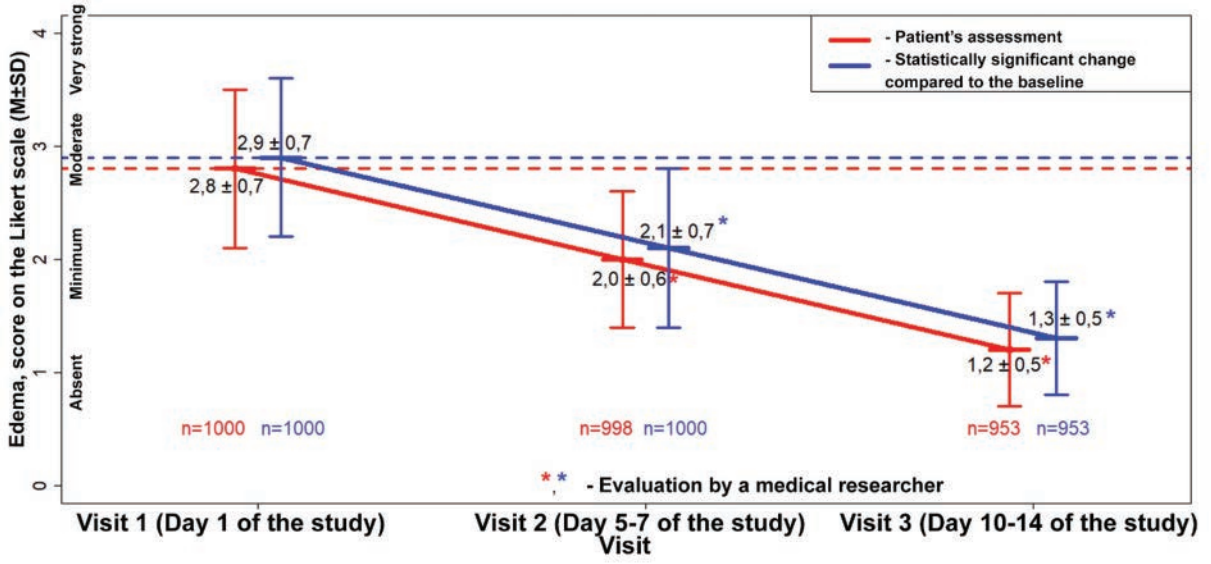


Figure 2. *Dynamics of symptom severity* ***Edema in the perianal region*** *according to the doctor's and patient's estimates (n = 1000)*

Table 8. *Dynamics of symptom severity* ***Edema in the perianal region*** *which was evaluated during the finger examination*

Indicator	Edema in the perianal area, score on the Likert scale[1]			Change relative to the baseline	
	Visit 1 (Day 1)	Visit 2 (Day 5–7)	Visit 3 (Day 10–14)	Visit 2 — Visit 1	Visit 3 — Visit 1
Relief® Pro cream (*n* = 333)					
N	333	331	311	331	311
M ± SD	2.65 ± 0.73	1.86 ± 0.55	1.10 ± 0.32	–0.80 ± 0.60	–1.57 ± 0.73
Relief® Pro suppositories (*n* = 383)					
N	383	383	379	383	379
M ± SD	2.90 ± 0.57	2.04 ± 0.49	1.21 ± 0.42	–0.86 ± 0.45	–1.69 ± 0.61
Relief® Pro cream + suppositories (*n* = 284)					
N	284	284	263	284	263
M ± SD	2.97 ± 0.68	2.20 ± 0.69	1.47 ± 0.59	–0.76 ± 0.54	–1.50 ± 0.67

Changes in the Size of the Largest Hemorrhoid Node

Against the background of the use of the drug Relief® Pro in all the subgroups of the treatment, there was a decrease in the size of the largest hemorrhoid node ($p < 0.001$) (Table 10). At the same time, the results obtained indicate the effectiveness of the treatment regardless of the dosage form of the drug used and the form of hemorrhoids — both external and internal nodes decreased.

The most significant decrease in this indicator (in percent) occurred in the Relief® Pro cream and the Relief® Pro suppositories subgroups — by 41.72% and 36.84% on day 5–7 of the treatment and by 76.98% and 69.08% on day 10–14, respectively. Nevertheless, in the combined treatment group, the results were also impressive: the reduction in the size of the largest node was 26.06% and 51.6% at visits 2 and 3, respectively. These data suggested that the differences are due to the form and degree of hemorrhoids, as well as the individual characteristics of the patients included in the study.

Assessment of Analgesic Effect

During the study, the patients were asked to fill out a one-page diary at home in order to assess the rate of onset and severity of the analgesic effect after the first use of the studied drug. On the reduction of the severity of pain syndrome after the first use of the Relief®, reported a total of about 95% of the patients: 98.5%, 98.7%, and 88.7% of the patients receiving the Relief® Pro cream, suppositories or a combination thereof, respectively. At the same time, in the group that received the

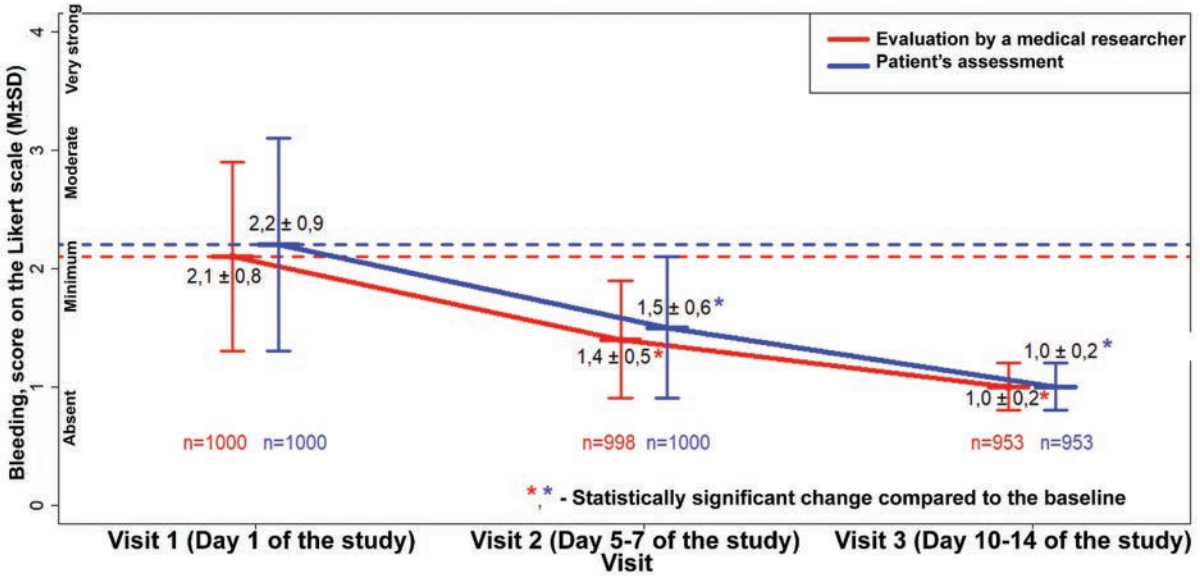


Figure 3. *Dynamics of symptom severity* ***Bleeding*** *according to the estimates of the doctor and the patient (n = 1000)*

Table 9. *Dynamics of symptom severity* ***Bleeding in the perianal area*** *which was evaluated during the finger examination*

Indicator	Bleeding in the perianal area, score on the Likert scale[1]			Change relative to the baseline	
	Visit 1 (Day 1)	Visit 2 (Day 5–7)	Visit 3 (Day 10–14)	Visit 2 — Visit 1	Visit 3 — Visit 1
Relief® Pro cream (*n* = 333)					
N	333	331	311	331	311
Average ± SD	2.0 ± 0.88	1.38 ± 0.51	1.02 ± 0.15	–0.63 ± 0.67	–1.04 ± 0.88
Relief® Pro suppositories (*n* = 383)					
N	383	383	379	383	379
Average ± SD	2.19 ± 0.80	1.44 ± 0.53	1.02 ± 0.16	–0.75 ± 0.63	–1.18 ± 0.8
Relief® Pro cream + suppositories (*n* = 284)					
N	284	284	263	284	263
Average ± SD	2 ± 0.83	1.47 ± 0.55	1.04 ± 0.2	–0.53 ± 0.61	–1.00 ± 0.81

Table 10. *Dynamics of changes in the size of the largest hemorrhoid node (n = 1000)*

Indicator	The size of the largest hemorrhoid node, mm			Change relative to the baseline	
	Visit 1 (Day 1)	Visit 2 (Day 5–7)	Visit 3 (Day 10–14)	Visit 2 — Visit 1	Visit 3 — Visit 1
Relief® Pro cream (*n* = 333)					
N	333	329	308	329	308
M ± SD	13.9 ± 4.7	7.9 ± 4.4	3.1 ± 4.1	–5.8 ± 2.6	–10.7 ± 3.2
Relief® Pro suppositories (*n* = 383)					
N	383	383	379	383	379
M ± SD	15.2 ± 5.2	9.5 ± 4.9	4.6 ± 4.9	–5.6 ± 2.3	–10.5 ± 3.4
Relief® Pro cream + suppositories (*n* = 284)					
N	284	284	n = 263	284	263
M ± SD	18.8 ± 5.5	13.9 ± 4.9	8.9 ± 4.5	–4.9 ± 2.8	–9.7 ± 4.5

Relief® Pro as part of a combination of the dosage forms, the least number of the patients reported such a decrease ($p < 0.001$). This fact was probably due to the combined form of the disease, as well as the severity, which was slightly higher in this subgroup.

Initially, the severity of pain on the VAS scale before the first use of the drug was higher in the Relief® Pro suppositories subgroup: 7.47 ± 1.35 points *vs* 6.85 ± 1.50 points (Relief® Pro cream) and 6.81 ± 1.73 points (Relief® Procream + suppositories) ($p < 0.001$). At the same time, a decrease in the severity of pain after the first use of the drug Relief® Pro was the highest ($p < 0.001$) in the Relief® Pro cream + suppositories treatment subgroup: — 4.86 ± 2.15 points, compared with — 3.14 ± 1.45 points and — 3.16 ± 1.74 points in the Relief® Pro cream and the Relief® Pro suppositories subgroups, respectively.

The rate of onset of the maximal analgesic effect after the first use of the drug was the lowest in the Relief® Pro cream + suppositories subgroup: 39.83 ± 25.26 min. ($p < 0.001$), *vs* with 20.19 ± 16.37 min. in the Relief® Pro cream subgroup and 16.98 ± 11.12 min. in the Relief® Pro suppositories subgroup.

The duration of the analgesic effect of the drug in the Relief® Pro cream + suppositories subgroup was also the smallest: 130.99 ± 71.57 min. ($p < 0.001$) compared to 198.84 ± 92.19 min. and 188.25 ± 93.74 min. in the Relief® Pro cream and the Relief® Pro suppositories subgroups, respectively (Table 11).

At the same time, when assessing the severity of pain sensations at Visits 1, 2 and 3, there was a pronounced change with a significant decrease in indicators at Visit 2 compared to the initial and minimum values or the absence of pain at Visit 3 in all the subgroups of the treatment (Table 12).

Identified in the Relief® Pro cream + suppositories subgroup, differences in reducing the severity of pain (both during the first use of the drug and according to the results of the course of the treatment), the rate of onset of the maximum analgesic effect and the duration of the analgesic effect are probably due to several factors: the combined form of hemorrhoids and the more pronounced severity of the disease in this subgroup, as well

as the need to use two dosage forms of the drug under study simultaneously.

Assessment of Treatment Satisfaction, Compliance to Recommendations and Treatment

Both the patients and the doctors noted very high satisfaction with the results of the treatment with the Relief® Pro drug. By the end of the course of the treatment, on average, in about 97% of the cases, the research doctors were satisfied with the results of the treatment: 99.1% of the cases in the Relief® Pro cream subgroup; 99.5% of the cases in the Relief® Pro suppositories subgroup; 92.8% of the cases in the Relief® Pro cream + suppositories subgroup.

The vast majority of the patients, on average about 96%, were also satisfied with the studied treatment at the end of the treatment: 98.7% of the cases in the Relief® Pro cream subgroup; 98.7% of the cases in the Relief® Pro suppositories subgroup; 90.5% of the cases in the Relief® Pro cream + suppositories subgroup.

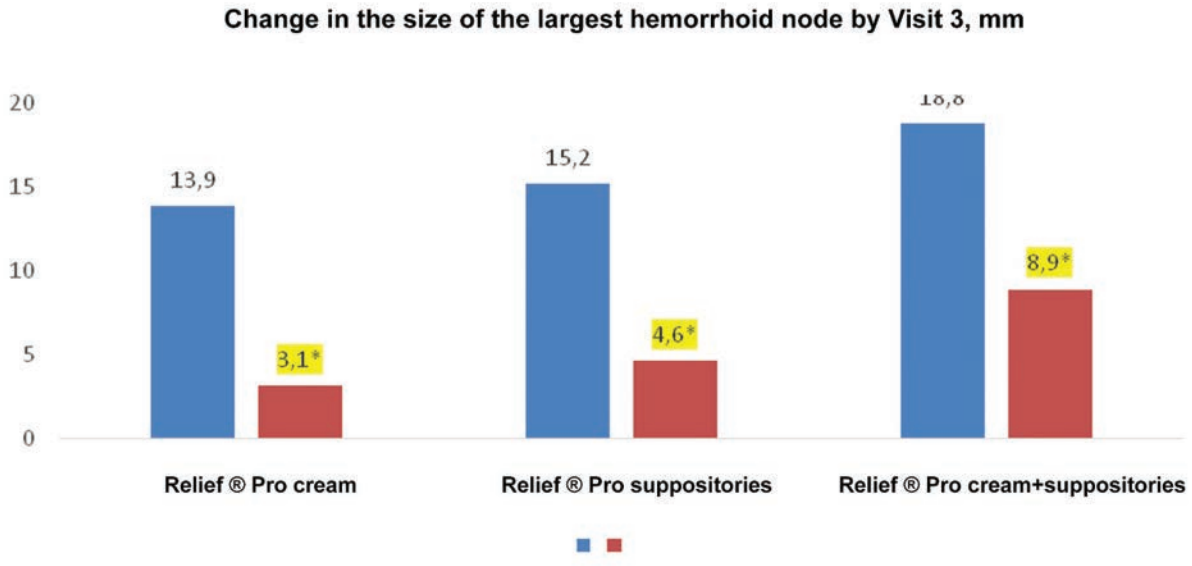
The conducted research allowed to obtain data from real clinical practice on patients' adherence to such recommendations of a research doctor as compliance with hygiene rules, diet, recommendations regarding physical activity, the use of dietary supplements, the use of concomitant treatment drugs. The vast majority of the patients (more than 99%), regardless of the subgroup of the treatment, fully or partially followed the recommendations of the researcher on hygiene, more than 97% of the patients (fully or partially) followed the diet, more than 96% of the patients followed the recommendations on physical activity. Recommendations for the use of dietary supplements were provided to the patients in total in more than 70% of the cases, while most of the patients (more than 70%) either fully or partially followed these recommendations. It is worth noting that only about half of the patients from the Relief® Pro cream + suppositories subgroup received recommendations for the use of dietary supplements.

The overwhelming majority of the patients (more than 81%) also followed the recommendations of the research doctor regarding the intake of other medications, concomitant treatment drugs.

Most of the patients followed the prescriptions of the research doctor regarding the dosage form and the frequency of the use of the Relief® Pro drug. The average duration of the use of the Relief® Pro drug by the patients was:

- 11.4 ± 1.9 days (Relief® Pro cream),
- 11.4 ± 1.7 days (Relief® Pro suppositories),
- 12.6 ± 1.4 days (Relief® Pro cream + suppositories);

The duration of the use of the drug in the Relief® Pro cream + suppositories subgroup was the highest ($p < 0.001$). This difference may probably be



** statistically significant differences compared to the initial data ($p < 0.001$)*

Figure 4. *The size of the largest hemorrhoid node during the treatment with Relief® Pro*

Table 11. *Dynamics of changes in the severity of pain during the first use of the drug (n = 1000)*

Groups	The severity of pain before using the drug, the score on the VAS scale	The maximum degree of pain reduction after the first use of the drug, the score on the VAS scale	The onset of the maximum analgesic effect after the 1st use, min.	Duration of analgesic effect, min.
Relief® Pro cream (*n* = 333)	6.85 ± 1.50	–3.14 ± 1.45	20.19 ± 16.37	198.84 ± 92.19
Relief® Pro suppositories (*n* = 383)	7.47 ± 1.35	–3.16 ± 1.74	16.98 ± 11.12	188.25 ± 93.74
Relief® Pro cream + suppositories(*n* = 284)	6.81 ± 1.73	–4.86 ± 2.15	39.83 ± 25.26	130.99 ± 71.57

Table 12. *The severity of pain during the treatment (n = 1000)*

Indicator	Pain, score on the VAS scale			Change relative to the baseline	
	Visit 1 (Day 1)	Visit 2 (Day 5–7)	Visit 3 (Day 10–14)	Visit 2 — Visit 1	Visit 3 — Visit 1
Relief® Pro cream (*n* = 333)					
N	333	333	310	333	310
M ± SD	6.79 ± 1.64	3.04 ± 1.47	0.65 ± 1.06	–3.75 ± 1.44	–6.27 ± 1.83
Median	7	3	0	–4	–7
Relief® Pro suppositories (*n* = 383)					
N	383	383	380	383	380
M ± SD	7 ± 1.43	3.50 ± 1.59	1.02 ± 1.5	–3.5 ± 1.51	–5.98 ± 1.89
Median	7	3	0	–4	–6
Relief® Pro cream + suppositories(*n* = 284)					
N	284	284	263	284	263
M ± SD	6.85 ± 1.81	4.46 ± 1.99	2.57 ± 1.78	–2.39 ± 1.46	–4.22 ± 1.6
Median	7	5	2	-2	-4

due to the slower dynamics of changes in the severity of hemorrhoidal disease, measured by the patients on the Sodergren scale, in this subgroup of the treatment.

Adverse Events (Safety/Tolerability)

During the follow-up, a total of 5 adverse events were registered in 3 patients: 2 adverse events (AE) in 1 patient in the Relief® Pro cream treatment subgroup and 3 AEs in 2 patients in the Relief® Pro suppositories subgroup.

Edema of the perianal area (3 cases) and bleeding in the perianal area (2 cases) were recorded. No cases of AE in the patients in the Relief® Pro cream + suppositories subgroup were identified.

All the AEs were regarded by the researcher as unrelated to the drug used. All the AEs registered during the study were resolved by the end of the study.

No cases of serious adverse events (SAE) were detected during this study.

DISCUSSION

Hemorrhoids are an urgent and widespread problem of modern man, which brings discomfort and great inconvenience to daily activity. Hemorrhoids are increasingly affecting people of young working age [2]. Inactive/sedentary lifestyle and other factors contributing to stagnation of blood circulation in the pelvic organs, and primarily in the rectum, as well as errors in nutrition and unstable bowel function lead to the emergence of a disease or exacerbation of an already existing process.

Topical symptomatic agents are an integral component of the complex conservative treatment of hemorrhoids. Increasingly, combined drugs that affect several symptoms at the same time are being used. In addition, combined drugs help to increase compliance and facilitate patients' compliance with the treatment regimen. The combination of topical GCS fluocortolone pivalate and the local anesthetic lidocaine has been successfully

used for many years and has been studied in several studies [15–17].

However, data on the efficacy and tolerability of the drug in real clinical practice have not been available to date.

The purpose of this prospective, multicenter observational study was to assess the efficacy and safety of treatment with Relief® Pro in patients with acute hemorrhoids of the I–II stages and exacerbation of chronic hemorrhoids.

In the study, in real conditions, positive changes were noted in patients with hemorrhoids with respect to the severity of the disease on the Sodergren scale, the severity of hemorrhoid symptoms and changes in the size of the largest hemorrhoid node. So, against the background of the use of the studied drug Relief® Pro regardless of the dosage form, already at the second visit, 5–7 days after the start of the treatment, the main symptoms of hemorrhoids — bleeding, itching, edema, the presence of discharge, discomfort — significantly decreased or disappeared, and were absent in almost all the patients by the end of the observation. Against the background of the treatment with the studied drug, the size of the largest hemorrhoid node by the end of the study decreased by 76.9% in the group of the patients who were prescribed the Relief® Pro cream, by 69.1% in the group of the patients treated with the Relief® Pro suppositories, and by 51.6% in the group of the patients treated with the both forms of the drug.

At the same time, the results obtained indicate the effectiveness of the treatment regardless of the dosage form of the drug used and the form of hemorrhoids — both external and internal nodes decreased. The pronounced effect of the drug on the pain syndrome, the rate of development and duration of the analgesic effect was noted.

The number of the patients with acute hemorrhoids of the I stage, II stage and exacerbation of chronic hemorrhoids in the study was approximately the same. However, the distribution of the patients by the subgroups of the treatment was uneven, since it was based on the type of dosage form of the prescribed treatment (cream, suppositories or a combination thereof). It can be assumed that the prescription of a particular dosage form of the Relief® Pro drug was carried out basing on the form of the disease: treatment of the external form of hemorrhoids was more often carried out with the cream (n = 318, 62%); the internal ones — with the suppositories (n = 253, 89.7%); and the combined form — with a combination of dosage forms of the cream + suppositories (n = 123, 60%).

It turned out that in the subgroup of the treatment with the use of the Relief® Pro cream and suppositories, the proportion of the patients with the 2nd degree hemorrhoids and with combined hemorrhoids (internal + external) was higher in comparison with the other subgroups, which could affect the treatment effectiveness (reducing the symptoms severity) obtained during the treatment. At the same time, despite the detected intergroup differences, in all the treatment subgroups, without exception, there was a positive change in all the efficiency indicators recorded by the researcher.

The initial characteristics of the patients included in this study are consistent with the data on the population of patients with hemorrhoids. These are people of active working age, who have several risk factors/triggers of hemorrhoids. It was noted that the overwhelming number of the patients followed the doctor's recommendations on the treatment duration with the Relief® Pro drug, as well as on compliance with diet, hygiene rules, and physical activity.

It seems important that both the patients and the doctors were very satisfied with the treatment results with the Relief® Pro drug.

Good tolerability of the treatment was recorded — adverse events were isolated and were not associated with the use of the drug under study.

Several limitations of this study also need to be taken into account. Since the study was observational and did not include a control group, it was impossible to conduct a direct assessment of the effectiveness of the Relief® Pro drug. Due to the open study design, a potential systematic evaluation error may be detected.

In addition, standard clinical conditions implied the impossibility of monitoring the use of concomitant treatment and the inability to obtain data at all time points, which could negatively affect the interpretation of the data.

CONCLUSION

The results of the study confirmed the efficacy and safety of the studied Relief® Pro drug when using it in patients with acute hemorrhoids of the 1–2 degrees and exacerbation of chronic hemorrhoids. Against the background of the use of the drug in the form of cream, suppositories or a combination of them, the severity of hemorrhoidal disease, the severity of the main symptoms of the disease and the size of hemorrhoids decreased significantly and in a short time. Monitoring of the safety of medical use of the drug confirmed its good tolerability and the absence of influence on vital functions.

In the study, valuable data were obtained characterizing the patient population, approaches to the diagnosis and treatment of hemorrhoids in real clinical practice. Besides, additional information was obtained on patients' adherence to the doctor's recommendations, patient and researcher's satisfaction with the treatment, as well as an assessment of patients' preferences regarding the dosage form of the drug under study and its consumer properties was made.

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REFERENCES

1. Shelygin Yu.A., Blagodarny L.A. Reference of coloproctologist. Moscow: Literra. 2012; c. 64–89. (in Russ.).
2. Vorobiev G.I., Shelygin Yu.A., Blagodarny L.A. Haemorrhoids. M .: Littera. 2010; pp. 38–40, 114–116, 137–138, 154–183. (in Russ.).
3. Corman ML. Hemorrhoids. In: Corman ML, eds. Colon and rectal surgery. 6th ed. Philadelphia, USA: Lippincott; 2013; pp. 272-366.
4. Wald A, Bharucha AE, Cosman BC, Whitehead WE. ACG clinical guideline: management of benign anorectal disorders. *Am J Gastroenterol*. 2014;109:1141–1157, (Quiz) 1058.
5. Bradley RD, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Hemorrhoids. *Dis Colon Rectum*. 2018;61:284–292.
6. Johanson JF, Sonnenberg A. The prevalence of hemorrhoids and chronic constipation: an epidemiologic study. *Gastroenterology*. 1990;98:380–386.
7. Wienert V., Llitz H., Raulf F. Handbuch Ha¨morrhoidalleiden. *Uni-Med Brennen*. 2008;30.
8. Kaidar-Person O, Person B, Wexner SD. Hemorrhoidal disease: a comprehensive review. *J Am Coll Surg*. 2007;204:102–117.
9. Acheson AG, Scholefield JH. Management of haemorrhoids. *BMJ*. 2008;336:380–383
10. Martinez-Zapata MJ, Vernooij RW, Uriona Tuma SM, Stein AT, et al. Phlebotonics for venous insufficiency. *Cochrane Database Syst Rev*. 2016 Apr 6;4(4):CD003229. DOI: 10.1002/14651858.CD003229.pub3. Update in: Cochrane Database Syst Rev. 2020 Nov 3;11:CD003229. PMID: 27048768; PMCID: PMC7173720.
11. Pauwels R. Mode of action of corticosteroids in asthma and rhinitis. *Clin Allergy*. 1986;16:281–288.
12. Truss M, Beato M. Steroid hormone receptors: interaction with deoxyribonucleic acid and transcription factors. *Endocr Rev*. 1993;14:459–479
13. Schimmer BP, Parker KL. Adrenocorticotropic hormone; Adrenocortical steroids and their synthetic analogs; inhibitors of the synthesis and actions of adrenocortical hormones. In: Hardman J.G., Limbird L.E., Goodman Gilman A (Hrsg.), Goodman and Gilman's The Pharmacological Basis of Therapeutics (10. Aufl.). New York, McGraw-Hill. 2001; p.1649–1678.
14. Corman ML. Colon and rectal surgery. 5th ed. Philadelphia: Lippincott; 2004.
15. Neiger A H.E. The symptomatic therapy of hemorrhoids and anal eczema — a report of experiences from proctology practice. *Schweiz Rundsch Med Prax*. 1990;79:918–920
16. Abramowitz L, Weyandt G, Havlickova B. The diagnosis and management of haemorrhoidal disease from a global perspective. *Aliment Pharmacol Ther*. 2010;31(1):1–58.
17. Ivanov V.V., Lebedev I.S., Blagodarny L.A. Role of local therapy of pain syndrome in patients after hemorroidectomy. *Koloproktologia*. 2019;19(4):110–115. (in Russ.). DOI: 10.33878/2073-7556-2019-18-4-110-115
18. Shelygin Yu.A., Frolov S.A., Titov A.Yu., Blagodarny L.A., et al. Clinical recommendations of the Association of Coloproctology of Russia on the diagnosis and treatment of hemorrhoids. *Koloproktologia*. 2019;18(1):7–38. (in Russ.). https://doi.org/10.33878/2073-7556-2019-18-1-7-38

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Rectal gastric heteroptopia in a child. Case-report of casuistic pathology

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ABSTRACT *Heterotopy of gastric mucosa in the rectum in children is a rare malformation to keep in mind when examining a child with a rectal bleeding. About 5 such clinical cases in children were described in the literature over the past 10 years. This condition is congenital, due to impaired tissue differentiation during embryogenesis. This case-report demonstrates the diagnostics and treatment of a child with rectal gastric heteroptopia.*

KEYWORDS: *heterotopic gastric mucosa, rectum, children*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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In the practice of pediatric surgeons, heterotopia is quite common. Diseases such as Meckel's diverticulum, duplication of the gastrointestinal tract (GIT), as a rule, are accompanied by the presence of a focus of heterotopia of cells of the gastric mucosa, less often of the pancreas or epithelium of the respiratory tract [1,2]. However, isolated gastric heterotopia into the rectum, both in the pediatric population and in adult patients, is an extremely rare abnormality. It is known that heterotopia is a congenital pathology, in contrast to metaplasia — the transformation of the epithelium in the process of vital activity. The term 'heterotopia' is the presence of a morphologically normal type of tissue in a non-physiological area for it. Heterotopia is more common in the anterior intestine, which is explained by a violation of the migration of endoderm cells developing from a common germ during embryogenesis [3]. However, variants of heterotopia site outside the gastrointestinal tract are described: in the mediastinum, scrotum or biliary tract [3,4]. Such a diverse localization is explained by the fact that the pluripotent stem cells of the endoderm are able to differentiate into all tissues of the gastrointestinal tract. The error of this process leads to the fact that the gastric mucosa has the most diverse localization [3].

Since the first publication of this pathology by Ewell G.H., Jackson R.H. in 1939, about 30 cases of isolated heterotopy into the rectum have been described in the literature [5]. Over the past decade, only 5 similar clinical cases in children have been found in the available literature [5–9]. Domestic papers describing isolated heterotopia in the rectum in children could not be found.

Due to the lack of observational studies on this topic and the presence of only a small number of published clinical cases, indicators such as morbidity and prevalence of pathology are currently unknown. In the literature review by Iacopini, F. et al., which included 72 cases of various heterotopias in adults and children, this pathology was more common in men — 63% than in women — 37%.

The authors also traced the age at the time of pathology detection, the median of which was 22 years (1 day — 69 years) [10].

The clinical picture of gastric epithelium heterotopia in the rectum includes symptoms such

as rectal bleeding, often in combination with diarrhea (22%), tenesmus (22%), and abdominal pain (55%). In 20% of cases, an asymptomatic course of the disease is described [3]. In addition, the production of hydrochloric acid by displaced stomach cells leads to damage to adjacent tissues and the occurrence of complications such as bleeding, the occurrence of fistulas (recto-vesical, -vaginal, -perineal), perforation of the rectum into the free abdominal cavity or the pelvic cavity [10]. In addition, to date, there have been isolated publications describing the appearance of malignant formations against the background of existing heterotopia, including those with an asymptomatic course [11]. Thus, the issue of malignancy at the moment remains open for research and discussion.

Rectal bleeding is the most common symptom of gastric heterotopia in the rectum [10]. However, it is important to remember about a wide range of diseases accompanied by the clinic of gastrointestinal bleeding, such as Meckel's diverticulum, gastrointestinal duplication of various localization, juvenile polyps and other less common polypous syndromes, anal fissures, inflammatory bowel diseases (ulcerative colitis, Crohn's disease), as well as various variants of vascular malformations. Such a variety of diseases dictates the need for a thorough clinical and laboratory check-up of a patient with the onset of gastrointestinal bleeding at any age using instrumental research methods (esophagoduodenoscopy, ileocolonoscopy, videocapsular endoscopy, radioisotope examination).

It should be noted the need for performing a biopsy of the formation and mucous membrane of the intestinal tract for histological verification, which plays a crucial role in making a final diagnosis.

It is important that some imaging methods such as CT and MRI do not have sufficient sensitivity and specificity in case of suspected gastrointestinal heterotopia.

The described methods of conservative therapy of the disease — proton pump blockers, antibacterial therapy for the purpose of eradication of Helicobacterpylori (if the latter is detected in a biopsy), may for some time lead to the relief of bleeding and the inflammatory process, and even to the healing of ulcers. However, in 62% of cases, within 3 months after discontinuation of treatment, there was a resumption of symptoms, which required surgery. Only radical removal of the heterotopy focus led to a complete recovery [10].

There have been significant changes in surgery in recent years: from resection of the affected part of the intestine to precision removal of the lesion under endoscopic control. To date, in the practice of colorectal surgeons, preference is given to endoscopic methods of treatment — loop resection, including polypectomy, endoscopic mucosal resection (EMR), argonoplasmic ablation of the residual zone, endoscopic submucosal dissection (ESD). Despite the fact that in 17% of cases after endoscopic resection of the mucous membrane, residual zones of heterotopia were revealed, this method in the hands of experienced specialists can certainly be called the gold standard of treatment [8,10].

It is important to note that most pediatric surgeons have no experience in performing such endoscopic procedures, given the rarity of pathology. Fibrosis of the submucosa, which is naturally observed with this anomaly, as a result of a chronic inflammatory process, can also cause significant difficulties when performing surgery.

Our clinical case demonstrates a rare congenital pathology and the choice of treatment method in a patient with isolated gastric heterotopia.

The boy V., aged 10 years old, was admitted to pediatric coloproctology unit with complaints of an admixture of blood and mucus in the stool. When collecting history of the disease, it was noted that the above complaints periodically disturbed the child from the age of 2 years old. During the initial check-up at the place of residence, an anal fissure was revealed, which explained the hematocheesia clinic.

Conservative topical therapy (anti-inflammatory suppositories) was ineffective, relapses of rectal bleeding persisted. No additional check-up was carried out. For the first time at the age of 9 years old, after an episode of massive rectal bleeding, the child underwent a proctoscopy: on the back wall of the rectum 10 cm from the anal verge, a rounded, diverticular formation

with a diameter of about 2 cm with pronounced mucosal hyperemia along the circumference and contact bleeding was visualized. For further examination and determination of treatment approach, the child was transferred to a federal institution.

Upon admission to the clinic, the general condition of the patient was of moderate severity. When clarifying the clinical and anamnestic data, it was noted that there were no other symptoms, the hereditary anamnesis was not burdened. His physical development corresponded to his age. Ileocolonoscopy was performed, according to which the mucous membrane of the bowel was pink, smooth throughout; the vascular pattern was clear and uniform. Along the posterior wall of the rectum at a distance of 10 cm from the anal verge, a crater-like depression up to 2 cm in diameter with pronounced contact bleeding was visualized (Fig.1). With a digital rectal examination, it was possible to palpate only the lower pole of this lesion.

To clarify the anatomical features, an MRI of the pelvis was performed, the results of which described the presence of an uneven thickening of the mucosa up to 35–40 mm in length up to 80–90 mm along the posterior wall of the rectum, above the level of the anal margin by 9 cm. It was difficult to assess the depth and extent of the lesion (Fig.2).

Considering the extreme rarity of such neoplasms in surgical practice, the contradictory data of the check-up on the depth and prevalence of heterotopia in the rectal wall, as well as the lack of experience in endoscopic dissection in children, it was decided to refrain from using this technique.

It was decided to perform a resection of the rectum.

The child underwent a low anterior rectal resection of the rectum with the stapler anastomosis at a height of 3 cm from the dentate line with intraoperative proctoscopy to determine the distal resection margin, without the preventive ileostomy.

According to the histology of the removed specimen, fragments of the gastric mucosa of the fundal type were detected.

The lamina propria of the mucosa was edematous, with weakly expressed lymphoplasmocytic infiltration with an admixture of eosinophils (Fig. 3).

No complications occurred after the surgery. First defecation was on the 4th day. On the 10th postoperative day, the child was discharged home in a stable condition. With catamnestic observation after 1 month, the child's condition

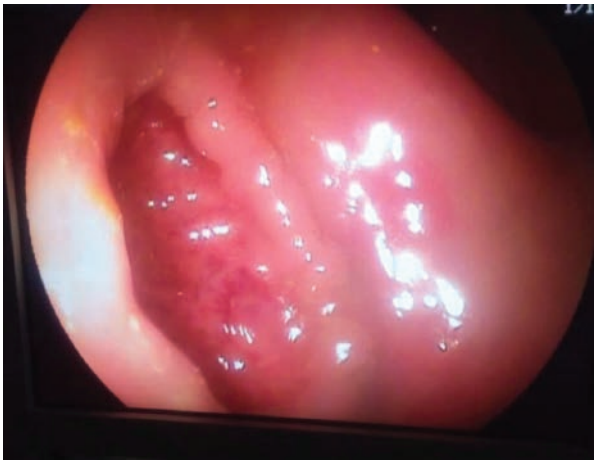

Figure 1. *Endoscopy image of gastric heterotopy of the rectum — lesion with a funnel-shaped depression in the center and with margins slightly raised*

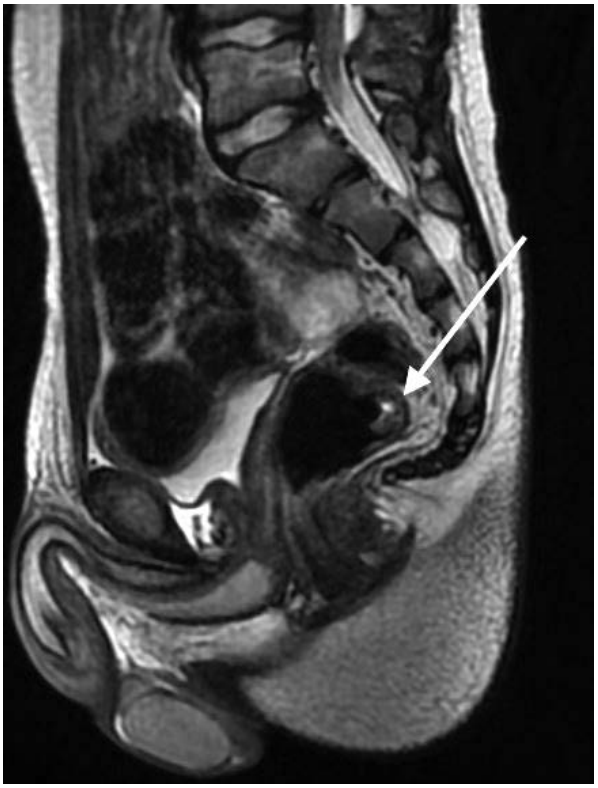

Figure 2. *Pelvic MRI of a patient with gastric heterotopy of the rectum. Local thickening of the rectal mucosa (arrow)*

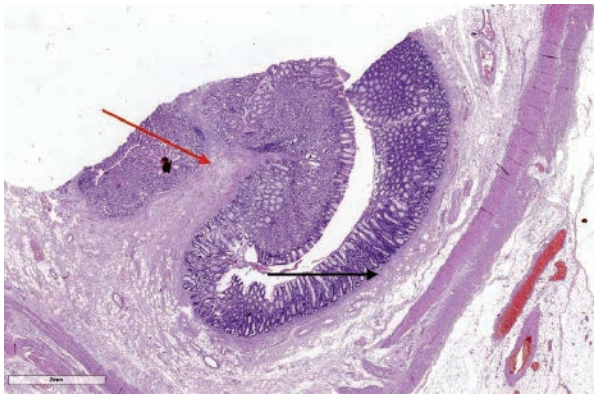

Figure 3. *Histology of gastric heterotopy. The site of heterotopy, represented by the cells of the fundus of the stomach (red arrow). Normal rectal mucosa (black arrow). Hematoxylin and eosin staining, ×11 increase*

was satisfactory. For 1.5 months after surgery, there was a syndrome of low anterior resection, with defecations 4–5 times a day.

During the control proctoscopy after 2 months, the rectal mucosa and the zone of anal sphincter did not change.

Despite the rarity of this disease, heterotopy should be included in the differential diagnostics when examining a child with a gastrointestinal bleeding clinic, of course, after excluding other more common diseases in childhood. This clinical case demonstrates the difficult path of finding a definitive diagnosis and choosing treatment approach for a child with an extremely rare congenital abnormality.

Nevertheless, such rather rare and casuistic clinical cases dictate the need to introduce new operational skills into the practice of pediatric surgeons to improve the quality of medical care for children.

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REFERENCES

1. Keese D, Rolle U, Gfroerer S. et al. Symptomatic Meckel's Diverticulum in Pediatric Patients—Case Reports and Systematic Review of the Literature. *Front Pediatr*. 2019;7:267. DOI: 10.3389/fped.2019.00267

2. Kim S-H, Cho Y-H, Kim H-Y. Alimentary tract duplication in pediatric patients: its distinct clinical features and managements. *Pediatr Gastroenterol Hepatol Nutr*. 2020;23(5):423–429. DOI: 10.5223/pghn.2020.23.5.423

3. Dinarvand P, Vareedayah AA, Phillips NJ, Hachem C, et al. Gastric heterotopia in rectum: A literature review and its diagnostic pitfall. *SAGE Open Med Case Rep*. 2017;5. DOI: 10.1177/2050313X17693968

4. Linden AF, Raiji MT, Azzam R, et al. Bile duct obstruction secondary to heterotopic gastric mucosa. *Journal of Pediatric Surgery, Case Reports*. 2020.

5. Rousseff T, Matthyssens L, Van Renterghem K. Rectal red blood loss in a healthy toddler is not always a juvenile polyp. *Acta Gastroenterol Belg*. 2017;80(1):67–70.

6. Al-Hussaini A, Lone K, Al-Sofyani M, et al. Gastric heterotopia of rectum in achild: a mimicker of solitary rectal ulcer syndrome. *Ann Saudi Med*. 2014;34(3):245–9. DOI: 10.5144/0256-4947.2014.245

7. Kokil G, Pulimood A, Mathai J. A rare case of a rectal polyp with gastric heterotopia. *Indian J Pathol Microbiol*. 2011;54(4):848–9. DOI: 10.4103/0377-4929.91521

8. Soares J, Ferreira C, Marques M. Endoscopic mucosectomy in a child presenting with gastric heterotopia of the rectum. *GE Port J Gastroenterol*. 2017;24:288–291. DOI:10.1159/000478939

9. Fernandes S, Safavi A, Tessier-Cloutier B, et al. Heterotopic gastric mucosa in the rectum. *Journal of Pediatric Surgery Case Reports*. 2020. doi.org/10.1016/j.epsc.2020.101673

10. Iacopini F, Gotoda T, Elisei W. et al. Heterotopic gastric mucosa in the anus and rectum: first case report of endoscopic submucosal dissection and systematic review. *Gastroenterology Report*. 2016;4(3):196–205. DOI: 10.1093/gastro/gow006.

11. Yu L, Yang Y, Cui L et al. Heterotopic gastric mucosa of the gastrointestinal tract: prevalence, histological features, and clinical characteristics. *Scandinavian Journal of Gastroenterology*. 2014;49: 138–144.

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Применение лазера в хирургическом лечении геморроя (обзор литературы)

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РЕЗЮМЕ *В обзоре литературы рассмотрены возможности и результаты лечения геморроя с применением лазера по сравнению с традиционными методами хирургического лечения этого заболевания. Оценивается эффективность и возможность малоинвазивного использования лазера в лечении геморроя при различной его длине волны. Описаны последние технические разработки лазерных технологий, открывающие хорошие перспективы для лечения этой болезни.*

КЛЮЧЕВЫЕ СЛОВА: *геморрой, метод HeLP, лазерная геморроидопластика*

КОНФЛИКТ ИНТЕРЕСОВ: *авторы заявляют об отсутствии конфликта интересов.*

ДЛЯ ЦИТИРОВАНИЯ: Вышегородцев Д.В., Королик В.Ю., Богормистров И.С., Батталова А.М., Мухин И.А. Применение лазера в хирургическом лечении геморроя (обзор литературы). *Колопроктология*. 2021; т. 20, № 4, с. 92–101. https://doi.org/10.33878/2073-7556-2021-20-4-92-101

The use of a laser in treatment of hemorrhoids (review)

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ABSTRACT *The literature review compares laser and traditional surgery for hemorrhoids. The efficiency and possibility of minimally invasive treatment using laser of different wavelengths were analyzed. The review described the innovative technologies of laser treatment of hemorrhoids which make this method promising.*

KEYWORDS: *hemorrhoids, procedure HeLP, hemorrhoidal LASER procedure*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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Геморрой по-прежнему считается одним из самых распространенных заболеваний человека. Распространенность заболевания среди населения земного шара отличается в разных странах [1]. Так в России она составляет 130–145 человек на 1000 взрослого населения, а удельный вес геморроя в структуре заболеваний толстой кишки колеблется от 34 до 41% [2]. В странах Европы удельный вес этого заболевания составляет от 39% до 64% [3,4], а в США геморрой диагностируется более чем у 1 млн населения в год [5].

История лечения геморроя насчитывает не одно столетие. Однако ни один из хирургических методов лечения, по-прежнему, не может полностью удовлетворить как хирургов, так и пациентов.

В настоящее время наиболее радикальным методом лечения является геморроидэктомия, которая применяется при 3 и 4 стадиях заболевания и является

достаточно эффективным методом лечения. Однако эта операция тяжело переносится пациентами ввиду выраженного послеоперационного болевого синдрома, нередким развитием расстройств мочеиспускания, длительным заживлением послеоперационных ран анального канала и сопровождается продолжительным периодом нетрудоспособности. В отдаленном периоде после геморроидэктомии могут встречаться такие осложнения, как стриктура анального канала (2,08–9%), недостаточность анального сфинктера (4–52%) и длительно незаживающие раны (2–18%) [6–16].

Именно поэтому в последние годы все большее место в лечении геморроидальной болезни занимают малоинвазивные методы лечения (лигирование латексными кольцами, склерозирование внутренних геморроидальных узлов, степлерная геморроидопексия по Лонго и дезартеризация геморроидальных узлов). Преимущества этих методов заключаются в малой интенсивности болевого синдрома, отсутствии необходимости в госпитализации или сокращении времени пребывания в стационаре, отсутствии ран в анальном канале, что, в конечном итоге, позволяет сократить сроки реабилитации пациента. Однако применение малоинвазивных методов в отличие от геморроидэктомии позволяет воздействовать лишь на один из факторов патогенеза геморроидальной болезни (механический или сосудистый). Так, главным образом, склеротерапия направлена на ликвидацию сосудистого фактора развития заболевания. Эффективность склерозирования внутренних геморроидальных узлов при 3–4 стадии геморроя не превышает 45% [17,18]. Лигирование латексными кольцами, главным образом, направлено на ликвидацию механического фактора развития заболевания, и его эффективность на поздних стадиях геморроя достигает не более 26% [19].

На современном этапе развития техники, применяемой в медицине, эффективность малоинвазивных методик лечения геморроя может быть расширена благодаря применению современных высокотехнологичных технологий, к которым относится лазерное излучение.

Использование лазера в различных областях медицины началось в 1962–64 гг. во многих странах мира, в том числе в СССР. Заметный прогресс лазерной хирургии в нашей стране стал возможным благодаря созданию в 1964 году CO_2-лазера — Скальпель-1. Опытный образец этой установки был разработан под руководством профессора Стельмаха М.Ф., который вместе с профессором Скобелкиным О.К. внес большой вклад в создание лазерной медицинской техники для здравоохранения в нашей стране [20].

Исследования показали, что при лазерном воздействии заживление ран имеет характерные особенности, заключающиеся в сокращении экссудативной фазы воспаления, раннем формировании грануляционной ткани и отсутствии грубой рубцовой деформации просвета полых органов желудочно-кишечного тракта. Эти положения явились морфологическим обоснованием широкого применения лазерного излучения в различных областях хирургии [20].

Применение лазеров в хирургии основано на избыточной энергии которая трансформируется в флюоресцентное свечение, фотохимические реакции, фототермические и фотомеханические реакции. При высокоэнергетическом воздействии основная часть энергии превращается в тепловую, которая за счет диффузии распространяется от зоны воздействия. Способность теплового воздействия на кровь и сосудистую стенку вызывать формирование тромба привела к идее использования эндовазальных технологий для температурной облитерации несостоятельных вен. В зависимости от длительности воздействия и пиковых значений температуры фототермические реакции могут быть следующими: фотобиологические эффекты (нагрев ткани до 40–45°C); коагуляция (60–80°C); высушивание (80–100°C); обугливание (более 150°C); абляция (свыше 300°C) [21,22].

Для достижения избирательного поглощения лазерного излучения определенной тканью необходимо подбирать длину волны под основной хромофор этой ткани. Разные хромофоры характеризуются различными коэффициентами поглощения. Основными тканевыми хромофорами являются: гемоглобин и меланин, которые характеризуются высоким уровнем поглощения излучения длины волны до 600 нм. Вода хорошо поглощает излучение с длиной волны более 1150 нм. По данным ряда авторов известно, что для длины волны более 1150 нм вода становится доминирующих хромофором, а глубина проникновения излучения в ткани падает. Особенность избирательного поглощения излучения разных длин волн учитывалась уже в ранних исследованиях результатов лечения сосудистых образований кожи [21,22].

Операционный лазер должен обладать способностью рассечения и коагуляции тканей. В хирургии нашли свое применение несколько типов лазеров: диодные лазеры; neodymium-YAG laser (неодимовый лазер); аргоновый лазер; лазеры с диоксидом углерода (CO_2-лазер) [23–25].

В последнее время все большее применение находят диодные лазеры, которые имеют широкий диапазон длин волн, что обеспечивает их селективное действие в различных тканях и органах. Для малоинвазивной хирургии требуются хирургические лазерные устройства, одновременно обеспечивающие хороший гемостаз и ограниченное проникновение в ткани. Они сократят продолжительность процедуры и предотвратят неожиданные интраоперационные

осложнения. В то же время сведенная к минимуму карбонизация тканей облегчит воспалительную реакцию и ускорит процесс регенерации. В ответ на растущий спрос в медицине разрабатываются мощные длинноволновые хирургических лазеры, излучающие свет на длине волны 1940 нм.

Использование лазерных технологий нашло свое место и в колопроктологии. Так в публикации Christine S. применял неодимовый лазер (Nd-YAG) у 41 пациента с эпителиальным копчиковым ходом (ЭКХ). Проведенное лечение оказалось успешным в 75% случаев [26]. Dragoni F. в своем исследовании так же описал применение лазера при лечении ЭКХ у 10 пациентов. Операция проводилась с использованием неодимового лазера с длиной волны 1064 нм. Отдаленные результаты лечения были прослежены через 2–4 года после последней процедуры. Рецидива заболевания не выявлено в данные сроки ни в одном случае [27].

В лечении свищей прямой кишки первые работы с использованием лазера берут свое начало с 1989 году, когда Хван С.А. с соавт. применили иссечение свища лазерным скальпелем [28]. В последующем Ellison G.W. (1995) использовал ND-YAG-лазер с длиной волны 1064 нм в экспериментальной работе у 20 собак [29]. Впервые в 2010 г. Wilhelm A. опубликовал результаты новой методики лечения свищей прямой кишки, заключающейся в лазерной коагуляциии свищевого хода по методике FiLaC™. Средний период наблюдения за оперированными пациентами составил 7,4 (2–11) месяцев. Заживление свища зафиксировано у 81,8% пациентов [30]. В систематическом обзоре по применению лазерной термооблитерации свищевого хода Матинян А.В. с соавторами показал актуальность применения данного метода в лечении свищей прямой кишки [31].

Применение лазерных технологий не могло не затронуть лечение геморроя, как наиболее распространенного заболевания. На начальных этапах применение лазера было связано непосредственно с удалением внутренних геморроидальных узлов и не давало существенных преимуществ относительно различных модификаций геморроидэктомии. Так, Leff E.I. описал применение CO_2-лазера в лечении геморроя. Двести двадцать шесть пациентов подверглись геморроидэктомии одним хирургом за трехлетний период. У 170 (75,2%) пациентов операция выполнена с помощью CO_2-лазера. У остальных была выполнена стандартная закрытая геморроидэктомия. Пациентов проспективно наблюдали на предмет послеоперационной боли, заживления ран и осложнений. Автором не было обнаружено различий между лазерной и нелазерной геморроидэктомией [32].

Iwagaki H. в своем исследовании 1816 пациентов установил, что полное время заживления после лазерной хирургии не отличается от времени обычного хирургического вмешательства (от 3 до 6 недель). Все пациенты наблюдались от 3 до 6 месяцев, рецидивов геморроя не наблюдалось [33].

Senagore A. провел рандомизированное исследование, в которое было включено 86 пациентов с 3–4 стадией геморроя, из них 51 пациент оперирован с применением Nd: YAG-лазера и 35 пациентов стандартной методики Фергюсона. Выяснилось, что использование Nd: YAG-лазера для геморроидэктомии не дает преимуществ по сравнению с традиционной геморроидэктомией [34].

Pandini L.C. провел сравнительное проспективное исследование, в котором оценивал ближайшие послеоперационные результаты хирургического лечения геморроидальной болезни (HD) по методу Миллигана–Моргана с использованием лазера CO_2 или холодного скальпеля. В каждую группу вошло по 20 пациентов. Автором также не было выявлено различий в отношении осложнений, среднего времени заживления послеоперационных ран, возвращения к нормальной деятельности и удовлетворенности пациентов [35].

С другой стороны, Chia Y.W. провел исследование, в которое вошло 28 пациентов с геморроем 3 или 4 стадией. Пациенты были рандомизированы для прохождения геморроидэктомии с помощью CO_2-лазера или традиционной геморроидэктомии. Автор пришел к мнению, что CO_2-лазер вызывает меньшее повреждение тканей соседних областей, чем обычная диатермия и, таким образом, вызывает меньшую послеоперационную боль, что является более безопасным методом лечения [36].

Salfi R. описал и применил у 200 пациентов новый метод лечения геморроя с использованием диодного лазера с длиной волны 980 нм в сочетании с допплеровским методом для определения дистальных ветвей верхней прямокишечной артерии. HeLP (Hemorrhoid laser prosedure) — метод интраоперационной локализации питающих ветвей прямокишечной артерии с помощью допплеровского зонда и использования лазера для блокады артериального притока путем дезартеризация. У всех проводилось лечение по методике HeLP: в прямую кишку вводится специально разработанный одноразовый проктоскоп, в дистальной части которого расположено небольшое окно с допплеровским датчиком. При помощи допплеровского датчика (20 МГц зонд, диаметром 3 мм) на 3 см проксимальнее зубчатой линии определяется расположение терминальных ветвей верхней прямокишечной артерии. Допплеровский датчик заменяется на световод лазера. Применение диодного лазера с длиной волны 980 нм (импульсный режим, 15–30 Дж каждый, в общей сложности около 60–120 Дж при мощности 10–25 Вт). Продолжительность операции составила

15 минут. Эффективность данного метода оценена в сроки 12 месяцев и составила 91% [37].

Crea N. провел исследование, в которое вошло 97 пациентов с геморроем 2–3 стадии. Им была применена методика HeLP с использование лазера с длиной волны 980 нм по стандартной технике описанного ранее метода. Частота рецидивов заболевания составила 5% в двухлетний срок наблюдения [38]. Позже в своей работе Crea N. проанализированы результаты 5-летнего непрерывного использования лазерной процедуры (HeLP) геморроя в стационаре с геморроем второй-третьей степени у 189 пациентов. Средний период наблюдения составил 42 месяца (от 6 до 62 месяцев). Болевые ощущения после операции отсутствовали у 94% пациентов. Полное исчезновение жалоб, характерных для геморроидальной болезни, удалось купировать более чем у 60% пациентов [39].

Nardi P.De. описал опыт 51 пациента по методике HeLP с использованием оптического волокна диодного лазера с длиной волны 980 нм (пять импульсов 13 Вт по 1,2 с каждый с паузой 0,6 с). В сроки 24 месяца после операции эффективность составила 84,3% [40].

Ram E. и соавт. приводят данные о лечении 62 пациентов с 2–3 стадией по методике с применением диодного лазера с длиной волны 980 нм. Спустя 2 дня после операции к выполнению привычно деятельности смогли приступить 88,7% пациентов, спустя 6 месяцев после операции ни в одном случает рецидива заболевания не было [41]. Boarini P. описал опыт лечения 55 пациентов по вышеописанной методике HeLP с применением диодного лазера 980 нм. Общий уровень удовлетворенности составил 89%, а исчезновение симптомов геморроидальной болезни — у 84% пациентов [42]. Следует отметить, что для данной методики во всех исследованиях применялся диодный лазер с длиной волны 980 нм.

Giamundo P. описал опыт лечения 284 пациентов, страдающих хроническим геморроем 2–3 стадии. У всех пациентов также проводилось лечение по методике HeLP: используя специально разработанный проктоскоп (комплект для HeLPR, Biolitec Biomedical Technology, Германия), 12 терминальных ветвей верхних ректальных артерий были идентифицированы с помощью доплеровского зонда 20 МГц и коагулированы с помощью лазерной энергии примерно на 2–3 см выше зубчатая линия. Платформа диодного лазера (Leonardo Dual 45, Biolitec Biomedical Technology, Германия), дающая 13 Вт импульсной лазерной энергии на длине волны 980 нм, позволила блокировать идентифицированные артерии. Селективное поглощение лазерный луч хромофором гемоглобина позволил сморщить артерии, ограничив тепловое воздействие на окружающие ткани. Анализ 276 пациентов, завершивших 2-летнее наблюдение, показал полное исчезновение симптомов у 89,9% (248/276) пациентов [43].

Одним из методов лазерной технологии является метод LHP лазерная геморроидопластика (LHP) — это малоинвазивная методика лечения геморроя, основанная на дозированном внутритканевом нагреве геморроидального узла посредством подаваемого с помощью световодного волокна лазерного излучения с его последующим склерозированием, а также окклюзирующим воздействии на сосудистый компонент. Характер воздействия лазерного излучения зависит от его характеристик (длины волны, длительности воздействия) и методики операции, в результате чего можно получить различные эффекты, такие как коагуляция либо вапоризация кавернозной ткани, находившейся в зоне контакта с рабочей частью световода, с последующим склерозированием более удаленных участков ткани узла, в которое вовлекаются конечные ветви верхней прямокишечной артерии, что обеспечивает эффект дезартеризации. При данной методике, несмотря на термическое воздействие на кавернозную ткань геморроидального узла, не повреждается слизистая оболочка и структура сфинктера. Кроме того, замещение кавернозной ткани на соединительную ткань с фиксацией ее к слизистой оболочке, предотвращает возникновение пролапса [44, 45].

В первых работах, посвященных применению методики LHP, Jahanshahi A. описал опыт лечения 341 пациента с геморроем 2,3,4 стадии с применением диодного лазера с длинной волны 980 нм и мощностью 30 Вт. У всех пациентов лечение проводилось по методике LHP. Лишь в 12 (3,5%) случаях были диагностированы осложнения: у 8 (2,34%) отек, кровотечение и абсцесс — у 2 (0,58%) пациентов. В сроки наблюдения до 1 года автор не отметил рецидивов ни в одном случае [25].

В дальнейшем, при методике LHP для лечения геморроя наиболее часто в качестве источника энергии использовался лазер с длиной волны 1470 нм, позволяющий добиться денатурации подслизистых белков, вызывая фиброз и, тем самым, прилипание слизистой оболочки к подлежащей ткани для предотвращения пролапса.

Brusciano L. представил опыт лечения 50 пациентов с 2–3 стадией геморроидальной болезни по методике LHP с применением диодного лазера с длиной волны 1470 нм. Пациенты были выписаны на следующий день после хирургической операции при отсутствии послеоперационных осложнений и наличии терпимой боли. По данным автора, интраоперационных осложнений не выявлено, болевой синдром оценённый в течение суток после операции по 10-балльной шкале ВАШ составил 2 балла. Все пациенты через 2 дня

после операции смогли приступить к повседневной активности, при периоде наблюдения 8,6 месяцев ни у одного пациента не было выявлено рецидивов заболевания [46].

Faes S. обследовал 50 пациентов со 2–3 стадией геморроя, которым было выполнено лечение по методике LHP с применением лазерной системы CeralasE с длиной волны 1470 нм. Оценивалось краткосрочное наблюдение на 1, 30, 60 день и длительное до 5 лет (уменьшение стадии геморроя, боль, удовлетворение, улучшение симптомов, нетрудоспособность, воздержание, осложнения, рецидив заболевания). При краткосрочном наблюдении отсутствие симптомов геморроидальной болезни 98% пациентов. Через 60 дней о полном или частичном отсутствии симптомов сообщили 36/50 (72%) и 10/50 пациентов (20%). Послеоперационные осложнения возникли у 9/50 пациентов. У 3 пациентов диагностирован свищ прямой кишки, у 1 — анальная трещина, тромбоз наружных геморроидальных узлов диагностирован у 2 пациентов, перианальной дерматит — у 1 пациента. В одном случае диагностировано кровотечение, и у одного пациента — нарушение мочеиспускания. Послеоперационная боль была слабой (визуальная аналоговая шкала 0–1) на 1-е сутки в 37/50 (74%), на 30-й день — у 47/50 (94%) и на 60-й день — у 50/50 пациентов (100%). После среднего периода наблюдения 5,4 года (стандартное отклонение 5,4 месяца) частота рецидивов составила 34% (15/44 пациентов), среднее время до рецидива — 21 месяц (от 0,2 до 6 лет) [47].

По данным Poskusa T., выполнено 40 операций по указанной методике. Оперированы пациенты со 2–3 стадией геморроя с применением диодного лазера с длиной волны 1470 нм. В отдаленном периоде через 1 год после операции в 10% наблюдений диагностирован рецидив заболевания [48].

Ferhatoglu M.F. и соавт. анализируют опыт лечения 47 пациентов с 2–3 стадией геморроя с применением лазера с длиной волны 1470 нм, в котором показывает, что через год после операции рецидив кровотечения возникает у 14,9% пациентов, а выпадение геморроидальных узлов — у 21,3% [49].

В исследование Недозимованного А.И. было включено 65 человек с хроническим геморроем 2 стадии (20%) и 3 стадии (80%) по классификации Goligher. Всем пациентам выполнялась лазерная подслизистая деструкция геморроидальных узлов с применением диодного лазера с длиной волны 1470 нм в импульсном режиме (время работы — 150 мс, время паузы — 50 мс); мощностью излучения 7–8 Вт. У 54 (83,%) пациентов послеоперационный период протекал гладко. Послеоперационный болевой синдром, в среднем, составил 3 ± 0,2 балла по ВАШ. Осложнения были отмечены у 11 (16,9%) пациентов в раннем послеоперационном периоде, но при этом оказались не фатальными. За время наблюдения рецидивов не зафиксировано [50].

Lakmali K. проанализировал данные 19 исследований, в которые было включено 1937 пациентов, перенесших лазерную деструкцию геморроидальных узлов. Четырнадцать были проспективными исследованиями [49,51–63], четыре — рандомизированными контрольными исследованиями [64–66] и одно — ретроспективным исследованием [67]. На основании проведенного анализа автор пришел к выводу, что применение лазера в лечении геморроя 2 и 3 стадии позволяет снизить уровень болевого синдрома и при этом сопровождается удовлетворительными отдаленными результатами.

Таким образом, преимущества лазеров с большей длиной волны позволяют достичь снижения уровня болевого синдрома в послеоперационном периоде, сократить сроки реабилитации. Лазеры, работающие на длинах волн, сильно поглощаемых водой, обладают потенциалом для улучшения гемостаза и сокращения, обеспечивая при этом узкую зону термического повреждения. В последние годы в медицине нашли применение волоконные лазеры, покрытые тулием, которые обладают большей длиной волны, до 1940 нм.

Zywicka B. в своем экспериментальном исследовании сравнил использование волоконного лазера на основе тулия (Thulium-Doped Fiber Laser (TDFL)) с длиной волны 1940, и диодного лазера с длиной волны 1470 на модели селезенки свиньи. Так частичная спленэктомия и разрезы селезенки были выполнены у 12 животных с использованием двух лазерных устройств. Ширина тепловых изменений составила в ткани селезенки при использовании тулиевого лазера — более чем в 2 раза меньше чем у диодного. Таким образом, оба лазера эффективны в хирургии селезенки и обеспечивают хороший гемостаз. Тем не менее, тулиевый лазер создает более узкую зону термического повреждения, что говорит о его большей эффективности для хирургии селезенки, особенно при выполнении более точных процедур [68].

Результаты Gesierich W. по использованию тулиевого волоконного лазера, работающего на длине волны 1940 нм, у пациентов (187 человек) для эндобронхиальной терапии являются многообещающими. Тулиевый лазер считался безопасным и универсальным методом лечения сужения дыхательных путей и обструкции стента, вызванной врастанием тканей, по сравнению с потенциальными преимуществами Nd: YAG-лазера (1064 нм). Выходная мощность лазера от 5 до 20 Вт считалась безопасной. Однако, по мнению авторов, необходимы дальнейшие сравнительные исследования [69].

Волоконный лазер с активной средой в виде оптического волокна, легированного тулием (Tm3+) (TDFL),

показывает почти в 1000 раз большее поглощение водой по сравнению с лазерами, излучающими свет при 1064 нм (Nd: YAG-лазер). Эта функция обеспечивает точную абляцию ткани с небольшим запасом коагуляции, в то время как лазерное излучение с длиной волны 1064 нм проникает глубже в ткань с менее контролируемыми эффектами коагуляции [69–71].

Żywicka B. и соавт. показали, что зоны термических тканей, достигаемые с помощью TDFL, были более узкими по сравнению с диодным лазером и лазером Nd:YAG, поэтому лазер TDFL представляется эффективным инструментом для точных хирургических процедур с узкой и контролируемой зоной разрушения прилегающей ткани [68]. Janeczek M. и соавт. показали эффективность TDFL при резке с узкой зоной термической травмы и обеспечивают хороший гемостаз во время частичной резекции печени и разреза ткани печени. TDFL, работающий при 1940 нм, может быть потенциальным инструментом в онкологической хирургии печени, особенно когда приоритетом является сохранение здоровых тканей и выполняются небольшие атипичные иссечения [71].

Таким образом, представленные данные научной литературы свидетельствуют о высокой эффективности лазеров в медицине, а именно в колопроктологии. Техническое усовершенствование лазеров, связанных с увеличением длины волны, открывает новые возможности в малоинвазивном лечении колопроктологических заболеваний. Однако в научной литературе отсутствуют сведения о применении тулиевых лазеров в лечении геморроя. Что, в свою очередь, диктует необходимость научных исследования в этом направлении.

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ЛИТЕРАТУРА

1. Gazet JC, Redding W, Rickett JW. The prevalence of haemorrhoids. A preliminary survey. *Proc R Soc Med*. 1970;63:78–80.
2. Воробьев Г.И., Шелыгин Ю.А., Благодарный Л.А. Геморрой. 2-е издание. М.: «Литера». 2010;188.
3. Altomare DF, Giuratrabocchetta S. Conservative and surgical treatment of haemorrhoids. *Na. Rev Gastroenterol Hepatol*. 2013;10:513–521.
4. Lohsiriwat V. Approach to Hemorrhoids. *Curr Gastroenterol Rep*. 2013;15:332.
5. Corman ML Colon and rectal surgery. 5-th ed. Philadelfia: «Lippincott». 2004;1741.
6. Хмылов Л.М. Геморроидэктомия ультразвуковым скальпелем. Автореф. дис... канд. мед. наук. М. 2006;30.
7. Arroyo A. et al. Open versus closed day-case haemorrhoidectomy: is there any difference? Results of a prospective randomised study. *Int J Colorectal Dis*. 2004;19:370–373.
8. Bessa SS. LigaSure versus conventional diathermy in excisional hemorrhoidectomy: a prospective, randomized study. *Dis Colon Rectum*. 2008;51:940–944.
9. Chen JS, You JF. Current status of surgical treatment for hemorrhoids — systematic review and meta-analysis. *Chang Gung Med J*. 2010;33:488–500.
10. Chung CC, Ha JPY, Tai YP, Tsang WWC et al. Double-blind randomized trial comparing Harmonic Scalpel hemorrhoidectomy, Bipolar

scissors hemorrhoidectomy, and scissors excision Ligation technique. *Dis Colon Rectum*. 2002;45(6):789–794.
11. Johannsson HO, Pahlman L, Graf W. Randomized clinical trial of the effects on anal function of Milligan–Morgan versus Ferguson haemorrhoidectomy. *Br J Surg*. 2006;93:1208–1214.
12. Khanna R, Khanna S, Bhadani S, et al. Comparison of ligasure hemorrhoidectomy with conventional Ferguson's hemorrhoidectomy. *Indian J Surg*. 2010;72(4):294–7.
13. Kwok SY, Chung CC, Tsui KK, Li MK. A double blind randomized trial comparing Ligasure and Harmonic Scalpel hemorrhoidectomy. *Dis Colon Rectum*. 2005;48:344–348.
14. Milito G, Cadeddu F, Muzi MG, et al. Haemorrhoidectomy with LigaSure vs conventional excisional techniques: meta-analysis of randomized controlled trials. *Colorectal Dis*. 2010;12:85–93.
15. Ommer A, Hinrichs J, Mollenberg H, et al. Long-term results after stapled hemorrhoidopexy: a prospective study with a 6 year follow-up. *Dis Colon Rectum*. 2011;54:601–618.
16. Ramadan E, Vishne T, Dreznik Z. Harmonic scalpel hemorrhoidectomy: preliminary results of a new alternative method. *Tech Coloproctol*. 2002;6:89–92.
17. Шелыгин Ю.А. Клинические рекомендации. Колопроктология. М.: «ГЭОТАР-Медиа». 2015;526.
18. Corman ML. Colon and rectal surgery. 5-th ed. Philadelfia: «Lippincott». 2004; p. 1741.
19. Sim AJ, Murie JA, Mackenzie I. Three year follow-up study on the treatment of first and second degree hemorrhoids by sclerosant injection or rubber band ligation. *Surg Gynecol Obstet*. 1983;157(6):534–536.
20. Шевченко Ю.Л., Стойко Ю.М., Мазайшвили К.В. Лазерная хирургия варикозной болезни. 2010;195.
21. Гоголева Н.Г. Применение лазеров в науке, технике, медицине: учебное пособие. 2007;79.
22. Добро Л.Ф., Богатов Н.М., Супрунов В.В. Лазеры в медицине: учебное пособие. 2011;82.
23. Altomare DF. Anal Fistula closure with FiLaC: new hope or the same old story? *Tech Coloproctol*. 2015. DOI: 10.1007/s10151-015-1347-9
24. Glover JL, Bendick WJ. The use of termal knives in Surgery: Electrosurgery, Lasers, Plasma scalpel. *Curr Probl Surg*. 1978;15:26–29.
25. Jahanshahi A, Mashhadizadeh E, Sarmast MH. Diode laser for treatment of symptomatic hemorrhoid: a short term clinical result of a mini invasive treatment, and one year follow up. *Polski przeglad chirurgiczny*. 2012;84(7):329–32.
26. Christine S, Lindholt GS, Malene B. Nd-YAG laser treatment of primary and recurrent pilonidal si-nus. *Lasers Med*. Sci. 2012;27:505–508.
27. Dragoni F, Moretti S, Cannarozzo G, Campolmi P. Treatment of recurrent pilonidal cysts with Nd-YAG laser: report of our experience. *Journal of Dermatological Treatment*. 2017.
28. Хван С.А., Рустанов И.Р., Шишкин В.Н. и соавт. Наш опыт лечения хронических свищей прямой кишки с применением лазерного скальпеля, гелий-неоновой лазеротерапией и лимфотропной антибиотикотерапией. *Актуальные вопросы проктологии:* Тезисы докладов Всесоюзной конференции. 1989;202–204.
29. Ellison GW, Bellan JR, et al. Treatment of perianal fistulas with ND: YAG Laser — results in Twenty cases. *Veterinary Surgery*. 1995;24:140–147.
30. Wilhelm A. A new technique for sphincter-preserving anal fistula repair us-ing a novel radial emitting laser probe. *Tech Coloproctol*. 2011;15:445–449.
31. Матинян А.В., Костарев И.В., Благодарный Л.А., Титов А.Ю. и соавт. Лечение свищей прямой кишки методом лазерной термооблитерации свищевого хода (Систематический обзор). *Колопроктология*. 2019;18(3):7–19. DOI: 10.33878/2073-7556-2019-18-3-7-19
32. Leff EI. Hemorrhoidectomy — laservs.nonlaser: Outpatient surgical experience. *Diseases of the Colon & Rectum*. 1992;35(8):743–746.
33. Iwagaki H, Higuchi Y, Fuchimoto S, Orita K. The laser treatment of hemorrhoids: results of a study on 1816 patients. *The Japanese journal of surgery volume*. 1989;19(6):658–661.
34. Senagore A, Mazier WP, Luchtefeld MA, et al. Treatment of advanced hemorrhoidal disease: a prospective, randomized comparison of cold scalpel vs. contact Nd:YAG laser. *Diseases of the Colon & Rectum*. 1993;36(11):1042–1049.
35. Pandini LC, Nahas SC, Nahas CSR, et al. Surgical treatment of haemorrhoidal disease with CO2 laser and Milligan–Morgan cold scalpel technique. *Colorectal Dis*. 2006;8(7):592–595.
36. Chia YW, Darzi A, Speakman CT, Hill AD, et al. CO2 laser haemorrhoidectomy — does it alter anorectal function or decrease pain compared to conventional haemorrhoidectomy? *Int J Colorectal Dis*. 1995;10(1):22–24.
37. Salfi R. A new technique for ambulatory hemorrhoidal treatment. *Coloproctology*. 2009;31:99–103.
38. Crea N, Pata G, Lippa M, et al. Hemorrhoidal laser procedure: short- and long-term results from a prospective study. *American journal of surgery*. 2014;208(1):21–25.
39. Crea N, Pata G, Lippa M, et al. Hemorrhoid laser procedure (HeLP) for second- and third-degree hemorrhoids: results from a long-term follow-up analysis. *Lasers in Medical Science*. 2021 Jan 13. DOI: 10.1007/s10103-021-03249-6.
40. Nardi PD, Tamburini AM, Gazzetta PG, et al. Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study. *Techniques in Coloproctology volume*. 2016;20(7):455–459.
41. Ram E, Bachar GN, Goldes Y, et al. Modified Doppler-guided laser procedure for the treatment of second- and third-degree hemorrhoids. *Laser therapy*. 2018;27(2):137–142.
42. Boarini P, et al. Hemorrhoidal Laser Procedure (HeLP): A Painless Treatment for Hemorrhoids. *J Inflam Bowel Dis Disor*. 2017;2(2):1–4. DOI: 10.4172/2476-1958.1000118
43. Giamundo P, Cecchetti W, Esercizio L, et al. Doppler-guided hemorrhoidal laser procedure for the treatment of symptomatic hemorrhoids: experimental background and short-term clinical results of a new mini-invasive treatment. *Surgical Endoscopy volume*. 2011;25(5):1369–1375.
44. Plapler H. A new method for hemorrhoid surgery: experimental model of diode laser application in monkeys. *Photobiomodulation, Photomedicine, and Laser Surgery*. 2008;26(2):143–146.
45. Титов А.Ю., Костарев И.В., Благодарный Л.А. и соавт. Субмукозная лазерная термоабляция внутренних геморроидальных узлов. *Хирургия. Журнал им. Н.И. Пирогова*. 2020;3:89–96.
46. Brusciano L, Gambardella C, Terracciano G, et al. Postoperative discomfort and pain in the management of hemorrhoidal disease: laser hemorrhoidoplasty, a minimal invasive treatment of symptomatic hemorrhoids. *Updates in Surgery volume*. 2020;72(3):851–857.
47. Faes S, Pratsinis M, Hasler-Gehrer S. et al. Short- and long-term outcomes of laser haemorrhoidoplasty for grade II-III haemorrhoidal disease. *Colorectal Dis*. 2019;21(6):689–696.
48. Poskus T, Danys D, Makunaite G, et al. Results of the double-blind randomized controlled trial comparing laser hemorrhoidoplasty with sutured mucopexy and excisional hemorrhoidectomy. *Int J Colorectal Dis*. 2020;35(3):481–490. DOI: 10.1007/s00384-019-03460-6
49. Lakmal K, Basnayake O, Jayarajah U, et al. Clinical Outcomes and Effectiveness of Laser Treatment for Hemorrhoids: A Systematic Review. *World Journal of Surgery*. 2021;45(4):1222–1236.
50. Васильев С.В., Недозимованый А.И., Попов Д.Е., Соркин Р.Г. и соавт. Лазерная подслизистая деструкция геморроидальных узлов у пациентов со 2–3 стадией хронического геморроя. *Колопроктология*. 2019;18(2):21–26. DOI: 10.33878/2073-7556-2019-18-2-21-26

51. Mohammed AF, Flaifel Janabi HM. A comparative study between laser hemorrhoidoplasty procedure and conventional hemorrhoidectomy. *JUBPAS*. 2019;27(1):69–86.
52. Alsisy AAAY, Salem IE. Comparative study between intrahemorrhoidal diode laser treatment and Milligan-Morgan hemorrhoidectomy. *Menoufia Med J*. 2019. 2018;32.
53. Asmz Rahman AR, Hasan M, Chandra S. Haemorrhoidal LASER Procedure (HeLP)—a painless treatment for haemorrhoid. *J Bangladesh Coll Physicians Surg*. 2019;38(1).
54. Brusciano L, Gambardella C, Terracciano G, et al. Postoperative discomfort and pain in the management of hemorrhoidal disease: laser hemorrhoidoplasty, a minimal invasive treatment of symptomatic hemorrhoids. *Updates Surg*. 2019. DOI: 10.1007/s13304-019-00694-5
55. Crea N, Pata G, Lippa M, et al. Hemorrhoidal laser procedure: short- and long-term results from a prospective study. *Am J Surg*. 2014;208(1):21–25. DOI: 10.1016/j.amjsurg.2013.10.020
56. De Nardi P, Tamburini AM, Gazzetta PG, et al. Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study. *Tech Coloproctol*. 2016;20(7):455–459. DOI: 10.1007/s10151-016-1479-6
57. Ram E, Goldes Y, Joubran S, Rath-Wolfson L. Modified Doppler-guided laser procedure for the treatment of second and third degree hemorrhoids. *Menoufia Med J*. 2018;27(2):137–142.
58. Faes S, Pratsinis M, Hasler-Gehrer S, et al. Short- and long-term outcomes of laser haemorrhoidoplasty for grade II–III haemorrhoidal disease. *Colorectal Dis*. 2019;21(6):689–696. DOI: 10.1111/codi.14572
59. Ferhatoglu MF, Kıvılcım T, Ekici U, Kebudi A. Laser hemorrhoidoplasty procedure for grade two and three hemorrhoidal disease. A retrospectively prospective study, analysis of forty-seven patients. *OSP J Surg*. 2019;1:101.
60. Giamundo P, Braini A, Calabro G, et al. Doppler-guided hemorrhoidal dearterialization with laser (HeLP): a prospective analysis of data from a multicenter trial. *Tech Coloproctol*. 2018;22(8):635–643. DOI: 10.1007/s10151-018-1839-5
61. Maloku H, Gashi Z, Lazovic R, et al. Laser hemorrhoidoplasty procedure vs open surgical hemorrhoidectomy: a trial comparing 2 treatments for hemorrhoids of third and fourth degree. *Acta Inform Med*. 2014;22(6):365–367. DOI: 10.5455/aim.2014.22.365-367
62. Maloku Halit LR, Hasime T. Laser hemorrhoidoplasty versus Milligan-Morgan hemorrhoidectomy — short term outcome. *Vojnosanit Pregl*. 2019;79(1):8–12.
63. Paulo Boarini LRB, de Azeredo P, Candelaria P, et al. LASER hemorrhoidal dearterialization. *J Coloproctol*. 2017;37(1):38–43.
64. Giamundo P, Salfi R, Geraci M, et al. The hemorrhoid laser procedure technique vs rubber band ligation: a randomized trial comparing 2 mini-invasive treatments for second- and third-degree hemorrhoids. *Dis Colon Rectum*. 2011;54(6):693–698. DOI: 10.1007/DCR.0b013e3182112d58
65. Mohammad Sadra Nazaria MKH. Comparison of intrahemorrhoidal coagulation with 980 Nanometer diode laser and Milligan Morgan hemorrhoidectomy: a randomized clinical trial. *J Clin Res Gov*. 2015;4:1–4.
66. Naderan M, Shoar S, Nazari M, et al. A randomized controlled trial comparing laser intra-hemorrhoidal coagulation and Milligan-Morgan Hemorrhoidectomy. *J Invest Surg*. 2017;30(5):325–331. DOI : 10.1080/08941939.2016.1248304
67. Abdulkarim A, Misoi B, Gathege D. Laser hemorrhoidoplasty: experience at Aga Khan University Hospital. *Ann African Surg*. 2020;17(2). DOI: 10.4314/aas.v17i2.8
68. Żywicka B, Rybak Z, Janeczek M, et al. Comparison of A 1940 nm Thulium-Doped Fiber Laser and A 1470 nm Diode Laser for Cutting Efficacy and Hemostasis in A Pig Model of Spleen Surgery. *Materials (Basel)*. 2020;13(5):116–7.
69. Gesierich W, Reichenberger F, Fertl A, et al. Endobronchial therapy with a thulium fiber laser (1940 nm). *J Thorac Cardiovasc Surg*. 2014;147:1827–1832.
70. Michalska M, Brojek Z, Rybak Z, et al. An all-fiber thulium doped fiber laser for medical application. *Elektron Konstr Technol Zastos*. 2016;57:13–15.
71. Janeczek M, Świderski J, Czerski A, et al. Preliminary evaluation of thulium doped fiber laser in pig model of liver surgery. *BioMed Res Int*. 2018.

REFERENCES

1. Gazet JC, Redding W, Rickett JW. The prevalence of haemorrhoids. A preliminary survey. *Proc R Soc Med*. 1970;63:78–80.
2. Vorobiev G.I., Shelygin Yu.A., Blagodarnyi L.A. Hemorrhoids. 2nd edition. M.: «Litera». 2010;188. (in Russ.).
3. Altomare DF, Giuratrabocchetta S. Conservative and surgical treatment of haemorrhoids. *Na. Rev Gastroenterol Hepatol*. 2013;10:513–521.
4. Lohsiriwat V. Approach to Hemorrhoids. *Curr Gastroenterol Rep*. 2013;15:332.
5. Corman ML Colon and rectal surgery. 5-th ed. Philadelfia: «Lippincott». 2004;1741.
6. Chmylov L.M.. Hemorrhoidectomy with an ultrasound scalpel . Abstract of the dissertation of the Candidate of medical Sciences. M. 2006;30. (in Russ.).
7. Arroyo A. et al. Open versus closed day-case haemorrhoidectomy: is there any difference? Results of a prospective randomised study. *Int J Colorectal Dis*. 2004;19:370–373.
8. Bessa SS. LigaSure versus conventional diathermy in excisional hemorrhoidectomy: a prospective, randomized study. *Dis Colon Rectum*. 2008;51:940–944.
9. Chen JS, You JF. Current status of surgical treatment for hemorrhoids — systematic review and meta-analysis. *Chang Gung Med J*. 2010;33:488–500.
10. Chung CC, Ha JPY, Tai YP, Tsang WWC et al. Double-blind randomized trial comparing Harmonic Scalpel hemorrhoidectomy, Bipolar scissors hemorrhoidectomy, and scissors excision Ligation technique. *Dis Colon Rectum*. 2002;45(6):789–794.
11. Johannsson HO, Pahlman L, Graf W. Randomized clinical trial of the effects on anal function of Milligan–Morgan versus Ferguson haemorrhoidectomy. *Br J Surg*. 2006;93:1208–1214.
12. Khanna R, Khanna S, Bhadani S, et al. Comparison of ligasure hemorrhoidectomy with conventional Ferguson's hemorrhoidectomy. *Indian J Surg*. 2010;72(4):294–7.
13. Kwok SY, Chung CC, Tsui KK, Li MK. A double blind randomized trial comparing Ligasure and Harmonic Scalpel hemorrhoidectomy. *Dis Colon Rectum*. 2005;48:344–348.
14. Milito G, Cadeddu F, Muzi MG, et al. Haemorrhoidectomy with LigaSure vs conventional excisional techniques: meta-analysis of randomized controlled trials. *Colorectal Dis*. 2010;12:85–93.
15. Ommer A, Hinrichs J, Mollenberg H, et al. Long-term results after stapled hemorrhoidopexy: a prospective study with a 6 year follow-up. *Dis Colon Rectum*. 2011;54:601–618.
16. Ramadan E, Vishne T, Dreznik Z. Harmonic scalpel hemorrhoidectomy: preliminary results of a new alternative method. *Tech Coloproctol*. 2002;6:89–92.
17. Shelygin Yu.A. Clinical recommendations. Koloproktologia. M.: «GEOTAR-Media». 2015;526. (in Russ.).
18. Corman ML. Colon and rectal surgery. 5-th ed. Philadelfia: «Lippincott». 2004; p. 1741.
19. Sim AJ, Murie JA, Mackenzie I. Three year follow-up study on the treatment of first and second degree hemorrhoids by sclerosant injection or rubber band ligation. *Surg Gynecol Obstet*.

1983;157(6):534–536.
20. Shevchenko Y.L., Stoiko Y.M., Mazaishvili K.V. Laser surgery of varicose veins. 2010;195. (in Russ.).
21. Gogoleva N.G. Application of lasers in science technology and medicine: training manual. 2007;79. (in Russ.).
22. Dobro L.F., Bogatov N.M., Suprunov V.V.. Lasers in medicine: training manual. 2011;82. (in Russ.).
23. Altomare DF. Anal Fistula closure with FiLaC: new hope or the same old story? *Tech Coloproctol*. 2015. DOI: 10.1007/s10151-015-1347-9
24. Glover JL, Bendick WJ. The use of termal knives in Surgery: Electrosurgery, Lasers, Plasma scalpel. *Curr Probl Surg*. 1978;15:26–29.
25. Jahanshahi A, Mashhadizadeh E, Sarmast MH. Diode laser for treatment of symptomatic hemorrhoid: a short term clinical result of a mini invasive treatment, and one year follow up. *Polski przeglad chirurgiczny*. 2012;84(7):329–32.
26. Christine S, Lindholt GS, Malene B. Nd-YAG laser treatment of primary and recurrent pilonidal si-nus. *Lasers Med*. Sci. 2012;27:505–508.
27. Dragoni F, Moretti S, Cannarozzo G, Campolmi P. Treatment of recurrent pilonidal cysts with Nd-YAG laser: report of our experience. *Journal of Dermatological Treatment*. 2017.
28. Hwang S.A., Rustanov I.R., Shishkin V.N., et al. Our experience in the treatment of chronic rectal fistulas using a laser scalpel, helium-neon laser therapy and lymphotropic antibiotic therapy. Current issues of proctology: Abstracts of reports of the All-Union conference. 1989;202–204. (in Russ.).
29. Ellison GW, Bellan JR, et al. Treatment of perianal fistulas with ND: YAG Laser — results in Twenty cases. *Veterinary Surgery*. 1995;24:140–147.
30. Wilhelm A. A new technique for sphincter-preserving anal fistula repair us-ing a novel radial emitting laser probe. *Tech Coloproctol*. 2011;15:445–449.
31. Matinyan A.V., Kostarev I.V., Blagodarniy L.A., Titov A.Yu. et al. Fistula laser ablation for anal fistulas (systematic review). *Koloproctologia*. 2019;18(3):7–19. (in Russ.) DOI: 10.33878/2073-7556-2019-18-3-7-19
32. Leff EI. Hemorrhoidectomy — laservs.nonlaser: Outpatient surgical experience. *Diseases of the Colon & Rectum*. 1992;35(8):743–746.
33. Iwagaki H, Higuchi Y, Fuchimoto S, Orita K. The laser treatment of hemorrhoids: results of a study on 1816 patients. *The Japanese journal of surgery volume*. 1989;19(6):658–661.
34. Senagore A, Mazier WP, Luchtefeld MA, et al. Treatment of advanced hemorrhoidal disease: a prospective, randomized comparison of cold scalpel vs. contact Nd:YAG laser. *Diseases of the Colon & Rectum*. 1993;36(11):1042–1049.
35. Pandini LC, Nahas SC, Nahas CSR, et al. Surgical treatment of haemorrhoidal disease with CO2 laser and Milligan–Morgan cold scalpel technique. *Colorectal Dis*. 2006;8(7):592–595.
36. Chia YW, Darzi A, Speakman CT, Hill AD, et al. CO2 laser haemorrhoidectomy — does it alter anorectal function or decrease pain compared to conventional haemorrhoidectomy? *Int J Colorectal Dis*. 1995;10(1):22–24.
37. Salfi R. A new technique for ambulatory hemorrhoidal treatment. *Coloproctology*. 2009;31:99–103.
38. Crea N, Pata G, Lippa M, et al. Hemorrhoidal laser procedure: short- and long-term results from a prospective study. *American journal of surgery*. 2014;208(1):21–25.
39. Crea N, Pata G, Lippa M, et al. Hemorrhoid laser procedure (HeLP) for second- and third-degree hemorrhoids: results from a long-term follow-up analysis. *Lasers in Medical Science*. 2021 Jan 13. DOI: 10.1007/s10103-021-03249-6.
40. Nardi PD, Tamburini AM, Gazzetta PG, et al. Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study. *Techniques in Coloproctology volume*. 2016;20(7):455–459.
41. Ram E, Bachar GN, Goldes Y, et al. Modified Doppler-guided laser procedure for the treatment of second- and third-degree hemorrhoids. *Laser therapy*. 2018;27(2):137–142.
42. Boarini P, et al. Hemorrhoidal Laser Procedure (HeLP): A Painless Treatment for Hemorrhoids. *J Inflam Bowel Dis Disor*. 2017;2(2):1–4. DOI: 10.4172/2476-1958.1000118
43. Giamundo P, Cecchetti W, Esercizio L, et al. Doppler-guided hemorrhoidal laser procedure for the treatment of symptomatic hemorrhoids: experimental background and short-term clinical results of a new mini-invasive treatment. *Surgical Endoscopy volume*. 2011;25(5):1369–1375.
44. Plapler H. A new method for hemorrhoid surgery: experimental model of diode laser application in monkeys. *Photobiomodulation, Photomedicine, and Laser Surgery*. 2008;26(2):143–146.
45. Titov A.Yu., Kostarev I.V., Blagodarny L.A. et al. Submucosal laser ablation of internal hemorrhoids. *Pirogov Russian journal of surgery*. 2020;3:89–96. (in Russ.).
46. Brusciano L, Gambardella C, Terracciano G, et al. Postoperative discomfort and pain in the management of hemorrhoidal disease: laser hemorrhoidoplasty, a minimal invasive treatment of symptomatic hemorrhoids. *Updates in Surgery volume*. 2020;72(3):851–857.
47. Faes S, Pratsinis M, Hasler-Gehrer S. et al. Short- and long-term outcomes of laser haemorrhoidoplasty for grade II-III haemorrhoidal disease. *Colorectal Dis*. 2019;21(6):689–696.
48. Poskus T, Danys D, Makunaite G, et al. Results of the double-blind randomized controlled trial comparing laser hemorrhoidoplasty with sutured mucopexy and excisional hemorrhoidectomy. *Int J Colorectal Dis*. 2020;35(3):481–490. DOI: 10.1007/s00384-019-03460-6
49. Lakmal K, Basnayake O, Jayarajah U, et al. Clinical Outcomes and Effectiveness of Laser Treatment for Hemorrhoids: A Systematic Review. *World Journal of Surgery*. 2021;45(4):1222–1236.
50. Vasiliev S.V., Nedozimovanii A.I., Popov D.E., Sorokin R.G, et al. Laser submucosal desrtruction of chronic hemorrhoids stage II-III. *Koloproktologia*. 2019;18(2):21–26. (in Russ.). DOI: 10.33878/2073-7556-2019-18-2-21-26
51. Mohammed AF, Flaifel Janabi HM. A comparative study between laser hemorrhoidoplasty procedure and conventional hemorrhoidectomy. *JUBPAS*. 2019;27(1):69–86.
52. Alsisy AAAY, Salem IE. Comparative study between intrahemorrhoidal diode laser treatment and Milligan-Morgan hemorrhoidectomy. *Menoufia Med J*. 2019. 2018;32.
53. Asmz Rahman AR, Hasan M, Chandra S. Haemorrhoidal LASER Procedure (HeLP)—a painless treatment for haemorrhoid. *J Bangladesh Coll Physicians Surg*. 2019;38(1).
54. Brusciano L, Gambardella C, Terracciano G, et al. Postoperative discomfort and pain in the management of hemorrhoidal disease: laser hemorrhoidoplasty, a minimal invasive treatment of symptomatic hemorrhoids. *Updates Surg*. 2019. DOI: 10.1007/s13304-019-00694-5
55. Crea N, Pata G, Lippa M, et al. Hemorrhoidal laser procedure: short- and long-term results from a prospective study. *Am J Surg*. 2014;208(1):21–25. DOI: 10.1016/j.amjsurg.2013.10.020
56. De Nardi P, Tamburini AM, Gazzetta PG, et al. Hemorrhoid laser procedure for second- and third-degree hemorrhoids: results from a multicenter prospective study. *Tech Coloproctol*. 2016;20(7):455–459. DOI: 10.1007/s10151-016-1479-6
57. Ram E, Goldes Y, Joubran S, Rath-Wolfson L. Modified Doppler-guided laser procedure for the treatment of second and third degree hemorrhoids. *Menoufia Med J*. 2018;27(2):137–142.
58. Faes S, Pratsinis M, Hasler-Gehrer S, et al. Short- and long-term outcomes of laser haemorrhoidoplasty for grade II–III haemorrhoidal disease. *Colorectal Dis*. 2019;21(6):689–696. DOI: 10.1111/codi.14572
59. Ferhatoglu MF, Kıvılcım T, Ekici U, Kebudi A. Laser hemorrhoido-

plasty procedure for grade two and three hemorrhoidal disease. A retrospectively prospective study, analysis of forty-seven patients. *OSP J Surg*. 2019;1:101.
60. Giamundo P, Braini A, Calabro G, et al. Doppler-guided hemorrhoidal dearterialization with laser (HeLP): a prospective analysis of data from a multicenter trial. *Tech Coloproctol*. 2018;22(8):635–643. DOI: 10.1007/s10151-018-1839-5
61. Maloku H, Gashi Z, Lazovic R, et al. Laser hemorrhoidoplasty procedure vs open surgical hemorrhoidectomy: a trial comparing 2 treatments for hemorrhoids of third and fourth degree. *Acta Inform Med*. 2014;22(6):365–367. DOI: 10.5455/aim.2014.22.365-367
62. Maloku Halit LR, Hasime T. Laser hemorrhoidoplasty versus Milligan-Morgan hemorrhoidectomy — short term outcome. *Vojnosanit Pregl*. 2019;79(1):8–12.
63. Paulo Boarini LRB, de Azeredo P, Candelaria P, et al. LASER hemorrhoidal dearterialization. *J Coloproctol*. 2017;37(1):38–43.
64. Giamundo P, Salfi R, Geraci M, et al. The hemorrhoid laser procedure technique vs rubber band ligation: a randomized trial comparing 2 mini-invasive treatments for second- and third-degree hemorrhoids. *Dis Colon Rectum*. 2011;54(6):693–698. DOI: 10.1007/DCR.0b013e3182112d58
65. Mohammad Sadra Nazaria MKH. Comparison of intrahemorrhoidal coagulation with 980 Nanometer diode laser and Milligan Morgan hemorrhoidectomy: a randomized clinical trial. *J Clin Res Gov*. 2015;4:1–4.
66. Naderan M, Shoar S, Nazari M, et al. A randomized controlled trial comparing laser intra-hemorrhoidal coagulation and Milligan-Morgan Hemorrhoidectomy. *J Invest Surg*. 2017;30(5):325–331. DOI: 10.1080/08941939.2016.1248304
67. Abdulkarim A, Misoi B, Gathege D. Laser hemorrhoidoplasty: experience at Aga Khan University Hospital. *Ann African Surg*. 2020;17(2). DOI: 10.4314/aas.v17i2.8
68. Żywicka B, Rybak Z, Janeczek M, et al. Comparison of A 1940 nm Thulium-Doped Fiber Laser and A 1470 nm Diode Laser for Cutting Efficacy and Hemostasis in A Pig Model of Spleen Surgery. *Materials (Basel)*. 2020;13(5):116–7.
69. Gesierich W, Reichenberger F, Fertl A, et al. Endobronchial therapy with a thulium fiber laser (1940 nm). *J Thorac Cardiovasc Surg*. 2014;147:1827–1832.
70. Michalska M, Brojek Z, Rybak Z, et al. An all-fiber thulium doped fiber laser for medical application. *Elektron Konstr Technol Zastos*. 2016;57:13–15.
71. Janeczek M, Świderski J, Czerski A, et al. Preliminary evaluation of thulium doped fiber laser in pig model of liver surgery. *BioMed Res Int*. 2018.

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ЮБИЛЕЙ/ANNIVERSARY
Yves Panis (Ив Панис)

9 ноября 2021 года профессору Yves Panis исполнилось 60 лет со дня рождения.

Yves Panis — талантливый хирург, выдающийся ученый, исключительный руководитель, профессор хирургии, заместитель главного редактора журнала «Колопроктология», который вот уже более 30 лет ведет активную научную, врачебную и педагогическую деятельность.

Yves Panis всю жизнь работает в одном из старинных госпиталей района Клиши города Парижа, открытым в 1935 году — Beaujon Hopital. С 1997 года получил статус профессора хирургии, а с 2007 года — бессменный руководитель отделения колоректальной хирургии в своем госпитале.

Научно-практический интерес профессора Panis включает изучение проблем колоректального рака, воспалительных заболеваний кишечника, при лечении которых активно использует лапароскопические технологии. Yves Panis известен как один из лучших специалистов по лечению язвенного колита и болезни Крона. К настоящему времени (октябрь 2021 г.), научные работы, опубликованные профессором Panis, процитировались в Pubmed более 440 раз, а индекс Хирша автора составил 79.

Yves Panis организовал и является основным исследователем в 6 мультицентровых рандомизированных исследованиях, результаты 3 из которых уже опубликованы. Это работы, посвященные раннему закрытию кишечной стомы, подготовке толстой кишки при раке прямой кишки, декомпрессии толстой кишки после операций при раке прямой кишки, программе ускоренного выздоровления после лапароскопических операциях по поводу колоректального рака,

On November 9, 2021, Professor Yves Panis celebrated his 60th birthday.

Yves Panis is a talented surgeon, an outstanding scientist, an exceptional leader, professor of surgery, Co-Editor of “Koloproktologia” Journal (Russian Journal of Coloproctology), who has been active in scientific, medical and pedagogical activities for more than 30 years.

Yves Panis has been working all his life in one of the famous hospitals of the Clichy district of Paris, established in 1935 — Beaujon Hopital.

Since 1997 he has received the status of professor of surgery, and since 2007 he has been the permanent head of the colorectal surgery unit in his Hospital.

The scientific and practical interest of Professor Panis includes the study of colorectal cancer, inflammatory bowel diseases, in the treatment of which he actively uses laparoscopic technologies.

Yves Panis is known as one of the best specialists in the surgery of ulcerative colitis and Crohn’s disease.

To date (October 2021), scientific papers published by Professor Panis have been cited in Pubmed over 440 times, and the author’s Hirsch index is 79.

Yves Panis has organized and is the principal researcher in 6 multicenter randomized trials, the results of 3 of which have already been published.

These are works devoted to early closure of the intestinal stoma, bowel cleansing for rectal cancer surgery, decompression of the bowel after procedures for rectal cancer, an enhanced recovery after laparoscopic procedures for colorectal cancer, single-port surgery, the use of a mesh implant when closing the stoma after laparoscopic resection of the rectum.

однопортовой хирургии, использованию сетчатого импланта при закрытии стомы после лапароскопической резекции прямой кишки.

Хотелось бы подчеркнуть, что ряд работ профессора Yves Panis опубликованы в таких журналах как Lancet, в Annals of Surgery, он является членом Европейской ассоциации колопроктологов (ESCP) и Европейской ассоциации эндоскопических хирургов (EAES), а также председателем хирургического общества при Европейской ассоциации по лечению язвенного колита и болезни Крона (ECCO) и членом Европейской экспертной группы по созданию консенсуса по хирургическому лечению язвенного колита.

До 2016 года был президентом GRECCAR Group (Французская группа по лечению рака прямой кишки) и GETAID Surgery (Французская группа по лечению воспалительных заболеваний кишечника).

Yves Panis– выдающийся ученый и хирург, принципиальный, честный и отзывчивый человек.

Редколлегия журнала «Колопроктология», коллектив ФГБУ «НМИЦ колопроктологии имени А.Н. Рыжих» Минздрава России горячо поздравляют юбиляра и желают здоровья и дальнейших творческих успехов и достижений.

It should be noted that a number of works by Professor Yves Panis have been published in such journals as the *Lancet, Annals of Surgery*. He is a member of the European Society of Coloproctologists (ESCP) and the European Association of Endoscopic Surgeons (EAES), as well as Chairman of the Surgical Society at the European Association for the Treatment of Ulcerative Colitis and Crohn's Disease (ECCO) and a member of the European Expert Group on Consensus-building on the Surgical Treatment of Ulcerative Colitis.

Until 2016, he was the president of the GRECCAR Group (French Group for the treatment of rectal cancer) and GETAID Surgery (French group for the treatment of inflammatory bowel diseases).

Yves Panis is an outstanding scientist and surgeon, a principled, honest and sympathetic person.

The editorial board of the journal Koloproktologia, the staff of the Russian National Medical Research Center of Coloproctology of the Healthcare Ministry of Russia warmly congratulate the jubilee and wish him health and further creative success and achievements.

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Благодарный Леонид Алексеевич — 75 лет

15 октября отмечает юбилей профессор кафедры колопроктологии РМАНПО, доктор медицинских наук Леонид Алексеевич Благодарный.

Леонид Алексеевич — выпускник Волгоградского медицинского института 1969 года. После окончания института с 1969 по 1976 год работал врачом-хирургом в отделении неотложной хирургии больницы скорой медицинской помощи г. Волжский Волгоградской области. С декабря 1976 по 1981 год проходил обучение на кафедре проктологии Центрального ордена Ленина института усовершенствования врачей (ФГБОУ ДПО РМАНПО Минздрава России). После успешной защиты кандидатской диссертации Л.А. Благодарный продолжил работу в ФГБУ «НМИЦ колопроктологии имени А.Н. Рыжих» Минздрава России, пройдя путь от младшего до старшего научного сотрудника Центра. В 1987 году академиком РАМН, профессором В.Д. Федоровым Л.А. Благодарному была предложена работа на кафедре колопроктологии РМАНПО Минздрава России. С того времени судьба Благодарного Л.А. стала тесно связана с Академией. В ней он вырос от ассистента до профессора кафедры колопроктологии. В 1999 году им была успешно защищена докторская диссертация на тему: «Клинико-патогенетическое обоснование выбора метода лечения геморроя», которая не потеряла своей актуальности и в настоящее время.

На сегодняшний день Леонид Алексеевич является одним из ведущих специалистов в области общей колопроктологии, получившим признание среди специалистов России и стран СНГ. Он успешно сочетает активную лечебно-практическую деятельность с научной и педагогической работой, принимает деятельное участие в подготовке квалифицированных кадров по специальности «Колопроктология». С образовательными лекциями и показательными операциями Благодарный Л.А. побывал в большинстве регионов нашей страны и во многих столицах стран СНГ.

При активном участии Леонида Алексеевича, вместе с сотрудниками кафедры, разработана основная профессиональная программа высшего образования — программа подготовки кадров в клинической ординатуре по специальности 31.08.55 «Колопроктология», а также издано более 10 учебно-методических пособий по колопроктологии. Л.А. Благодарный — автор и соавтор более 200 научных работ, в том числе 7 монографий по основным проблемам диагностики и лечения колопроктологических заболеваний, а также глав по колопроктологии во многих хирургических изданиях.

Под руководством Леонида Алексеевича защищено 7 кандидатских диссертаций. С момента создания Ассоциации колопроктологов России и по настоящее время он является членом ее Правления. При его участии созданы национальные клинические рекомендации по колопроктологии, которые уже выдержали 2 издания.

Благодарный Л.А. является членом редакционной коллегии журналов «Колопроктология» и «Амбулаторная хирургия».

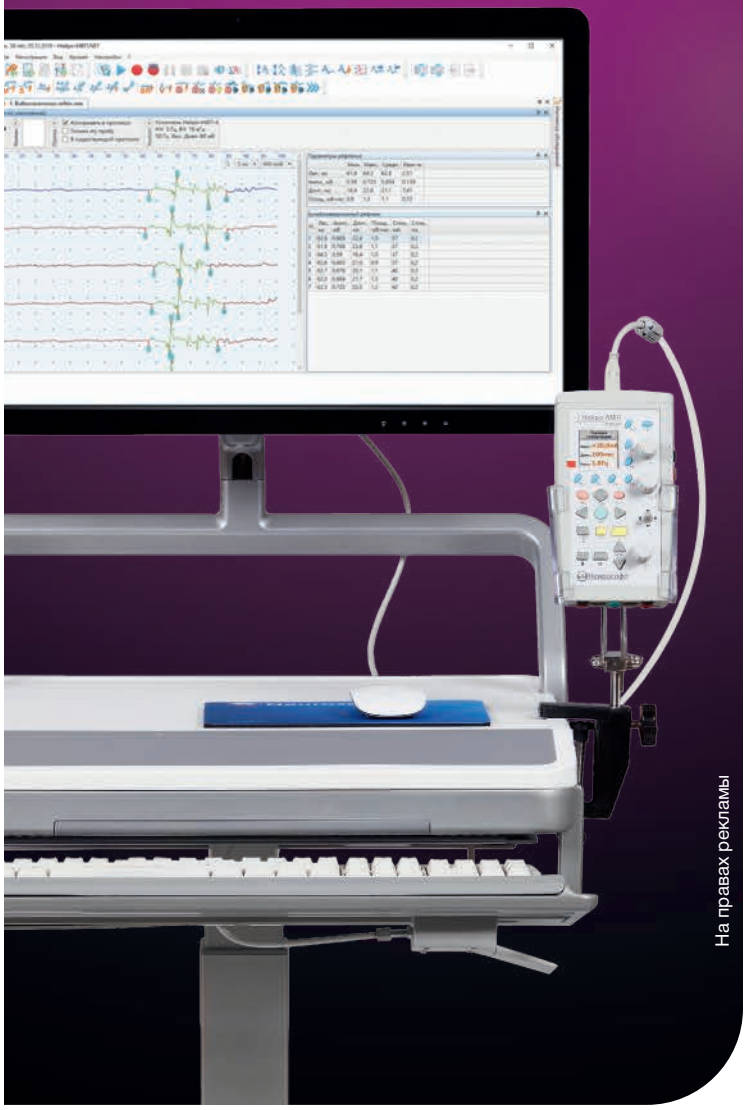
Коллектив ФГБУ «НМИЦ колопроктологии имени А.Н. Рыжих» Минздрава России, сотрудники РМАНПО и кафедры колопроктологии, члены редакционной коллегии и редакционного совета журнала «Колопроктология» сердечно, от всей души поздравляют Леонида Алексеевича Благодарного с юбилеем и желают ему крепкого здоровья, благополучия, долгих лет активной научно-практической и педагогической деятельности.

Нейро-МВП-Микро

Компания «Нейрософт» представляет портативный комплекс со специальными методиками для ЭМГ-исследования нервно-мышечных структур наружного сфинктера и тазового дна.

Области применения:

- Урология
- Колопроктология
- Гинекология
- Научные исследования



Комплекс позволяет проводить весь перечень нейрофизиологических исследований тазового дна, применяемых в диагностических и научных целях:

- исследование бульбокавернозного рефлекса и других сакральных рефлексов в ответ на электрическую стимуляцию полового нерва (n. pudendus) при оценке проводимости рефлекторной дуги (S2-S4);
- поверхностная электромиография наружного анального сфинктера и мышц тазового дна, позволяющая оценить уровень тонического напряжения;
- игольчатая электромиография с количественным анализом ПДЕ в сочетании с исследованием сакрального рефлекса, позволяющая диагностировать денервацию сакральных сегментов;
- стимуляционная электронейромиография n. pudendus с использованием одноразового электрода Св. Марка, исследование дистального участка n. pudendus;
- соматосенсорные вызванные потенциалы с n. pudendus, в особенности у пациентов с сохранением сакральных рефлексов и гипестезией в области промежности;
- кожные симпатические вызванные потенциалы с мышц промежности, позволяющие выполнить исследование проводящей функции немиелинизированных волокон из симпатического центра и миелинизированных сенсорных волокон;
- анализ вызванного моторного ответа с мышц промежности при кортикальной и сакральной магнитной стимуляции (оценивается проведение по кортикоспинальному тракту с регистрацией ВМО с мышц тазового дна (при наличии магнитного стимулятора)).

В соответствии с приказом №206н Министерства здравоохранения и социального развития РФ от 2 апреля 2010 года «Об утверждении Порядка оказания медицинской помощи населению с заболеваниями толстой кишки, анального канала и промежности колопроктологического профиля» миограф входит в стандарт оснащения центров колопроктологии.

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** Для получения полной информации, пожалуйста, обратитесь к инструкции по медицинскому применению лекарственного препарата или получите консультацию специалиста.*

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** Для получения полной информации, пожалуйста, обратитесь к инструкции по медицинскому применению лекарственного препарата.*

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