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Ileorectal Anastomosis for Ulcerative and Crohn's Colitis

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In considering surgical management of total involvement of colon and rectum with inflammatory disease of the bowel, a surgeon is faced with a choice between total proctocolectomy with a permanent ileostomy or preservation of the rectum with an ileorectal anastomosis. The former may be combined with the construction of a Kock reservoir ileostomy [1]. Preservation of the natural passage has anatomic, physiologic, biochemical, psychological, esthetic, and economic advantages that hardly need be reiterated. The disadvantages of permanent ileostomy and proctocolectomy may be summarized as follows: (1) psychological unacceptability; (2) stomal complications needing subsequent surgical revisions; (3) sexual dysfunction; (4) expenditure for appliances; and (5) unhealed perineal wounds in some patients.

The proponents of total proctocolectomy cite the following as disadvantages of ileorectal anastomosis: (1) retention of a rectal segment with potential risk for development of cancer; (2) possible recrudescence of inflammatory disease necessitating subsequent major operations, including conversion to ileostomy and proctectomy; (3) leakage after the anastomosis; and (4) frequent bowel movements.

In our practice removal of the rectum has never been considered casually; the only absolute indication is severe perianal suppurative disease and fistula formation with sphincter damage. An attempt is made to preserve the rectum in all cases of chronic ulcerative colitis and granulomatous disease of the bowel after total abdominal colectomy. A primary anastomosis is performed if the rectum shows only hyperemia and granularity on sigmoidoscopic examination. A two-stage operation with ileostomy and

mucous fistula followed by secondary hookup after the rectum has healed is chosen for more advanced disease of the bowel. Severe ulcerations of the mucosa, pseudopolyp formation, presence of distal stricture, and perianal suppurative disease are considered definite contraindications for primary anastomosis. Two patients with rectal strictures were dilated and subsequently anastomosed with success, as were three patients with pseudopolyps in the rectal segment.

Material and Methods

In a consecutive series of eighty-six patients operated on for inflammatory bowel disease (Table I), the following thirty patients did not have ileorectal anastomoses and are excluded. Four patients died before the secondary anastomoses of the ileum to the rectum after total abdominal colectomy: one had carcinomatous "linitis plastica" involving the excised segment; one succumbed to pulmonary embolism postoperatively; and two died of small bowel obstruction, two months and ten months after surgery. Sixteen patients were excluded because the disease was only segmental: eight had right hemicolectomy for Crohn's disease of the terminal ileum; four had partial colectomy for right-sided Crohn's disease; three had partial resection of the left colon for segmental Crohn's disease; and one had subtotal colectomy with ileosigmoidostomy. Five patients with severe rectal involvement underwent one-stage total proctocolectomy with ileostomy: three with ulcerative

TABLE I Surgical Procedures for Inflammatory Bowel Disease

Primary ileorectal anastomosis	24
"Staged" ileorectal anastomosis	32
Awaiting hookup	4
Dead before hookup	4
One-stage total proctocolectomy with ileostomy	5
Segmental resection for Crohn's disease	16
Defunctioning ileostomy only (closed later)	1
Total	86

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TABLE II Indications for Ileorectal Anastomosis

Intractable triad	
Diarrhea	}
Abdominal pain	
Weight loss	
Infection	
Internal/external fistulas	}
Perforation, abscess	
Peritonitis	
Obstruction, stricture	10
Toxic megacolon	6
Suspected malignancy	3
Bleeding	2
Total	56

colitis having extensive damage to the anal musculature after operations for multiple fistulas; one with Crohn's disease having a rectovaginal fistula with extensive suppurative disease; and one with Crohn's disease having a hemolytic anemia and difficulties in matching transfusions. Four of these thirty excluded patients are awaiting ileorectal anastomosis after colostomy with ileostomy and mucous fistula.

Fifty-six patients (20 male, 36 female) had ileorectal anastomosis performed after total abdominal colectomy. The ages of the patients ranged from eighteen to seventy years (average, 39.6 years). The average duration of symptoms prior to surgery was nine years. No evidence of increased complications was observed in fifty-two patients who had received prior corticosteroid therapy.

On the basis of endoscopic and radiologic findings, gross appearance at surgery, and tissue histology, thirty cases (54 per cent) were classified as Crohn's disease and twenty-six (46 per cent) as chronic ulcerative colitis. The indications for surgery are shown in Table II. In general a more conservative regional excision of the bowel was performed in the patients with Crohn's disease (16 patients). Twenty-four patients had primary anastomoses, and thirty-two patients were operated on in two stages.

Surgical Technic

After a conventional mobilization of the colon and the terminal ileum, the diseased bowel is removed while retaining 15 to 20 cm of distal segment of the rectum for primary anastomosis. An intraperitoneal single-layer anastomosis is constructed in end-to-end fashion using 5-0 monofilament stainless steel wire. Interrupted sutures transversing all layers of the bowel and 5 ml apart incorporated the submucosa and barely excluded the mucosa. Square knots are tied on the inside in the posterior row and on the outside in the anterior row. This technic has been described in more detail in our previous reports [2,3].

Preparation of the Rectum

In the group of thirty-two patients with two-stage procedures, the sigmoid stump was brought out as mucous fistula. Intensive topical steroid therapy was required for the rectum using a variety of different poorly absorbed steroids. Steroid preparations in methyl cellulose media adhered to the rectal ulcerations and promoted healing

when other methods failed. Insoluble steroids such as cortisol acetate, methyl prednisolone acetate, triamcinolone diacetate, and betamethasone sodium phosphate proved superior to the more soluble cortisol or dexamethasone sodium phosphate forms. Efficacy of topical steroid therapy was demonstrated previously by Trimpi and Zamborsky [4], and the technics of delivery were described in detail. On occasion simultaneous oral and topical steroids were utilized as advocated by Truelove [5].

The choice of the corticosteroid preparation and its application merits further discussion. Unfortunately, little has been written in the standard textbooks on local instillation of steroids (only one fourth of a page by Goodman and Gilman [6] and two paragraphs by Bockus [7]). There is extensive absorption of the soluble cortisol solutions (up to 50 per cent of the cortisol semisuccinate preparation [Cortenema®]). Although a three week course as recommended by the manufacturer may improve mild inflammatory disease, therapy with cortisol acetate mixed with methyl cellulose and Metamucil® often benefits the extensively ulcerated rectum.

As the duration of the contact of the corticosteroid solution with the inflamed mucosa is of paramount importance, it is imperative that the patient retain the entire enema in a dosage adjusted to the individual patient. Although 100 mg of cortisol acetate in 60 to 100 ml volume is usually instilled nightly, this may alternatively be given as 30 to 50 ml every 12 hours. A rectal "drip" instillation is advised for an irritable bowel segment unable to hold a standard enema. In our opinion, the available corticosteroid suppositories are of inadequate potency to treat more than a mild distal ulcerative proctitis.

Patients refractory to therapy in an ambulatory setting should be admitted to a hospital for this local treatment of the rectum stump. Spectacular results are then often achieved and are attributable to change in environment and regimented rest.

The average interval treatment period of the retained rectal segment with topical corticosteroids was 7.2 months (range, 1 to 28 months). An attempt was made to reverse the appearance of the rectal mucosa to as normal as possible before the anastomosis. However, residual erythema and mild granularity did not prove to be a contraindication. In two patients with ulcerative colitis treated for 15 months and 28 months with failure to heal ulceration and bleeding, an ileorectal anastomosis was carried out in the presence of purulent exudate. Subsequent improvement was noted in both, although periodic therapy with local corticosteroids was necessary in one.

Results

None of the fifty-six patients was lost to follow-up, which ranged from a minimum of six months to a maximum of twenty years (average, 8.4 years). A questionnaire (Table III) was returned by all patients, all had personal interviews, and all were examined proctoscopically. Follow-up results showed

that fifty-two of fifty-three patients were satisfied with the operation. The average number of daily bowel movements was 1.4 and the average number of Lomotil® tablets taken per day was 1.1. Thirty-four patients had less than four daily bowel movements, and one patient reported having more than eight bowel movements per day. Twenty patients did not use Lomotil at all.

No deaths were attributable to ileorectal anastomosis. None of the primary anastomoses leaked. In the patients with staged anastomoses, leakage occurred in one of thirty-two with ensuing persistent enterocutaneous fistula for which reoperation was necessary. This particular anastomosis had been performed with braided 5-0 wire. The incidence of dehiscence was thus 1.8 per cent. Other complications were iliac vein thrombosis (1 patient), pneumonia (3), pulmonary embolism (2), urinary infection (3), and ureter transection (1).

Status of the Rectum after Ileorectal Anastomosis. All but three patients have retained their rectums after the anastomosis (95 per cent). In no case has carcinoma in the retained segment been found. The patients undergo sigmoidoscopy every three months or more frequently if recrudescence of inflammation in the rectum occurs. Biopsies are not done routinely for cellular dysplasia.

Two operative specimens with chronic ulcerative colitis showed occult and unsuspected foci of carcinoma. Both patients remained clinically well with carcinoembryonic antigen titers in the normal range for five and six years.

The rectums have remained free of disease in twenty-eight patients with Crohn's disease. Of the twenty-five patients with ulcerative colitis, ten have experienced recurrent exacerbations, which have been controlled by local corticosteroids and/or sulfapyridine. One of the patients with ulcerative colitis had rectal bleeding necessitating two transfusions but has remained well for the past two years.

Three anastomoses have been taken down for reasons of intractable diarrhea, perineal fissures, and fistulas. Two of these patients had Crohn's disease (failure rate, 6.6 per cent) and one had chronic ulcerative colitis (failure rate, 3.8 per cent). One additional patient with ulcerative colitis has giant benign perianal acanthosis, and its wide excision may warrant an ileostomy in the near future.

Results of Proctocolectomy with Ileostomy. The results of total proctocolectomy with ileostomy in the five patients have proved disappointing. Of patients with chronic ulcerative colitis, one has been hospitalized twice for ileostomy dysfunction, another has

TABLE III

Patient Questionnaire

1. Are you satisfied with the result of your operation?
Yes _____ No _____ If no, why?
2. To your recollection, how long did you suffer from "colitis" before the surgery?
_____ years
3. Would you prefer to have lived with an ileostomy instead, if you have ever had one?
Yes _____ No _____
4. How many bowel movements a day do you have?

5. Do you use Lomotil or any other antidiarrheal agents?
Yes _____ No _____
6. Do you have adequate control over your bowels?
Yes _____ No _____
7. Working ability: Did you resume your previous occupation?
Yes _____ No _____
8. Has your sexual life changed? (Particularly describe the potency if you are male and any discomfort during intercourse if you are a woman.)
9. Any other symptoms such as rectal bleeding, abdominal cramps or loss of weight?
10. Have you gained weight since surgery?
Yes _____ No _____
11. Consistency of feces: Thin _____ Pulpy _____
Solid _____

Physician Evaluation

Proctoscopic Findings

Need for Azulfidine/Steroid/Other therapy

Remarks

had ileostomy revisions on three occasions for recurrent disease, and a third underwent two revisions for the same reason. One patient with Crohn's disease had the ileostomy transplanted to the left side for a persistent enterocutaneous fistula that did not heal despite prolonged parenteral hyperalimentation and immunotherapy; her perineal wound is still unhealed twenty-seven months postoperatively.

It is probable that these patients had severe disease that vastly influenced their outcome.

Comments

The literature is replete with favorable and unfavorable results of ileorectal anastomosis for inflammatory disease of the bowel. The results vary according to the nature of the pathology. Aylett [8] who has the largest reported series of ileorectal anastomoses first published his work in 1957. In 1971 [9] he reported on 369 patients with "ulcerative colitis" undergoing operation between 1952 and 1970, with an overall mortality of 5 per cent for patients treated by total colectomy and ileorectal anastomosis. Of these patients, 309 (84 per cent) were leading active and healthy lives. There were no cases of male impotence. Although the average number of daily bowel movements was four, some had only one or two during 24 hours. Only twenty-four patients were con-

sidered failures. Carcinoma developed in seven. Rectal stricture, perirectal suppuration, incontinence, and miscellaneous causes occurred in the remainder.

Contrary to our practice, Aylett states that the ileorectal anastomosis must be protected by an ileostomy, which is made in continuity and brought out through the right iliac fossa. A barium enema is routinely performed three weeks after the colectomy. In 12 per cent of his patients this x-ray examination revealed a leak; most showed healing at a barium study performed three weeks after discharge. The ileostomies were then closed with safety. During colectomy, the pedicle of the inferior mesenteric artery with its accompanying veins and sympathetic nerves was deliberately divided. Aylett believes the resulting reduction of blood supply to the rectum and/or the division of the nerves plays some part in subsequent healing. Aylett further believes that the surgical excision of the entire colon and upper rectum alleviates toxemia and promotes epithelialization of the rectum.

In a recent personal communication, Aylett [10] has analyzed a total of 461 patients with 436 survivors. The remainder died in the immediate postoperative period. Nineteen have developed carcinoma and have been subjected to abdominoperineal excision. There was one operative death after abdominoperineal excision. Seven have died of cancer and the rest are well, one twelve years after surgery. "It is fair to say that three of the patients who had cancer and died therefrom would not now be considered as suitable for ileorectal anastomosis in view of our present knowledge of premalignant biopsy changes," he writes. Twenty-two patients have been given a permanent ileostomy, mostly because the rectum failed to heal. The remainder in this series are well and the rectum has reepithelialized.

What is the risk of cancer in the retained rectal segment? Adson, Cooperman, and Farrow [11] reported in 1972 a retrospective analysis of sixty-five patients with ileorectal anastomoses. Twenty-four of thirty-five operative patients with chronic ulcerative colitis survived, of whom seventeen had intact anastomoses. Two of the patients who died had carcinoma in the preserved rectum. Young patients required proctectomy most often. Of twenty-five of thirty surviving patients with Crohn's disease, thirteen required proctectomy, whereas rectal function was satisfactory in nine of the twelve patients with intact anastomoses. Adson, Cooperman, and Farrow [11] concluded that conservation of a normal or minimally diseased rectal segment was considered appropriate in Crohn's disease. They were concerned

about the development of carcinoma in chronic ulcerative colitis, but they pointed out the variability of the disease, the small area of retained bowel at risk, and the difficulty in differentiating between Crohn's disease and chronic ulcerative colitis. Other authors have expressed concern over the risk of development of cancer in the retained rectal segment. Goligher et al [12] estimated the cumulative risk to reach a level of 41.8 per cent after twenty-five years of evolution of the colitis. However, these figures were attributable to "universal colitis" and probably grossly misrepresented the actual figures for the possibility of development of carcinoma in a small inspectable segment of the bowel. Moss and Keddie [13] reported that two of ninety-three patients with a retained rectum after colectomy for ulcerative colitis developed carcinoma in the rectal stump. Earlier, Mayo, Fly, and Connelly [14] had reported an incidence of carcinoma in the retained rectum to be 6.7 per cent. Korelitz, Dyck, and Klion [15], however, reported only one instance of cancer in the rectum when 98 per cent of their 136 patients required reoperation for failure to control the disease. Griffen, Lillehei, and Wangenstein [16] have encountered this complication in two of fifty-two patients treated by colectomy and ileorectal anastomosis and MacDougall [17] reported finding five carcinomas in the rectum in a series of 240 patients treated by this operation. In none of these reports have the lengths of the rectal segments retained and the frequency of the follow-up been stated. If the claim of Morson and Pang [18] can be confirmed that epithelial dysplasia on rectal biopsy provides a reliable means of selecting colitis patients especially prone to develop carcinoma, preservation of the rectum may be a more justifiable alternative in surgery for chronic ulcerative colitis.

Can the type of inflammatory bowel disease be the principal criterion for selecting the surgical procedure? Although some authors concede that the rectum may be preserved in Crohn's disease with less risk of carcinoma and failure [19], Tompkins et al [20] found no difference in the fate of rectal segment in the two diseases. In this study with sixty-five patients with both types of colitis, only 15.4 per cent had functioning rectal segments after seven to twelve years. In our series, the failure rate was the same in both colitides.

Another aspect to be addressed is the rate of suture line recurrence of the disease at the site of ileorectostomy. Jones, Lennard-Jones, and Lockhart-Mummery [21] reported a recurrence rate of 47 per cent (16 patients out of 38) after ileorectal anastomosis in Crohn's disease. A similarly high recurrence rate of 50 per cent was reported by Baker [22] on a

six year follow-up of his twenty-six patients in 1971 and other authors have reported similar experiences [23-27]. Although a recurrence proximal to the anastomosis after segmental resection of bowel for Crohn's disease is a commonly observed phenomenon, not a single recurrence in the ileum proximal to ileorectal anastomosis has been observed in our series. We consider the clinical manifestation of disease in the rectal remnant to be a recrudescence of previously dormant disease and not a true recurrence. None of our patients developed symptoms that warranted a takedown of the anastomosis for this reason. It might even be speculated that there is some healing factor in the ileal contents responsible for improving the rectal segment, as this was observed in two of our patients with chronic colitis who were anastomosed in the presence of active disease.

Our experience with proctocolectomy and ileostomy is disappointing, although very small. However, Hawk and Turnbull [28] reported ileitis in 20 per cent of their patients. Others, including Korelitz and associates [29,30] in 1967 and 1972, have also reported a high incidence. Steinberg et al [31] suggested that there is a recurrence rate of 10 per cent at the ileostomy site the first year, with an annual 5 per cent risk in each subsequent year. All their patients had at least one recurrence in follow-up of more than fifteen years.

An important consideration, insufficiently stressed in the literature, is the high incidence of impotence after excision of the rectum. Inflammatory disease of the bowel is a disease of the young. Erection of the penis cannot occur if the nervi erigentes are severed. These vulnerable nerve fibers lie below the peritoneal reflection on either side of the rectum in close proximity to the middle hemorrhoidal vessels [32]. Admittedly, the incidence of impotence is much lower than after radical resection of the rectum for cancer. Grave psychological and social repercussions in these patients may result from disturbance of sexual function. Watts, De Dombal, and Goligher [33] in 1966 reported some impairment of function in eleven of forty-one patients who had undergone ileostomy and proctocolectomy. Seven had permanent impotence. Six of eight older patients with a mean age of fifty-nine years became completely impotent.

Conclusion

The rectum can be preserved in surgery for inflammatory disease of the bowel and anastomosed primarily to the ileum when the disease is mild. With preservative and judicious application of steroids, the

disconnected rectum can be healed in more severe cases and hooked up secondarily.

The anastomosis can be performed with safety using a single-layer 5-0 monofilament stainless steel wire. Recurrence at the suture line has probably been misinterpreted in the past, and the incidence of carcinoma overstated. The alternative of ileostomy and proctocolectomy is wrought with inherent disadvantages of ileostomy complications and sexual disturbance. Unless the rectum is involved in extensive suppurative disease with multiple fistula formation, colectomy with ileorectal anastomosis is worthy of consideration.

Summary

Except in the presence of severe perineal suppuration or sphincter damage by previous surgery for fistulas, the rectum was preserved in all patients considered candidates for surgery for inflammatory disease of the bowel. A primary anastomosis with a single-layer 5-0 monofilament stainless steel wire was carried out when a relatively healthy rectum with erythema and granularity presented. For patients with more severe disease of the rectum, a two-stage operation with intensive interval treatment of the rectal stump with topical corticosteroids was carried out.

Of a total of eighty-six patients with involvement of the colon and rectum with either Crohn's disease or chronic ulcerative colitis, fifty-six patients were treated by local abdominal colectomy and ileorectal anastomosis. Twenty-four had primary anastomosis and thirty-two had a two-stage operation. One anastomotic dehiscence developed. A mean follow-up of 8.4 years (6 months to 20 years) has been satisfactory. Only three anastomoses have been taken down for unsatisfactory results.

With the proper selection of patients and with appropriate treatment of the diseased rectal segment, a large majority of patients with inflammatory disease of the bowel can have long-term salutary results after colectomy and ileorectal anastomosis.

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