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ORIGINAL ARTICLE

Ileal pouch-anal anastomosis in paediatric age group: perioperative period, functional outcome and patient satisfaction

Authors' Contribution:
A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

Patrycja Sosnowska-Sienkiewicz[1ABCDEF], Karolina Michalik[2BCDE], Przemysław Mańkowski[1BDEF]

[1]Department of Pediatric Surgery, Traumatology and Urology, Poznan University of Medical Sciences, Poland; Head: prof. Przemysław Mańkowski MD PhD
[2]Student Research Group of Pediatric Surgery, Poznan University of Medical Sciences, Poland; Head: Patrycja Sosnowska-Sienkiewicz MD PhD

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ABSTRACT:

Introduction: Restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) is a procedure which enables reconstruction of the continuity of the gastrointestinal track after resection of the large intestine and rectum. The most common diseases that require this type of resection include: ulcerative colitis and familial adenomatous polyposis.

Aim: The study aimed to determine the effectiveness of IPAA in the surgical treatment of the paediatric age group.

Material and methods: The research material was collected based on medical records of 21 patients who underwent proctocolectomy at the Department of Pediatric Surgery, Traumatology, and Urology of the Medical University of Poznan in 2000–2021.

Results: In a group of 21 patients, 11 children were qualified for proctocolectomy due to ulcerative colitis (UC), 6 due to familial adenomatous polyposis (FAP), 3 due to Hirschsprung's disease (HD), and one child due to Crohn's disease (CD). Early complications in treated patients included dehiscence of the postoperative wound, bleeding from the lower gastrointestinal tract and anastomotic leakage. Late complications included pouchitis, stenosis of the ileostomy, narrowing of the anastomotic site and soiling. Quality of life was rated at an average of 9–10 by 16 patients on a scale of 1–10.

Conclusions: IPAA is a proven method of reconstruction for the paediatric age group requiring proctocolectomy. Complications are common, most often related to the underlying disease and the clinical condition of the patients. Despite possible complications, patients rate their quality of life high on the scale. Each qualification for surgery should be carried out in a multidisciplinary team.

KEYWORDS: anastomosis, child, ileostomy, intestinal pouch, laparotomy, proctocolectomy

ABBREVIATIONS

BMI – Body Mass Index
CD – Crohn's disease
FAP – familial adenomatous polyposis
HD – Hirschsprung's disease
HNPCC – hereditary non-polyposis colon cancer
IPAA – ileal pouch-anal anastomosis
UC – ulcerative colitis

INTRODUCTION

Total proctocolectomy is a resection of the large intestine and rectum. This operation may be necessary if a child has a colon and rectum disease that cannot be treated with medications only. The most common diseases that require this type of treatment include: ulcerative colitis (symptomatic disease resistant to conservative treatment, presence of significant side effects of drug treatment, steroid dependence, need to discontinue pharmacological treatment for various reasons, presence of cancer or dysplasia, growth retardation in children), genetic burden of cancer of the rectum and colon (familial adenomatous polyposis; FAP, hereditary non-polyposis colon cancer; HNPCC), colonic dysmotility, Hirschsprung's disease involving the entire colon, idiopathic megacolon, idiopathic megarectum, severe constipation and Crohn's disease limited to the colon (which is a controversial issue) [1–4]. Toxic megacolon is a rare but absolute indication for colectomy [1].

Patients may also have an ileostomy, which is to prevent the anastomotic leak in high-risk intraperitoneal colonic anastomosis [2, 5]. Depending on the patient's clinical condition and the treating surgeon's decision, the scheme of surgical treatment may include various options.

During ileorectal pull-through, the small intestine is connected to the rectum inside the patient's body. Ileoanal pull-through is a procedure in which the small intestine is brought down (pulled through) and connected to the anus inside the patient's body. A pouch is made during the same surgery, which creates a pouch for the stool [6].

Depending on the shape of the inner pouch, there are types in the form of letters J, S, W, or H [3]. All of them allow young people to avoid a permanent stoma after colectomy. These patients are often operated on in puberty, which is an emotionally vulnerable period of life [1].

In most reports, the construction of an intestinal tank (J-pouch or S-pouch) has a better functional result than straight anastomosis [7]. Several studies have focused mainly on faecal frequency and incontinence. However, some other factors, such as the ability to discriminate between air and stool and the ability to defer defecation, are also crucial in evaluating functional outcomes and patient satisfaction [1].

Over the years, the approach has changed and has increased the frequency of producing intestinal reservoirs in children [4, 7].

AIM

The study aimed to determine the effectiveness of ileal pouch-anal anastomosis (IPAA) in the surgical treatment of the paediatric age group.

MATERIALS AND METHODS

The research material was collected based on medical records of patients treated at the Department of Pediatric Surgery, Traumatology, and Urology of the Medical University of Poznan in 2000–2021. During this period, 21 patients were admitted to the surgery department for proctocolectomy.

A "J-pouch" was made in all the operated children. Five children underwent one-stage surgery. The remaining 16 patients were treated with a temporary stoma, three of them in 3 stages.

Surgery technique

Surgery with ileal pouch-anal anastomosis mostly consisted of 2 stages: at the first stage the colon and rectum were removed and the pouch was created by connecting with a linear stapling device two terminal loops of the ileum. Afterwards, the enterotomy was made at the bottom of the curve, which enabled a circular stapling device to connect the pouch with the top of the anal canal. After that, to relieve the anastomosis, the ileostomy was created about 20–30 cm above it. At the second stage the ileostomy was closed and the continuity of the gastrointestinal track was restored.

The procedure can also be performed without creating temporary ileostomy or it may consist of three stages, with ileostomy being performed before the radical surgery as a separate stage (Fig. 1.).

The analysis of surgical treatment included the following components:

- age of the operated patient,
- indications for surgery,
- number of treatment stages,
- hospitalization time after radical surgery,
- duration of the surgical procedure,
- postoperative course,
- the time from radical surgery until the continuity of the gastrointestinal tract was restored.

Each operated patient was assessed during the anamnesis and physical examination 28 days after the intervention. The elements of the medical examination included a detailed assessment of vital functions related to the functioning of the intestinal pouch:

- how many times the stools were passed per day,
- how many times the stools were passed at night,
- assessment of stool consistency on a scale of 1–10, where 1 is very loose, 10 is very dense,
- the feeling of pressure on the stool
- urgent pressures,
- if there was leakage of stools,
- whether there was dirty linen,
- if there were diarrhoea and constipation
- assessment of the current quality of life on a scale of 1–10.

The course of the therapeutic process in each of the analysed patients was complete, and no patient was excluded from the study. Microsoft Excel was used for data collecting. The obtained information was analysed statistically, descriptively, and mathematically using the arithmetic mean.

Consent of the bioethics committee was waived because of the retrospective and non-invasive nature of the study. These rules are compliant with the guidelines of the Bioethical Commission of Poznan University of Medical Sciences.

RESULTS

In a group of 21 patients, 11 children were qualified for proctocolectomy due to ulcerative colitis (UC), 6 due to familial adenomatous polyposis (FAP), 3 due to Hirschsprung's disease (HD), and one child due to Crohn's disease (CD). The disease spread to the entire colon in the last patient and did not respond to pharmacological treatment. The large intestine presented numerous strictures. After multi-specialist consultations, this patient was also qualified for proctocolectomy with ileal pouch-anal anastomosis.

The mean age of the radically operated patients was 14 years. For UC and FAP, the mean age was 13 years, and for HD, 15 years. The patient with CD was also 15 at the time of radical surgery.

Each qualification for surgery was carried out in a multidisciplinary team with the participation of a gastroenterologist, paediatric surgeon and anaesthesiologist.

Early complications in treated patients included dehiscence of the postoperative wound, bleeding from the lower gastrointestinal tract and anastomotic leakage.

Late complications included pouchitis, stenosis of the ileostomy, narrowing of the anastomotic site and soiling. After 4 weeks of proctocolectomy the patients passed on average 4 stools during the day and 2 at night.

Stool consistency on a scale of 1–10 was most often rated as 4 in the first week after surgery, 6 in the second and third week, and 7 in the fourth week after surgery.

All of the operated patients declared that they felt pressure on the stool, had no urgent pressures, and did not report stool leakage. Soiling of the linen occurred in 3 children.

Diarrhoea and constipation were not reported in our patients. Loose stools (4 out of 10 on a stool consistency scale) occurred in 16 patients in the first week after surgery.

Quality of life was rated at an average of 9–10 by 16 patients on a scale of 1–10. Detailed results of the performed analysis were presented in the table and figures below (Tab. I., Fig. 2., 3., 4.).

DISCUSSION

Most children can be observed or treated with medical therapy, but a small group of patients requires such a radical treatment as

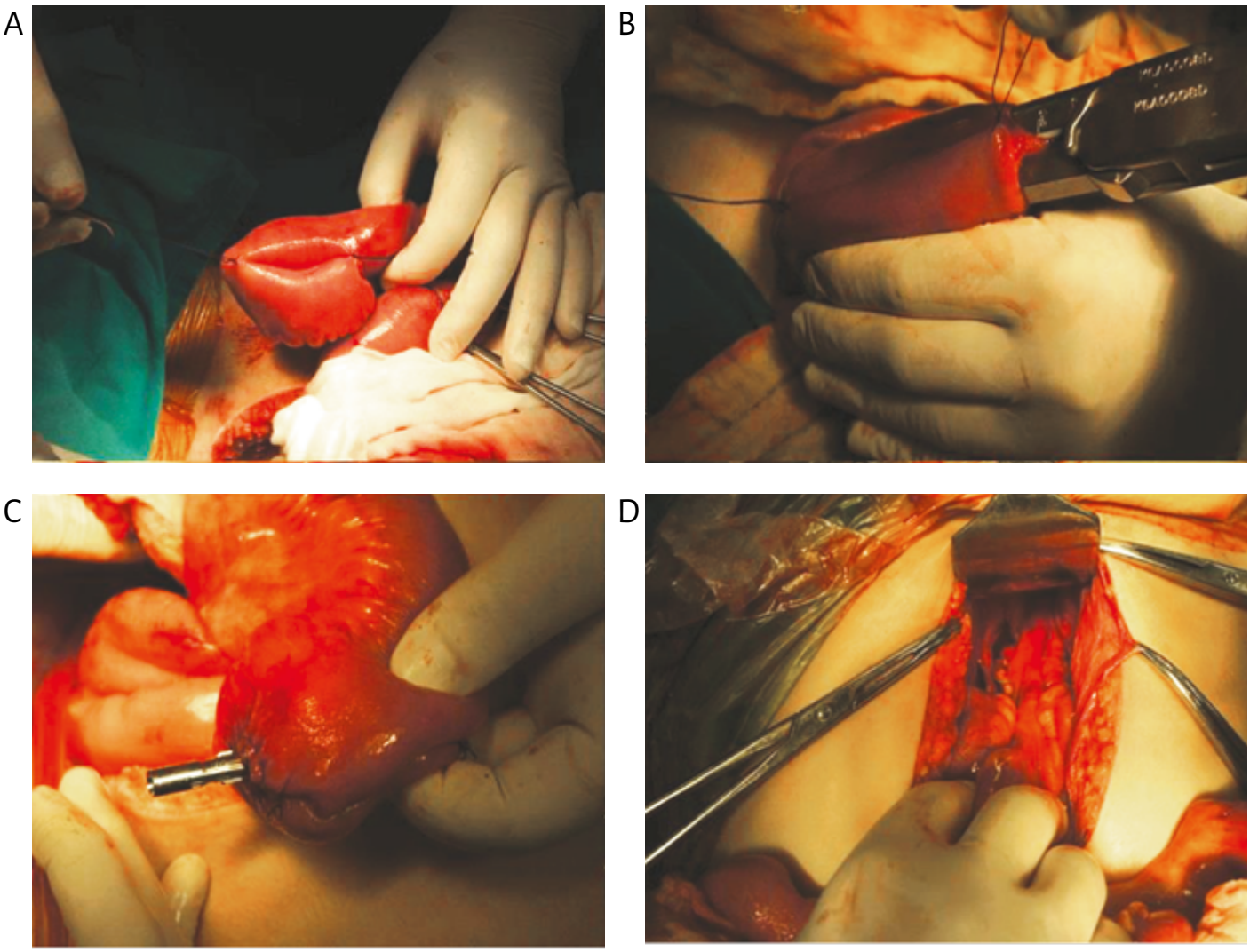

Fig. 1. The most essential stages in the formation of an intestinal J-pouch: (A) initial fixation using single sutures of the two terminal loops of the ileum; (B) Connecting loops with a linear stapling device; (C) Preparation of the complete pouch for end-to-end anastomosis with the anal canal using a circular stapler; (D) The pouch in the abdominal cavity after anastomosis with the anal canal.

proctocolectomy at an early age [1]. Total proctocolectomy with ileal pouch-anal anastomosis is the standard surgical treatment for familial adenomatous polyposis and inflammatory bowel disease including ulcerative colitis [8]. In most reports, the construction of an intestinal reservoir (J-pouch or S-pouch) gives a better functional result than a straight anastomosis [1].

In the children we treated, the most common indication for this type of surgery was ulcerative colitis, less often familial adenomatous polyposis. We also created an intestinal pouch in 3 patients with Hirschsprung's disease. Rintala et al. described, that the functional outcome of patients with Hirschsprung's disease who underwent restorative proctocolectomy with J-pouch appears to be satisfying [9–11]. The number of daily bowel movements is highly acceptable, and these patients seem to achieve daytime continence [9]. Although the number of patients with this diagnosis we observe is small, we can confirm the above observations.

Most of the children treated in our center were operated on in two stages. Only in 5 cases was the decision made to use one-stage treatment without a temporary stoma. Such a decision was conditioned by the very good clinical condition of the patient and the trouble-free course of the entire radical surgery. This is worth emphasising, all these 5 patients were operated on after 2015. For a long time, ileostomy was considered additional protection during anastomosis healing [5]. Currently, Ahmed et al. suggest that ileostomy for ileal-pouch-anal anastomosis does not reduce leakage rate or postoperative morbidity, independent of the surgical strategy [12]. Other authors have similar views. They suggest that a diverting ileostomy should only be constructed for high-risk patients [13].

Among late complications, the most common following total proctocolectomy with ileal pouch-anal anastomosis in patients in our study was pouchitis (3 patients). Lillehei et al. found ulcerative colitis patients had a 47% rate of at least one episode after total proctocolectomy with ileal pouch-anal anastomosis [14]. Diederen et al. noticed 22% of their study pediatric population with pouchitis postoperatively [15]. The differences in pouchitis rates are most likely connected with the definition of pouchitis utilised in each study. Pouchitis, was defined in our study as a condition that requires antibiotics.

Also soiling occurred in 3 of all our patients. In relation to the study group of 21 operated patients, these constituted about 14% of patients. Wewer et al. described the above mentioned complications as a frequent problem in about 44% of patients, when, during the follow-up examination, they identified episodes of dirty linen [1].

Tab. I. Characteristics of patients undergoing proctocolectomy with ileal pouch-anal anastomosis.

Diagnosis The research data	UC (n = 11)	FAP (n = 6)	HD (n = 3)	CD (n = 1)
Average age (years)	13	13	15	15
Number of stages				
One stage	3	2	–	–
Two stages	6	3	3	1
Three stages	2	1	–	–
Time of radical surgery (minutes)				
With ileostomy	290	260	280	305
Without ileostomy	246	220	–	–
Time of hospitalization after radical surgery (days)	17	18	15	14
The period from radical surgery to restoration of the continuity of the gastrointestinal tract (months)	5	4	6	8
Early complications	YES	YES	NO	NO
Late complications	YES	YES	NO	NO

UC – ulcerative colitis, FAP – familial adenomatous polyposis, HD – Hirschsprung's disease, CD – Crohn's disease

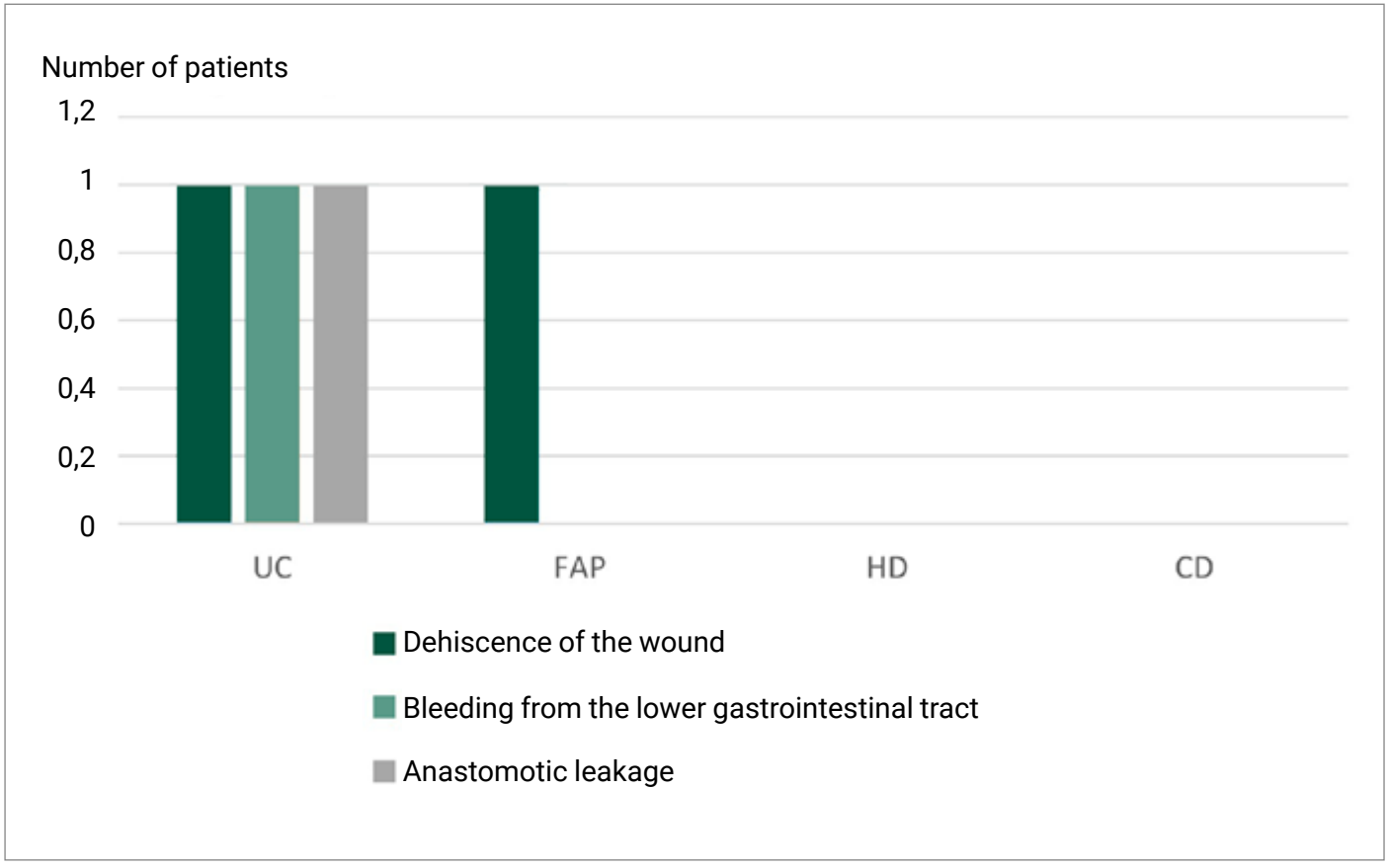

Fig. 2. Early complications in patients undergoing proctocolectomy with ileal J-pouch-anal anastomosis.

Patients we operated on reported these episodes as sporadic, not more often than 3–4 times a week. They are under constant outpatient care. They undergo behavioural training using the Biofeedback method, with gradual improvement in faecal accidents. What is worth emphasizing, all our patients were able to hold back defecation.

Two of our patients had a narrowing of the anastomotic site. It was noticed during the outpatient check-up one month after the operation. In these cases, regular hegarations without the required anaesthesia resolved the problem [16]. Complex treatment connected with intervention may also be necessary [17].

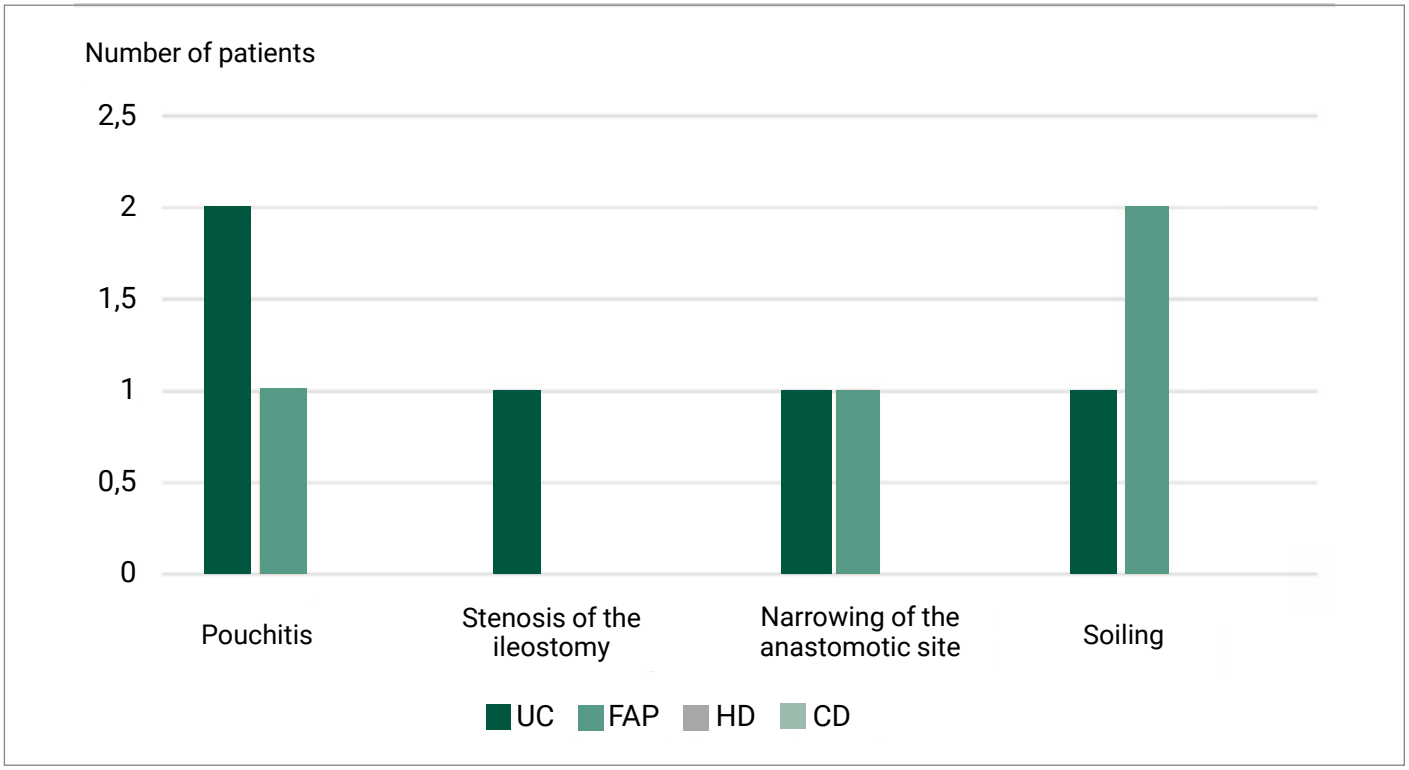

Fig. 3. Late complications in patients undergoing proctocolectomy with ileal J-pouch-anal anastomosis.

Stenosis of ileostomy was observed in one of our cases. Husain et al. suggest that usually in this situation ischemia is the underlying factor. Also, infection and retraction of stoma may lead to stenosis [18]. In our patient, we observed redness and slight swelling of the tissues around the stoma in the postoperative period. The redness and swelling disappeared, but the consequence was a narrowing of the stomy. Stenosis is usually treated with dilation, however, multiple sessions are usually required and tissue trauma during dilation invokes fibrosis. Revision is a definitive treatment [18].

Among early complications in the material studied we observed postoperative wound dehiscence. This complication occurred in 2 obese patients with BMI over 30. They required renewed surgical treatment in general anaesthesia. Overweight and obesity are the risk factors for the development of postsurgical complications in all age groups [19].

One of the possible complications described in scientific literature is anastomotic leakage. Our team defined it as any defect at the anastomotic site confirmed by imaging or during surgical reintervention. This complication occurred in 1 patient operated on due to ulcerative colitis in our study group. The consequence was reoperation, surgical closure of the leakage site and ileostomy. In references, the frequency of this complication is estimated at 1–17% depending on the analysed study [20].

Bleeding from the lower gastrointestinal tract occurred in one of our patients. It was resolved, treated conservatively. The patient maintained stable laboratory results all the time. Due to the short time after the operation (2 days), we decided not to subject the patient to endoscopic control.

Sixteen patients rate their current quality of life in the range of 9–10 (76%), four in the range of 7–8, and one patient in the range of 5, on a 10-point quality-of-life scale. That patient was dissatisfied with the frequency of bowel movements during the day. In the publication by Wawer et al. seventeen patients (63%) were completely satisfied with the operation, nine patients (33%) found the result fairly good and one patient (4%) was not satisfied [1]. We can conclude that most patients reported being satisfied with the procedure.

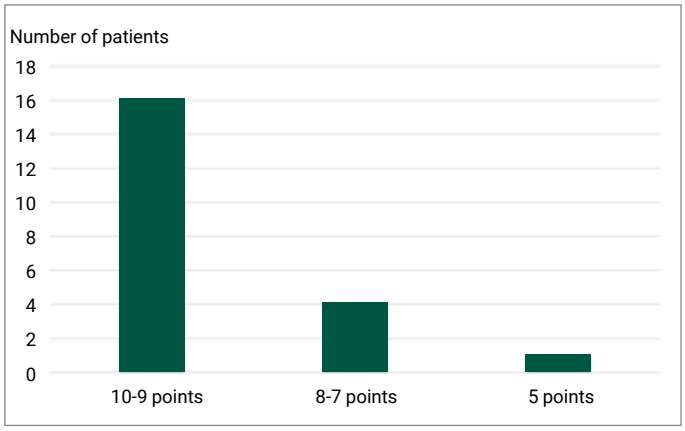

Fig. 4. Assessment of patients' current quality of life during an outpatient control, 4 weeks after radical surgery, rated on a scale of 1–10.

CONCLUSIONS

1. IPAA is a proven method of reconstruction for the paediatric age group requiring proctocolectomy. Complications are common, most often related to the underlying disease and the clinical condition of the patients. Despite possible complications, patients rate their quality of life high on the scale.
2. Each qualification for surgery should be carried out in a multidisciplinary team.

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Competing interests: The authors declare that they have no competing interests.

Corresponding author: Patrycja Sosnowska-Sienkiewicz MD PhD; Department of Pediatric Surgery, Traumatology and Urology, Poznan University of Medical Sciences, Poland; Szpitalna Street 27/33, 60-572 Poznan, Poland; Phone: +48 61 8491578; E-mail: patrycja.sosnowska@outlook.com; sosnowska@ump.edu.pl

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