The THAI Journal of SURGERY

Official Publication of the Royal College of Surgeons of Thailand

Vol. 28 January - March 2007 No. 1

Long-term Functional Outcomes after Restorative Proctocolectomy with J-pouch Ileoanal Anastomosis: 10-year Experience in Thai Patients

Chakrapan Euanorasetr, MD

Department of Surgery, Faculty of Medicine, Rematibodi Hospital, Bangkok, Thailand

Abstract

Background: **Restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) has become the procedure of choice for ulcerative colitis (UC) and familial adenomatous polyposis (FAP). Early functional outcomes after IPAA are good in Western studies, but there are minimal data on the long-term function of the pouch. The outcomes of IPAA in Thai patients are not well known. The aim of this study was to evaluate the risk of postoperative morbidity and the long-term functional results in Thai patients with UC and FAP who underwent IPAA.**

Methods: **A retrospectively review was carried out in 16 patients (10 with polyposis, 6 with colitis) who underwent IPAA by a single surgeon (C.E.) between May 1996 and September 2005. All patients underwent a total proctocolectomy, mucosal proctectomy, hand-sewn J-pouch ileoanal anastomosis and a protective ileostomy.**

Results: **The median age at surgery was 37.5 years (ranged 26-59 years). The colitis patients were older than the polyposis patients (median of 52 VS 34 years). Four patients in colitis group (66.7%) and three patients in polyposis group (30%) had coexisting colorectal carcinoma. All patients were followed for at least 12 months with a median length of follow-up at 43 months (ranged 12-124 months). There was no hospital mortality. The overall complications rate was 31.2% (30% in polyposis group and 33.3% in colitis group). The most common complication was small bowel obstruction (18.8%), followed by wound infection (12.5%), pelvic abscess and pouch fistula (6.3%). Pouchitis occurred in 6.3%. Pouch failure developed in 6.3%. The average number of stool per day/night before IPAA in polyposis and colitis patients were 2.8/0.5 and 7.7/2.3, respectively. The average stool frequency per day / night after IPAA in polyposis and colitis group were 4.9/1 and 4.2/1, respectively. About 53% of all patients had perfect continence at night. All patients had no difficulty in evacuation or urgency.**

Conclusion: **IPAA in Thai patients in this study developed an acceptable morbidity and no mortality. Long-term functional outcomes after IPAA in Thai patients are as good as in Western patients.**

Correspondence address : *Chakrapan Euanorasetr, MD, Department of Surgery, Faculty of Medicine, Ramathibodi Hospital, Bangkok 10400, Thailand, E-mail address: racen@mahidol.ac.th*

Introduction

Restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) has become the operation of choice for the surgical treatment of patients with ulcerative colitis (UC) and familial adenomatous polyposis (FAP).[1-12] This procedure shares the goal of removing the affected colon and rectum with the traditional proctocolectomy and adds the additional goal of maintaining GI continuity and transanal defecation.

From the Western viewpoint, IPAA is a rather safe procedure with an acceptable morbidity.[1,3-12] The focus is now turning to optimizing and assessing function.

Early bowel function following IPAA has been demonstrated to be good.[1-12] However, area of concern remains regarding the long-term functional outcome. There are minimal data on the long-term function of the pouch following IPAA, only two reports from the Mayo Clinic,[13,14] two from the United Kingdom,[10,15] and one from the Cleveland Clinic.[16]

The purpose of this study was to evaluate the morbidity and long-term functional outcomes in Thai patients who underwent an IPAA for UC and FAP. This is the first report of the study of IPAA in Thai patients.

Patients and Methods

Between May 1996 and September 2005, 16 patients who underwent IPAA for either UC (6 patients = 37.5%) or FAP (10 patients = 62.5%) by the author (C.E) at Ramathibodi Hospital, Mahidol University, were studied. Four patients in colitis group (66.7%) and 3 patients in polyposis group (30%) had coexisting colorectal carcinoma. All patients were followed for more than 12 months after surgery. The demographic data including pre-operative bowel function, operative mortality and morbidity, pouchitis, pouch failure, post-operative stool frequency, daytime and nighttime fecal incontinence and urgency were reviewed and analyzed. Pre-operative anal physiology was not performed because it cannot predict post-operative outcomes.[17] Operative mortality was defined as death occurring within 30 days of operation from any cause. Wound infection was defined as the presence of inflammation and/or purulent discharge and/or positive wound swab for bacterial growth. Anastomotic leak was defined as the presence of contrast medium or fecal material at the level of anastomosis or ileal pouch. Pouchitis was identified clinically by the sudden onset of frequency, watery and sometimes bloody stool, often associated with abdominal cramping, malais and fever. No patients had endoscopic or histologic confirmation of the presence of pouchitis. Pouch failure was defined as the need for pouch excision any time during follow-up or indefinite proximal diversion. Fecal incontinence was defined as none, occasional spotting ((≤2 per week and no interruption of daily activities) or frequent (>2 per week with interruption of daily activities or gross fecal soiling). Urgency was defined as an inability to retain stool more than 15 minutes.

Operative data

All ileal pouches were created with a J-shaped reservoir and were anastomosed to the dentate line by hand-sewn sutures. A two-stage operation was performed in all patients. The first stage consists of total colectomy, proximal proctectomy, mucosectomy of the distal rectum, hand-sewn J-pouch ileoanal anastomosis and temporary diverting loop ileostomy. At a second operation, the temporary ileostomy was taken down.

Operative technique

Restorative protocolectomy with hand-sew J-pouch ileoanal anastomosis was performed as described by the author18 elsewhere. Briefly, all patients underwent abdominal colectomy, rectal mobilization using a close rectal dissection technique. Posteriorly, the dissection was continued until the presacral fascia and the fascia propria of the rectum fuse in the back of the rectum to form Waldeyer fascia. Waldeyer fascia must be incised with electrocautery or with scissor. Anteriorly, the dissection was undertaken posterior to Denonvillier fascia. In male patient, the anterior dissection was continued to the level of the inferior border of the prostate gland. This can be determined by palpating the urinary catheter as it passes through the membranous urethra. In female patient, the anterior dissection was continued until the thickening of the perineal body and anal sphincter mechanisms can be palpated. Additional lateral dissection was necessary so that the rectum is circumferentially mobilized to the level of the levator ani muscles. The distal rectum was transected at the top of the levator muscles leaving

approximately 3-4 cm. of upper anal canal and lower rectal wall. The specimen was removed. The most distal 30 to 40 cm. of the terminal ileum was used to construct the J-pouch. Enterotomy was made at the apex of the pouch and a linear cutter or GIA 100 mm. inserted and fired twice. The pouch should be 15-20 cm. in length. The stapled lines were inspected for bleeding. The intra-anal mucosectomy was started at the dentate line with scissors. Injection of diluted solution of epinephrine 1:200,000 would facilitate the mucosectomy by raising the mucosa of the internal sphincter and decreasing bleeding. The remaining rectal muscular cuff after mucosectomy consisted of the internal sphincter and about 2 cm of rectal muscularis. The pouch was pulled through the pelvic floor into the anal canal. A hand-sewn anastomosis was performed between the dentate line and the pouch using 16-20 interrupted stitches of 3-0 monofilament absorbable sutures. The diverting loop ileostomy was constructed between 25 and 40 cm. proximal to the pouch. The loop ileostomy was closed at three months after surgery following a normal contrast study of the pouch.

Results

Three male and 13 female patients underwent IPAA in this study. The median age at the time of IPAA was 37.5 years (ranged 26-59 years). Ten patients (62.5%) were younger than 45 years and 6 patients (37.5%) older than 45 years. The colitis patients were older than the polyposis patients (median of 52 VS 34 years). The median length of follow-up was 43 months (ranged 12-124 months), with all patients being followed for at least 12 months. The ileostomy was closed at a mean of 3.8 months after IPAA. Four patients in colitis group (66.7%) and 3 patients in polyposis group (30%) had coexisting colorectal carcinoma; 2 with stage II and 5 with stage III according to the TNM classification. Two patients with colorectal carcinoma developed distant metastases and died 38 and 47 months after the operation. The demographic data of all patients was shown in Table 1 and 2 and postoperative morbidity and mortality in Table 3 and 4.

The overall complication rate was 31.2%. The incidence of complications was similar in both groups (30% in polyposis patients and 33.3% in colitis patients). Following closure of the ileostomy, 3 patients (18.8%) developed small bowel obstruction. Of these, 2 patients (66.6%) required surgery. Wound infection occurred in 12.5%, pelvic abscess occurred in 6.3% and pouch fistula in 6.3%. There was no mortality.

Pouchitis occurred in one patient (6.3%). One patient was considered to have pouch failure at last follow-up. Pelvic abscess and its primary sequela, pouch fistula, were the cause of pouch failure that needed permanent ileostomy in this patient.

Regarding functional outcomes, the average number of stool per day/night before IPAA in polyposis and colitis patients was 2.8/0.5 and 7.7/2.3 respectively. Following a mean follow-up of 53.1 months after IPAA, the average stool frequency per day/night in polyposis and colitis patients was similar in both groups i.e. 4.9/1 and 4.2/1, respectively. About 53% of all patients were continent at night, 40% had occasional incontinence and 6.7% suffered frequent incontinence at night (Table 3 and 5).

Table 1 Demographic data (N = 16)

Data	Total (n = 16)	FAP (n = 10)	UC (n = 6)
Gender			
Male	3	2	1
Female	13	8	5
Age			
Mean (SD (yrs)	40.9 ± 11.2	35.8 ± 9.3	49.5 ± 9.1
Median (ranged) (yrs)	37.5 (26-59)	34 (26-59)	52 (32-58)
Follow-up			
Mean (SD (months)	53.1 ± 35.2	-	-
Median (ranged) (months)	43 (12-124)	-	-

FAP: familial adenomatous polyposis; UC: ulcerative colitis

Table 2 Demographic data (n = 16)

Pts	Gender	Age	Diagnosis	Surgery	Closure of ileostomy (months)	F.U. (months)	Final status
1	F	34	FAP	IPAA	3	12	Alive
2	F	26	FAP	IPAA	4	16	Alive
3	F	39	FAP + CRC (Stage III, LN1/140)	IPAA	4	19	Alive
4	F	28	FAP	IPAA	3	23	Alive
5	F	59	FAP	IPAA	4	25	Alive
6	F	40	FAP + CRC (Stage II)	IPAA	3	39	Alive
7	F	34	FAP + CRC (Stage III, LN1/136)	IPAA	3	62	Alive
8	M	36	FAP	IPAA	>4	80	Alive
9	M	32	FAP	IPAA	3	103	Alive
10	F	30	FAP	IPAA	3	124	Alive
11	F	49	UC + CRC (Stage II)	IPAA	3	33	Alive
12	F	51	UC	IPAA	3	57	Alive
13	F	53	UC	IPAA	2	61	Alive
14	F	54	UC + CRC (Stage III, LN 3/62)	IPAA	3	47	Death
15	F	32	UC + CRC (Stage III, LN 6/78)	IPAA	4	38	Death
16	M	58	UC + CRC (Stage III, LN 2/84)	IPAA	13	111	Alive

CRC: Colorectal carcinoma; FAP: Familial adenomatous polyposis, UC: Ulcerative colitis; IPAA: Ileal pouch anal anastomosis

Table 3 Complications and functional outcomes after IPAA (n=16)

All pts (n = 16)	Polyposis pts (n = 10)	Colitis pts (n = 6)	
Mortality (%)	0	0	0
Complications (%)	5/16 (31.2%)	3/10 (30%)	2/6 (33.3%)
SBO (%)	3/16 (18.8%)	2/10 (20%)	1/6 (16.7)
Wound infection (%)	2/16 (12.5%)	1/10 (10%)	1/6 (16.7%)
Pelvic abscess (%)	1/16 (6.3%)	1/10 (10%)	0
Pouch fistula (%)	1/16 (6.3%)	1/10 (10%)	0
Pouchitis (%)	1/16 (6.3%)	1/10 (10%)	0
Pouch failure (%)	1/16 (6.3%)	1/10 (10%)	0
Pre-operative stool frequency (D/N) (average)	4.7/1.3	2.8/0.5	7.7/2.3
Post-operative stool frequency (D/N) (average)	4.6/1	4.9/1	4.2/1
Incontinence (%) (D/N)	6.7% / 46.7%	11.1% / 44.4%	0/50%
Urgency	0	0	0

SBO: Small bowel obstruction; D/N: day/night

All patients were able to defer emptying their pouch for 15 minutes. All patients had no difficulty in evacuation.

Discussion

IPAA is intended to remove the entire diseased colon and rectum while preserving intestinal continuity. In 1980, Utsunomiya et al[19] and Parks et al[20] simultaneously described their experience with IPAA using J-pouch and S-pouch, respectively.

First IPAA at the Mayo Clinic21 and Cleveland Clinic16 was performed in 1981 and 1986 respectively. The first IPAA at Ramathibodi Hospital was performed by the author in 1996.

Most of the patients in this series (10 patients or 62.5%) underwent IPAA for FAP, and only 6 patients (37.5%) for UC. In contrast, most patients who underwent IPAA at the Mayo Clinic22 and Cleveland Clinic23 were for UC (UC 89% VS FAP 11% and UC 80.8% VS FAP 6.1%, respectively). A recent meta-analysis of 43 Western studies comprising 9,317 patients

Table 4 Mortality and morbidity after IPAA (n = 16)

Pts	Gender	Age	Diagnosis	Hospital Mortality	Complications	Pouchitis	Pouch failure
1	F	34	FAP	No	No	No	No
2	F	26	FAP	No	Wound infection, SBO (re-operation)	One time	No
3	F	39	FAP + CRC (Stage III, LN1/140)	No	No	No	No
4	F	28	FAP	No	SBO (re-operation)	No	No
5	F	59	FAP	No	No	No	No
6	F	40	FAP + CRC (Stage II)	No	No	No	No
7	F	34	FAP + CRC (Stage III, LN1/136)	No	No	No	No
8	M	36	FAP	No	Pelvic abscess, Pouch fistula	No	Permanent ileostomy
9	M	32	FAP	No	No	No	No
10	F	30	FAP	No	No	No	No
11	F	49	UC + CRC (Stage II)	No	Wound infection	No	No
12	F	51	UC	No	No	No	No
13	F	53	UC	No	No	No	No
14	F	54	UC + CRC (Stage III, LN 3/62)	No	No	No	No
15	F	32	UC + CRC (Stage III, LN 6/78)	No	SBO (conservative)	No	No
16	M	58	UC + CRC (Stage III, LN 2/84)	No	No	No	No

CRC: Colorectal carcinoma, SBO: Small bowel obstruction, FAP: Familial adenomatous polyposis, UC: Ulcerative colitis

Table 5 Functional outcomes after IPAA (n =16)

Pts.	Gender	Age	Diagnosis	F.U. (months)	Pre-operative stool frequency (D/N)	Post-operative stool frequency (D/N)	Incontinence (D/N)	Urgency
1	F	34	FAP	12	2-3/0-1	4/1	None/None	No
2	F	26	FAP	16	3/0-1	4/0-1	None/None	No
3	F	39	FAP + CRC (Stage III, LN1/140)	19	2-3/0-1	6-7/0-1	None/Occasional	No
4	F	28	FAP	23	1-2/0	5/0	None/None	No
5	F	59	FAP	25	2-3/0-1	5/1	Occasional/Frequent	No
6	F	40	FAP + CRC (Stage II)	39	2-3/0	5/0-1	None/None	No
7	F	34	FAP + CRC (Stage III, LN1/136)	62	3-4/0-1	5-6/1-2	None/Occasional	No
8	M	36	FAP	80	7/1-2	→	Permanent ileostomy	←
9	M	32	FAP	103	1-2/0	3-4/0-1	None/None	No
10	F	30	FAP	124	1-2/0	4/1	None/None	No
11	F	49	UC + CRC (Stage II)	33	5-6/1-2	4-5/0-1	None/Occasional	No
12	F	51	UC	57	5-6/1-2	3-4/0-1	None/Occasional	No
13	F	53	UC	61	8-10/2-3	2-3/0-1	None/None	No
14	F	54	UC + CRC (Stage III, LN 3/62)	47	10/2-3	4-5/0-1	None/Occasional	No
15	F	32	UC + CRC (Stage III, LN 6/78)	38	6-8/1-2	5/0-1	None/Occasional	No
16	M	58	UC + CRC (stage III, LN 2/84	111	6/1-2	3/0-1	None/None	No

UC: Ulcerative colitis, FAP: Familial adenomatous polyposis, CRC: Colorectal carcinoma

in 2005 by Hueting et al24 showed that the indications for IPAA were UC in 87.5%, FAP in 8.9% and others in 3.6%. Up to 30% of Western patients with UC will eventually require surgical treatment. But UC is an uncommon disease in Thai people and most of them are not severe or pancolitis. This study also showed some other different characteristic from others. The mean age at surgery was 35.8 years in polyposis patients and 49.5 years in colitis patients which was older than other reports. The mean age at surgery in the literatures

Table 6 Complications and outcomes following IPAA: Two recent meta-analysis studies

Parameters	Lehrmann et al. 2003[42] (N = 8,316)	Hueting et al. 2005[24] (N = 9,317)
Diagnosis	UC	UC = 87.5%, FAP = 8.9%, Other = 3.0%
Mean follow-up	NA	3 yrs.
Anastomotic leak	4.3%	NA
Pelvic sepsis	5.4%	9.5%
Fistula	5.9%	NA
Small bowel obstruction requiring surgery	8.5%	NA
Anastomotic stricture	7.5%	NA
Pouchitis	25.1%	NA
Pouch failure	6.2%	8.5%
Bowel movement (24 hours)	7.2	NA
Incontinence (severe / mild)	NA	3.7% / 17%

NA: not available, UC: Ulcerative colitis, FAP: Familial adenomatous polyposis

ranged from 26.5-28 years in polyposis patients[22,25] and 31-33 years in colitis patients.[10,14,21,22] Also, a significant number of patients in this study were associated with colorectal carcinoma. Four patients in colitis group (66.7%) and three patients in polyposis group (30%) had coexisting colorectal carcinoma.

IPAA is a safe procedure with low mortality and acceptable morbidity. There was no hospital mortality in this series. The overall mortality rate in the literatures ranged from 0-1%.[3,7,8,14,22,23,25,26] The overall incidence of complications in this study was 31.2%. Reported incidence of complications ranged from 5-63%[1,7,15,22,23,26-30] The most common complication was small bowel obstruction (18.8%), followed by wound infection (12.5%), pelvic abscess and pouch fistula (6.3%). Small bowel obstruction was a common complication with the incidence varied between 12% and 35%.[1,14,23,31-33] The incidence of small bowel obstruction that required surgery was 7.3-17%.[1,25] The obstruction was most commonly due to pelvic adhesion (32%) followed by adhesion at the ileostomy closure site (21%).[31] The incidence of pelvic abscess and pouch fistula (6.3%) in this study was similar to the Cleveland Clinic results (5-7%).[9,16]

Pouchitis occurred in one patient (6.3%). The incidence of pouchitis was similar to Japanese report[2] but lower than that in Western reports. The incidence of pouchitis in the Japanese population was 5.5-11.6%[2]. Reported incidence of pouchitis in Western studies varied from 18-50%.[3,7-8,10,22,23,26,29,32,34-36] The number of pouchitis continued to increase with prolonged follow-up.[14] The exact cause of pouchitis is still not known.[14,22] Fortunately, patients with pouchitis respond well to antibiotics such as metronidazole and ciprofloxacin.[11] Less than 10% of patients suffer chronic pouchitis with poor response to treatment.[14]

Two tools have been created to standardize the diagnosis and report of pouchitis; the pouch disease activity index[37] and the pouch activity score.[35] Each of them provides numerical score based on clinical, endoscopic, and histological findings. Neither index is widely used diagnostically but they are useful for reporting the results of clinical trials.[1] At present, similar to this study, the diagnosis of pouchitis is based on clinical findings.

Pouch failure occurred in one patient (6.3%). The incidence of pouch failure was low compared with Western reports (2-29%).[1-3,7,12,14,23,24,26,27,29,34,36,38-41] The cause of pouch failure in this study was persistent pouch fistula. In general, two types of pouch failure have been considered. Early failure arises from complications of the procedures such as pelvic abscess and pouch fistula. Late failure more likely reflects poor pouch function and unwillingness of patients to undergo ileostomy closure.

Lehrmann et al. in 2003[41] performed a systematic literature review and meta-analysis evaluating complications and outcomes following IPAA in 8,317 patients. A recent meta-analysis of 43 studies comprising 9,317 patients in 2005 by Hueting et al[24] also reported complications and outcomes following IPAA. The main outcome measures are listed in Table 6.

Mean stool frequency was 4.6 per day and 1 per night in this study. Daytime stool frequency was

slightly less in polyposis patients (4.2 per day) than in colitis patients (4.9 per day). This might be explained, in part, by fewer older patients in the polyposis group. Pemberton et al at Mayo Clinic[27] found that older patients had more stool during daytime than younger patients. In other reports, mean stool frequency varied from 4.5-7 stool per day and 0.6-1.3 stool per night.[1,5,7-8,10,14,16,21,22,24-26,28,30,42,43]

Some degree of daytime incontinence was found in 6.7% and nighttime incontinence in 46.7% in this study. Daytime and nighttime incontinence in other reports varied from 3-26% and 12-64%, respectively.[1,5,7,14,21,22,25,30,42] Incontinence affected older patients more frequently than younger patients.5,21

However, this study showed no urgency problem. The overall urgency rate in the literature ranged from 0-56%[8,22,25,42]

FAP is a good comparative model versus UC for assessing quality of life after IPAA because most patients are asymptomatic before surgery. All UC patients reported that quality of life was "always" or çsometimesé better after surgery. Whereas 30% of FAP patients reported that overall quality of life was worse since surgery.[4,7,42,44] In this study, the mean stool frequency per day/night was less than before IPAA (7.7/2.3 VS 4.2/1) in colitis patients, but was more than before IPAA (2-8/0.5 VS 4.9/1) in polyposis patients. Thus, comparing surgical results, patients with UC experienced improved bowel function after IPAA, whereas patients with FAP experienced poorer bowel function. However, both groups were too small in number. The difference of surgical results between UC and FAP patients were difficult to assess.

When colorectal carcinoma complicates UC or FAP, the role of IPAA is uncertain because of the concern that the procedure may compromise the oncologic therapy and that oncologic therapy may compromise IPAA function. In general, the presence of potentially curable cancer either in the colon or high in the rectum does not preclude IPAA, although in locally advanced rectal cancer, it would seem prudent to defer pouch formation if postoperative radiation therapy is contemplated. IPAA is not appropriate for patient with low rectal cancer because tumor cells may survive deep within the muscular rectal cuff.

The author performed IPAA in 4 patients with UC and 2 with FAP complicated by colorectal carcinoma. IPAA in these situations is acceptable because it does not compromise oncologic resection. In 1998, Radices et al from Mayo Clinic45 investigated the impact both of IPAA on cancer outcomes and of cancer treatment on IPAA function. They concluded that IPAA could be performed in the setting of colorectal carcinoma without significant impact on oncologic outcomes or long-term pouch function. Others have shown that quality of life is excellent in patients who have IPAA for colorectal carcinoma complicating UC.[3,7,35,45,46]

Two types of IPAA have been described, hand-sewn or stapled anastomosis. Proponents of stapled pouch-anal anastomosis claim that the procedure causes less sphincter trauma and greater preservation of anal sampling reflexes.[47-49] Therefore it reduces the risk of postoperative problems with continence.[8,11] The choice of anastomotic technique would therefore depend on the risk of impairment of bowel function versus the risk of developing cancer in the long-term, as well as on-going inflammation in the retained rectal mucosa in patients with UC.[50,51]

Four randomized controlled trials and one case-controlled study, however, failed to show the differences between the two techniques with respect to complication rates, anal physiology and pouch function.[30,52-55] The recent meta-analysis of 21 studies comparing hand-sewn versus stapled IPAA among 4,183 patients suggested that both techniques had similar early postoperative outcomes. However, stapled IPAA offers improved nocturnal continence.[11]

Hand-sewn anastomosis is definitely necessary for patients presenting with colorectal carcinoma, dysplasia in the lower rectum and redo-ileal pouch procedure.[9,11] Dysplasia or carcinoma may arise within the columnar cuff, and there are reports of carcinoma arising distal to the stapled IPAA.[56-59] Recurrent UC within the columnar cuff, termed "cuffitis", can cause discomfort, urgency, bloody diarrhea and increased stool frequency.[60]

The author favors the J-pouch reservoir because of the ease of construction and functional results are equal to those of the S- and W-pouch reservoir.[61,62] J-pouch will ultimately accommodate up to 400 ml. of feces and empty spontaneously.[1]

Although there is no defined age at cut-off for patients having IPAA, many would suggest 60 or 65 years as the upper limit.[5] However, little evidence supports this recommendation, but the relative

infrequency of IPAA in older patients has made it difficult to stratify patients by age.

While a temporary ileostomy formation and closure may be associated with significant morbidity, the author still establishes a temporary ileostomy in all patients after IPAA surgery (two-stage IPAA) in an attempt to avoid catastrophic pelvic sepsis in the event of anastomotic dehiscence. Several reports have shown that anastomotic leak occurred in 5.3% to 14%.[1,40,63,64] The Cleveland Clinic data suggests that ileostomy closure will result in less major morbidity than a one-stage IPAA.[66] The overall complication rates at the Clecveland Clinic for 1,504 ileostomy closures following IPAA was 11.4%. Complications included small bowel obstruction (6.4%, one-forth requiring operation), wound infection (1.5%), abdominal sepsis (1%) and enterocutaneous fistula (0.6%).[65] Routine pouchogram before ileostomy closure is now a standard practice.[1]

Conclusion

IPAA results with an acceptable morbidity and no mortality. Long-term functional outcomes after IPAA in this study are as good as in Western reports. These data support the use of IPAA in most patients requiring proctocolectomy for UC and FAP in Thai patients.

REFERENCES

1. Bach SP, Mortensen NJM. Revolution and evolution: 30 years of ileoanal pouch-surgery. Inflam Bowel Dis 2006; 12: 131-45.
2. Arai K, Koganci K, Kimura H, et al. Incidence and outcome of complications following restorative proctocolectomy. Am J Surg 2005; 190: 39-42.
3. Becker JM, Stucchi AF. Proctocolectomy with ileoanal anastomosis. J Gastrointest Surg 2004; 8: 376-86.
4. Delaini GG, Scaglia M, Colucci G, et al. The ileoanal pouch procedure in the long-term perspective: a critical review. Tech Coloprocto 2005; 9: 187-92.
5. Delaney CP, Fazio VW, Remzi FH, et al. Prospective, age-related analysis of surgical results, functional outcome, and quality of life after ileal pouch-anal anastomosis. Ann Surg 2003; 238: 221-8.
6. Kornbluth A, Sachar DB. Ulcerative colitis practice guidelines in adults (update): American College of Gastroenterology, Practice Parameters Committee. Am J Gastroenterol 2004; 99: 1371-85.
7. Liechtenstein GR, Cohen R, Yamashita B, et al. Quality of life after proctocolectomy with ileoanal anastomosis for patients with ulcerative colitis. J Clin Gastroenterol 2006; 40: 669-77.
8. Michelassi F, Lee J, Rubin M, et al. Long-term functional results after ileal pouch anal restorative proctocolectomy for ulcerative colitis: A prospective observational study. Ann Surg 2003; 238: 433-41.
9. Tekkis PP, Fazio VW, Lavery IC, et al. Evaluation of the learning curve in ileal pouch-anal anastomosis surgery. Ann Surg 2005; 241: 261-8.
10. Wheeler JMD, Banerjee A, Ahuja N, et al. Long-term function after restorative proctocolectomy. Dis Colon Rectum 2005; 48: 946-51.
11. Lovegrove RE, Constantinides VA, Herio AG, et al. A comparison of hand-sewn versus stapled ileal pouch anal amastomosis (IPAA) following proctocolectomy. A meta-analysis of 4,183 patients. Ann Surg 2006; 244: 18-26.
12. Tulchinsky H, Hawley P, Nicholls J. Long-term failure after restorative proctocolectomy for ulcerative colitis. Ann Surg 2003; 238: 229-34.
13. Farouk R, Dozois RR, Pemberton JH, et al. Incidence and subsequent impact of pelvic abscess after ileal pouch-anal anastomosis for chronic ulcerative colitis. Dis Colon Rectum 1998; 41: 1239-43.
14. Meagher AP, Farouk R, Dozois RR, et al. J ileal pouch-anal anastomosis for chronic ulcerative colitis: complications and long-term outcome in 1310 patients. Br J Surg 1998; 85: 800-3.
15. Setti-Carraro P, Ritchie JK, Wilkinson KH, et al. The first 10 years' experience of restorative proctocolectomy for ulcerative colitis. Gut 1994; 35: 1070-5.
16. Fazio VW, O'Riordain MG, Lavery IC, et al. Long-term functional outcome and quality of life after stapled restorative proctocolectomy. Ann Surg 1999; 230: 575-84.
17. Church JM, Saad R, Schroder T, et al. Predicting the functional result of anastomosis to the anus: the paradox of preoperative anal resting anal pressure. Dis Colon Rectum 1993; 36: 895-900.
18. Euanorasetr C. Restorative proctocolectomy with J-pouch ileoanal anastomosis. In: Thavichaigarn P, editors. Carcinoma of the colon and rectum. Bangkok: Kosit Publishing; 2006.
19. Utsunomiya J, Iwama T, Imajo M, et al. Total colectomy, mucosal proctectomy, and ileoanal anastomosis. Dis Colon Rectum 1980; 23: 459-66.
20. Parks AG, Nicholls RJ, Belliveau P. Proctocolectomy with ileal reservoir and anal anastomosis. Br J Surg 1980; 67: 533-8.
21. Farouk R, Pemberton JH, Wolff BG, et al. Functional outcomes after ileal pouch-anal anastomosis for chronic ulcerative colitis. Ann Surg 2000; 231: 919-26.
22. Dozois RR, Kelly KA, Welling DR, et al. Ileal pouch-anal anastomosis: comparison of results in familial adenomatous polyposis and chronic ulcerative colitis. Ann Surg 1989; 210: 268-73.
23. Fazio VW, Ziv Y, Church JM, et al. Ileal pouch-anal

anastomosis complications and function in 1005 patients. Ann Surg 1995; 222: 120-7.
24. Hueting WE, Buskens E, van der Tweel I, et al. Results and complications after ileal pouch anal anastomosis: a meta-analysis of 43 observational studies comprising 9,317 patients. Dig Surg 2005; 22: 69-79.
25. Parc Y, Piquard A, Dozois R, et al. Long-term outcome of familial adenomatous polyposis patients after restorative coloproctectomy. Ann Surg 2004; 239: 378-82.
26. Romanos J, Samarasekera DN, Stebbing JF, et al. Outcome of 200 restorative proctocolectomy operations: the John Radcliff Hospital experience. Br J Surg 1997; 84: 814-8.
27. Pemberton JH, Kelly KA, Beart RW Jr, et al. Ileal pouch-anal anastomosis for chronic ulcerative colitis. Long-term results. Ann Surg 1987; 206: 504-13.
28. Bullard KM, Madoff RD, Gemlo BT. Is ileoanal pouch function stable with time? Dis Colon Rectum 2002; 45: 299-304.
29. Marcello PW, Roberts PL, Schoetz DJ Jr, et al. Long-term results of the ileoanal pouch procedure. Arch Surg 1993; 128: 500-3.
30. Reilly WT, Pemberton JH, Wolff BG, et al. Randomized prospective trial comparing ileal pouch-anal anastomosis performed by excising the anal mucosa to ileal pouch-anal anastomosis performed by preserving the anal mucosa. Ann Surg 1997; 225: 666-76.
31. MacLean AR, Cohen Z, MacRae HM, et al. Risk of small bowel obstruction after the ileal pouch-anal anastomosis. Ann Surg 2002; 235: 200-6.
32. Marcello PW, Roberts PL, Schoetz DJ Jr, et al. Obstruction after ileal pouch-anal anastomosis: a preventable complication? Dis Colon Rectum 1993; 36: 1105-11.
33. Francois Y, Dozois RR, Kelly KA, et al. Small intestinal obstruction complicating ileal pouch-anal anastomosis. Ann Surg 1989; 209: 46-50.
34. Belliveau P, Trudel J, Vasilevsky CA, et al. Ileoanal anastomosis with reservoir: complications and long-term results. Can J Surg 1999; 42: 345-52.
35. Heuschen UA, Autschbach F, Allemeyer EH, et al. Long-term follow-up after ileoanal pouch procedure: algorithm for diagnosis, classification, and management of pouchitis. Dis Colon Rectum 2001; 44: 487-99.
36. Mikkola K, Luukkonen P, Jarvinen HJ. Long-term results of restorative proctocolectomy for ulcerative colitis. Int J Colorectal Dis 1995; 10: 10-4.
37. Sandborn WJ, Tremaine WJ, Batts KP, et al. Pouchitis after ileal pouch-anal anastomosis: a pouchitis disease activity index. Mayo Clin Proc 1994; 69: 409-15.
38. Korsgen S, Keighley MR. Causes of failure and life expectancy of the ileoanal pouch. Int J Colorectal Dis 1997; 12: 4-8.
39. Fazio VW, Tekkis PP, Remzi F, et al. Quantification of risk for pouch failure after ileal pouch anal anastomosis surgery. Ann Surg 2003; 238: 605-14.
40. Heuschen UA, Hinz U, Allemeyer EH, et al. Risk factors for ileoanal J-pouch related septic complications in ulcerative colitis and familial adenomatous polyposis. Ann Surg 2002; 235: 207-16.
41. Lehrmann J, Stucchi AF, LaMorte WW, et al. Complications and outcomes after ileal pouch-anal anastomosis (IPAA): A meta-analysis of more than 8300 patients. Gastroenterology 2003; 124: A814.
42. Michelassi F, Hurst R. Restorative proctocolectomy with J-pouch ileoanal anastomosis. Arch Surg 2000; 135: 347-353.
43. McIntyre PB, Pemberton JH, Wolff BG, et al. Comparing functional results one year and ten years after ileal pouch-anal anastomosis for chronic ulcerative colitis. Dis Colon Rectum 1994; 37: 303-7.
44. Seidel SA, Peach SE, Newman M, et al. Ileoanal pouch procedures: clinical outcomes and quality of life assessment. Am Surg 1999; 65: 40-6.
45. Radice E, Nelson H, Devine RM, et al. Ileal pouch-anal anastomosis in patients with colorectal cancer: Long-term functional and oncologic outcomes. Dis Colon Rectum 1998; 41: 11-7.
46. Thompson-Fawcett MW, Richard CS, O'Connor BI, et al. Quality of life is excellent after a pelvic pouch for colitis-associated neoplasia. Dis Colon Rectum 2000; 43: 1497-502.
47. Holdsworth PJ, Johnston D. Anal sensation after restorative proctocolectomy for ulcerative colitis. Br J Surg 1988; 75: 993-6.
48. Deen KI, Williams JG, Grant EA, et al. Randomized trial to determine the optimum level of pouch-anal anastomosis in stapled restorative proctocolectomy. Dis Colon Rectum 1995; 38: 133-8.
49. Miller R, Lewis GT, Bartolo DC, et al. Sensory discrimination and dynamic activity in the anorectum: evidence using a new ambulatory technique. Br J Surg 1988; 75: 1003-7.
50. Thompson-Franscett MW, Mortensen NJ, Warren BF. "Cuffitis" and inflammatory changes in the columnar cuff, anal transitional zone, and ileal reservoir after stapled pouch-anal anastomosis. Dis Colon Rectum 1999; 42: 348-55.
51. Remzi FH, Fazio VW, Delaney CP, et al. Dysplasia of the anal transitional zone after ileal pouch-anal anastomosis: results of prospective evaluation after a minimum of ten years. Dis Colon Rectum 2003; 46: 6-13.
52. Choen S, Tsunoda A, Nicholls RJ. Prospective randomized trial comparing anal function after hand-sewn ileoanal anastomosis with mucosectomy versus stapled ileoanal anastomosis without mucosectomy in restorative proctocolectomy. Br J Surg 1991; 78: 430-4.
53. Luukkonen P, Jarvinen H. Stapled vs hand-sutured ileoanal anastomosis in restorative proctocolectomy. A prospective, randomized study. Arch Surg 1993; 128: 437-40.
54. Hallgren TA, Fasth SB, Oresland TO, et al. Ileal pouch anal function after endoanal mucosectomy and handsewn ileoanal anastomosis compared with stapled anastomosis without mucosectomy. Eur J Surg 1995; 161: 915-21.
55. Mc Intyre PB, Remberton JH, Beart RW Jr, et al. Double-stapled VS handsewn ileal pouch-anal anastomosis in patients with chronic ulcerative colitis. Dis Colon Rectum 1994; 37: 430-3.
56. Baratsis S, Hadjidimitriou F, Christodoulou M, et al. Adenocarcinoma in the anal canal after ileal pouch-anal

anastomosis for ulcerative colitis using a double stapling technique: report of a case. Dis Colon Rectum 2002; 45: 687-91.
57. Laureti S, Ugolini F, D'Errico A, et al. Adenocarcinoma below ileoanal anastomosis for ulcerative colitis: report of a case and review of the literature. Dis Colon Rectum 2002; 45: 418-21.
58. Sequens R. Cancer in the anal canal (transitional zone) after restorative proctocolectomy with stapled ileal pouch-anal anastomosis. Int J Colorectal Dis 1997; 12: 254-5.
59. Puthu D, Rajan N, Rao R, et al. Carcinoma of the rectal pouch following restorative proctocolectomy. Report of a case. Dis Colon Rectum 1992; 35: 257-60.
60. Shen B, Lashner BA, Bennett AE, et al. Treatment of rectal cuff inflammation (cuffitis) in patients with ulcerative colitis following restorative proctocolectomy and ileal pouch-anal anastomosis. Am J Gastroenterol 2004; 99: 1527-31.
61. McHugh SM, Diamant NE, Mcleod R, et al. S-pouches vs. J-pouches. A comparison of functional outcomes. Dis Colon Rectum 1987; 30: 671-7.
62. Johnston D, Williamson ME, Lewis WG, et al. Prospective controlled trial of duplicated (J) versus quadruplicated (W) pelvic ileal reservoirs in restorative proctocolectomy for ulcerative colitis. Gut 1996; 39: 242-7.
63. Tjandra JJ, Fazio VW, Milsom JW, et al. Omission of temporary diversion in restorative proctocolectomy-is it safe? Dis Colon Rectum 1993; 36: 1007-13.
64. Galandiuk S, Wolff B, Dozois RR, et al. Ileal pouch-anal anastomosis without ileostomy. Dis Colon Rectum 1991; 34: 870-3.
65. Wong KS, Remzi FH, Gorgun E, et al. Loop ileostomy closure after restorative proctocolectomy: outcome in 1,504 patients. Dis Colon Rectum 2005; 48: 243-50.