

PROCEEDINGS

SURGICAL METHODS FOR MINIMIZING THE INCIDENCE OF PARACOLOSTOMY HERNIAS

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ABSTRACT

INTRODUCTION: Regardless of the advances in surgical techniques, parastomal hernia continues to be a frequent and serious complication after colostomy construction. The outcomes after surgical treatment are often not satisfactory, and the recurrence rate is high.

AIM: The study aims to present modern surgical methods for the prevention of paracolostomy hernias.

MATERIALS AND METHODS: The study included 77 patients with formed colostomies in the Clinic of Surgery of Alexandrovska University Hospital during the period from 2017 to 2022, analyzed with a follow-up period of at least six months. Group A includes 35 patients whose stoma was constructed by the extraperitoneal route. Group B consists of 42 patients with the traditional transperitoneal technique. In addition, 2 patients in whom synthetic mesh was used to treat and prevent paracolostomy hernia are reported.

RESULTS: In group A only one patient was diagnosed with parastomal hernia, while in group B there were 9. The difference between the two groups was found to be statistically significant ($p < 0.05$). In the cases where a prophylactic synthetic mesh was utilized, no complications were observed.

CONCLUSION: Improving surgical techniques for preventing paracolostomy hernias is crucial, as they represent an inevitable complication, in most cases, after colostomy formation. The results of the conducted study as well as the available literature data highlight the benefits of methods such as the extraperitoneal route for stoma construction and the prophylactic use of synthetic meshes.

Keywords: *colostomy, parastomal, hernia, colorectal surgery*

INTRODUCTION

Derived from the Greek, the word *stomat* means *mouth*. Gastrointestinal stomas represent artificial connections of the gut to the skin (1). In the modern era, Alexis Littre's perception of colostomy in the early 18th century marks the beginning of the development of this field in surgery (1,2). The first successful

colostomy was performed by Duret on an infant with colonic obstruction due to an imperforate anus in 1793 (1,3). The initial ones established were put into application to alleviate congenital anomalies, states of intestinal obstruction, complications of inflammatory processes, injuries, etc. Currently, colostomy remains a frequently performed procedure with indisputable importance and represents a magnificent exchange for conditions like low rectal and anal cancer, even though it largely alters a patient's quality of life. Stoma construction is associated with significant morbidity and can affect the patient's physical and mental health (4). Despite the establishment of many modifications and improvements in surgical techniques, complications still tend to occur, ranging from 20 to 70% incidence rate (3,5). The most common and troublesome stoma-related complication is

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Received: August 6, 2023

Accepted: October 15, 2023



the parastomal hernia (PSH). There are several surgical methods that can be employed to minimize the rate of paracolostomy hernias (PCH) in patients with an end colostomy. One method is the prophylactic mesh placement which aims to reinforce the abdominal wall. Also, compelling literature data indicates that extraperitoneal colostomy (EPC) is associated with a lower incidence rate of PCH compared to traditional transperitoneal colostomy (TPC) (6).

AIM

The objective of the current study is to explore modern surgical methods for the prevention of PCH and to investigate which technique results in lower PCH incidence rates in patients with end colostomy at the Clinic of Surgery of Alexandrovska University Hospital.

MATERIALS AND METHODS

A total of 77 patients with end colostomies during the period from 2017 to 2022 in the Clinic of Surgery were included in the present study. All patients, except those who underwent colostomy construction in 2022, were analyzed with a median follow-up period of at least one year. The patients were divided into two groups depending on the surgical technique for colostomy formation. Group A included 35 patients with EPC, 31 of whom underwent laparoscopic abdominoperineal resection (APR). Group B consisted of 42 patients with traditional TPC—20 with laparoscopic APR. Chi-square test was used to compare the categorical frequencies. Two patients in whom synthetic mesh was used to treat and prevent PCH were reported. In addition, a comprehensive literature review was conducted. Scopus, PubMed, and Google Scholar databases were searched.

Herein, we present the technique for constructing an EPC during laparoscopic APR applied in our clinic, similar to techniques reported by other authors (6,7). Usually, the colostomy site coincides with the assistant trocar, located through (6) or lateral to the lateral border (7) of the left rectus abdominis muscle at or slightly above the level of the umbilicus. During the abdominal phase of the operation when the rectum is fully mobilized, the descending colon is resected at an adequate level to provide sufficient length of the colon, thus facilitating the construction of a tension-free end colostomy at the assistant tro-

car site. The extraperitoneal retrotransversalis tunnel is created by separating the complex of the parietal peritoneum, extraperitoneal and transversalis fascia from the transverse abdominal muscle (Fig. 1). This step can be achieved with the help of the assistant trocar (Fig. 2, Fig. 3) (7) or the conventional open technique (6). In the end, when the extraperitoneal tunnel is shaped to adequately fit the colon (Fig. 4), the latter is pulled out and the stoma is constructed.

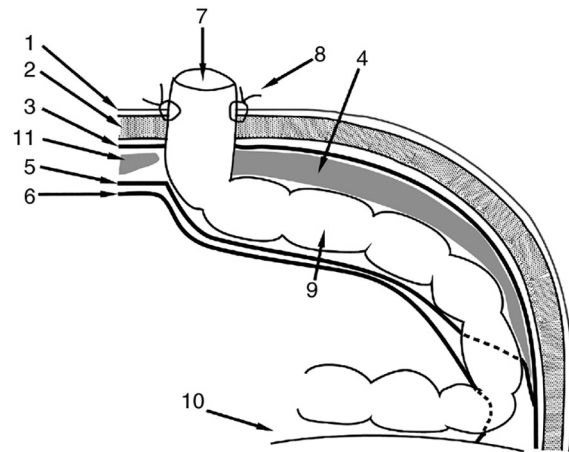


Fig. 1. Cross-section of the abdominal wall at the level of the extraperitoneal retrotransversalis canal: 1) skin; 2) subcutaneous fat; 3) anterior fascia of m. transversus abdominis; 4) m. transversus abdominis; 5) posterior fascia of m. transversus abdominis; 6) parietal peritoneum; 7) colostomy trephine; 8) fixation to the skin; 9) colon in the retroperitoneal canal; 10) renal fascia; 11) m. rectus abdominis. (Tulina IA, Kitsenko YE, Ubushiev MN, Efetov SK, Wexner SD, Tsarkov PV. Laparoscopic technique of modified extraperitoneal (retrotransversalis) end colostomy for abdominoperineal excision. Colorectal Dis. 2018;20(8):O235-O238. doi: 10.1111/codi.14267.)

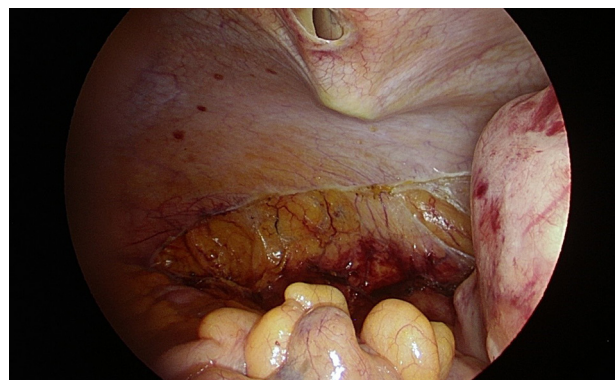


Fig. 2. Separating the complex using an assistant trocar (step 1).

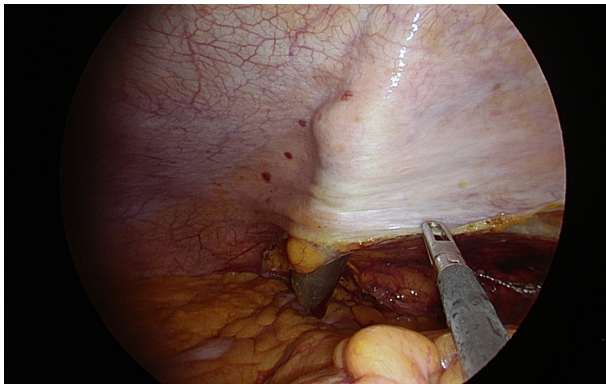


Fig. 3. Separating the complex using an assistant trocar (step 2).

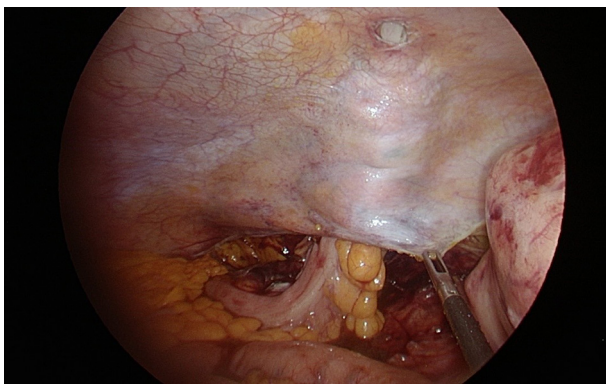


Fig. 4. Shaping the extraperitoneal tunnel to adequately fit the colon.

RESULTS

In Group A only one patient was diagnosed with PCH, while in Group B—9. The difference between the two groups was found to be statistically significant ($p < 0.05$). Two patients with stoma stenosis were diagnosed in Group B and 1 in Group A. Also, 3 cases of transstomal prolapse were observed in Group B. The summarized data is presented on Fig. 5. Although the median operative time was 8

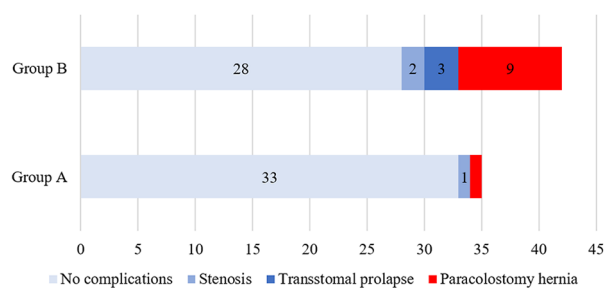


Fig. 5. Summarized results for Group A and Group B.

minutes longer in Group A, no significant statistical difference between the two groups was observed. In the cases where a prophylactic synthetic mesh was utilized, no complications we observed.

DISCUSSION

Permanent colostomy is unavoidable in some forms of rectal and anal cancer following APR. Despite the relative simplicity of the construction technique, the presence of an end colostomy is associated with significant morbidity (5). Transperitoneal colostomy is usually the preferred surgical approach, even though it has been reported to carry an increased risk of stoma-related complications, such as PCH, retraction, and prolapse (7). A paracolostomy hernia remains the most common stoma-related complication with an incidence reported to be the highest (4–48%) after end colostomy when compared to other stoma types and configurations (3,8,9,10,11). Essentially, PSH are incisional hernias that develop in the proximity of a colostomy or ileostomy (11,12). The extraperitoneal route for colostomy construction is used as an alternative technique in our department even though it is not widely accepted by many surgeons. It was first introduced by Sames (13) and Golligher (14) independently in 1958. Hamada et al. (15) reported promising results in preventing PSH of end colostomy after laparoscopic APR using the extraperitoneal route. Wang et al. (16) have also underlined the benefits of EPC and suggest that it should be the first choice after laparoscopic APR. Recent publications also suggest the beneficial effects of this extraperitoneal stoma formation. A meta-analysis by Kroese et al. (17) included 10 studies of 1048 patients (347 with EPC and 701 with TPC). The PSH rate was found to be significantly lower in the extraperitoneal group ($p < 0.001$). Luo et al. (9) conducted a study including 5 eligible random controlled trials (RCTs) assessing the efficacy of EPC in preventing stoma-related complications. The results of the analysis revealed a statistically lower rate of PSH when the extraperitoneal route and a laparoscopic approach were used ($p = 0.003$). In addition, EPC was associated with a lower incidence of stomal prolapse than TPC. In the current literature, several modified surgical techniques regarding EPC have been described (6,7,18,19). From a theoretical point of view, EPC is associated with more evenly spread forces of the ab-

dominal wall (pressure and tension), compared with the transperitoneal method, where these forces are concentrated on one created defect through all layers of the abdominal wall. Moreover, in the extraperitoneal technique, the colon is tunneled laterally toward the stoma, preventing lateral space occurrence and subsequent obstruction. Also, with the rise in the intra-abdominal pressure the sigmoid colon is pushed laterally to the stoma, preventing abdominal contents from herniating (17). Literature data and clinical outcomes from our clinic suggest that EPC has proven to be a safe and simple technique leading to lower PCH and overall stoma-related complication rates.

The use of prophylactic synthetic non-absorbable mesh upon constructing an end colostomy is another method to reduce the incidence of PCH, recommended by the latest European Hernia Society guidelines (20). However, the risk of infection, intestinal adhesion, and intestinal perforation, as well as the procedure's higher cost and dubious effectiveness, should be taken into consideration when choosing this method in patients undergoing rectal surgery (19). Many randomized clinical trials and reviews have reported contradictory results. The PRESTO systematic review and meta-analysis, including 8 RCTs and 3 non-RCTs, has reported positive results in favor of prophylactic mesh utilization. The observed PSH rate in the mesh group varied from 0% to 59% and from 20% to 94% in the control group (21). A randomized controlled double-blinded multicenter trial (STOMAMESH study) conducted by Odensten et al. (22) revealed that the use of reinforcing mesh did not alter the rate of PSH. Brandsma et al. (23,24,25) have presented both short- and long-term results regarding the effectiveness and safety of prophylactic mesh placement during colostomy formation. The incidence of PSH in the mesh group was 4.5% and 24.2% in the non-mesh group ($p=0.0011$) after 1 year of follow-up. For the long-term follow-up (60 months), 27.8% of the patients with a mesh developed a PSH, while 37.2% in the non-mesh group ($p=0.22$) did. The authors conclude that prophylactic mesh placement delays the onset of PSH but does not reduce its incidence.

Limitations

The present study presents a short-term comparison between outcomes after EPC and TPC. In

future studies, it would be preferable to investigate the two groups for a longer follow-up period. The number of patients with placed prophylactic mesh is insufficient and a larger study population is needed for the study to gain statistical power.

CONCLUSION

Improving surgical techniques for preventing PCH is crucial, as they represent an inevitable complication in most cases after colostomy formation. Based on the results of the present study as well as the available literature data, EPC had more advantages than TPC. The prophylactic use of synthetic meshes still remains controversial. More large RCTs with long-term follow-up are needed to assess the benefits and drawbacks.

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