UDC 616.348-089.871-07
DOI https://doi.org/10.32782/2226-2008-2025-4-5

O. I. Poyda https://orcid.org/0000-0001-9443-630
V. M. Melnyk https://orcid.org/0000-0003-4788-546X

METHODS OF FORMING LIFELONG ILEOSTOMIES OF A NEW TYPE

Bogomolets National Medical University, Kyiv, Ukraine

UDC 616.348-089.871-07

O. I. Poyda, V. M. Melnyk
METHODS OF FORMING LIFELONG ILEOSTOMIES OF A NEW TYPE
Bogomolets National Medical University, Kyiv, Ukraine
Introduction. Formation of a lifelong ileostomy is an important measure of surgical rehabilitation of patients after colectomy and rectal extirpation. The known methods of forming lifelong ileostomies provide only controllability of the bowel movement function. However, they do not reduce the severity of post-collectomy syndrome.

The aim of the study is to improve the results of surgical rehabilitation of patients with lifelong ileostomy by developing and implementing into clinical practice a new type of retaining reservoir and nonreservoir ileostomy to prevent severe forms of post-colectomy syndrome.

Materials and methods. The study group consisted of 23 patients in whom surgical intervention was completed with the formation of the author's lifelong retaining ileostomies of a new type. The comparison group consisted of 24 patients who underwent the formation of a classic Brook ileostomy after colectomy and rectal extirpation.

The peculiarity of the formation of the author's methods of retaining ileostomies was to preserve the anatomical integrity of the small intestine wall, to create anatomical structures for physiological delay of the contents.

Results and discussion. The use of lifelong retention ileostomies of a new type after colectomy and rectal extirpation contributed to a decrease in the rate of transit through the small intestine, an increase in the duration of contact of the contents with the surface of the mucous membrane, and a significant improvement in the course of intestinal digestion and absorption. This resulted in an increase in the number of patients to 20 (90.9%) with grade I (mild) post-colectomy syndrome, a significant decrease to 2 (9.1%) with grade II (moderate) and no patients with grade III (severe).

The prospect of further research, according to the authors, is to further improve lifelong ileostomies aimed at ensuring the controllability of the bowel movement function.
Keywords: collectomy and rectal extirpation, lifelong ileostomy, post-collectomy syndrome.

УДК 616.348-089.871-07

О. І. Пойда, В. М. Мельник
МЕТОДИ ФОРМУВАННЯ ДОВІЧНИХ ІЛЕОСТОМ НОВОГО ТИПУ
Національний медичний університет імені О. О. Богомольця, Київ, Україна
Розроблено методи формування довічних утримуючих ілеостом нового типу для попередження тяжких варіантів перебігу постколектомічного синдрому після колектомії та екстирпації прямої кишки.

Зазначені утримуючі ілеостоми використані у 23 пацієнтів, 12 (52,2%) чоловіків та 11 (47,8%) жінок 19–47 років, оперованих з приводу виразкового коліту, хвороби Крона товстої кишки, родинного аденоматозного поліпозу. Це сприяло фізіологічній затримці, зменшенню швидкості транзиту вмісту по тонкій кишці, збільшенню тривалості контакту з поверхнею слизової оболонки, покращенню перебігу процесів кишкового травлення та всмоктування, збільшенню кількості пацієнтів до 20 (90,9%) з I (легким) ступенем постколектомічного синдрому, зменшенню їх кількості до 2 (9,1%) з II (середнім) і відсутності з III (тяжким) ступенями.
Ключові слова: колектомія та екстирпація прямої кишки, довічна ілеостома, постколектомічний синдром.

Introduction

A lifelong ileostomy is formed after colectomy and rectal extirpation, as well as after extirpation of the surgical anal canal stump and removal of the pelvic small bowel reservoir due to complications of its healing [2; 6; 7]. In these cases, the restorative or reconstructive-restorative stages of surgical intervention become impossible and inappropriate due to the removal of the rectal sphincters. According to some authors, colectomy with rectal extirpation accounts for 4.1–5.4% of coloproctological operations [1; 6; 8]. Indications for colectomy with rectal extirpation include severe variants of inflammatory bowel disease, in particular, ulcerative colitis, Crohn's disease with total colon damage and destruction of the rectal sphincters [5; 7], familial adenomatous polyposis with a low-grade rectal tumour [1; 7; 10].

Removal of the entire colon and the formation of a lifelong monoileostomy lead to disability of the patient and the need for daily medical and hygienic care of the stoma [1; 3; 9]. Disability is also caused, to a large extent, by the occurrence of post-collectomy syndrome due to malnutrition and malabsorption and, accordingly, significant losses of intestinal contents, and with it fluids, electrolytes, trace elements, proteins and other ingredients. In turn, this leads to severe dysfunctions of internal organs and systems, creating the need for conservative therapy aimed at correcting these metabolic disorders [1; 8; 9].

In such cases, it is important to use surgical rehabilitation methods aimed at ensuring the controllability of ileostomy

functioning, improving the course of intestinal digestion and absorption by forming prestomal reservoir structures.

The first reservoir ileostomy after colectomy and rectal extirpation was proposed by N.J. Kock (1969). Subsequently, a number of other modifications were created based on the principle of N.J. Kock, in particular: a retaining small intestinal reservoir (W.O. Barnett, 1983), a continental ileostomy (J.H. Pemberton et al, 1983), reservoir ileostomy (Y.V. Baltaitis, 1984), T-reservoir retaining intra-abdominal ileostomy (A.M. Kaiser, 2002), three-knee S-reservoir retaining ileostomy (J.S. Wu, V.W. Fazio, 2002) and others [4; 8; 9; 10]. These designs of reservoir ileostomies differed only in certain technical aspects of formation. Their common features were the formation of a reservoir by the type of anatomical container by crossing and suturing the walls of the small intestine – 'anatomical reservoir', the creation of an invagination valve in the reservoir cavity to prevent uncontrolled leakage of liquid content, and emptying the reservoir through the ileostomy only with the help of a probe [3; 4; 8; 9]. The formation of these prestomal constructions was accompanied by frequent postoperative complications in 12.3–14.6% of patients, in particular, insufficiency of intestinal sutures of the formed reservoirs, significant losses of liquid chemistry through the ileostomy, within 1–1.5 litres per day, which often led to severe post-colectomy syndrome [5; 8; 9]. It should be noted that the design of reservoir ileostomies was proposed in the absence of sealed stool containers. Therefore, they had a single goal – to prevent uncontrolled bowel movements. At the same time, the loss of chyme was similar to that of a reservoirless ileostomy, which did not contribute to a decrease in the severity of post-collectomy syndrome. However, the undoubted advantage of these reservoir ileostomies was the absence of the need for a colostomy bag.

Given the significant disadvantages of traditional reservoir ileostomies, to ensure an adequate level of surgical rehabilitation of patients after colectomy and rectal extirpation, it became necessary to develop more advanced lifelong retention ileostomies of a new type.

Objective – to improve the results of surgical rehabilitation of patients with lifelong ileostomy by developing and implementing into clinical practice a new type of retaining reservoir and nonreservoir ileostomy to prevent severe forms of post-collectomy syndrome.

Materials and methods

Since the beginning of the 21st century, the practice of care for intestinal stomas has included hermetic ileostomy bags, which are tightly fixed to the skin of the peristomal area with an adhesive base, which greatly facilitates the care of the ileostomy. It was at that time that the idea of creating a new type of retaining ileostomy arose, which would create conditions for improving the course of intestinal digestion and absorption and thus reduce the severity of post-collectomy syndrome.

The author's methodical approach to the formation of a lifelong ileostomy was to create anatomical structures capable of physiological temporary delay in the movement of the contents through the small intestine, to increase the duration of contact of the chyme with the surface of the mucous membrane, to improve the course of intestinal digestion and absorption, and to contribute to a significant reduction in the severity of post-collectomy syndrome.

In accordance with the above provisions of the methodological approach, the retaining reservoir ileostomy was formed prestomally in the terminal ileum in the shape of the letter 'W' (Fig. 1).

The components of this retention reservoir ileostomy were physiological factors that delayed the movement of the contents through the intestinal canal, namely, fixed anatomical bends and retention valves. Each of these valves was placed proximal and distal to these bends. The longitudinal size of the small intestine between the formed bends was 12–14 cm, which in most cases corresponded to the longitudinal size of the small intestine loop of the operated patient.

The retaining valve, as an additional factor in delaying the movement of the contents through the small intestine, had two components: a protector and a flap, which were located proximally in the intestinal lumen (Fig. 2).

The proximal location of the retention valve components ensured an effective physiological delay in

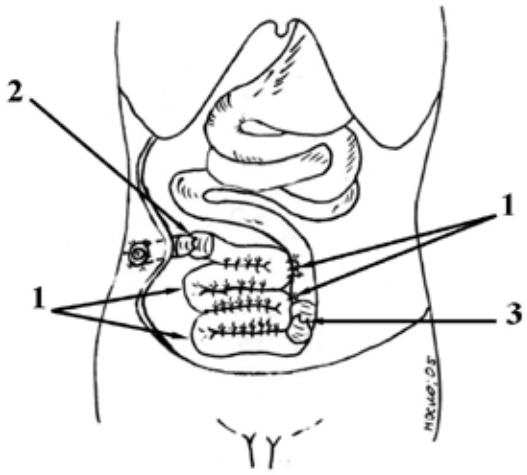

Fig. 1. Retaining reservoir ileostomy: 1 – fixed bends in the terminal part of the small intestine; 2 – the retaining valve is located distally; 3 – the retaining valve is located proximally

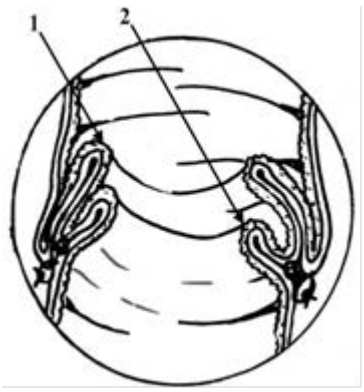

Fig. 2. Retaining valve: 1 – valve leaf; 2 – valve protector

the advancement of the contents. Anatomical bends and retention valves were formed using serosuperior sutures, which ensured the preservation of the anatomical integrity of the small intestine wall.

Taking into account the risk of Crohn's disease recurrence in the area of the formed reservoir ileostomy, even with the application of serous-muscular sutures, a method of forming a reservoirless retaining ileostomy was developed. In this case, the retaining structures were placed directly in the area of the ileostomy itself (Fig. 3).

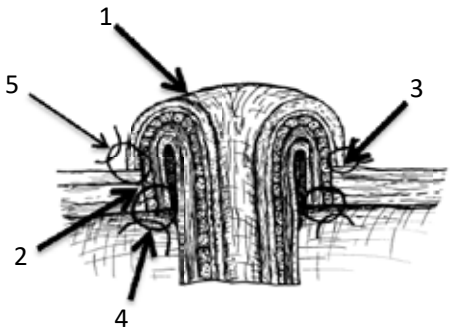

Fig. 3. Retaining reservoirless ileostomy: 1 – evagination of a segment of the small intestine; 2 – a demucosalised area of the evaginate; 3 – the edges of the stomatal window; 4 – the first level of sutures; 5 – the second level of sutures.

The stages of its formation included the creation of an evaginate section of the small intestine and mucosectomy of the terminal section of the evaginate with a length corresponding to the thickness of the anterior abdominal wall. The evaginate was placed in the stomal window so that the edges of this window were in contact with the demucosal surface. The sutures were placed between the walls of the stoma window and the demucosalised area of the evaginate at two levels. The first level was along the edge of the cut of the demucosalised area of the evaginate to the parietal peritoneum and aponeurosis, and the second level was along the edge of the cut of the evaginate mucosa. The evaginate itself and the walls of the stomatal window reduced the lumen of the ileostomy. Under such conditions, the movement of the contents was delayed, and emptying was possible only with an increase in pressure in the lumen of the prestomal area of the small intestine. Delayed movement of the contents led to an increase in the time of its transit through the small intestine, improving the course of intestinal digestion and absorption. The reservoirless retention ileostomy was used exclusively in patients undergoing surgery for colon Crohn's disease, as the risk of disease recurrence in the reservoir area was quite likely. Care for retaining reservoir and nonreservoir ileostomies involved the use of a faecal colostomy bag.

The study included 47 patients after colectomy and rectal extirpation operated on at the Coloproctology Centre of Ukraine, the main clinical base of the Department of Surgery No. 1 of the Bogomolets National Medical University, in the period from 2010 to 2024. The study group included 23 patients. Of these, 12 (52.2%) were men and 11 (47.8%) were women. The patients' age ranged from 19 to 47 years. The indications for surgical treatment in 5 (21.7%) patients were ulcerative colitis, in 8 (34.7%) patients – Crohn's disease of the colon, in 6 (26.1%) patients – familial adenomatous polyposis, in 2 (9.5%) patients – multicentric colon cancer with a tumour in the lower ampullary rectum, 2 (8.7%) had cancer of the lower ampulla of the rectum on the background of diverticular disease with total involvement of all anatomical parts of the colon and cecum. According to the generally accepted classification according to TNM criteria, colon tumours were as follows: pT1-4 N0-2 M0-1, G1-2.

The peculiarity of ulcerative colitis and Crohn's disease was the severe clinical course of the diseases, total colon involvement, and destruction of the rectal sphincters by the inflammatory process.

Concomitant diseases, including hypertension, obesity, diabetes mellitus, and varicose veins of the superficial veins of the lower extremities, were diagnosed in 9 (39.1%) patients.

In patients of the study group, the radical stage of surgical treatment included colectomy with rectal extirpation. In patients with existing malignant tumours of the colon, surgical interventions were performed using generally accepted oncological standards. This radical surgery was completed with the formation of a lifelong retaining reservoir ileostomy in 17 (73.9%) patients and a lifelong retaining nonreservoir ileostomy in 6 (26.1%) patients.

The comparison group consisted of 24 patients. The radical stage of surgical intervention in them was similar to the radical stage in the study group. However, the surgical intervention was completed with the formation of a standard lifelong ileostomy according to Brook. There was no significant difference between the patients in the study group and the comparison group in terms of the diagnosis of the underlying disease, the features of its clinical course, in particular the nature of the colon lesion, the presence of complications, age, gender, and concomitant diseases. This gave grounds to consider them representative.

For the diagnosis of the underlying disease, its complications, and postoperative complications, generally accepted standard clinical research methods, clinical and biochemical laboratory methods, and instrumental methods were used. Among the instrumental methods used were radiological: irrigography, computed tomography, computed colonography, as well as magnetic resonance imaging, colonoscopy with biopsy and pathological examination of biopsies.

Functional results were determined on the basis of the study of intestinal digestion and absorption functions. The weight of the ileostomy stool was determined, coprological examination of the stool chemistry, radiological control of the duration of transit of the barium sulfate mixture through the small intestine, and the duration of contrast retention in the formed prestomal reservoir were performed. Body weight as an integral indicator of intestinal digestion and absorption was determined by weighing patients on a medical scale. Statistical processing of digital data was performed using the software package StatSoft Statistica 6.0.

An important measure of the diagnostic and therapeutic process was compliance with ethical, legal and regulatory

measures in accordance with the international standards of the Declaration of Helsinki. Compliance with ethical and legal norms during the conduct of scientific research is certified by the conclusion of the Commission on Bioethical Expertise and Ethics of Scientific Research of the O.O. Bogomolets National Medical University dated March 16.03.2021. Protocol No. 7.

Results and discussion

In 1 (4.3%) patient of the study group, peritonitis occurred in the early postoperative period due to perforation of the small intestine in the area of serosuppurative sutures and against the background of Crohn's disease relapse. In connection with this complication, the patient underwent a resection of the prestomal area of the small intestine along with the small intestinal reservoir, and a lifelong Brook ileostomy was formed. Other complications: postoperative wound suppuration, pneumonia, pyelonephritis, acute thrombosis of the superficial veins of the lower extremities occurred in 5 (21.7%) patients in the study group and 5 (20.1%) in the comparison group ($p>0.05$).The difference in the indicators was statistically insignificant.

Functional outcomes were determined in 22 patients of the study group, since the patient after removal of the prestomal reservoir and formation of a lifelong Brook ileostomy was excluded from further functional studies.

Functional outcomes were assessed 1 year after completion of surgical treatment. During this period, the digestive system adapted to the new anatomical relationships that arose after the radical and reconstructive stages of surgical treatment, as well as the relative stabilisation of the operated patients. Functional results are presented in Table 1.

The data in the table indicate a much more favourable course of intestinal digestion and absorption in the patients of the study group. This is evidenced by a decrease in the mass of chyme in the ileostomy stool in a significantly larger number of patients. At the same time, the weight of the chemo in the stool approaches the known values of the weight of daily stool of a healthy person. A more favourable course of intestinal absorption function was also indicated by the mushy, rather than liquid, consistency of the stool in a significantly larger number of patients in the study group.

Intestinal absorption dysfunction in patients of the comparison group was indicated by a twofold, and in some cases threefold, higher weight of stool with a predominantly liquid consistency.

The results of the coprological examination of ileostomy stool also indicate a more favourable course of intestinal digestion in the study group. They had only a small amount of undigested nutrients, in particular, fibre, extracellular starch, muscle fibre, and neutral fat. In patients in the comparison group, the content of these substances increased to a moderate and, in some cases, significant level.

Radiological control of barium sulfate transit through the small intestine in patients with a retention ileostomy showed a sufficient time delay in contrast advancement both in the reservoir and in proximal areas of the small intestine (Fig. 4).

The radiograph illustrates the deposition of contrast in the prestomal reservoir – 1, adjacent areas of the small intestine – 2, 7 hours after per os administration.

In patients of the study group, the bulk of the contrast was in the reservoir and proximal loops of the small intestine 7 hours ± 40 minutes after per os administration. In most of them, the evacuation of contrast through the ileostomy began at this time and lasted for 2 hours ± 20 minutes. The given delay time indicated an increase in the duration of contact of the small intestine contents with the mucosal surface and more favourable conditions for the course of intestinal digestion and absorption. In patients in the comparison group, the average duration of barium sulfate transit through the small intestine was significantly shorter, amounting to only 4 hours ± 30 minutes. The difference was significant ($p<0.05$).

The transit time of barium sulphate was longer, 5 hours ± 20 minutes, but statistically insignificant ($p>0.05$), in patients of the study group after the formation of a reservoirless retention ileostomy compared with patients in the comparison group. This also indicated more favourable conditions for intestinal digestion and absorption.

The body weight of the operated patients was also indicative. The average body weight before surgery in the

Table 1

Functional results

Values of values	Patient groups			
	Study group (n=22)		Comparison group (n=24)	
	abs.	% abs.	abs.	% abs.
Weight of chyme during ileostomy emptying				
0.35–0.45 kg	19	86.4	1	4.2*
0.46–0.8 kg	3	13.6	3	12.5
0.81–1.2 kg	–	–	20	83.3*
Results of the coprogramme				
Porridge–like consistency of the chemistry	20	90.9	4	16.7*
Liquid consistency of the chemistry	2	9.1	20	83.3*
The presence of fibre	insignificant		considerable	
Extracellular starch	insignificant		moderate	
Altered muscle fibres	insignificant		moderate	
Neutral fat	insignificant		considerable	

Note: *Difference in figures is significant ($p<0.001$)

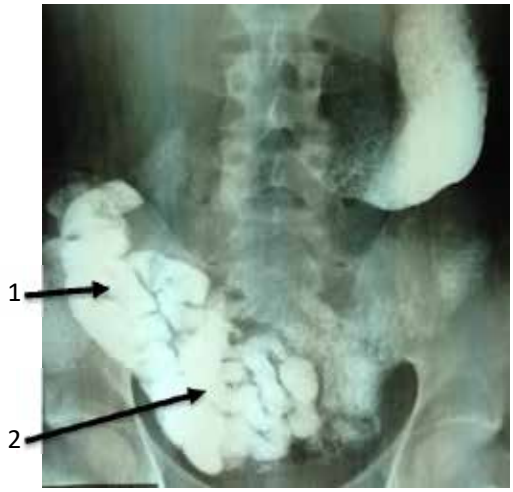

Fig. 4. Radiological monitoring of barium sulphate transit through the small intestine in a patient with a reservoir-retaining ileostomy 1 year after surgery

study and comparison groups did not differ significantly. It was 48.7±3.2 kg and 46.9±4.3 kg, respectively. The difference in indicators is not significant ($p>0.05$). In 1 year after completion of surgical treatment, the average body weight in patients of the study group increased significantly to 79.5±3.6 kg. In patients of the comparison group, the average body weight during this observation period was only 57.2±4.3 kg. The difference was statistically significant ($p<0.05$). Thus, the assessment of the criterion of average body weight indicates a significantly more favourable course of intestinal digestion and absorption in patients of the study group compared to patients of the comparison group who underwent a classic Brook ileostomy.

Improvement of intestinal digestion and absorption in patients of the study group had a significant impact on the severity of post-collectomy syndrome (Table 2).

The data in Table 2 indicate a significantly higher number of patients in the study group with grade I (mild) post-collectomy syndrome, in the presence of which conservative treatment aimed at correcting metabolic disorders is not indicated. The number of patients in the comparison group with II (moderate) and III (severe) degrees was also significantly higher. These patients periodically underwent conservative treatment aimed at compensating for metabolic disorders.

The main objective of the development and formation of retaining reservoir and nonreservoir ileostomies in patients after colectomy and rectal extirpation was to improve the course of intestinal digestion and absorption in order to prevent severe forms of post-collectomy syndrome. To achieve this goal, it was important to create conditions to reduce the speed of the contents' movement through the small intestine and thus increase the duration of the chyme's contact with the surface of the small intestinal mucosa. In this regard, when forming a retaining reservoir ileostomy, two factors were used to delay the movement of the contents through the small intestine: fixed anatomical bends and retaining valves. Fixed anatomical bends were created in the prestomal region of the small intestine in the shape of the letter 'W' using seromuscular sutures. The length of the small intestine between the edges of the created bends was 12–14 cm, which corresponded to the longitudinal size of the small intestine loop of the operated patient. The retention valve was also created using seromuscular sutures as an additional factor in delaying the advancement of the contents and was located proximally and distally from the indicated bends at a distance of no more than 2–3 cm.

Thus, the features of the retaining reservoir ileostomy were as follows:

1. Creation of a functional, not anatomical reservoir, in which there is a physiological delay in the advancement of the contents of the small intestine, rather than its accumulation.
2. Use of physiological factors that delay the movement of the contents, in particular intestinal bends and valves.
3. Atraumatic formation of the structure – without transmural damage by applying serous-muscular sutures, and not by cutting the small intestine wall with subsequent suturing.
4. Preservation of the anatomical integrity of the small intestine wall.
5. Improvement of intestinal digestion and absorption processes.
6. Reducing the loss of chemistry during the day to 0.35–0.45 kg.
7. Improvement of physical properties of the stool in the ileostomy stool to mushy, sometimes to the appearance of 'thick porridge'.
8. Regularity of the frequency of ileostomy discharge, up to 3–4 times during the day.
9. The presence of post-collectomy syndrome, mainly of the first (mild) degree, which does not require special correction.
10. The ability to 'control' the frequency of ileostomy emptying by limiting food intake or eating at a certain time.

Retaining reservoirless ileostomy was formed exclusively in patients operated for Crohn's disease of the colon, with its total destruction in order to reduce the risk

Table 2

Severity of post-collectomy syndrome

The degree of post-collectomy syndrome	Patient groups			
	Study group (n=22)		Comparison group (n=24)	
	abs.	abs.	abs.	abs.
I (mild)	20	90,6	7	29,2*
II (moderate)	2	8,1	11	45,8*
III (severe)	–	–	6	25,0*

Note: *Difference in figures is significant ($p<0.001$)

of recurrence of the disease. Since the risk of recurrence in Crohn's disease remains quite probable even in the area of serous-muscle suturing. That is why the peculiarity of the formation of a reservoirless ileostomy was to create a factor of delay in the advancement of the small intestine content not in the prestomal region of the small intestine, but in the area of the ileostomy itself by forming a demucosalised small intestine evaginate and its location at the level of the stoma window of the anterior abdominal wall. At the same time, the formed evaginate of the terminal part of the small intestine served as a factor of delayed movement of the contents.

Therefore, the formation of lifelong retaining reservoir and nonreservoir ileostomies led to an improvement in the course of intestinal digestion and absorption in the study group by reducing the rate of transit of the contents in the small intestine, increasing the duration of its contact with the surface of the mucous membrane. Improvement of intestinal digestion and absorption processes led to the occurrence of the most favourable, I (mild) degree of post-collectomy syndrome in a significantly larger number of patients. It further contributed to the improvement of the quality of life, social and labour rehabilitation and reintegration of the operated patients into society.

Conclusions

1. The principle of physiological delay in the movement of the contents, reduction of the rate of its transit through the small intestine, increase in the duration of contact of the chyme with the mucosal surface, and improvement of the course of intestinal digestion and absorption are the basis for the formation of lifelong retention of reservoir and nonreservoir ileostomies.

2. The use of methods for the formation of lifelong ileostomies of a new type led to an increase in the number of patients to 20 (90.9%) with I (mild) degree of post-collectomy syndrome, a significant decrease to 2 (9.1%) with II (medium) and the absence of III (severe) degrees.

The prospect of further research, according to the authors, is to further improve lifelong ileostomies aimed at ensuring not only the improvement of intestinal digestion and absorption, but also the controllability of the bowel movement function.

BIBLIOGRAPHY

1. Abdulrakhman AK. The choice of the method of reconstructive surgery in radical surgical treatment of non-tumorous diseases of the large intestine: Dys. kand. med. nauk. Kyiv: Natsionalnyi medychnyi universytet imeni O.O. Bohomoltsia, 2020. 199 s. (in Ukrainian).
2. Angriman I, Pirozzolo G, Bardini R, Cavallin F, Castoro C, Scarpa M. A systematic review of segmental vs subtotal colectomy and subtotal colectomy vs total proctocolectomy for colonic Crohn's disease. *Colorectal Dis*. 2017 Aug;19(8):e279–e287. doi: 10.1111/codi.13769.
3. Chang S, Shen B, Remzi F. When Not to Pouch: Important Considerations for Patient Selection for Ileal Pouch-Anal Anastomosis. *Gastroenterol Hepatol (N Y)*. 2017 Aug;13(8):466–475. PMC5572960.
4. Ecker KW, Tönsmann M, Nils K, Ecker J, Möslein G. Salvage surgery for continent ileostomies (CI) after a first successful revision: more long-term blame on the reservoir than the nipple valve. *Int J Colorectal Dis*. 2022 Mar;37(3):553–561. doi: 10.1007/s00384-021-04054-x.
5. Lopez NE, Zaghyian K, Fleshner P. Is There a Role for Ileal Pouch Anal Anastomosis in Crohn's Disease? *Clin Colon Rectal Surg*. 2019 Jul;32(4):280–290. doi: 10.1055/s-0039-1683917.
6. Mark-Christensen A, Erichsen R, Brandsborg S, et al. Pouch failures following ileal pouch-anal anastomosis for ulcerative colitis Affiliations expand. *Colorectal Dis*. 2018 Jan;20(1):44–52. doi: 10.1111/codi.13802.
7. Maya AM, Boutros M, DaSilva G, Wexner SD. IPAA-related sepsis significantly increases morbidity of ileoanal pouch excision. *Dis Colon Rectum*. 2015 May;58(5):488–93. doi: 10.1097/DCR.0000000000000330.
8. Melnyk VM, Poida OI. Choosing a method for forming a secondary ileostomy. Klinichna khirurhiia. 2022; 89(9–10) supplement: 54–55. (In Ukrainian).
9. Melnyk VM, Poida OI, Kadir AA. New reconstructive and visual operations in radical surgical treatment of non-tumorous diseases of the large intestine. *Khirurhiia Ukrainy*. 2019;(1):23–8. (In Ukrainian). doi: http://doi.org/10.3978/SU2019-1-23.
10. Xian-rui Wu, Hao-xian Ke, Ravi P Kiran, Bo Shen, Ping Lan. Continent Ileostomy as an Alternative to End Ileostomy. *Gastroenterology Research and Practice*. First published: 10 January 2020. Jan 10:2020:9740980. doi: 10.1155/2020/9740980.

Надійшла до редакції 14.04.2025 р.
Прийнята до друку 01.09.2025 р.
Електронна адреса для листування qwerasd.v@ukr.net