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PREVENTION OF PARASTOMAL HERNIAS

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ПАРАСТОМАЛ ЧУРРАЛАРНИНГ ОЛДИНИ ОЛИШ

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ПРОФИЛАКТИКА ПАРАСТОМАЛЬНЫХ ГРЫЖ

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Резюме. *Колоректал жарроҳлик ривожланишининг ҳозирги босқичида stoma билан касалланганлар сонини кўпайтириш тенденцияси мавжуд. Стоманинг яратилиши парастомал чурра ҳосил бўлишининг омилидир, бу кўпинча беморни тўлиқ реабилитация қилишга тўсқинлик қиладиган жиддий асоратларга олиб келади. Кўпинча парастомал чурра операциядан кейинги икки йил ичида ҳосил бўлади, аммо операциядан кейинги даврда чурра еҳтимоли сақланиб қолади. Ҳозирги ишда, парастомал чурраси олдини олиш замонавий усулларини тақдим клиник тадқиқотлар ва ҳузур-таҳлил натижаларини таҳлил қилади. Усулларни тавсифлашда уларнинг хавфсизлиги, самарадорлиги ва иқтисодий асослилигига еътибор қаратилади.*

Калит сўзлар: *парастомал чурра; ичак стомаси; колостомия; илеостомия; тўр ендопротези.*

Abstract. *At the present stage of development of colorectal surgery, there is a tendency to increase the number of stoma patients. The creation of a stoma is a factor in the formation of a parastomal hernia, which often leads to serious complications that prevent the full rehabilitation of the patient. Most often, a parastomal hernia is formed in the next two years after surgery, but the possibility of hernia formation persists throughout the postoperative period. In this work presents modern methods for the prevention of parastomal hernias, analyzes the results of clinical trials and meta-analyses. When describing the methods, emphasis is placed on their safety, efficiency and economic feasibility.*

Key words*: parastomal hernia; colostoma; ileostoma; mesh endoprosthesis.*

The steady increase in the incidence of colorectal cancer and other diseases of the colon leads to an increase in the number of operations ending with the imposition of an intestinal stoma [1,2,3,4,5,6,7,8,9]. In the United States, about 100 thousand people annually undergo surgical interventions with the formation of ileo- or colostomy [10]. In the Russian Federation, the number of patients which have stoma, according to a number of sources, reaches 120–140 thousand people [11, 12]. The creation of a stoma is a risk factor for the development of a parastomal hernia [13], i.e., protrusion of the abdominal organs into the hernial sac through a hole in the anterior abdominal wall, previously created surgically to form a stoma [14]. The incidence of parastomal hernias is 28.3% for permanent end ileostomies and 48% for permanent end colostomies [15]. Most often, a parastomal hernia is formed in the next two years after surgery, but the possibility of hernia formation persists throughout the postoperative period. Some surgeons believe that the formation of a parastomal hernia is inevitable [16]. In most cases of surgical intervention, the stage of stoma formation is not the main one, while the problem of stoma care comes to the fore for the patient [17, 18]. Parastomal hernia, both in ileo- and colostomy [19–25], is one of the main reasons that impede the full rehabilitation of the patient, since it often leads to the development of serious complications that negatively affect the quality of life of the patient. It has been noted that in patients with parastomal hernia, the risk of stoma-related complications is significantly higher than in ostomy patients without hernia [26-29]. There are many methods of surgical treatment and prevention of parastomal hernias, however, such hernias still remain a serious surgical problem [15, 17, 30]. One of the main reasons for the appearance of parastomal hernias is technical errors in the formation of stoma [31–33]. Proceeding from this, the solution to the problem is seen in the improvement of the technique of imposing a stoma and the development of methods for the prevention of hernias [34]. It is believed that the location of the stoma on the anterior abdominal wall affects the incidence of parastomal hernias. When forming the stomal canal through the sheath of the rectus muscle, the likelihood of their development is less in comparison with pararectal access [35]. There are several options for passing the intestine through the rectus muscle. Traditionally, a cruciform incision is made on the front sheet of the rectus sheath, the back sheet of the sheath with the rectus muscle is split vertically and a stoma is formed. Another option is to place the stoma in the region of the lateral edge of the sheath of the rectus abdominis muscle, in foreign sources - lateral rectus abdominis positioned stoma (LRAPS) [36, 37]. With this method, a horizontal incision is made on the anterior leaf of the sheath of the rectus muscle, after which it is shifted medially. Then the posterior leaf is cut horizontally and a stoma is formed [38]. Thus, a study involving 72 patients and a median follow-up of 24 months showed that the risk of parastomal hernia with LRAPS is approximately 10%, and with the traditional method - 40–60% [36]. At the same time, in a review of nine retrospective cohort studies [39], including 761 patients in total, there was no difference between pararectal access and transrectal techniques (relative risk - 1.29%, confidence interval - 95%), although the authors of the review themselves indicate incompleteness.

the studies they analyzed and the considerable variability in techniques. Also noteworthy is a meta-analysis performed by P.W. Carne [15], which shows that only 4 of the 24 studies reviewed demonstrate a lower likelihood of hernia formation in the formation of a stoma through the rectus muscle. Thus, the relationship between the site of stoma creation and the likelihood of parastomal hernia is currently uncertain [14, 16, 40]. The size of the incision during the formation of the stomal canal continues to be discussed [17, 41, 42]. In the study by S. Pilgrim et al. [43], conducted with the participation of 33 patients, confirmed the hypothesis that an excessively long incision of the aponeurosis is a constant predictor of the development of parastomal hernia. The authors found that each additional millimeter of incision in the aponeurosis increases the risk of hernia by 10%. The main rule for the formation of the size of the incision is a tight girth of the intestine without the occurrence of ischemia, however, this factor remains subjective and difficult to assess [44–46]. It is known that even if the diameter of the intestine carrying the stoma is ideally matched to the fascial incision, the latter tends to expand. This dilatation is especially pronounced in elderly patients, patients with diabetes mellitus, cancer patients, individuals with increased intra-abdominal pressure due to abdominal obesity, benign prostatic hyperplasia or chronic cough [47–49]. On the other hand, as in the case of the expansion of the hernia defect in postoperative hernia [50], dilatation of the stomal canal also occurs due to a metabolic disorder in the connective tissue due to genetic characteristics and the long-term existence of the abdominal wall defect [49, 50]. The main direction in the prevention of parastomal hernias is to strengthen the diastasis of tissues between the fascial aperture of the stomal canal and the intestine carrying the stoma [45]. Most of these techniques are based on strengthening the entire perimeter of the stomal canal with the help of endoprostheses. In this regard, an original method of prevention without the use of a mesh implant is of interest. Instead of a cruciform incision in the formation of the stomal canal, recommended by C.C. Lyon and A.J. Smith [33], it was proposed to perform a linear incision of the aponeurosis, the corners of which are reinforced with two interrupted sutures made of non-absorbable suture material. In a group of 25 patients with a median follow-up of 12 months, no parastomal hernia occurred [44]. With sufficient effectiveness of the method, it is worth noting its safety and low cost compared to other prevention methods that use mesh prostheses, bioimplants, or specially designed devices.

There is evidence that suturing the stoma-bearing bowel segment to the anterior abdominal wall prevents parastomal hernia formation. So, K. von Smitten et al. [25] reported on 54 patients with terminal sigmostoma, half of whom used this technique for stoma formation. However, no statistically significant difference was found between the groups. H. Abcarian and R.K. Pearl argue against bowel fixation, which has also not yet been clinically validated [36]. Thus, the available evidence is insufficient to support or refute the hypothesis that closing the lateral space by fixing the stoma-bearing bowel to the anterior abdominal wall reduces the risk of parastomal hernia [15]. In 1958 J.C. Goligher and C.P. Sames simultaneously described an extraperitoneal method for creating end stomas [47–49]. The operation consisted in the formation of the retroperitoneal canal along the anterior abdominal wall by exfoliating the peritoneum from the muscular-aponeurotic layer to the place of optimal removal of the intestinal stoma to the anterior abdominal wall. This approach preserves the peritoneum on the inside of the stomal canal. Similar anatomical and physiological conditions are created using the modified P.H. Sugarbaker in the surgical treatment of a formed parastomal hernia [16]. Hamada et al. analyzed the data of 37 patients, 22 of whom had a retroperitoneal stoma created during laparoscopic abdominoperineal extirpation [50]. According to the results of this retrospective study, laparoscopic extraperitoneal colostomy leads to the formation of a parastomal hernia in only 4.5% of cases compared with 33% of transperitoneal colostomy ($p = 0.03$). A similar conclusion was made in a meta-analysis by L. Lian et al. [11], covering 1000 patients. It was found that after open surgery, the incidence of parastomal hernias in retroperitoneal stoma is significantly lower ($p=0.002$) compared to the traditional technique. However, when using this technique, there is a decrease in the incidence of stoma prolapse and intestinal obstruction. There are no obvious drawbacks to the retroperitoneal technique, except that it is not uncommon to have to mobilize the left flexure of the colon to obtain the required length for stoma formation. Despite promising results [47], extraperitoneal stomas are not yet recommended for universal use, even in the formation of permanent stomas [16]. The authors agree that further studies are needed to evaluate the effectiveness of this method of preventing parastomal hernias [15]. In 1977 J.D. Rosin and R.A. Bonardi [32] proposed the use of a mesh prosthesis to strengthen the stomal canal. I. Bayer et al. [23] published the first studies of strengthening the anterior abdominal wall with a mesh prosthesis during the formation of a colostomy in 1986.

To date, many types of mesh implants are available for the prevention and treatment of parastomal hernias. Most often, polypropylene prostheses are used especially their large-pore lightweight variants [24, 25]. In addition, composite implants containing biodegenerative anti-adhesive molecules are widespread [36–41, 48,]. There were no complications when using two-component prosthesis [32]. It was noted that the severity of the inflammatory process of the abdominal organs located in close proximity to large-porous implants is lower [11]. When implanting the mesh for prophylactic purposes, it is placed relative to the defect of the aponeurosis, which in this case is the stomal canal. The most commonly used methods are on lay (the implant is placed over the aponeurosis defect [24, 37]) and sub lay (the mesh prosthesis is placed under the edges of the aponeurosis defect retromuscularly, preperitoneally [25, 39–41] or intraperitoneally [36, 41,48]. should be at least 10 cm and overlap the anterior abdominal wall by at least 5 cm [16]. In most studies involving the prophylactic use of mesh prostheses, parastomal hernias have occurred after open surgery [43,44] using flat meshes small, less than 6×6 cm [35]. Placement of the endoprosthesis in direct contact with the contents of the abdominal cavity and intestinal loops is risky, as it can lead to the formation of fistulas, adhesions, or the development of strictures [36]. Prophylactic implant placement is performed both in traditional open and laparoscopic operations, which increases the time of surgical intervention by an average of 30 minutes [34]. Recent meta-analyses and systematic reviews have shown a reduction in the incidence of clinically detectable parastomal hernias with a prophylactic mesh prosthesis compared with operations without its use - 10.8-24.4% [27, 38] and 36-94% [29, 30], respectively. In addition, recent studies have not noted an increase in the incidence of infectious complications and the severity of pain syndrome both with and without an endoprosthesis [23, 24, 31, 32]. Janes et al. [43], who performed prophylactic implantation of a mesh prosthesis using the sub lay

method, with a median follow-up of 5 years, reported the incidence of parastomal hernias in 13.3% versus 81% in the control group. In the study of A.L. Goncharova et al. [23], the median follow-up was 20–25.5 months. It was found that a modified version of the P.H. Sugarbaker with a composite allograft during the primary intervention is safe and can be used prophylactically, as it can reduce the incidence of parastomal hernia by five times. However, the question of the need for total prevention remains debatable, since 73% of patients in the control group did not develop a parastomal hernia during the observation period.

The subject of a randomized multicenter clinical trial conducted in Finland was the study of the formation of parastomal hernia after abdominoperineal extirpation of the rectum [31]. For prophylactic purposes, a two-component composite endoprosthesis was installed intra-abdominally on the peritoneum. According to CT diagnostics, there was no significant difference in the frequency of hernia formation between the groups. However, it was noted that the number of visually determined parastomal hernias significantly decreased in the group with an endoprosthesis installed - 14.3% versus 32.3% in the control group ($p<0.05$). This study once again demonstrates the importance of distinguishing the clinical and instrumental diagnosis of parastomal hernias. The effectiveness of the prevention of parastomal hernias with the help of a mesh implant installed during the primary laparoscopic surgery was confirmed. In a randomized clinical trial, X. Serra-Aracil et al. [20] implanted a mesh endoprosthesis for prophylactic purposes using a modified P.H. sugarbaker. The occurrence of a hernial protrusion was diagnosed using CT of the abdominal cavity. As a result, parastomal hernia was detected in 25% of patients in the experimental group and in 64% of the control group. In the randomized controlled trial PREVENT [34], patients of the experimental group received a light mesh prosthesis in the sublay/retromuscular position for prophylactic purposes. Short-term results showed that 3 of 67 patients in the polypropylene mesh group and 16 of 66 patients in the control group had parastomal hernia. There were no differences in the development of infectious complications, pain syndrome and formation of other postoperative hernias.

In the study by A. Lykke et al. [15] assessed the safety and efficacy of preventing paracolostomy hernias using a mesh prosthesis in emergency surgery. In 48% of cases, the surgical field is contaminated. Despite this, a preventive mesh prosthesis was installed in half of the patients. Even taking into account the contamination of the surgical field, no difference in the development of wound complications was found. In addition, at a median follow-up of 12 months, the incidence of parastomal hernias in the experimental and control groups was the same. It is believed that in case of contamination of the surgical field, which occurs from time to time during the formation of an ileostomy or colostomy, a differentiated approach is necessary. In conditions where the surgical field is infected, the use of bioimplants (much more expensive products than synthetic meshes) is preferable due to their lower propensity for bacterial contamination [16]. In addition, they significantly reduce the risk of developing intestinal parastomal fistulas due to less likelihood of intestinal erosion. In clinical practice, Permacol and Strattice bioprostheses are widely used making of sheet pigskin, devoid of antigenic structure and chemically soldered (cross linking). As a result of the manufacturing process, an implant is made from this material, which is a pure cross-linked collagen and elastin without cellular structures and adipose tissue [26, 37]. Initially, the use of bioimplants was reported to significantly reduce the incidence of parastomal hernias, although this claim was based on a small number of studies involving a small number of patients [38, 39]. The multicentre, prospective, randomized PAISM trial refuted the initial results. It compared patients in whom the terminal stoma was formed according to the standard technique with those in whom it was reinforced with a Strattice bioimplant placed in the sub lay position [20]. The bioimplant was placed anterior to the posterior leaf of the sheath of the rectus abdominal muscle; the intestine carrying the stoma was passed through a cruciform incision. After 24 months of observation, statistically identical results of parastomal hernia formation were obtained in the main group (10.2%) versus 13% in the control group, respectively. The authors concluded that the strengthening of the stomal canal with mesh bioimplants is safe, but not economically justified for routine prophylactic use [20]. In summary, recent clinical studies and meta-analyses on the prophylactic use of mesh implants provide encouraging results. However, in most studies, an insufficient number of patients have been studied, so the probability of errors is high [39]. Additional contradictions are introduced by the results, in which there is no significant difference in the incidence of parastomal hernias when using a mesh endoprosthesis [25]. In this regard, it is recommended to use the obtained data with caution in clinical practice [31]. Another promising way to prevent parastomal hernias is the use of staplers for stoma formation. The results of a traditional manual stomia are highly dependent on the skill of the surgeon, so the use of such devices for stomia seems to be justified. This is a simple and effective way to standardize the procedure for stoma formation, which will reduce the number of complications [22]. The device for stoma formation was first proposed by S. Resnick in 1986 [13]. Currently, several original methods are known. In 2011 N.S. Williams et al. [34] published the first data on the use of the stapled mesh stoma reinforcement technique (SMART), which consists in suturing a bioimplant with a stapler suture to the posterior sheet of the sheath of the rectus abdominis muscle. For this, a specially designed stapler is used, reminiscent of a standard stapler circular stapler EEA. With this technology, a reinforced hole is created in the fascia layer with a precisely defined size from 17 to 30 mm. The bioprosthesis is fixed with a circular intermittent stapler suture to the outer sheet of the sheath of the rectus abdominis muscle. Primary data from non-randomized controlled trials show a significant reduction in parastomal hernias with this technique, 19% versus 73% ($p<0.04$) [15]. A similar method was tested in their work by scientists from Australia Z.Q. Ng and P. Tan [16], however, unlike N.S. Williams, they used a standard 25 and 28 mm circular stapler and an Ultra-pro composite mesh prosthesis. The latter was circularly fixed to the inner leaf of the sheath of the rectus muscle. The excess mesh implant was sutured to the posterior leaflet with interrupted sutures. Through the thus formed stomal canal, the intestine carrying the stoma was passed. Two out of 14 patients developed a parastomal hernia that did not require surgical treatment, which was diagnosed using CT. There were no complications associated with the stoma [36]. Long-term results of this technique are not presented. Its comparison with traditional prophylactic methods of implantation is to be carried out in future studies.

Thus, the problem of choosing a method for the prevention of parastomal hernias is now coming to the fore. To date, there are several effective evidence-based methods of prevention. The study of the effectiveness of the use of mesh endoprostheses continues. In some clinics, they are already used in routine practice [38].

Studies show that the use of mesh polymer endoprostheses in the treatment of ventral hernias reduces the number of recurrences, but leads to an increase in the frequency of wound complications [37-41]. In this regard, it is possible that with the prophylactic installation of mesh implants and a decrease in the likelihood of developing a parastomal hernia, an increase in the risk of wound complications in the stoma is also inevitable. This assumption is confirmed by studies that indicate an increase in the number of infectious complications associated with stoma after operations, during which a mesh implant was placed during its formation [12–14]. It was also noted that parastomal hernia did not form in 52–73% of patients with a permanent terminal colostomy [15, 23]. We believe that in the presence of several alternative methods of prevention that significantly reduce the incidence of parastomal hernia, the total implantation of a mesh endoprosthesis in all patients with a permanent stoma is not necessary, since such an installation exposes a significant group of patients to an unjustified risk of complications. Further studies are needed to identify groups of patients with varying degrees of risk of developing parastomal hernias in order to rationally prevent them.

Literature:

1. Ayupov R.T. Modern approaches to the treatment of advanced colorectal cancer. Creative surgery and oncology 2010; 3:32–36.
2. Davydov M.I., Aksel E.M. Statistics of morbidity and mortality from malignant neoplasm in 2000. In the book: Malignant neoplasm in Russia and the CIS countries in 2000. M: RONTS im. N.N. Blokhin RAMS; 2002; with. 85–106.
3. Timerbulatov M.V., Gainutdinov F.M., Ibatullin A.A., Kulyapin A.V. Treatment of rectal cancer, current trends. Healthcare of Bashkortostan 2008; 7:15–18.
4. Toychuev Z.M., Gataullin I.G., Aglullin I.R., Khamitov M.R., Kadzhi M.R. Prevention of paracolostomy complications after abdominoperineal extirpation of the rectum. Kazan medical journal 2012; 93(5): 725–728.
5. Statistics of malignant neoplasm in Russia and CIS countries in 2009. Pod. ed. Davydova M.I., Axel E.M. Bulletin of RONTS im. N.N. Blokhin RAMS 2011; 22(3, App. 1).
6. Chissov V.I., Petrova G.V., Starinsky V.V., Kharchenko N.V., Gretsova O.P. Incidence of the population of Russia with malignant neoplasms in 2000. Russian journal of oncology 2000; 3:39–44.
7. Poddubnaya I.V., Axel E.M. Kipriyanova N.S. Component analysis of the dynamics of the incidence of malignant neoplasm of the population (Yakutia, 1990–2003). Siberian journal of oncology 2007; 2:55–62.
8. Moskovchenko A.N., Groshilin V.S., Dudarev S.I. Possibilities of correcting the functional results of applying single-barreled colonic stoma. Ulyanovsk biomedical journal 2015; 3:48–51.
9. Malignant neoplasm in Russia in 2001, Ed. Chissova V.I., Starinsky V.V., Petrov G.V. M: Medicine; 2003; 234 c.
10. Hendren S., Hammond K., Glasgow S.C., Perry W.B., Buie W.D., Steele S.R., Rafferty J. Clinical practice guidelines for ostomy surgery. Dis Colon Rectum 2015; 58(4): 375–387.
11. Sukhanov V.G. Social rehabilitation of patients with stoma. M: Science; 2006.
12. Nazarova D.A. Research, analysis and development of practical recommendations for nursing care of patients with intestinal stoma. Bulletin of RUDN University. Series: Medicine 2017; 21(3): 347–355.
13. Śmietański M., Bury K., Matyja A., Dziki A., Wallner G., Studniarek M., Fridiger J., Szczepkowski M., Świerblewski M., Wróblewski T., Tarnowski W., Solecki R., Mitura K. Polish guidelines for treatment of patients with parastomal hernia. Pol Przegl Chir 2013; 85(3): 152–180.
14. Shelygin Yu.A., Achkasov S.I., Moskalev A.I. National clinical guidelines for herniology. M; 2017.
15. Carne P.W., Robertson G.M., Frizelle F.A. Parastomal hernia. Br J Surg 2003; 90(7): 784–793.
16. Glasgow S., Dharmarajan S. Parastomal hernia: avoidance and treatment in the 21st century. Clin Colon Rectal Surg 2016; 29(3): 277–284.
17. Ermolaev E.I. Comparative evaluation of the results of colostomy. Medicine and Ecology 2010; 4:182–184.
18. Kurdyukova P.G., Popov I.P., Popova N.V. Late complications of colostomy. Bulletin of the East Siberian Scientific Center of the Siberian Branch of the Russian Academy of Medical Sciences 2006; 5:354–355.
19. Vorobyov G.I., Tsarkov P.V. Fundamentals of surgery for intestinal stoma. M: Capital city; 2002.
20. Kald A., Juul K.N., Hjortsvang H., Sjödahl R.I. Quality of life is impaired in patients with peristomal bulging of a sigmoid colostomy. Scand J Gastroenterol 2008; 43(5): 627–633.
21. Krogsgaard M., Pilsgaard B., Borglit T.B., Bentzen J., Balleby L., Krarup P.M. Symptom load and individual symptoms before and after repair of parastomal hernia: a prospective single centre study. Colorectal Dis 2017; 19(2): 200–207.
22. Scarpa M., Ruffolo C., Boetto R., Pozza A., Sadocchi L., Angriman I. Diverting loop ileostomy after restorative proctocolectomy: predictors of poor outcome and poor quality of life. Colorectal Dis 2010; 12(9): 914–920.
23. Dalgatov G.M., Zagirov U.Z., Zagirova N.N., Isaev U.M., Salikhov M.A. Medical and social rehabilitation of colostomy patients. Bulletin of new medical technologies 2007; 14(4): 114–115.
24. Kosovan V.N. Assessment of the quality of life of patients with a colonic stoma. Clinical surgery 2012; 9:9–11.
25. Gyulmamedov P.F. Therapeutic intestinal stoma - indications, tactics, complications (our experience). Actual problems of modern medicine 2007; 7(1–2): 107–109.
26. Aquina C.T., Iannuzzi J.C., Probst C.P., Kelly K.N., Noyes K., Fleming F.J., Monson J.R. Parastomal hernia: a growing problem with new solutions. Dig Surg 2014; 31(4–5): 366–376.

27. Chikinev Yu.V., Zadilsky R.P. Late complications of colostomy formed in conditions of intestinal obstruction. Medicine and education in Siberia 2015; 3:39.
28. Leong A., Londono-Schimmer E., Phillips R. Life-table analysis of stomal complications following ileostomy. Br J Surg 1994; 81(5): 727–729.
29. Lobakov A.I. Rehabilitation of patients with postoperative therapeutic intestinal stoma. Surgery 2006; 5:12–14.
30. Shakeev K.T. Complications of a colostomy. Medicine and Ecology 2008; 4:91–25.
31. Shaposhnikov V.I., Ashkhamaf M.Kh., Zorik V.V., Marchenko N.V., Gedzyun R.V. Analysis of technical errors in the formation of terminal kolostomy. Kuban Scientific Medical Bulletin 2013; 3:139–141.
32. Stoiko Yu.M., Manikhas G.M., Khanevich M.D., Konovalov S.V. Prevention and treatment of complications of colostomy. St. Petersburg: Agraf+; 2008.
33. Ibatullin A.A., Timerbulatov M.V., Gainutdinov F.M., Kulyapin A.V., Bulatov R.R., Ibatullin R.T. Analysis of unsatisfactory results of stoma operations. Bulletin of the East Siberian Scientific Center of the Siberian Branch of the Russian Academy of Medical Sciences 2007; 4(56): 85–86.
34. Timerbulatov M.V., Ibatullin A.A., Gainutdinov F.M., Kulyapin A.V., Aitova L.R., Kyzylbaeva A.I., Abdeev A.A., Fatkhullin A.S. Late complications of intestinal stoma and their surgical correction. Kazan medical journal 2012; 93(4): 602–606.
35. Sjödahl R., Anderberg B., Bolin T. Parastomal hernia in relation to site of the abdominal stoma. Br J Surg 1988; 75(4): 339–341.
36. Evans M.D., Thomas C., Beaton C., Williams G.L., McKain E.S., Stephenson B.M. Lowering the incidence of stomal herniation: further follow up of the lateral rectus abdominis positioned stoma. Colorectal Dis 2011; 13(6): 716–717.
37. Stephenson B.M., Evans M.D., Hilton J., McKain E.S., Williams G.L. Minimal anatomical disruption in stoma formation: the lateral rectus abdominis positioned stoma (LRAPS). Colorectal Dis 2010; 12(10): 1049–1052.
38. Schein's common sense: prevention and management of surgical complications. Schein M., Rogers P.N., Leppäniemi A., Rosin D. (editors). Shropshire: TFM Publishing Limited; 2013; 558 p.
39. Hardt J., Meerpohl J.J., Metzendorf M.I., Kienle P., Post S., Herrle F. Lateral pararectal versus transrectal stoma placement for prevention of parastomal herniation. Cochrane Database Syst Rev 2013.
40. Kroese L.F., de Smet G.H., Jeekel J., Kleinrensink G.J., Lange J.F. Systematic review and meta-analysis of extraperitoneal versus transperitoneal colostomy for preventing parastomal hernia. Dis Colon Rectum 2016; 59(7): 688–695.
41. Kalashnikova I.A., Achkasov S.I. Algorithm for the diagnosis and treatment of complications of intestinal stoma. Coloproctology 2009; 3:8–15.
42. Ermolaev I.E. Complications of a colostomy. Medicine and Ecology 2010; 4:37–41.
43. Pilgrim C., McIntyre R., Bailey M. Prospective audit of parastomal hernia: prevalence and associated comorbidities. Dis Colon Rectum 2010; 53(1): 71–76.
44. Shakeev K.T., Nurbekov A.A., Zhanasova M.M. Evaluation of the effectiveness of the method for the prevention of colostomy. Bulletin of Surgery of Kazakhstan 2010; 1:70–71.
45. Atlas of intestinal stomas. Fazio V.W., Church J.M., Wu J.S. (editors). Springer US; 2012.
46. Volenko A.V., Andreev Yu.V., Volenko I.A., Andreev V.G. Comparative analysis of the results of using a sutureless colostomy in colon surgery. Bulletin of the East Siberian Scientific Center of the Siberian Branch of the Russian Academy of Medical Sciences 2011; 4–2:29–31.
47. Londono-Schimmer E.E., Leong A.P., Phillips R.K. Life table analysis of stomal complications following colostomy. Dis Colon Rectum 1994; 37(9): 916–920.
48. López-Cano M., Lozoya-Trujillo R., Quiroga S., Sánchez J.L., Vallribera F., Martí M., Jiménez L.M., Armengol-Carrasco M., Espín E. Use of a prosthetic mesh to prevent parastomal hernia during laparoscopic abdominoperineal resection: a randomized controlled trial. Hernia 2012; 16(6): 661–667.
49. Nastro P., Knowles C.H., McGrath A., Heyman B., Porrett T.R., Lunniss P.J. Complications of intestinal stomas. Br J Surg 2010; 97(12): 1885–1889.
50. Parshikov V.V., Fedaev A.A. Abdominal wall prosthetic repair in ventral and incisional hernia treatment: classification, terminology and technical aspects (review). Sovremennye tehnologii v medicine 2015; 7(2): 138–152.

ПРОФИЛАКТИКА ПАРАСТОМАЛЬНЫХ ГРЫЖ

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Резюме. *На современном этапе развития колоректальной хирургии наблюдается тенденция к увеличению числа стомированных пациентов. Создание стомы является фактором образования парастомальной грыжи, которая зачастую приводит к серьезным осложнениям, препятствующим полноценной реабилитации больного. Чаще всего парастомальная грыжа формируется в ближайшие два года после операции, однако возможность грыжеобразования сохраняется на протяжении всего послеоперационного периода. В настоящей работе представлены современные методы профилактики парастомальных грыж, проанализированы результаты клинических исследований и метаанализов. При описании методик сделан акцент на их безопасности, эффективности и экономической обоснованности.*

Ключевые слова*: парастомальная грыжа; кишечная стома; колостома; илеостома; сетчатый эндопротез.*