

Restorative proctocolectomy with ileal reservoir

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ABSTRACT

Objectives: Restorative proctocolectomy with ileal reservoir is a procedure that eliminates mucosal disease of the colon and rectum yet it preserves fecal continence. It has become the operation of choice for most patients with chronic ulcerative colitis and familial adenomatous polyposis.

Methods: The study was carried out at Baghdad Teaching Hospital, Medical City, Baghdad, Iraq, during the period January 1988 through to January 2001, we carried out 30 cases of restorative proctocolectomy with ileal reservoir. At the beginning we used the S pouch (3 cases), then the J pouch (8 cases), finally we shifted to the extended J pouch (19 cases) with improved results.

Results: Our surgical technique and the pre-operative and post-operative care improved, with more cases of

restorative proctocolectomy with ileal reservoir carried out in our center. This is associated with a good progress in the functional results and a decrease in the early and late complications of the procedure.

Conclusion: Restorative proctocolectomy with ileal reservoir is a major surgical procedure with many early and late complications, but if it is carried out in expert hands with careful selection of the patients it will give good results.

Keywords: Restorative proctocolectomy with ileal reservoir, ulcerative colitis, familial adenomatous polyposis, functional results.

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The procedure of restorative proctocolectomy with ileal reservoir (RPIR) involves removal of the cecum, the colon, the rectum, and the mucosa of the upper anal canal, with the creation of an ileal pouch. The pelvic floor muscles and the anal sphincter muscles are preserved. The ileal pouch or ileal reservoir is constructed for the storage of feces, then is brought down and anastomosed to the anal canal at the dentate line.

The procedure eliminates mucosal diseases of the colon and rectum yet it preserves fecal continence.¹⁻³ Restorative proctocolectomy with ileal reservoir has become the operation of choice for most patients with chronic ulcerative colitis (UC) and familial adenomatous polyposis (FAP) in addition to other relative indications.^{4,5} (Figure 1) Parks⁶ performed

the first RPIR in 1976 and a report of 5 cases was published 2 years later.¹ Although several thousands of these operations have been carried out in the world (especially in the United States of America and Western Europe), the experience in this country was much smaller and even in some large centers the operation is not performed. Parks et al^{2,6} in their original description of the operation used a 3-loop (S) reservoir but it was found that only half the patients could void spontaneously and the remainder needed to use a catheter. It was subsequently shown that the problem in emptying was related to the length of the distal ileal segment and if this was kept short this difficulty will largely overcome. Evacuation occurs spontaneously with a 2-loop (J) reservoir as this provides dependent emptying and completely avoids

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the distal ileal segment. This type of reservoir is however associated with increased frequency of emptying which is probably the result of a smaller capacity. (**Figure 2**) Later on the 4-loop W reservoir was added but was not popular due to a difficult and longer procedure with more complication.³

Recently in Japan, they have been concentrating on the J pouch technique in favor of an easier procedure with increased experience and improvement on the functional results by increasing the capacity of the pouch (**Figure 3**).⁷

Methods. During the period January 1988 through to January 2001, 30 RPIR were performed at Baghdad Teaching Hospital, Medical City, Baghdad, Iraq. Three of them were S-reservoir, 8 were the usual J-reservoir and 19 were extended J-reservoir. The age ranged from 16 years to 50 years (**Table 1**). Most of our patients had inflammatory bowel disease, for example ulcerative colitis (26 patients), 4 patients had polyposis, 2 of them had familial adenomatous polyposis (FAP) and the other 2 were hemertomatous polyposis, there was no associated large bowel carcinoma in any of our patients.

Preoperative preparation. The patient is put on fluid diet for 72 hours before the operation to assure that the small bowel contains no food matter. Triple antibiotics are given in the morning of operation (in the form of gentamicin 80mg, metronidasole 1gm and cephalosporin 1gm) intravenously. Ileostomy was carried out in 6 patients with a severe form of ulcerative colitis, for example very advanced and complicated cases with prolonged diarrhea with blood, severe anemia, hypoproteinemia, and on a very high dose of steroids. Simple defunctioning loop ileostomy as near as possible to the ileocecal junction is carried out (so it will not affect too much resection of the terminal ileum in the definitive surgery later). This procedure was a simple life saving procedure in these patients and all the patients improved significantly after it, for example diarrhea stopped, anemia improved, hypoproteinemia corrected, gained weight, weaned of steroids, and gradually these patients became fit for the definitive surgery RPIR usually after 12-16 weeks.

Abdominal dissection. The patient is catheterized and placed in the Lloyd-davis position, the abdomen is opened through a long median incision, the dissection is begun by incising the peritoneal reflection in the left of the sigmoid mesentery, and the ureter is identified and pushed posteriorly. The peritoneum on the right aspect of the mesosigmoid is then incised and the distal part of the vascular pedicle containing the inferior mesenteric vessels is ligated in continuity and divided. The mesosigmoid is then lifted forwards off the aorta and the dissection carried downwards into the pelvis keeping close to the mesentery. The hypogastric nerves are then clearly seen as 2 strands lying posteriorly beneath the pelvis

fascia at the level of and inferior to the lumbosacral disc (there preservation is of great importance in male patients). The pelvic peritoneum is then divided on either side of the rectum and access in the midline is carried out as low as possible. The dissection is continued posteriorly between the mesorectum and the presacral fascia, this plane is clearly defined and the pelvic fascia should not be breached, scissor dissection is used throughout and blunt dissection with a swab on a holder is avoided as this may damage the pelvic nerves. The lateral ligaments are then divided as close as possible to the rectal wall, the rectum is now fully mobilized and a Haye's clamp is placed across the bowel just above the intended site of division, the aim is to divide the rectum less than 7cm above the canal margin, this could be assessed with the finger of an assistant passed through the anal verge. The colectomy then proceeds in the standard manner with preservation of the omentum. The terminal ileum is transected obliquely just proximal to the ileocecal junction and the specimen removed. At this stage the vessels of the small bowel mesentery are inspected, the terminal ileum must come down into the pelvis without tension, and to obtain increased length (**Figure 4**) further division of the ileocecal vessels at a more proximal level may be carried out without interfering with the vascular arcades, also the base of the mesentery may require mobilization by dissection of the main vascular pedicle off the posterior abdominal wall and duodenum, when fully mobilized the terminal ileum should extend several centimeters below the symphysis pubis.⁸⁻¹⁰

Creation of the ileal J pouch. The terminal ileum is closed by 2 layers, a 15cm length of ileum is measured, 2 equal 15cm limbs are opposed for creation of the ileal pouch. A continuous seromuscular suture is inserted along the 15cm length of the antimesenteric border of the 2 limbs of ileum, light occlusion clamps are placed across the ileal mesentery, to prevent excessive bleeding after division of the bowel wall, an incision is made into the ileal lumen on either side of the seromuscular suture, both loops of ileum are incised along the whole length of the pouch so that the 2 lengths of ileum are laid open. A full thickness continuous absorbable suture is placed along the whole length of the pouch. A large Foley's catheter (26F-28F) is put into the apex of the pouch, then the seromuscular layer is completed. The apex of the pouch must reach the anorectal junction guided by the catheter.⁹

Creation of the ileal extended J pouch. This is performed by the same previous procedure except that the length of the ileal limb would be 20cm instead of 15cm, this will increase the capacity of the pouch and improve its functional properties.^{4,7,11}

Creation of the ileal S pouch. The terminal ileum is folded into 3 equal loops measuring 15cm

leaving a 5cm spout of distal ileum free. Babcock tissue forceps holds the inflexions of each loop.

The adjacent loops are joined along the antimesenteric border by a continuous seromuscular suture of 3/0 catgut or dexon and the lumen of each loop is then opened along each side of this suture line. A 2nd layer of continuous 3/0 (catgut or dexon) suture is inserted through all layers of the bowel. The opposing free edges of the proximal and distal loops are sutured using 2 layers of catgut or dexon. The reservoir is completed.¹⁻³

The perineal operation. Mucosal proctectomy (mucosectomy). A self-retaining anal retractor (Park's) is inserted into the anus and the submucosa is injected with 1/300000 adrenaline solution. The mucosa is divided just above the dentate line and (with scissors) dissected off the underlying muscularis propria in strips, care is taken not to damage the muscle in stripping the mucosa or by excessive use of diathermy.

Ileoanal anastomosis. The catheter is placed through the rectal remnant and into the perineum. The pouch can be brought down to the level of the anorectal junction so that the mucosal edge of the pouch and the anorectal junction should be opposed without tension. Full thickness absorbable sutures are placed around the circumference of the anorectal junction using interrupted sutures by the aid of self retaining anal park's retractor. The catheter is sutured in the perineum, so as to splint and drain the anastomosis. In the end, loop ileostomy is carried out, the wound is closed leaving 2 drains in the pelvis and behind the pouch.^{8,9,11}

Post-operative management. Triple antibiotics 8 hourly for 5 days. Redivac abdominal drain removed 3-4 days postoperatively. Urinary catheter and pouch catheters are removed 7 days postoperatively. Patients are usually discharged on the 10th-14th day post operatively with 2 weeks follow up. Almost all of them will develop some sort of narrowing at the pouch-anal anastomosis, the patient is taught to use a medium sized candle to dilate the anastomosis, leaving the stenosis will predispose to pouchitis. All the patients are taught to do perineal and sphincter exercises. The function of the anal muscles are assessed and followed up carefully. The protection ileostomy is usually closed 3-6 months after the operation.

Results. Patients were seen regularly at 3-4 weeks, they would do the self-dilatation after the first visit with the sphincter and perineal exercises. All of them have great improvement in their symptoms and started to gain weight. Ileostomy will be closed after they develop satisfactory function of the sphincter muscles with good sphincter tone, this usually occur 3-6 months post-operatively, usually during this period they will have poor control of the mucus

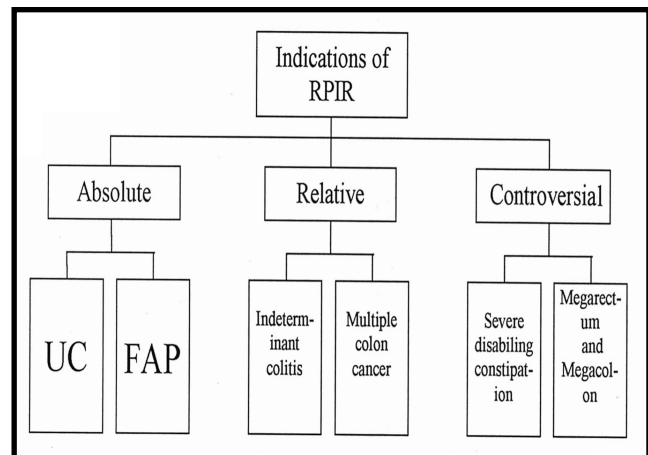


Figure 1 - Indications of restorative proctocolectomy with ileal reservoir (RPIR). UC - ulcerative colitis, FAP - familial adenomatous polyposis.

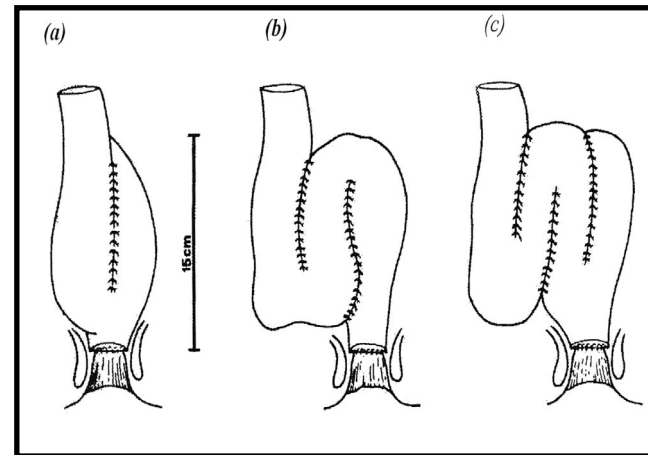


Figure 2 - The 3 popular types of ileal pouch.

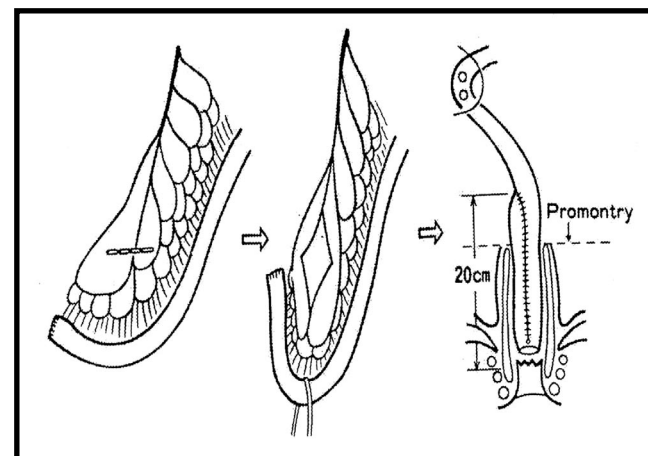


Figure 3 - Extended J pouch technique.

Table 1 - Age and sex distribution.

Age/Year	Female	Male	Total
10-19	2	3	5
20-29	7	5	12
30-39	5	3	8
40-49	3	1	4
50-59	1	0	1
Total	18	12	30

Table 3 - Factors assessed in evaluating the continence.

Factors Evaluated	Distribution by degree of continence %		
	Normal	Satisfactory	Frequent Leak
Day	75	23	2
Night	60	30	10
Original Diagnosis			
UC	72	25	3
Polyposis	90	10	0
Age			
< 40 years	75	25	0
≥ 40 years	55	45	0
UC - ulcerative colitis			

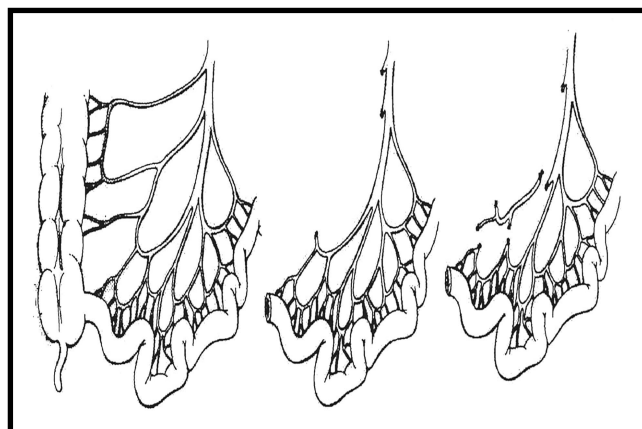


Figure 4 - Increased lengthening of the ileum.

Table 4 - Early complications.

Complication	N
Sepsis	11
Wound infection	9
Septic shock	2
Obstruction	0
Toxic psychosis	0
Electrolyte disturbance	3
DVT	1 (fatal at 3rd day)
N - number, DVT - deep vein thrombosis	

Table 2 - Functional results.

Catheter evacuation	Patients
Evacuation/24 hours	
3-5	22
>10	3
Evacuation at night	
not rare	0
more than once	16
more than 3 times	9
Continence	
Normal	18
Satisfactory	2
Frequent leak	3

Table 5 - Late complications.

Complication	N
Perineal sepsis	3
Intestinal obstruction	6 (conservative)
Anastomotic stricture	3 (dilatation)
Pouchitis	6 (antibiotics)
N - number	

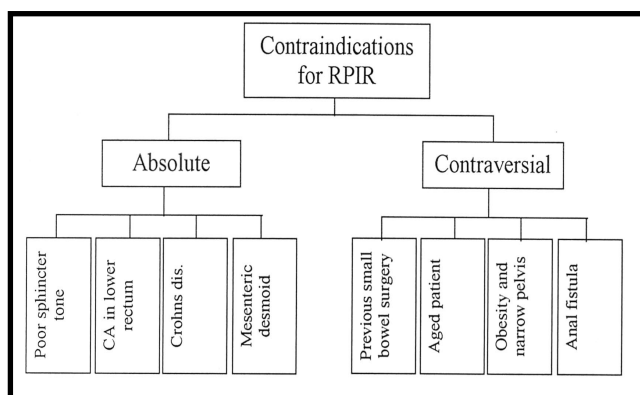


Figure 5 - Contraindications for restorative proctocolectomy with ileal reservoir. CA - carcinoma, dis - disease.

discharge from the anus.¹²⁻¹⁵ The functional results of our patients have been summarized in **(Table 2)**. There are factors assessed in evaluating the continence in our patients, these are summarized in **(Table 3)**. The complications, which developed in our patients, were summarized into early and late as shown in **(Table 4 & 5)**.

Discussion. Although RPIR is a major operation we carry it out with confidence in our unit and our experience with the pre-operative preparation, operative technique and post-operative management (as mentioned in this article) is giving improved results. From our experience we consider that selection of the patients is a very important factor in the operation results so always we must review the indications for this major procedure **(Figure 1)**, then as always we are trying to prepare the patients as much as possible pre-operatively to be fit for our surgery. Also we are considering some contraindication which should be in mind whilst practicing these operations **(Figure 5)**. Now we are mainly using the extended J pouch with better results regarding functional outcome (improved capacity with less evacuations per 24 hours, less evacuations at night and good continence results) and also with less complications. Regarding the severely ill patients

(specially advanced UC) we are doing defunctioning loop ileostomy to divert the bowel contents from the diseased colon and decreasing the mucus and bloody diarrhea, so that the patients condition will improve gradually so that we will be able to do definitive RPIR even in these moriband patients.

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