

Ileal Pouch–Anal Anastomosis

Does Age at the Time of Surgery Affect Outcome?

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Hypothesis: Functional outcome and quality of life in older patients (>55 years) undergoing ileal pouch–anal anastomosis (IPAA) for ulcerative colitis or familial adenomatous polyposis have been incompletely studied. Our aim was to update our understanding on how the age of the patient at the time of surgery influences functional outcome and quality of life after IPAA.

Methods: From January 1, 1981, to December 31, 2000, two thousand two patients who underwent IPAA were studied. Patients were grouped by age at operation: 45 years or younger (n=1688), between 46 and 55 years (n=249), and older than 55 years (n=65). Mean age was 33.5 years. Postoperative complications, function, and quality of life were assessed with a questionnaire administered annually.

Results: Follow-up for patients older than 55 years was a mean±SD of 8.1±4.8 years. Overall, follow-up was a mean of 10.1±5.7 years. The pouch failure rate for pa-

tients older than 55 years was 1.6% at 10 years. No statistically significant difference in pouch failure between age groups was observed. Overall, frequent daytime and nighttime incontinence, respectively, occurred in 5.6% and 13.3% of the patients at 10 years. Incontinence was more common in older patients ($P=.002$ at 3 years). Quality of life as assessed by social activities, work, travel, sexual activity, family relationships, and sports and recreation was not significantly different among age groups. Most patients felt that their condition had improved or that they had no restrictions after IPAA.

Conclusions: Postoperative complications after surgery seem to be unrelated to age at the time of surgery. Although incontinence may occur more frequently in older patients, IPAA does not adversely affect quality of life in patients older than 55 years.

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TOTAL PROCTOCOLECTOMY with ileal pouch–anal anastomosis (IPAA) is the standard of care and the most common surgical option offered to patients with ulcerative colitis or familial adenomatous polyposis.¹⁻³ This operation cures patients of the intestinal manifestations of ulcerative colitis and provides an excellent quality of life (QOL) while avoiding a permanent ostomy.^{4,5}

Ileal pouch–anal anastomosis is a complex procedure that has historically been used in younger and healthier patients. Most large series on IPAA report a mean age between 30 and 35 years.²⁻⁶ Given the complexity of IPAA and its possible morbidities such as pelvic sepsis, anastomotic leakage, increased stool frequency, pouchitis, fecal incontinence, evacuation disorders, and pouch failure, many surgeons have avoided its use in patients older than 50 years.

The evidence to support this entrenched surgical dictum is limited. Given that IPAA is infrequently performed in older patients makes it difficult to analyze the outcomes and complications of this procedure. Attempts have been made in the past to compare outcomes in patients of different age groups, but small numbers make definitive conclusions difficult.

Over the last decade, IPAA has been performed increasingly on a larger population of patients older than 50 years. Bauer et al⁷ reported on 66 patients with IPAA who were older than 50 years and compared them with 253 patients younger than 50 years. Overall morbidity, mortality, and postoperative outcomes were similar. However, QOL after surgery and functional outcome were not evaluated. Other series have looked at short-term functional outcomes of patients older than 55 years and found slightly increased stool fre-

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quencies and incontinence rates.^{8,9} A recent series from our own institution looked at long-term durability in patients who had their IPAA at a young age and then were followed up for 15-year period.¹⁰ Their long-term function and QOL were both good and consistently stable over time. Only 1 study has reported significant long-term follow-up of patients in their 50s, 60s, and 70s.¹¹

To expand on our current understanding of the effect of age at the time of IPAA outcome, we examined our institutional experience between January 1, 1981, and December 31, 2000. Two thousand two hundred thirty-four patients were prospectively evaluated for post-IPAA complications, functional outcomes, and QOL.

METHODS

Between January 1, 1981, and December 31, 2000, two thousand two hundred thirty-four patients underwent IPAA at the Mayo Clinic, Rochester, Minn. Patients were excluded from our prospective analysis for the following criteria: diagnosis was not familial adenomatous polyposis or chronic ulcerative colitis, patients refused to participate in research-related activity, diagnosis later changed to Crohn disease, no follow-up data obtained, or diverting loop ileostomy had not been closed prior to December 31, 2001. After these exclusion criteria were applied, data on the remaining 2002 patients were analyzed. Patients were stratified by their age at date of IPAA surgery into the following groups: 45 years or younger, between 46 and 55 years, and older than 55 years. Surgery was performed by 8 consultant surgeons and involved the formation of an ileoanal J pouch.

The technical aspect of IPAA has been described previously⁴ but involved the formation of a 12- to 15-cm J pouch with either a hand-sewn or double-stapled anastomosis. Most patients were also treated with a diverting ileostomy at the time of their original surgery with subsequent takedown after 3 months.

FUNCTIONAL OUTCOMES

Functional outcomes, complications, pouch failure rates, and QOL parameters were obtained from a prospectively maintained database of all patients. Permission to review patient records was obtained from the institutional review board. All patient data, demographics, surgical details, and postoperative functional outcomes were recorded prospectively. Patients were asked to complete a self-administered, structured questionnaire annually after surgery. This information was requested either at the time of follow-up visits or by the use of a mailed questionnaire. Assessments were performed at 1, 3, 5, and 10 years post-IPAA procedure.

From this survey, functional outcomes were assessed along with postoperative complications (strictures, abscess, fistula, obstruction, pouchitis, or pouch failure). Pouchitis was defined by the clinical findings of flulike symptoms, an increase in the frequency of bowel movements, cramping, urgency, blood in stools, and/or endoscopic evidence. Pouch failure was defined as a defunctioning ileostomy for more than 12 months with the pouch in situ or the need for pouch excision.

Quality of life was similarly assessed with the same questionnaire. The QOL data were recorded using techniques established by Mayo Clinic several years ago.¹² Questions regarding patient sexual life, social activities, sports activities, work activities, family relationships, and ability to travel after their IPAA compared with prior to surgery were assessed. Within

Table 1. Demographic Data and Postoperative Pathological Diagnosis for Patients Undergoing Proctocolectomy and IPAA

Variable	Age Group, y			Total
	≤45	46-55	>55	
Demographic data				
No. of patients	1688	249	65	2002
No. of males	874	150	45	1069
No. of females	814	99	20	933
Postoperative diagnosis				
UC	1489	239	62	1790
FAP	199	10	3	212

Abbreviations: IPAA, ileal pouch–anal anastomosis; FAP, familial adenomatous polyposis; UC, ulcerative colitis.

each category, patients ranked their outcomes as “improved,” “not affected,” “mildly restricted,” or “severely restricted” relative to their status prior to surgery. Although this QOL instrument has not been formally validated, it has been used annually for nearly 2 decades for our institutional patients with IPAA who number more than 2500. Given this large experience and consistent findings from this instrument, we have found it an invaluable tool for assessing the patient-reported QOL.

STATISTICAL ANALYSIS

Outcomes of primary interest were bowel function, complications, and patient QOL. Function and QOL data were analyzed at 1, 3, 5, and 10 years after surgery. Parameters composed of discrete, categorical variables were analyzed using the χ^2 or Fisher exact tests whenever necessary and appropriate. Complications were evaluated as time to event outcomes. Specifically, the cumulative probabilities of these outcomes were calculated using the Kaplan-Meier method. Log-rank tests were used to assess the association of age group and sex with these complications. All statistical tests were 2-sided, and the threshold of statistical significance was set at $P < .05$.

RESULTS

Patients were stratified by their age at the date of the IPAA procedure as 45 years or younger ($n = 1688$), between 46 and 55 years ($n = 249$), and older than 55 years ($n = 65$). Mean age was 33.5 years with a minimum age of 11 years and a maximum age of 68 years (median = 32 years). Within the older group of patients, there were 51 patients between 56 and 60 years, 12 patients between 61 and 65 years, and 2 patients older than 65 years. Overall, there were 1069 men and 933 women who underwent an IPAA procedure. Twenty of the older than 55-year age group were women and 45 were men. Most patients underwent an IPAA procedure for the diagnosis of ulcerative colitis ($n = 1790$, 89.4%), while 212 patients (10.6%) had familial adenomatous polyposis (**Table 1**).

Patients older than 55 years were followed up for a mean \pm SD of 8.1 ± 4.8 years. Overall follow-up was a mean of 10.1 ± 5.7 years. At 1-year post-IPAA, 1640 (81.9%) of 2002 patients had returned or completed the questionnaire. Returned or completed questionnaires were

Table 2. Number of Patients Who Responded in Each Defined Age Group at Each Follow-up Period

Follow-up Period, y	Age Group, y		
	≤45	46-55	>55
1	1376	215	50
3	1477	217	55
5	1338	192	52
10	892	118	25

filled out in 1749 (87.6%) of 1996 patients being followed up at 3 years, 1582 (83.7%) of 1889 patients being followed at 5 years, and 1035 (71.4%) of 1450 patients being followed at 10 years. The number of patients who responded for follow-up at the defined periods varied between the different age groups (**Table 2**).

POUCH FAILURE

Pouch failure in patients older than 55 years was 1.6% at 10 years. Only 1 of 65 patients older than 55 years had pouch failure. This pouch failure was due to chronic severe pouchitis. The overall pouch failure rate was 1.0% at 1 year, 3.1% at 3 years, 4.0% at 5 years, and 5.9% at 10 years. No significant difference in pouch failure was detected between the various age groups ($P=.42$). Twelve of the 249 patients between 46 and 55 years and 96 of 1688 patients 45 years or younger had pouch failure. Gender had no observable effect on pouch failure in any age group ($P=.12$).

POUCHITIS AND POST-IPAA COMPLICATIONS

Rates of pouchitis in patients older than 55 years rivaled the rates seen in younger patients. Overall pouchitis rates were 9.5% at 1 year, 22.6% at 3 years, 32.3% at 5 years, and 44.2% at 10 years in all patients. Pouchitis rates were significantly higher in patients who were between 46 and 55 years compared with the patients 45 years or younger ($P=.01$). Men and women had similar rates for the development of pouchitis ($P=.51$).

Postoperative stricture rates in patients older than 55 years were equivalent to those younger than 45 years. Overall rates of stricture development were 4.2% at 1 year, 10.1% at 3 years, 13.5% at 5 years, and 20.0% at 10 years. Stricture rates were significantly higher in the 46- to 55-year-old age group ($P=.009$) compared with the younger patients. No difference in stricture rates was observed between men and women.

Infectious complications such as abscess and fistula rates were not significantly different in the older than 55-year-old population compared with the younger patients. Absolute rates of abscess and fistula development in patients older than 55 years at 10 years were 5.5% for both. Overall abscess and fistula rates at 10 years were 7.0% and 7.1%, respectively. However, women had significantly higher fistula rates than men ($P<.001$). The rates for women and men, respectively, were 10.0% and 4.5% at 10 years.

Long-term risk of obstruction for patients older than 55 years was 3.1% at 1 year, 4.8% at 3 years, 14.5% at 5

years, and 28.6% at 10 years. Overall obstruction rates were 4.8% at 1 year, 10.6% at 3 years, 14.8% at 5 years, and 23.2% at 10 years. While no significant difference were observed among the age groups, women tended to have slightly higher rates of obstruction than men ($P=.02$). The rates for women vs men, respectively, were 26.1% vs 20.7% at 10 years.

Medical complications were significantly lower in the 45-year and younger group compared with the 46- to 55-year-old group. However, no significant difference was observed between the older than 55-year-old group and the other 2 age groups.

FUNCTIONAL OUTCOME

The number of stools during the day were not significantly different in the older than 55-year-old patients compared with the younger patients with IPAA. This finding was consistent through the 5-year follow-up period. Patients older than 55 years had a mean \pm SD daytime stool frequency of 6.0 ± 2.5 at 1 year, 5.4 ± 2.2 at 3 years, 5.9 ± 2.4 at 5 years, and 5.3 ± 2.1 at 10 years. Overall mean stool frequency rates during the day were 5.7 ± 2.3 at 1 year, 5.7 ± 2.2 at 3 years, 5.7 ± 2.4 at 5 years, and 5.7 ± 2.7 at 10 years.

Both the older than 55-year-olds and the 46- to 55-year-olds had significantly more stools at night than the younger than 45-year-old patients through all periods ($P<.001$). The mean \pm SD nighttime stool frequency in the older than 55-year-olds was 2.0 ± 1.1 at 1 year, 2.0 ± 1.4 at 3 years, 1.9 ± 1.1 at 5 years, and 2.0 ± 0.8 at 10 years. Overall stool frequency rates at night were 1.5 ± 1.3 at 1 year and 1.7 ± 1.4 at 10 years.

Frequent daytime incontinence occurred more often in patients older than 55 years compared with patients younger than 45 years (15.2% vs 4.1% at 1 year [$P=.004$]; 13.5% vs 3.4% at 3 years [$P=.002$]; 6.7% vs 4.5% at 5 years [$P=.46$]; and 12.0% vs 4.8% at 10 years [$P=.13$]). Although the overall difference between age groups was maintained at all times, the significant difference of daytime incontinence between patients older than 55 years and those younger than 45 years seemed to decline after 3 years. No significant differences were identified between the 45-year and younger and the 46- to 55-year-old age groups at any period (**Table 3**).

Frequent nighttime incontinence was also more common in the patients older than 55 years compared with patients in the 45 years or younger age group (26.1% vs 9.4% at 1 year [$P=.001$]; 19.6% vs 9.3% at 3 years [$P=.03$]; 15.6% vs 8.9% at 5 years [$P=.18$]; and 24.0% vs 12.2% at 10 years [$P=.11$]). The 46- to 55-year-old patients had no significant difference in nighttime incontinence rates compared with the 45-year-old or younger patients (**Table 4**).

The percentage of patients who had none or only occasional incontinence was highest in the patients who underwent IPAA surgery when they were 45 years or younger. Most patients in all age groups reported none or only occasional incontinence during the daytime and nighttime (Table 3 and Table 4). On further analysis, women tended to have slightly more daytime incontinence compared with men ($P=.046$ both at 3 years and

Table 3. Percentage of Frequent Daytime Incontinence Among Age Groups

Variable	Age Group, y			
	Overall	≤45	46-55	>55
Frequent daytime incontinence, %				
1 y	5.0	4.1	8.1	15.2*
3 y	4.6	3.4	10.0	13.5*
5 y	5.2	4.5	9.1	6.7
10 y	5.6	4.8	10.3	12.0
Never or occasional daytime incontinence, %				
1 y	95.0	95.9	91.9	84.8
3 y	95.4	96.6	89.7	86.5
5 y	94.8	95.5	90.9	93.3
10 y	94.4	95.2	89.7	88.0

*Patients older than 55 years had statistically significantly more incontinence than patients younger than 45 years at 1 and 3 years, but this effect diminished after 5 years. There was no statistically significant difference between age groups older than 55 years compared with those between 46 and 55 years. Most patients had no or only occasional daytime incontinence over the follow-up periods.

10 years). However, there was no sex difference in nighttime incontinence.

PATIENT QOL

Patient's social activities, work activities, sexual life, travel, and family relationships were examined. The percentage of patients who experienced severe restrictions in sexual life ranged from 3.0% at 1 year to 4.2% at 10 years among all patients. Overall, 17.8% of patients felt improved sexual function after an IPAA procedure at 1 year and this percentage continued to improve with time (19.7% improvement at 3 years; 22.7% at 5 years; and 27.8% at 10 years). Most patients older than 55 years (65%) felt improved or no difference in sexual activity after IPAA. There was no significant difference detected in sexual life between patients who underwent IPAA at the age of 45 years or younger and those who were older than 55 years at 1 and 3 years' follow-up. Sexual restrictions were more common in patients older than 55 years compared with patients 45 years or younger after 5 years' follow-up ($P = .003$ at 5 years; $P < .001$ at 10 years). There was no significant difference in sexual restrictions observed between the 46- and 55-year-old patients and the older than 55-year-old patients (**Table 5**). Evaluation of sex differences revealed that men appeared to suffer more severe sexual restrictions than women post-IPAA ($P = .002$ at 1 year; $P = .004$ at 3 years; $P = .07$ at 5 years; and $P = .03$ at 10 years).

No patients older than 55 years reported severe restrictions for work activity or family relations. Severely restricted social activity were experienced in 1.6% at 1 year, 1.0% at 3 years, 1.8% at 5 years, and 2.4% at 10 years among all patients. A few of the patients in the older than 55-year-old group reported severe restrictions involving social activity, sports activity, and travel. There was no significant difference in travel, sports activity, social activity, family relations, or work between age groups at

Table 4. Percentage of Frequent Nighttime Incontinence Among Age Groups

Variable	Age Group, y			
	Overall	≤45	46-55	>55
Frequent nighttime incontinence, %				
1 y	11.1	9.4	18.3	26.1*
3 y	10.7	9.3	18.0	19.6*
5 y	10.0	8.9	16.1	15.6
10 y	13.3	12.2	19.8	24.0
Never or occasional nighttime incontinence, %				
1 y	88.9	90.6	81.7	73.9
3 y	89.3	90.7	82.0	80.4
5 y	90.0	91.1	83.9	84.4
10 y	86.7	87.8	80.2	76.0

*Patients older than 55 years had statistically significantly more incontinence than patients younger than 45 years at 1 and 3 years. There was no statistically significant difference between age groups older than 55 years compared with those between 46 and 55 years. Most patients had no or only occasional nighttime incontinence over the follow-up periods. There was slightly more nighttime incontinence than daytime incontinence.

Table 5. Severe Sexual Restrictions at 5 Years and 10 Years Were More Common in Patients Older Than 55 Years Compared With Patients 45 Years or Younger*

	Age Group, y			
	Overall	≤45	46-55	>55
Sexual restrictions, 5 y, %	4.3	2.5	10.6	14.7
Sexual restrictions, 10 y, %	4.2	3.1	7.4	21.7

* $P = .003$ at 5 years and $P < .001$ at 10 years. No statistically significant differences were observed between patients older than 55 years and those between 46 and 55 years.

1, 3, 5, and 10 years. Seventy percent of patients older than 55 years felt that their IPAA had improved or not affected their social activities. Eighty-four percent and 82% of the patients older than 55 years felt improved or not affected after IPAA in regards to work activity and family relations, respectively. Travel and sports activity improved or were unaffected after IPAA in 62% and 69%, respectively. The remainder of the patients 55 years or older felt mild restrictions compared with their preoperative status (**Table 6**).

COMMENT

The IPAA procedure was performed and described in the 1970s as an alternative to nonrestorative proctocolectomy.¹³ Because of the complexity of the procedure and lack of prospective analysis on outcomes of patients, the IPAA surgery was reserved for only "ideal" younger candidates.

In the past, our own institution has reported poor functional results in older patients.¹⁴ Mean bowel frequency was 11 in 24 hours in patients older than 50 years compared with 7 in 24 hours in patients younger than 50 years. Incontinence seemed to correlate to bowel frequency in

Table 6. Data From 3 Years Postoperatively Are Shown Because These Are Representative of the Values Seen at 1, 5, and 10 Years Except for Sexual Restrictions at 5 and 10 Year Periods*

Type of Restriction, Degree of Severity	Age Group, y			
	Overall	≤45	46-55	>55
Social	1.0	0.9	1.8	0
Work	0.6	0.5	0.9	0
Sexual*	3.3	2.7	4.7	10.7
Family relations	0.1	0.2	0	0
Sports	3.0	3.0	1.9	7.4
Travel	2.3	2.0	3.7	3.3

*Data are given as percentages. No statistically significant differences were found among age groups for these variables.

the study. Findings such as these as well as concerns of the development of pelvic sepsis as seen by Dayton and Larsen,⁸ evacuation disorders, persistent incontinence, and pouch failure have led to the limited availability of the IPAA procedure to patients older than 50 or 55 years. Many series have confirmed that function after IPAA for chronic ulcerative colitis has favorable outcomes, with an excellent QOL for more than 90% of patients.³⁻⁶ However, most of these patients are older than 55 years. With recent advances in surgical techniques as well as medical care, the historical contraindication of IPAA from a safety and morbidity prospective in those older than 55 years has been questioned. Likewise, the issues of postoperative function and QOL have had limited investigation. To address our primary concern of postoperative outcome, function, and QOL in those who undergo IPAA at an age older than 55 years, we have produced this series.

Our institution has a 20-year history of reporting on patients who have undergone an IPAA procedure. In the past, we have examined patients older than 45 years and found functional results to be inferior to those younger than 45 years.³ At the time of this study, QOL was not considered and the numbers of patients older than 45 years were much smaller than the present study. Also, from a recent publication by our group, pouch function and QOL is not only good but consistently stable over time.¹⁰ However, the patients in that study who were followed up for more than 15 years underwent their IPAA procedure while they were in their early 30s. Therefore, we have not as a group looked at older patients who undergo an IPAA procedure and evaluate them from a postoperative, functional, and QOL aspect over the long term. Not only have we reviewed these issues in this article, but we were also able to compare their results with the tremendous experience in younger patients using the same metrics.

We know from the current literature outside the Mayo Clinic that little and sometimes conflicting data have been presented on IPAA and the elderly population. These limited data until recently have been insufficient to serve as a guide for surgeons offering IPAA to those older than 55 years. In a recent series of IPAA performed at the Cleveland Clinic, Cleveland, Ohio, Delaney et al¹¹ analyzed their patients by age groups. Older patients tended to have more

problems with incontinence and nighttime seepage. Although there was a slight benefit in terms of QOL, health, functional outcomes, and energy for patients younger than 45 years, these differences were minor compared with the various age groups older than 45 years. In the 42 patients older than 65 years that were analyzed, 89% were happy to have undergone the IPAA procedure and 96% would recommend it to others. Although the Cleveland Clinic's study was comprehensive and the best to date, the lack of follow-up data makes long-term results in the older patients questionable.

Other series on older patients and IPAA have shown that the procedure is safe in older patients with no increase in immediate postoperative complications.^{15,16} Some studies have commented on increased incontinence rates in older patients but felt this was owing to slow recovery of the sphincter muscles.^{17,18} A shortcoming with these studies is that they evaluate only a few patients older than 50 years,¹³⁻¹⁸ causing difficulty in accurately assessing their results. Furthermore, the evaluation in these published series have been made at only 1 time point after the IPAA procedure. Moreover, QOL measures were not investigated.

In this review, we present univariate analysis of the postoperative outcome, function, and QOL in 65 patients older than 55 years. These data have been compared on an age-related scale to the more than 2000 patients who underwent IPAA for Crohn ulcerative colitis or familial adenomatous polyposis during the same period. Overall, most patients older than 55 years felt improved or had no restrictions after IPAA. The pouch failure rate for older patients was 1.6% for the periods studied. There was no age-related association with pouch failure. Daytime and nighttime incontinence was infrequent in most patients as well.

Continence was inferior in the patients older than 55 years after surgery compared with those 45 years or younger. However, the difference between age groups was not statistically significant after 5 years. This effect may be owing to the dropout rate that was seen in the older patient group. Despite this reduction in continence after IPAA in the first 3 years, the older than 55-year group did not perceive their QOL as assessed by their ability for sexual activity, work activity, family relations, travel, social activity, and sports activity to be affected. As expected, women of all ages tended to have more problems with daytime continence compared with men. However, there was no observed difference with nighttime continence between sex.

Restrictions on sexual life were not apparent during the first 3 years of follow-up in patients older than 55 years compared with other age groups. Significant differences in sexual restrictions were observed at 5 and 10 years in the patients older than 55 years. This finding most likely is multifactorial. Loss of a spouse, the aging process, a greater preponderance of men in the older than 55-year group, and decreased response rate to this question in the QOL survey may have contributed to these result differences. Men seemed to be affected more with sexual restrictions than women.

The issue of IPAA surgery in patients older than 70 years is one that will be of acute interest in the near fu-

ture. Given the results of Delaney et al,¹¹ Tan et al,¹⁵ and Takao et al,¹⁶ this procedure needs to be considered in this age group. The failing of our current series is that we had no patients older than 68 years. With our results and recent publications, there is a renewed interest in this procedure and its use in the elderly population. In the future, selection criteria will need to be addressed to complete this area of clinical research.

CONCLUSIONS

This study provides reasonable evidence that patients of any age who were deemed surgical candidates at a highly specialized center can expect good postoperative outcomes, function, and QOL after IPAA. Patients older than 55 years at the time of the surgery have statistically inferior functional results in terms of continence. However, from a QOL perspective, these same patients experienced similar restrictions as their younger counterparts. Likewise, age was not a risk factor for pouch failure either immediately postoperatively or years after the IPAA procedure. Complication rates also do not seem to be significantly increased in older age groups. We feel that reasonable results have been obtained in this older than 55-year age cohort who underwent IPAA. Further investigation will hopefully help identify those patients older than 55 years who should be considered for the IPAA procedure.

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DISCUSSION

David Rothenberger, MD, Minneapolis, Minn: This article summarizes the Mayo Clinic's experience with the IPAA procedure for ulcerative colitis and familial adenomatous polyposis. To my knowledge, this is the world's largest, single-institution experience with the longest reported follow-up available in the literature. During a 20-year period, 2002 patients underwent IPAA surgery with a mean follow up of 10.1 years. Remarkably, 1036 (71.4%) of 1450 patients were followed up at 10 years. You should be congratulated on tracking such a large number of patients for so long. This is not an easy feat and we all benefit from your efforts.

The current report combines effect of age not only on complications and functional outcomes after IPAA but also on QOL. It is the latter that makes this study unique. Others have reported that morbidity, mortality, and pouch failure in patients older than 50 years are similar to those younger than 50 years. The Mayo Clinic series confirms these findings. As noted in the article, the Cleveland Clinic reported that stool frequency and incontinence rates were higher in patients older than 55 years, an outcome again confirmed by the current Mayo Clinic study. This is the only large study of QOL on a long-term basis in patients older than 55 years undergoing IPAA.

I have 3 questions for the authors:

Since the most unique aspect of this article is your QOL assessment of the patients older than 55 years compared with the overall series, we must know more about the QOL tool used in your analysis. You state that the Mayo Clinic developed the tool but, to my knowledge, this tool has never been validated. Is this still true? If so, how or why should we accept your primary conclusion that IPAA does not adversely affect QOL in patients older than 55 years?

In your overall experience at 10 years of follow-up, you found a 5.9% pouch failure rate, frequent daytime incontinence in 5.6% and nighttime incontinence in 13.3%, pouchitis in 44.2%, anal strictures in 20%, abscesses in 7.0%, pouch fistulas in 7.1%, and bowel obstruction in 23.2% of patients. Given these statistics that nicely detail what I would consider to be the major long-term morbidity of IPAA, were you surprised that QOL scores and satisfaction with IPAA surgery were so high? Could this suggest that the QOL instrument used in this study is not very good at detecting QOL issues?

You conclude that patients of any age who were deemed surgical candidates could safely undergo IPAA surgery at a highly specialized center such as yours with the expectation of good postoperative outcomes, function, and QOL. You do not address the bias that I believe underlies your success in the older patients with IPAA. Clearly, your experienced group of IPAA surgeons has developed a process of determining who gets IPAA and who gets total proctocolectomy and ileostomy. This may not be spelled out in a formal way, but I am sure it exists and I wonder if you could shed some light on your decision-making process. For instance, what do you advise the elderly, morbidly obese patient? What operation do you recommend to the elderly woman with colitis who had 6 children and partial anal incontinence as a result? Your oldest patient was 68 years. Are you really giving the green light to doing IPAA surgery on 70- and 80-year-old patients? Can you tell us how many patients had a total proctocolectomy and ileostomy for ulcerative colitis or familial adenomatous polyposis during this 20-year period at the Mayo Clinic and what their ages were at the time of such surgery?

Dr Wolff: The IPAA operation has been around for about 25 years and there are more than 3400 papers in the literature on this operation, and with a 92% to 94% success rate, I believe that it is one of the most successful operations ever devised by man. But, 22 years ago we did not know how this was going to turn out. It was a new operation, we did not know what was going to happen when the 50-year-old patients who received a pouch became 70 years old, or when the 60-year-old patient who received a pouch became 80 years old. Therefore, we adopted a very conservative stance as far as performing pouches in older patients. Through the foresight of some of my colleagues, namely, John Pemberton, Keith Kelly, Bob Beart, we started a registry in those early days to find out just what happened with this operation as time progressed and that is the reason that we are able to present this data today. The validation of questionnaires is a relatively new phenomenon and to my knowledge was not done when we started our registry. But, if you look at the SF36 [36-Item Short Form], for instance, you will find that our questionnaires are similar to that validated questionnaire, but in fact, it is true that our questionnaire has not been validated; however, it does cover all the important aspects of life with an IPAA procedure. This also is a yearly questionnaire and, therefore, it has value as far as picking up progressive change. It is true that we could have missed some things, although I suspect that it is a pretty accurate picture of what is going on. You have to remember, we do not really know what happens in the normal population with aging and bowel function either. So there is not a lot of data on that particular population for comparison. So, David, the answer to your first question about this questionnaire is that it has not been validated. If we changed the questionnaire at this point, we would probably confound some of our findings and it might, indeed, be more inaccurate than what we have.

Regarding your second question about the impressive string of complications long-term with this procedure. Yes, it is sort of daunting. But you have to remember that most of these complications are transitory. They are temporary. These things are correctable and most of these complications, if not all of them, have no effect on long-term outcome and function in these patients. I think the main point here is that these patients are happy to have had this procedure and not have chronic ulcerative colitis anymore. Most of these patients had a temporary ileostomy. Only about 100 of our patients in this series of 2000 had a 1-stage procedure. They remember what an ileostomy was like, and if you propose going back to an ileostomy, you will find they are adamantly against it, even if they have Crohn disease. They are fiercely loyal to this procedure, and despite the complications, they are happy with it. And I think that just simply comes from being healthy at last.

The third question was about the selectivity in these patients. Yes, we were selective in the early days. We have been very conservative. You ask what our criteria are? Well in the upper Midwest, BMI [body mass index; calculated as weight in kilograms divided by the square of height in meters] is a big factor and we tend to perform double-stapled procedures in patients who are obese. We tend to perform double-stapled procedures in patients who are older, and, yes, we have liberalized the indications for our operation in older people. Recently one of my colleagues performed the procedure in an 82-year-old marathon runner. He underwent anorectal manometry preoperatively. I think that is a tool that we can use effectively, particularly in the patients that you outlined in making that decision, and ultimately the decision has to rest with the patient after you have described the potential, the possible outcomes, the possible disadvantages, and so forth. We still perform proctocolectomy and Brooke ileostomy and you raise a good point, in that we should perhaps go back and do a case-matched series with patients older than 55 years who had proctocolectomy and Brooke ileostomy vs those who had a pouch and see if the QOL and satisfaction are similar. We still do about 20 proctocolectomies and Brooke ileostomies for IBD [irritable bowel disease] on a yearly basis.

Richard Thirlby, MD, Seattle, Wash: I have 1 brief question. The only quibble I would have with this article is that the cutoff for the old age group is younger than the senior author of the article. I really do not worry about doing pouches on 55-year-olds. I start to get nervous at 65 years. You address this a little bit, but do you have any feel for the incontinence rates or the other complications in the 65-year and older group?

Dr Wolff: We have more than 50 patients who are older than 65 years and have had the pouch for varying lengths of time. Some have had the pouch for only 1 or 2 years, the others have had it for 10, 15, or even 20 years. We have not seen a significant deterioration in function in that group of patients older than 65 years.