Barnett Continent Intestinal Reservoir

Multicenter Experience with an Alternative to the Brooke Ileostomy

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PURPOSE: Since 1988, surgeons at five hospitals have been performing the Barnett continent intestinal reservoir (BCIR). The BCIR includes modifications to the original Kock pouch, designed to reduce the incidence of valve slippage and fistula formation. Principle modifications include an intestinal collar, an isoperistaltic valve, and a lateral pouch design. METHOD: This unique collaborative study includes 510 ulcerative colitis or familial polyposis patients, with a follow-up time from one to five years postoperatively. RESULTS: Ninety-two percent still have functioning reservoirs. Six and one-half percent have had their pouches removed and replaced with conventional Brooke ileostomies. Reoperation rate for major pouch-related complications (other than pouch removal) was 12.8 percent. These complications included slipped valve (6.3 percent), valve fistulas (4.5 percent), and pouch fistulas (6.3 percent). Several questions were administered to patients whose responses revealed a significant improvement in general quality of life, state of mind, and overall health. CONCLUSIONS: The BCIR represents a successful alternative to patients with a conventional Brooke ileostomy or those who are not candidates for the ileal pouch-anal anastomosis. [Key words: Coloprotectomy, restorative; Ileal reservoir; Ileal pouch; Ileostomy; J-pouch; Kock pouch; Proctocolectomy, restorative]

Mullen P, Behrens D, Chalmers T, Berkey C, Paris M, Wynn M, Fabito D, Gaskin R, Hughes T, Schiller D, Veninga F, Vilar P, Pollack J. Barnett continent intestinal reservoir: multicenter experience with an alternative to the Brooke ileostomy. Dis Colon Rectum 1995;38:573–582.

Read in part at the meeting of The American Society of Colon and Rectal Surgeons, Orlando, Florida, May 8 to 13, 1994.

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Management of the clinical and emotional sequelae of colectomy presents a challenging problem for patients, nurses, and physicians. An ideal surgical intervention will minimize both interference with the conduct of the patient's daily life and subsequent clinical complications of the procedure itself.

In 1952, Brooke[1] created an innovative ileal stoma in which a one-inch segment of ileum protrudes beyond the abdominal wall. This permitted appliances acting as fecal reservoirs to be more easily and securely applied to the abdominal wall. However, some patients undergoing the Brooke ileostomy procedure still experienced problems such as appliance leakage and skin irritation. Despite such problems, the Brooke ileostomy was for many years the standard treatment for those patients requiring total proctocolectomy.

Kock[2] published in 1969 his first series of patients with a continent intestinal reservoir (Kock pouch), a surgical intervention designed to eliminate the need for an external appliance and its attendant complications. Initial enthusiasm for this pouch in the surgical community has been tempered as reports of complications have appeared.[3–5]

In 1978, Parks and Nicholls[6] published results of a series of patients undergoing an ileal pouch-anal anastomosis (IPAA) procedure in which a pouch of ileum is brought to the anal verge of the rectum through an intact tube of rectal muscles. The advantage of the IPAA is that it permits the maintenance of rectal defecation. However, IPAA is not possible for the many thousands of individuals who previously had a proctocolectomy.

In 1979, Spencer and Barnett[7–10] began to modify the Kock pouch in an attempt to provide an ileostomy alternative that both preserved the Kock pouch's elimination of the need for an external appliance and decreased the complication rates that had been reported with the Kock pouch technique. Barnett's experience with a series of more than 300 Barnett continent intestinal reservoir procedures, using a progressive series of modifications of his surgical techniques, has been reported.[11]

This paper reports a collaborative study involving five institutions and 12 surgeons, all using a common surgical technique for performance of the Barnett continent intestinal reservoir procedure. We provide a brief technical description of the Barnett continent intestinal reservoir technique used by the participating surgeons and further provide both clinical and quality-of-life outcomes of patients who have undergone the Barnett continent intestinal reservoir procedure. Additionally, an assessment of the place of the Barnett continent intestinal reservoir technique as a therapeutic option in treatment of inflammatory bowel disease is provided.

Collaborating hospitals now jointly sponsor a patient registry for all patients undergoing the Barnett continent intestinal reservoir procedure. This registry is designed to permit data collection and patient follow-up on an ongoing, prospective basis. The authors intend to use this prospective data to supplement the retrospective data reported in this paper and to perform a more sophisticated multivariate analysis of selected variables as sufficient patient volumes accrue.

METHOD

The surgeons, whose clinical results are presented, developed expertise in the procedure in a structured program involving (among other things) opportunity for direct observation of Dr. Barnett's operative technique. An informed consent process, which included a complete description of alternative surgical options, was used for all patients. Because the Barnett continent intestinal reservoir procedure is not considered experimental, no Institutional Review Board approval was sought at any of the participating institutions.

Patient Population/Patient Selection

Between January 1988 and December 1991, 510 Barnett continent intestinal reservoir procedures were performed on patients presenting with an initial diagnosis of ulcerative colitis, familial polyposis, or conditions other than Crohn's colitis. Patients were all in good health other than their primary bowel disorder. Distribution of diagnoses in our series (Table 1) included 475 patients with ulcerative colitis, 26 with familial polyposis, and 9 with other diseases. Five patients included in this series with an initial diagnosis of ulcerative colitis were subsequently thought to have Crohn's disease. Only patients with an initial diagnosis of Crohn's disease are excluded from this series.

Of the 510 patients who underwent the Barnett continent intestinal reservoir procedure, 370 (72 percent) were converted from a Brooke ileostomy, 92 (18 percent) had a total proctocolectomy and Barnett continent intestinal reservoir as a primary procedure, and 48 (9 percent) had a Barnett continent intestinal reservoir conversion from a previously failed IPAA or Kock procedure. Patient population consisted of 286 women (56 percent) and 224 men (44 percent). All patients reported in this study have been followed for a minimum of 0.8 and a maximum of 4.8 years post-Barnett continent intestinal reservoir, with a mean postoperative follow-up time of 2.2 years.

Data Collection

A study questionnaire was formulated as a result of a consensus development process involving all 12

Table 1.
Reasons for Performance of the Barnett Continent Intestinal Reservoir

Primary Disease Diagnosis	Brooks Conversion	Primary Proctocolectomy	Failed Alternative Procedures	Total Patients
Ulcerative colitis	344	86	45	475
Familial polyposis	20	3	3	26
Other	6	3	0	9
Total	370	92	48	510

participating surgeons. Inpatient and outpatient surgical records were reviewed, and relevant data were abstracted.

Patients known to have had their pouch removed were considered failures, and no further contact with them was made. However, clinical information on their readmissions and complications up to the time of pouch removal were incorporated into the study database.

The study questionnaire was sent to all patients who were not known to have had pouches removed. The questionnaire surveyed a variety of issues including the current functioning of the Barnett continent intestinal reservoir, occurrence of hospitalizations outside the participating five centers, and impact of the operative procedure on quality of the patient's life. A series of follow-up mailings were sent and telephone calls made to nonrespondents. Of these, 73 percent of patients responded to one of the three questionnaire mailings sent, and 27 percent were contacted by telephone. In total, 86.7 percent of patients in the study were followed to conclusion of the study or to excision of the pouch. The remaining 13.3 percent of patients who could not be found are included in the analysis, assuming they have had no further pouch-related surgeries, because this represented such a small percentage of the total. Even assuming that lost patients had failure rates twice that of found patients, the addition of these two or three patients would not have changed the overall failure rates appreciably. Efforts are continuing to find these lost patients. The lost patients are, however, excluded from the quality-of-life analysis.

In an attempt to assess the existence of outcome differences between participating centers, complication rates for four of five participating centers were examined. (The fifth center had not accumulated sufficient patients at the time of the study to permit statistically valid comparisons.) Patient outcomes were analyzed for the first postoperative year, only to eliminate distortions caused by the fact that the surgeons at each center had been trained at different times and hence had dissimilar long-term patient follow-up intervals.

Procedural Description

Several differences exist between the Kock pouch and the Barnett continent intestinal reservoir. These are in both the valve and the pouch itself. The Kock pouch uses an antiperistaltic valve that is held in place by surgical staples. The Barnett continent intestinal reservoir valve is isoperistaltic in direction. The valve is held in place both by surgical staples and a segment of living intestine used as a collar at the valve-access segment junction. It is our belief that these two elements are primarily responsible for our reduced rate of valve slippage and pouch failure. The Kock pouch is globular in orientation, and this gives the pouch a naturally weak trifurcated suture line. The Barnett continent intestinal reservoir uses a side-to-side orientation to eliminate the trifurcated suture line.[11] An anterior serosal patch technique was initiated in September 1988 but was not universally used within the series.

A brief technical description of the Barnett continent intestinal reservoir procedure is illustrated in Figure 1. Approximately 60 to 65 cm of distal ileum is used during the procedure. This includes 8 to 10 cm for the collar, 15 cm doubled on itself (for a total of 30 cm) to construct the pouch itself, 12 cm for the isoperistaltic valve, and 5 to 10 cm for the access segment to the outside. Limbs of the pouch are then doubled back on themselves and sutured with a double layer carried onto the anterior aspect of the pouch (Fig. 1). The valve and access segment are measured, and the bowel is divided proximal to this measure-

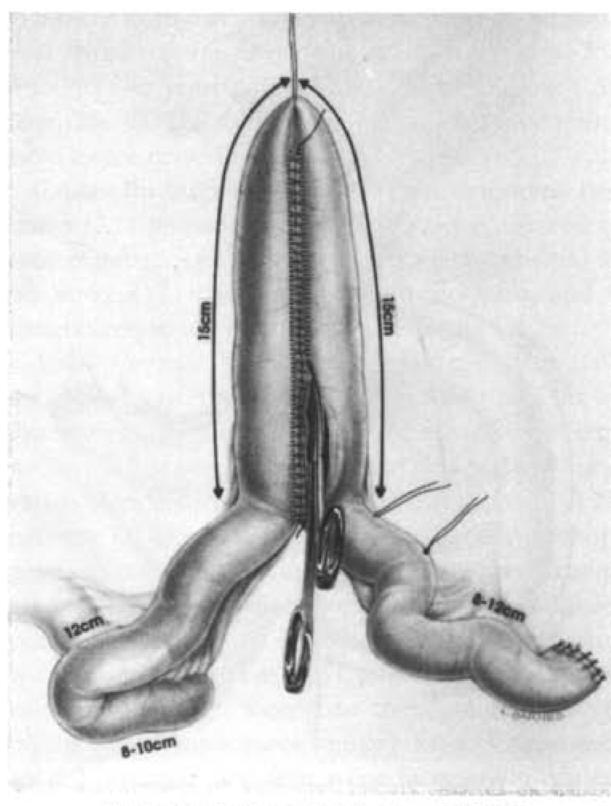

Figure 1. Technical illustration of BCIR.

ment (Fig. 2). The valve segment is then intussuscepted on itself, making an isoperistaltic valve of 5 cm in length, and is stapled three times with the TA®55 (U.S. Surgical Corp., Norwalk, CT) stapling device (Fig. 3). The anterior suture line is completed, a side-to-side proximal small bowel-to-pouch anastomosis is done, a serosal patch is placed on the anterior suture line, and an intestinal collar is brought through a defect in the mesentery and sutured tightly around the base of the valve (Figs. 4 and 5). The new, flat stoma is located just above the pubic hair line.

Preoperative Evaluation/Postoperative Care

Preoperative evaluation and postoperative care were similar in all centers. Total parenteral nutrition was routine until patients were able to establish adequate oral alimentation (median, 13 days). Mechanical and antibiotic bowel preparation was used and prophylactic antibiotics were administered. Gastrostomy was routinely used for gastric decompression. The Barnett continent intestinal reservoir pouch was placed on intermittent tube suction, with saline irrigation done at two-hour intervals. Patients were left on suction for 15 to 17 days postoperatively to maximize valve adherence and stability. The patient was then taught to care for the pouch and stoma and was placed on a rigid schedule for pouch drainage using intubation techniques with a soft, flexible 28-F to 30-F catheter until the pouch fully dilated to maturity in two to three months. At pouch maturity, it is recommended that patients intubate three to four times per day.

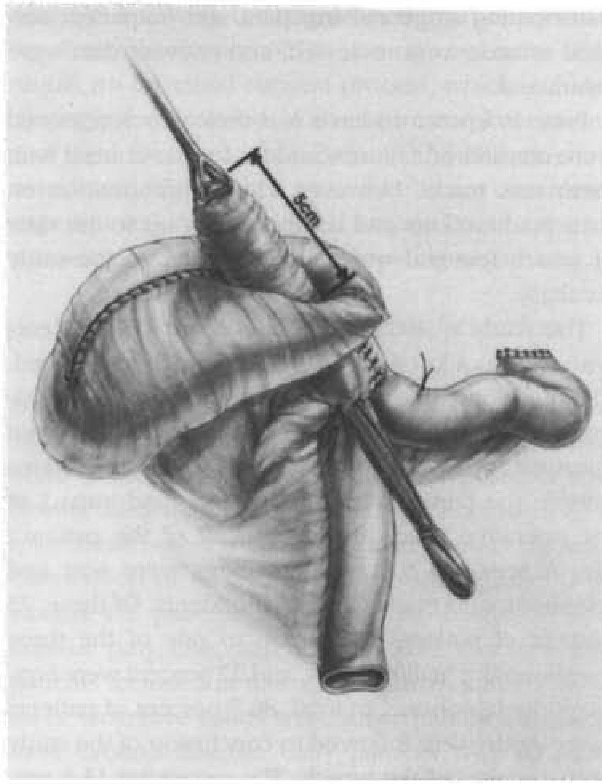

Figure 3. Stapling.

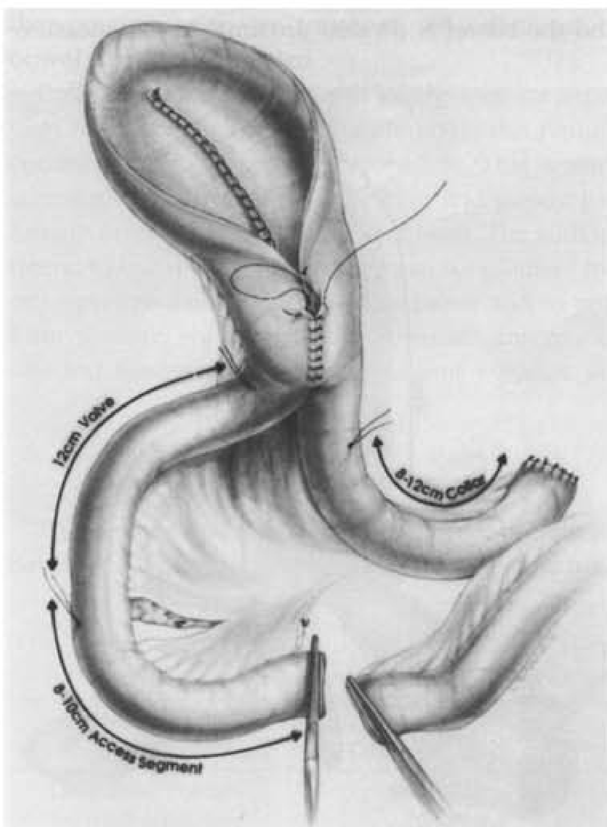

Figure 2. Bowel divided proximal to measurement of valve and access segment.

RESULTS

There has been no surgical mortality in our series. Five deaths have occurred during the follow-up period. All deaths but one occurred more than one year after the Barnett continent intestinal reservoir. The one death occurred six months after the Barnett continent intestinal reservoir procedure and two months following pouch excision and reversion to an ileostomy.

Of the 510 patients initially operated on, four hundred seventy (92.2 percent) have fully functioning pouches at least one year after initial surgery. Thirty-three patients (6.5 percent) had their pouches excised. Seven patients have intact pouches with tem-

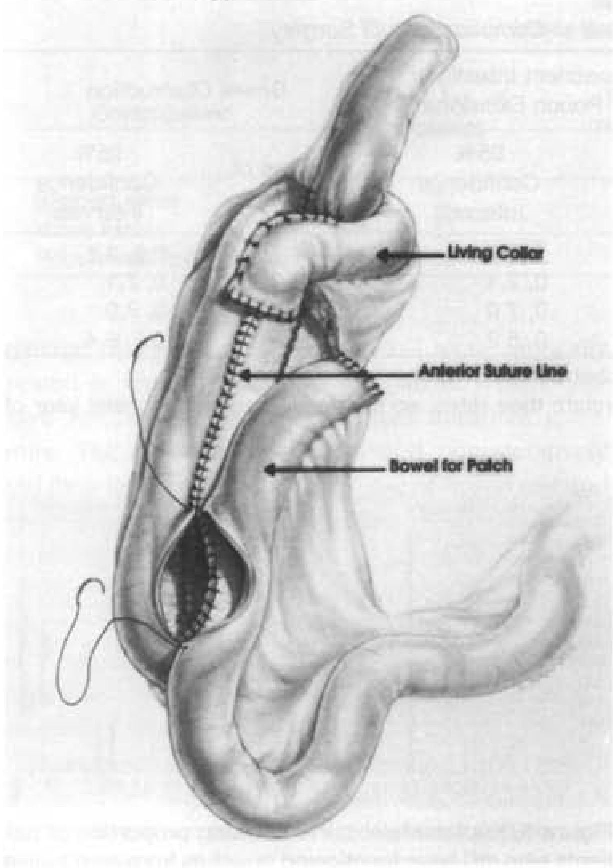

Figure 4. Intestinal collar through a defect in mesentery.

porary ileostomies awaiting closure and restoration of pouch function (Table 2).

Of the 470 patients with fully functioning pouches, 372 required no further pouch-related operations following initial pouch construction. Thirty-eight patients (8.1 percent) required only minor surgical procedures to effect a successful outcome; 60 patients (12.8 percent) required major subsequent surgical procedures (Table 2).

Complication rates during the first follow-up year for the centers studied are presented in Table 3. There is a statistically significant difference between Center 2 and others with respect to complication rates.

A learning curve phenomenon for surgical outcomes was searched for in the data by counting fistula formation rates of ten surgeons for their first ten and last eight to ten operations. A 3.8 percentage point reduction was found, not sufficient to be statistically significant ($P = 0.49$). Addition of more patients in our ongoing prospective data registry may allow a much more sensitive examination of this important point.

Table 2.
Pouch Status

Pouch Status	No. of Patients	%
Fully functioning	470	92.2
Pouch excised	33	6.5
Intact pouch with temporary ileostomies awaiting closure	7	1.4
Total	510	100

Course Following Initial Surgery: Patients with Functioning Pouches

Type of Post-Pouch Surgery Required to Obtain Functioning Pouch	No. of Patients	%
No subsequent surgery required	372	79.1
Major repair surgery required	60	12.8
Minor outpatient surgery required	38	8.1
Total	470	100

Major Surgical Complications

Major complications included pouch failure leading to excision, valve slippage, and fistula formation involving either the valve or the pouch.

Pouch Excisions. Of 33 pouches removed, 21 failed in the first year, 8 in the second year, and 4 in the third year. None of the ninety-two patients followed for three to five years had pouch excisions during that time (Fig. 6). The excision rate appeared to be unrelated to the reason for the pouch insertion.

Causes for failure were difficult to determine because 17 of 33 patients had their pouches excised at centers outside our network. Of 16 pouch excisions at our centers, 11 had nonrepairable problems, and 5 patients requested pouch removal (Table 4).

Valve Slippage. Valve slippage of the intussuscepted segment occurred in 32 (6.3 percent) patients in this series, 20 of whom developed this problem within the first postoperative year. Of 32 patients, new valves were constructed to correct this slippage in 24 patients. Of these 24, 14 required no subsequent surgery, 4 patients required subsequent surgery to achieve a successful outcome, and 6 patients had their pouch excised. Of the eight remaining patients who were treated in various ways other than with a new valve construction, three had their pouch excised, one required subsequent surgery to achieve a successful outcome, and four were successfully treated medically. Thus, 28 patients required a total of 46

Table 3.
A List by Medical Centers of the Rates of Complications of Surgery

Center	Major Reoperations*		Barnett Continent Intestinal Reservoir Pouch Excisions		Bowel Obstruction	
	Percent of Patients	95% Confidence Intervals	Percent of Patients	95% Confidence Intervals	Percent of Patients	95% Confidence Intervals
1	11.6	8.0, 15.2	5.0	2.5, 7.5	1.7	0.2, 3.2
2	3.0	0, 7.1	3.0	0, 7.1	3.0	0, 7.1
3	19.0	7.1, 30.9	2.4	0, 7.0	2.4	0, 7.0
4	11.8	5.3, 18.4	2.2	0, 5.2	4.3	0.2, 8.4

* Major reoperations excludes pouch excision and bowel obstruction.
Some centers have longer follow-up periods, which may inflate their rates, so summaries are within initial year of surgery for each patient.

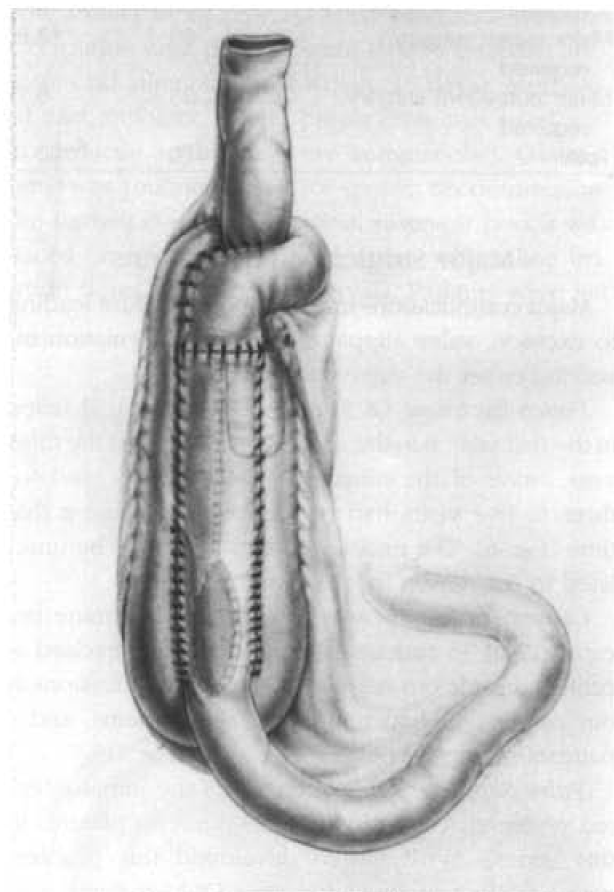

Figure 5. Sutured tightly around base of valve.

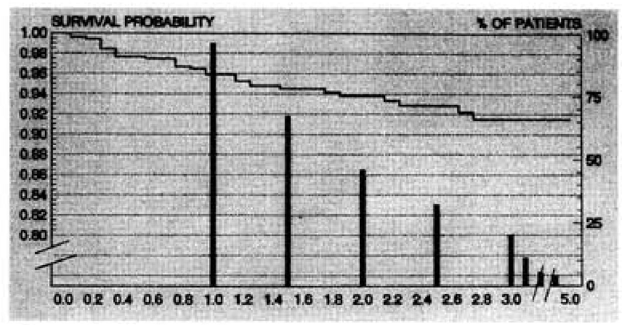

Figure 6. Kaplan-Meier curve showing proportion of patients who still have functioning pouches from zero to five years after surgery. Vertical lines indicate the percent of initial 510 patients being followed at each specified time interval.

Table 4.
Reasons for Pouch Excisions

	Slipped Valve	Pouch/Valve Fistula	Personal	Total
Not repairable	2	9	0	11
Patient desire	4	0	1	5
Total	6	9	1	16

reoperations. Of the 32 patients treated for valve slippage, 23 (72 percent) achieved a fully functioning pouch, and 9 ultimately had their pouch excised (Table 5).

Fistula Formation. A total of 52 patients (10.2 percent) developed either valve or pouch fistulas or both. Twenty-three patients (4.5 percent) have had a valve fistula, with 20 of 23 occurring within the first year postoperatively. Primary repair was accomplished in 4 patients, and valve replacement in 16. One had a temporary ileostomy that was later closed, and three patients had their pouches excised (Table 5).

Pouch fistulas occurred in 32 patients (6.3 percent), with 27 occurring within the first year postoperatively. Twenty-five required reoperation for correction. Of these 25 patients, 11 were treated with fistula closure or diverting ileostomy, 3 of whom have subsequently had the ileostomy closed and now have a functioning Barnett continent intestinal reservoir. The average duration of the loop ileostomies before closure was six months. The four still open have been so for an

Table 5.
Outcomes of Major Bowel-Related Complications

Complication	Total No. of Patients	Functioning Pouch Status	Temporary Ileostomies in Process of Treatment	Pouch Excised
Slipped valve	32	22	1	9
Valve fistula	23	22	0	3
Pouch and collar fistula	32	21	4	7

average of 1.3 years. Seven patients were surgically treated in various other fashions, all of whom now have functioning Barnett continent intestinal reservoirs. The seven who were treated nonoperatively had their fistulas closed with the use of bowel rest and hyperalimentation. Seven patients who developed pouch fistulas ultimately required pouch excision (Table 5). In summary, of 52 patients who developed either pouch or valve fistulas, 39 ultimately achieved successful operative results, 9 had their pouches excised, and 4 temporary ileostomies are still in the process of treatment.

Pouch Leak. Pouch leak occurred in 11 patients, 10 of whom developed during initial hospitalization. Of the ten, five were treated with temporary ileostomies. In summary, of these 11 patients, 7 have functioning pouches, 1 temporary ileostomy remains open, and 3 have had their pouches excised.

Minor Surgical Complications

Stoma stenosis or redundant mucosa at the skin level requiring surgical revision developed in 40 patients. Revision was usually accomplished under local anesthesia on a day-surgery basis. Peristomal hernia occurred in eight patients, all of whom were repaired surgically.

Medical Complications

Pouchitis, our most common nonoperative complication, is an inflammation of the pouch that has also been described as a common complication of other pouch procedures.[12, 13] The true incidence of pouchitis is difficult to determine because of variable criteria for diagnosis and variable degrees of severity. Seventy-three percent of the surveyed patients did not consider pouchitis a significant problem. Diagnosis of pouchitis is a clinical one, with patients having symptoms of cramping, loose, frothy, or bloody stools. Severe cases will have body aches, malaise, or even fever. Oral metronidazole has generally been an effective treatment. Other antibiotics have also been used successfully. To date, no pouch has been removed solely because of pouchitis.

Other Complications

Complications in this category are generic to abdominal surgery rather than specific complications unique to pouch operations discussed above. A total of 50 patients (10 percent) developed symptoms of postoperative small bowel obstruction, 20 of whom required surgical intervention. In addition, six patients developed ventral hernias, which were repaired surgically.

Wound infections occurred in 22 of our 510 patients, each of whom received prophylactic antibiotics. Each of our patients receives a central venous line intraoperatively for hyperalimentation. There were 10 central venous line-related sepsis problems, all controlled by catheter removal and administration of intravenous antibiotics.

Quality of Life

We attempted to measure the quality of life pre-BCIR and post-BCIR operation by allowing patients to respond separately to three questions. These questions involved a self-assessment of post-BCIR quality of life, state of mind, and general health status.

Table 6 presents the patients' responses to these three questions, according to whether the patient had a primary Barnett continent intestinal reservoir operation, conversion of a Brooke ileostomy, or revision of a failed Kock/IPAA pouch. In all three instances, patients consistently indicated that life had changed for the better following the Barnett continent intestinal reservoir operation insertion. Responses were consistently positive despite different scales used to record them.

Two other variables expected to affect patient's quality of life were the daily amount of mucus secreted from the pouch access segment and the daily

Table 6.
Patient's Response to Quality-of-Life Questions (%)

(1) In General, How Would You Rate Your Health Now?*

	Failed Kock, IPAA	Primary	Brooke Conversion
Excellent	28	44	29
Very Good	47	34	34
Good	19	17	23
Fair	6	5	11
Poor	0	0	3
Total	100	100	100

(2) State of Mind Since Your BCIR Operation*

	Failed Kock, IPAA	Primary	Brooke Conversion
Improved	81	86	75
Unchanged	19	9	19
Worse	0	5	6
Total	100	100	100

(3) Patient Response: Life After BCIR†

	Failed Kock, IPAA	Primary	Brooke Conversion
Much better	76	76	72
Better	16	11	19
Same	8	5	3
Worse	0	4	4
Much worse	0	4	2
Total	100	100	100

* Based on 409 patients who responded.
† Based on 423 patients who responded.
BCIR = Barnett continent intestinal reservoir; IPAA = ileal pouch-anal anastomosis.

frequency of pouch intubations. The impact of mucus secretion is summarized in Table 7. One-third of patients reported none or minimal mucus. Only 22 percent of patients felt mucus secretions to be excessive. Distribution of intubation frequencies is presented in Table 8. Median number of intubations is 4 in 24 hours, with nighttime intubation being rare.

Table 7.
Patient's Response to Quality-of-Life Questions (%)
Do You Have Mucus Drainage from the Access Segment? If Yes, How Much?

Excessive Mucus	Moderate Mucus	Minimal Mucus	No Mucus
22	44	22	12

* Based on 421 patients who responded.

Table 8.
Distribution of Patients According to Usual Frequency of Intubation of Pouch

Intubate/Day	No. of Patients	%
1	5	1.2
2	31	7.3
3	101	23.8
4	138	32.5
5	67	15.8
6	39	9.2
7+	43	10.1
Total	424	100

DISCUSSION

The data presented in this paper demonstrate that the Barnett continent intestinal reservoir is an effective surgical alternative. The data also confirm comparability of results during the first postoperative year obtained at various participating centers.

Despite inherent weaknesses of an uncontrolled case series such as that presented in this paper, we believe that our results can be used to draw preliminary clinical conclusions concerning the appropriate use of the Barnett continent intestinal reservoir. This is based on the large study size, extended length of time of patient follow-up, and high follow-up percentage of 86.7 percent.

Based on our experience to date, we draw the following two conclusions: (1) the Barnett continent intestinal reservoir can improve the quality of life for patients with existing Brooke ileostomies; (2) patients who are not considered candidates for IPAA could be considered candidates for the Barnett continent intestinal reservoir as a primary procedure in preference to the Brooke ileostomy.

The Barnett continent intestinal reservoir procedure provides an effective mechanism for elimination of the need for an external appliance, an inherent feature of the Brooke ileostomy. This feature affords major clinical advantages to patients as illustrated by the fact that the vast majority of our patients indicated that their lives had improved following their Barnett continent intestinal reservoir surgery. In particular, 75 percent of patients who underwent a Barnett continent intestinal reservoir as a conversion from a Brooke ileostomy indicated that their state of mind had improved, and 91 percent subjectively assessed that life after the Barnett continent intestinal reservoir operation was either better or much better.

Loss of control over intestinal effluent is clearly a significant event in the life of patients who must undergo a proctocolectomy. The Brooke ileostomy collects intestinal effluent but never really controls elimination. Clinical experience of most physicians involved in the treatment of patients with inflammatory bowel disease invariably confirms that patients consider continence penultimate to survival.

Physicians who treat patients with an external ileostomy appliance, particularly those patients who have recovered from a debilitating or life-threatening course of ulcerative colitis, often feel that no further surgical intervention is merited. This is partly based on the fact that these patients frequently minimize their postsurgical problems and do not communicate to their doctor the extent to which the appliance interferes with choice of clothing as well as social, athletic, and sexual activity. The response of these patients to the Barnett continent intestinal reservoir procedure has, therefore, been gratifying.

Early studies of the Kock pouch indicated failure rates as high as 40 percent. Modifications to the Kock pouch by Fazio and Church,[5] Cohen,[14] Dozois, *et al.*,[15] Gellernt,[16] and Kock himself[17] have brought this failure rate down appreciably.

The Barnett continent intestinal reservoir, which seeks to accomplish the same goal as the Kock pouch, is a different operation. Unique to the Barnett continent intestinal reservoir technique is the isoperistaltic valve and intestinal collar. It is our firm conviction that the low valve slippage rate and overall success of the Barnett continent intestinal reservoir in our series is because of these two innovations. The isoperistaltic valve recreates what we see in nature in bowel intussusception, and the living intestinal collar reinforces the valve/access segment junction without use of foreign material. Marlex® (CR Bard, Inc., Billeries, MD) collars previously used by Barnett and others did decrease dessusception, but the cost was fistulas caused by the foreign material. Other techniques used to help minimize valve slippage are stripping of the peritoneum and mesenteric fat in the valve segment, scarification of the serosa, and use of surgical staples in three locations.

The existing clinical literature still leaves physicians uncertain on how they can best advise their patients with inflammatory bowel disease, who must choose among the Brooke ileostomy, the Barnett continent intestinal reservoir, the modified Kock pouch, the IPAA, or alternative procedures. We believe that our quality-of-life data should provide valuable information for such patients. Comparing complication rates of the various available surgical procedures is difficult because of reporting differences in the existing literature (which includes over 100 publications). These inconsistencies include a lack of standardized complication definitions, variable follow-up times, and incomplete description of study patient characteristics.

A meta-analysis of reported consecutive series of each of five surgical approaches to the problem is under way. The meta-analysis will cover the following procedures: the Brooke ileostomy, direct ileoanal anastomosis, IPAA, and both Kock and Barnett abdominal continent pouches.

Techniques of meta-analysis may assess benefits and risks of various surgical options available. Based on the meta-analysis now in the process of completion, we believe that rates of pouch failure, slipped valves, and fistulas reported in our series compare favorably with existing published studies concerning alternative pouch procedures. We recognize that definitive answers with regard to relative efficacy and complication rates of major available alternative pouch operations can only be supplied in the future by rigorously conducted randomized trials.

ACKNOWLEDGMENTS

The authors thank William O. Barnett, M.D., F.A.C.S., for surgical procedure development, Susan Kay, N.R., CPHQ, for biostatistical records, and Greg Wheat and Gerald Humphreys for project coordination.

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Invited Editorial

The Barnett continent reservoir is a variation of the Kock pouch. The reservoir has undergone numerous changes, and this article details a large experience with a consistent version of this pouch. It represents a multigroup experience and, therefore, probably is not the result of the passionate and evangelistic experience of one individual. Results seem to be fairly and critically evaluated, and the authors should be recognized for carrying out this sort of careful analysis of their work.

Everyone has been anxious to see this sort of critical appraisal of the Barnett continent ileostomy. Conclusions will, in part, be in the eye of the beholder. It seems to me that the authors have fairly pointed out what would appear to be certain strengths and certain potential weaknesses of their modification. In particular, the authors would appear to have a lower slipped nipple incidence than other modifications. On the other hand, they seem to have a higher risk of pouch fistulas and surgery-related complications. The excision rate of 6.5 percent would seem consistent with or perhaps slightly higher than most other series. A major repair required of 13 percent would be similar to the 15–20 percent reported from the Mayo Clinic[1] and Cleveland Clinic.[2]

This is an important article, which documents that the continent ileostomy is a viable alternative in management of patients who have traditionally required a Brooke ileostomy, and the authors are to be congratulated for their objective appraisal.

REFERENCES

1. Dozois RR, Kelly KA, Beart RW Jr, Beahrs OH. Improved results with continent ileostomy. Ann Surg 1980; 192:319–24.
2. Fazio VW, Church JM. Complications and function of the continent ileostomy at the Cleveland Clinic. World J Surg 1988;12:148–54.

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