ILEAL-POUCH-ANAL ANASTOMOSIS AFTER RESTORATIVE PROCTOCOLECTOMY IN PATIENTS WITH ULCERATIVE COLITIS OR FAMILIAL ADENOMATOUS POLYPOSIS – 11 YEARS OF EXPERIENCE

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Restorative proctocolectomy is the “gold standard” in surgical treatment for ulcerative colitis and familial adenomatous polyposis. The two alternative techniques of ileal-pouch-anal anastomosis include hand-made and double line stapled suture.

The aim of the study was to analyze postoperative complications and functional results of the two types of anastomosis.

Material and methods. The study group consisted of 108 patients operated between 1994 and 2005 for ulcerative colitis (n=97) or familial adenomatous polyposis (n=11). Stapled anastomosis was performed in 88 (81.5%) cases and hand-made suture was performed in 20 (18.5%) cases.

Results. No significant differences between the two anastomotic techniques were found in terms of postoperative complications and late functional results.

Conclusions. The low rate of complications and well-accepted functional outcomes prove that restorative proctocolectomy is a safe surgical procedure that can be offered to patients with ulcerative colitis or familial adenomatous polyposis. Double line stapled suture should be the preferred method of ileal-pouch-anal anastomosis, however, the hand-made suture remains its valuable alternative and may be considered in selected cases.

Key words: restorative proctocolectomy, ileal-pouch-anal anastomosis, ulcerative colitis, familial adenomatous polyposis

Restorative proctocolectomy (removal of colon and rectum with construction of ileal pouch with pouch-anal anastomosis – ileal-pouch-anal anastomosis – IPAA) has become the “gold standard” surgical approach to patients who underwent operative treatment for ulcerative colitis (u.c.) or familial adenomatous polyposis (f.a.p.) (1, 2, 3). In some cases, this procedure may be considered in other situations, such as undetermined colitis, multifocal colorectal cancer and Crohn’s disease limited to the large bowel (however, the last case remains a matter of significant controversies) (4, 5).

Restorative proctocolectomy is the most common surgical method of treatment for patients suffering from u.c. However, in some cases, other surgical procedures may be considered including the classical proctocolectomy with permanent end ileostomy or colectomy with ileo-rectal anastomosis (6, 7). According to some authors, the latter procedure may be especially beneficial in terms of preserving fertility in female patients (8). The majority of authors underline advantages of restorative proctocolectomy with the ileal “J”-shape pouch and recommend this procedure as the method of choice in patients with u.c. Despite a certain number of distant complications which may necessitate removal of the ileal pouch in up to 10% of cases (9), the majority of patients (about 90%) is satisfied with overall results of this method of surgical treatment (5, 7, 10). Nevertheless, significant controversies exist over the indications for restorative proctocolectomy,
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The choice of the appropriate time to perform it, and technical details. Several other issues include: a) choice of the best form of ileal pouch ("J" vs "S" vs "W"), b) technique of ileal-pouch-anal anastomosis (hand-made anastomosis with anal mucosectomy vs double line stapled suture), c) indications for and effects of restorative proctocolectomy in cases of undetermined colitis or Crohn’s disease, d) necessity of protecting pouch-anal anastomosis by means of temporarily loop ileostomy in each patient, use of laparoscopic techniques in restorative proctocolectomy and e) the effects of ileal pouch construction on elderly patients (11, 12, 13). Recently published data have proven that restorative proctocolectomy may be successfully performed by laparoscopic or laparoscopic-assisted technique and results presented by centers specializing in laparoscopic surgery are similar to these achieved by means of traditional open surgery (14, 15). The number of patients undergoing laparoscopic surgery should be steadily growing in future.

Many authors have tried to assess which techniques of ileal-pouch-anal anastomosis (hand-made anastomosis with distal anal mucosectomy or double line stapled suture) should be recommended. The assessment has been based on a clinical determination of functional results in operated patients (number of stools, ability to differentiate stools from intestinal gases, necessity of special diet or anti-diarrheic drugs intake) as well as manometric investigation of the anal canal and ileal-pouch function (12, 16). It is currently widely accepted that double line stapled suture offers better functional results, although hand-made anastomosis is still considered an alternative method with satisfying distant functional results (11, 12, 16, 17).

The aim of the study was to analyze postoperative complications and functional results achieved in patients undergoing restorative proctocolectomy for ulcerative colitis (u.c.) and familial adenomatous polyposis (f.a.p.) to compare two alternative methods of pouch-anal anastomosis: hand-made anastomosis from perineal approach with "pull-through" technique including distal rectal mucosectomy (from about 3 cm above dentate line) and double line stapled suture with preservation of 1-2 cm of rectal mucosa above the dentate line within the anal transitional zone. According to some authors, the anal transitional zone plays a key role in defecation, especially in the differentiation between stools and intestinal gases (18, 19).

Based on the collected data, the authors tried to determine which method of ileal-pouch-anal anastomosis offered less postoperative complications and better late functional results.

**MATERIAL AND METHODS**

The analyzed group consisted of 108 patients who between 1994 and 2005 who underwent restorative proctocolectomy in the 1st Department of General, Gastroenterologic and Endocrine Surgery, Medical University in Wroclaw. Indications for surgery included u.c. in 97 cases and f.a.p. in 11 cases. The patients’ age varied between 14 and 58 years. In the u.c. group (n=97), 39 patients (40.2%) required emergency surgery (perforation of large bowel, megacolon toxicum, massive hemorrhage, fulminant colitis). In this group, the 3 stage procedure was performed. The first stage included colectomy with occlusion of the distal rectum (Hartmann’s procedure) and end ileostomy. The second stage consisted of removal of the distal rectum (proctectomy), construction of ileal-“J” pouch (made of distant segment of ileum) with pouch-anal anastomosis and temporarily protective loop ileostomy. Finally, during the third stage, the loop ileostomy was closed (after endoscopic and radiologic (“pouchography”) assessment of ileal pouch and anastomosis). The remaining 58 patients (59.8%) were operated on an elective basis, mainly in the course of long-lasting ulcerative colitis. They underwent a two-stage procedure: a) first stage included proctocolectomy with ileal-pouch construction, pouch-anal anastomosis and loop ileostomy and b) the second stage consisted of ileostomy occlusion. The two-stage restorative proctocolectomy was also performed in all (n=11) patients operated for f.a.p.

The hand-made one layer pouch-anal anastomosis from perineal approach was performed in 20 (18.5%) patients (group I). This included the “pull-through” maneuver and rectal mucosectomy about from 3 cm above the dentate line. This approach was aimed at radical removal of advanced rectal inflammation (u.c.) or numerous rectal polyps (f.a.p.). In the remaining 88 (81.5%) patients, a pouch-anal anastomosis was performed by means of a double line stapled suture with PI-30 and CEEA 31 staplers about 1 cm above the dentate line. In
2 patients, the original plan of mucosectomy and hand-made anastomosis must have been rejected due to substantial problems with adequate mobilization of the ileum and constructed pouch leading to unacceptable tension in the line of anastomosis. In these patients, a stapled anastomosis was successfully performed.

In all operated patients, the ileal “J”-shaped pouch was constructed. The average pouch length was about 15 cm resulting in an optimal pouch capacity of 150-200 ml. The pouch was constructed with a GIA stapler with two 90 mm sets of staples; in one case, the pouch was sutured by hand.

In all cases, the pouch-anal anastomosis (hand-made or stapled) was protected by means of a loop ileostomy, which was closed 3 months later. In the authors’ opinion, this helped to prevent some complications related to possible leak in the ileal pouch-anal anastomosis, which in some cases may even necessitate removal of a newly constructed ileal pouch. Before occlusion of the ileostomy, each patient underwent rectoscopy with assessment of pouch-anal anastomosis and X-ray study of ileal pouch with barium introduced via Foley’s catheter placed in efferent loop of the ileostomy. This allowed visualization of ileal pouch morphology, proper passage through pouch-anal anastomosis and practical assessment of anal sphincter function at rest and during defecation.

The collected material was analyzed in relation to early and late postoperative complications as well as final functional results in both operated groups of patients (number of stools per day and possible stools/gas incontinence, defined as lack of control on passing gases or watery/solid stools).

RESULTS

There were no fatal complications in either of the operated groups. Late functional outcome (number of stools per day and/or stools or gases incontinence) assessed at least 3 months after ileostomy closure are presented in tab. 1.

Early and late postoperative complications in both groups of patients are presented in tab. 2 and 3.

All operated patients undergo ambulatory follow up on regular basis. This includes regularly repeated rectoscopic examinations for collection of biopsies of pouch mucosa to diagnose any cases of dysplasia or foci of cancer in patients operated for u.c. or adenomas in patients with f.a.p. So far, (the longest follow up period is 11 years) no such lesions have been detected.

DISCUSSION

The aims of surgical treatment for ulcerative colitis and familial adenomatous polyposis

Table 1. Late functional results of restorative proctocolectomy

<table>
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<th>Group I (n=20)</th>
<th>Group I (n=88)</th>
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<tbody>
<tr>
<td>Number of stools / 24h</td>
<td>2-6</td>
<td>2-7</td>
</tr>
<tr>
<td>Stools/gases incontinence</td>
<td>0</td>
<td>1</td>
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Table 2. Early postoperative complications of restorative proctocolectomy in patients with u.c. and f.a.p.

<table>
<thead>
<tr>
<th></th>
<th>Group I (n=20)</th>
<th>Group II (n=88)</th>
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</thead>
<tbody>
<tr>
<td>Wound infection</td>
<td>2 (10%)</td>
<td>7 (7.9%)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>2 (10%)</td>
<td>6 (6.8%)</td>
</tr>
<tr>
<td>Abdominal bleeding requiring laparotomy</td>
<td>0 (0%)</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Anastomosis leak requiring pouch removal and terminal ileostomy</td>
<td>0 (0%)</td>
<td>1 (1.1%)</td>
</tr>
<tr>
<td>Pulmonary infection</td>
<td>1 (5%)</td>
<td>3 (3.4%)</td>
</tr>
</tbody>
</table>

Table 3. Late postoperative complications of restorative proctocolectomy in patients with u.c. and f.a.p.

<table>
<thead>
<tr>
<th></th>
<th>Group I (n=20)</th>
<th>Group II (n=88)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anastomosis stricture</td>
<td>1 (5%)</td>
<td>5 (5.6%)</td>
</tr>
<tr>
<td>Intestinal mechanical obstruction requiring laparotomy</td>
<td>1 (5%)</td>
<td>3 (3.4%)</td>
</tr>
<tr>
<td>Pouchitis (only u.c. Patients)</td>
<td>2 (10%)</td>
<td>16 (18%)</td>
</tr>
</tbody>
</table>
| Pouch-vaginal fistula  | 0 (0%)        | 2 (2.2%)--only u.c.
include: 1) total removal of diseased large bowel, 2) maximal reduction in the cancer risk, 3) maintenance of physiological stool passage and 4) reduction in the number of necessary surgical interventions. Restorative proctocolectomy fulfills these expectations. This has been confirmed in a large number of operated patients presented in the available literature (5, 7, 20, 21) as well as in our own, much smaller, material.

In all of our operated patients, the ileal pouch used was the “J” type. This choice was based on widely reported substantial advantages of this type of pouch, including relatively simple construction, satisfactory functional outcome (5-7 stools per day), easy pouch emptying, full stools and gas continence (day and night) in 90% of cases (22, 23, 24, 25). According to the available literature, the pouch with best late functional results is the “W” type (22). However, technically difficult construction and anastomosis of this type of pouch makes it rather unpopular. In our material, the “J”-type ileal pouch was constructed with the use of a GIA stapler. No significant deterioration of pouch function in the late postoperative period was detected in our material, which is in agreement with the existing literature (23).

The choice of optimal pouch-anal anastomosis technique, its distance from anal margin, and rectal mucosectomy are still matters of significant controversy. Double line stapled anastomosis seems to be the most popular technique (5, 25, 26), however hand-made anastomosis with distal anal mucosectomy has some strong supporters (11, 12, 17, 27). Japanese authors (16) performed a direct comparison of patients operated for u.c. or f.a.p. with double line stapled anastomosis and preservation of anal transitional zone versus a group of patients operated with a hand-made suture with mucosectomy. They found that functional results (both clinical and manometric) were better in the stapled anastomosis group; however, this group of patients required regular and thorough follow up of the retained anal transitional zone mucosa in order to detect dysplasia or adenoma formation. In our material, distal anal mucosectomy and hand-made anastomosis was performed in patients with numerous adenomatous polyps (f.a.p.) or massive anal inflammatory changes (u.c.). In these cases, the aim of the mucosectomy was to make the surgery as radical as possible.

It must be stated that in the authors’ material, stapled anastomosis was technically possible on all operated patients. In 2 cases, we had to reject original plan of hand-made anastomosis with mucosectomy due to technical difficulties in the ileal pouch mobilization and unacceptable tension expected in the region of the anastomosis. In these patients, double line stapled anastomosis was performed safely. The stapled anastomosis shortens the overall surgery time by about 30-45 minutes. The late functional outcome and postoperative complications were similar in both groups of operated patients. In a very interesting study, Dutch authors presented results of postoperative assessment of anal sphincter integrity after hand-made anastomosis (17). They proved that despite good late functional results this method of anastomosis leads to significant sphincter damage in over 50% of cases.

The protective loop ileostomy is in our department considered as routine procedure and it was performed in all operated patients. In recent years however there have been some literature data suggesting that construction of protective loop ileostomy can be safely rejected (11, 28). The proposed alternative is a drain introduced through the anus protecting the newly constructed anastomosis. In the authors’ material, no significant complications of loop ileostomy have been noticed, and in our opinion, this procedure offers the best possible protection of proper healing after the ileal pouch-anal anastomosis.

In one case, the ileal pouch must have been removed and replaced by a terminal ileostomy due to significant anastomotic leak and symptoms of pelvic sepsis. The rate of such complications reported in literature is approximately 3-10% (5, 7, 9, 21).

In one patient from group I (hand-made anastomosis) and three patients from group II (stapled anastomosis), the pouch-anal anastomosis stricture occurred. In each case, this required mechanical divulsion. The higher number of such cases in group II probably reflects the well known fact that stapled anastomosis is more prone to stricture formation (29). Fortunately, the stricture developed after occlusion of loop ileostomy in only one case. In the remaining three cases, the stricture was diagnosed and successfully managed prior to ileostomy closure. This may be at least partly explained by the fact that the passage of stools...
through the pouch-anal anastomosis after ileostomy occlusion prevents anastomosis from stricture development.

In our material, (the longest follow up lasting for 11 years) no case of either dysplasia or cancer occurred in the anal transitional zone, which has been preserved in patients from group II. In one patient operated due to f.a.p., several small polyps developed during the postoperative period; they were removed during control rectoscopies. This problem has been discussed in the literature. Saigusa et al. (16) analyzed all available reports from years 1984-1997 and found 7 cases (5-u.c.; 2-f.a.p.) of adenocarcinoma, which developed in the region of the ileal-pouch-anal anastomosis. It may seem likely that prior full mucosectomy should prevent this kind of problem, however 4 of reported 7 adenocarcinomas developed after mucosectomy. In these cases, this suggests that either the mucosectomy left small “patches” of large bowel mucosa or cancer developed in the ileal mucosa (30, 31, 32). Chronic atrophic pouchitis may play an important and independent role in cancer development (33).

Analysis of our material as well as the literature confirms that stapled anastomosis is easier, faster and less traumatic and may be performed in each case of elective restorative proctocolectomy, which suggests that the double line stapled suture should be the preferred technique for ileal-pouch-anal anastomosis. However, this recommendation should be confirmed by longer follow up period of operated patients, repeated manovolumetric studies of constructed ileal pouches as well as a precise assessment of the relation between radical anal mucosectomy and the risk of cancer development in the region of an ileal pouch or pouch-anal anastomosis.

CONCLUSIONS

1. Restorative proctocolectomy performed by an experienced surgical team is a safe treatment method for ulcerative colitis and familial adenomatous polyposis; it is characterized by low complication rate and is well accepted by operated patients.

2. Double line stapled suture should be the preferred method of ileal-pouch-anal anastomosis. Hand-made suture with rectal mucosectomy is a reasonable alternative which may be considered in selected patients.

REFERENCES


