

Parks' Coloanal Pull-through Anastomosis for Severe, Complicated Radiation Proctitis

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A variety of operations have been proposed for the treatment of radiation injuries of the rectum. In this study, the procedure advocated by the late Sir Alan Parks—resection of the diseased segment down to its points of fixation to the vagina, bladder or prostate; with perianal mucosal stripping of the anorectal segment and primary coloanal (pull-through) anastomosis—was performed in 11 patients. In two others, an attempt at colorectal anastomosis was abandoned because of extreme scarring in the pelvis. The procedures were done following definitive treatment of carcinoma of the rectum (seven patients), carcinoma of the cervix (two patients), carcinoma of the uterus (one patient), carcinoma of the ovary (one patient), seminoma (one patient), and carcinoma of the bladder (one patient). One patient died from a pulmonary embolus on the seventh postoperative day. Of the survivors with a coloanal anastomosis, all had successful closure of their temporary colostomies with follow-up from one to six years. In eight, continence was assessed as being good or excellent. Four patients required anastomotic dilatation and another required a surgical procedure for anastomotic stricture. There was one instance each of reoperation for small bowel obstruction and ileocolic fistula. There were no instances of recurrence of hemorrhage, fistulas, perineal pain or tenesmus. The Parks procedure obviates the need for a difficult dissection of the lower rectum and separation of tissues damaged by radiation and avoids the need for eversion techniques. Its selective use is advocated for patients suffering from severe radiation injuries of the rectum. [Key words: Radiation injury of rectum; Rectal stricture; Pull-through; Coloanal anastomosis]

THE LATE SIR ALAN PARKS had an original mind. He was a great surgical innovator and a brilliant technician. In examining the problems of postirradiation and rectovaginal fistulas, he also recognized that the tissue around the fistula did not allow for simple closure and, if an anastomosis was to be affected, it must be made between normal tissues and normal anorectal function then should follow.

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Previous attempts had been made to bypass the fistula by creating a new rectum using variations of the abdominoanal pull-through technique after subtotal rectal resection.

Techniques such as the Bacon-Babcock, Maunsell-Weir, and Turnbull-Cutait have not been widely adopted due to the incidence of necrosis of the colon, stenosis, and poor subsequent anal function.¹

Parks² refined the concept of a sleeve anastomosis between healthy colon and the mucosa denuded anorectal stump, performing a primary anastomosis within the dilated anorectum. He used this in a variety of conditions in adults and reported, in 1978, five patients with postirradiation, rectovaginal fistulas, successfully cured by this technique.

Cook and DeMoor³ reported the results of this procedure in 37 South African women with rectovaginal fistulas—the result of irradiation for cervical carcinoma. The operation was technically successful in 35 of 37 patients. Full continence was achieved in 54 percent, initially, improving to 75 percent (21/28) at one year postoperatively, with no deaths. Clearly this operation lends itself to postirradiation complications other than fistulas alone. Since 1977, the author has attempted the operation in patients with severe, postirradiation, proctitis (diarrhea, pain, and tenesmus) complicated by a combination of massive, recurrent hemorrhages, fistulas or rectal stricture.

Materials and Methods

From 1977 to the present, 13 patients with radiation injury of the rectum underwent coloanal anastomosis, mucosal proctectomy, and segmental resection of the sigmoid colon and proximal rectum. All patients had a temporary colostomy fashioned. There were eight women

and five men with ages ranging from 47 to 73 years in this series. Symptoms began from six months to six years after primary radiation. Indications for radiotherapy were carcinoma of the rectum (seven patients), carcinoma of the cervix (two patients), carcinoma of the uterus (one patient), seminoma of the testis (one patient), carcinoma of the ovary (one patient), and carcinoma of the bladder (one patient). Patient details are outlined in Table 1.

Technique

Patients were evaluated to exclude recurrent disease. Mechanical preparation was obtained by whole gut lavage. Preoperative and perioperative antibiotics used included: neomycin, gentamicin, metronidazole, and ampicillin.

Conduct of the Operation: The technique herein described avoids the need for difficult dissection of the lower rectum. A perianal anastomosis avoids the hazards associated with eversion techniques.

The patient is placed on the operating table, in the synchronous, combined position, with the legs elevated and abducted (Lloyd-Davies). The abdomen is then opened using a long, midline incision. The left colon, including the splenic flexure, is mobilized to enable non-irradiated bowel to be brought down through the pelvis to the anal canal without tension. The rectum is mobilized by close dissection to the bowel downward until the necrosed tissue is reached (Fig. 1). At this point, the rectum is divided. No attempt is made to free it from the vagina in the female, or bladder and prostate in the male.

TABLE I.

Patient Number	Sex	Age (Years) at C.A.A.*	Diagnosis	Treatment	Associated Conditions	Interval before C.A.A.	Interval to Colostomy Closure	Continence
1	F	73	Ca.† at anorectum	6,000 r‡	Massive recurrent hemorrhage	3 years	N.A.§	N.A.
2	F	58	Ca. rectum	A.R.¶ 6,000 r	Rectovaginal, rectovesical fistulas, Crohn's disease	1 year	6 months	Good
3	M	64	Ca. rectum	A.R. 6,000 r	Rectovesical fistula, stricture, anastomosis	Attempted at 2 years—failed	Permanent	N.A.
4	F	62	Ca. rectum	Local excision 4,500 r	Recurrent, hemorrhage, stricture	2 years	3 months	Fair
5	F	66	Ca. rectum	A.R. 2,200 r	Rectal hemorrhage	2 years	6 months	Good
6	M	61	Ca. rectum	A.R. 6,000 r	Rectal stricture, rectovesical fistula	5 years	5 months	Good
7	M	51	Ca. rectum	A.R. 6,000 r	Rectal stricture, hemorrhage	7 months	4 months	Good
8	F	68	Ca. uterus	Hysterectomy. Rads ? dose	Frozen pelvis, rectal bleeding	26 years	2 months	Good
9	M	62	Seminoma (right) testis	Right orchiectomy, 3,960 r	Stricture	10 years	2 months	Fair
10	M	63	Ca. bladder	Cystectomy, Rads ? dose	Frozen pelvis	Attempted, failed	Permanent colostomy	N.A.
11	F	47	Ca. cervix	Hysterectomy, 5,000 r	Ulcerative colitis, hemorrhage, obstruction	4 years	5 months	Good
12	F	60	Ca. cervix	Radium inserts	Rectovaginal fistula, proctitis, hemorrhage	1 year	3 months	Good
13	F	65	Ca. ovary	Hysterectomy, 4,650 r	Cystitis, proctitis, stricture	12 years	2 months	Good

*Ca. = cancer.

†C.A.A. = coloanal anastomosis.

‡r = rads.

§N.A. = not applicable.

¶A.R. = anterior resection.

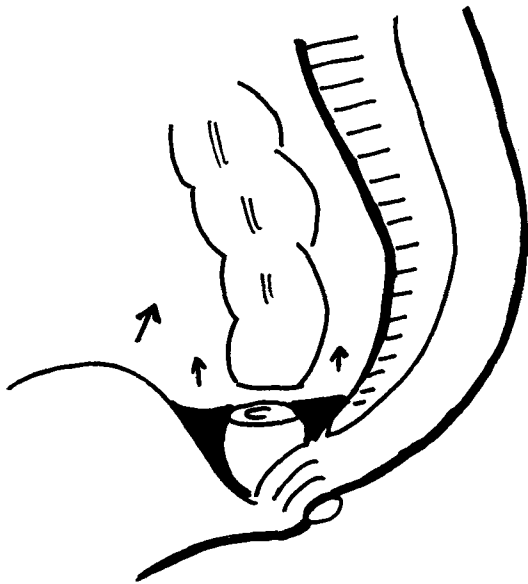


FIG. 1. The rectum should be sectioned at the most convenient point, leaving scar and fistula below undisturbed.

Proximally, the colon is divided where the bowel is healthy, has a good blood supply, and cannot have been irradiated.

From the perineal approach, the anus is gently stretched and a Parks self-retaining retractor is inserted. A solution of 1:200,000 adrenalin in normal saline is injected into the submucosal layer above the dentate line (Figs. 2 and 3). The mucosa is then stripped off the underlying muscle using sharp, pointed scissors. The dissection is continued upward into the rectum itself until, finally, the whole rectum is denuded of mucosa. This is achieved by reinserting and rotating the retractor around the anus. If a fistula is present, it is left untouched. If a stricture of the rectum is present, it is fully dilated either from above or below.

Using stay sutures, the colon is then threaded carefully

through the denuded rectum to the level of the dentate line. The colon is anastomosed perianally to the anal canal at the level of the dentate line (Fig. 4). Interrupted sutures of 3-0 Dexon® or 1-0 catgut are placed through all layers of the colon, the internal sphincter, and the anal mucosa. The sutures are tied without tension. By withdrawing and rotating the retractor before reinsertion, successive segments of the anal canal are displayed and the anastomosis is completed. In this way the whole of the residual rectum is relined with normal colon (Fig. 5). The anastomosis preferably should be at the level of the ampulla where the rectum will accommodate the colon adequately. A temporary colostomy is used to "protect" the anastomosis.

Hazards: It must be possible to follow the rectum down into the pelvis. Where the pelvis is frozen, attempts at forcing a passage are dangerous. In the male, there is the possibility of splitting the bladder in the midline down to the prostate and beyond. Lateral cuts can endanger the ureters. In two patients, it was not possible to proceed for this very reason and the operation had to be abandoned. There must be no tension on the normal bowel threaded through the rectum for anastomosis. Tension will lead to dehiscence and retraction of the colon, with or without colonic necrosis. Extensive mobilization of the colon is always mandatory. Thus, it is essential to maintain an intact blood supply to the colon. Closure of the colostomy is dependent on anastomotic healing as shown by a distal loop, radiopaque enema. Average delay in closure of the colostomy is two to six months. The area of dissection has a poor blood supply due to irradiation. Pelvis sepsis is common and it is, therefore, necessary to have good drainage of the pelvis and site of anastomosis.

Results

One patient died from a pulmonary embolus on the seventh postoperative day (Patient 1, Table 1). Two of the

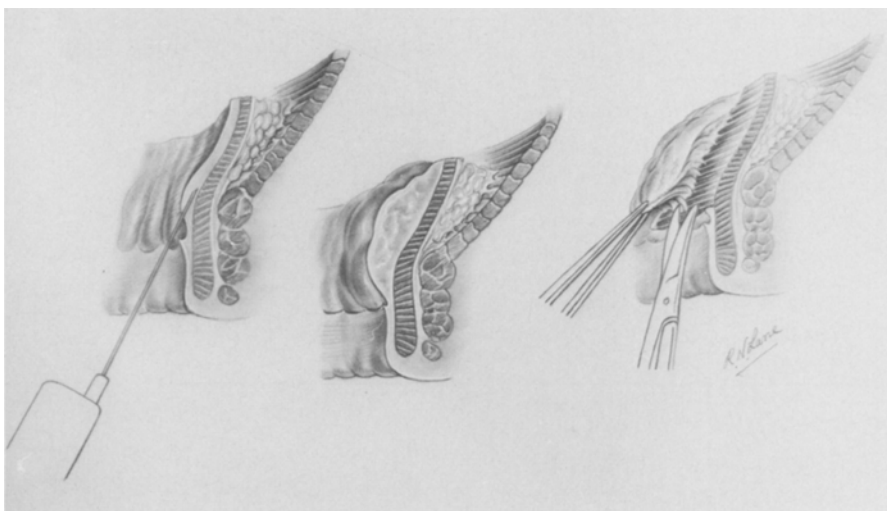


FIG. 2. The submucosa above the dentate line is infiltrated with saline and adrenalin (1:200,000). The mucosa is stripped off the muscle wall with sharp, pointed scissors. The retractor has been omitted in this illustration for clarity. (Photograph courtesy of the Royal College of Surgeons of England.)

13 patients underwent construction of a permanent colostomy when operative findings precluded a coloanal anastomosis. The remaining ten patients have been followed from one to six years without recurrence of their original disease. Eight of these are fully continent with various degrees of urgency, which are fully controllable. Two are not totally continent and have occasional leaks. Four patients have required anastomotic dilatation on more than one occasion. One patient each, with anastomotic stricture and small bowel obstruction, required further surgery. A further patient, with radiation ileitis and small-bowel obstruction, required surgery for ileocolic fistula (Table 2).

None of the patients has had recurrence of rectal hemorrhage or fistulas. None has had symptoms of post-irradiation proctitis and all are free of pain and tenesmus.

Discussion

The incidence of severe, radiation-induced, proctosigmoiditis ranges from 2.4 to 5.0 percent and is related to total dosage.⁴ The condition is seen most commonly in women treated for carcinoma of the cervix by intracavi-

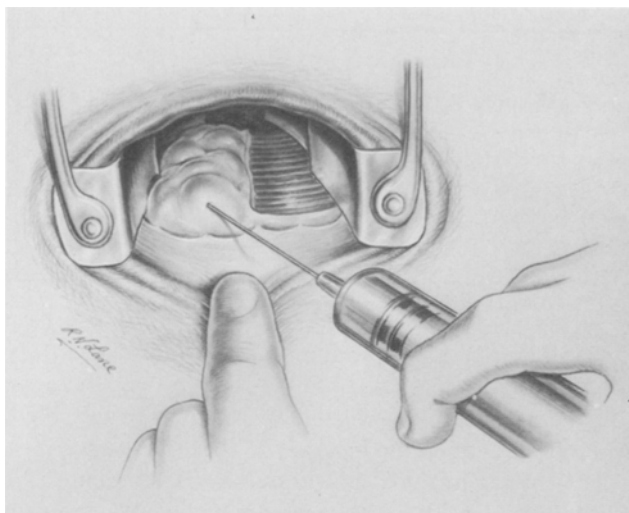


FIG. 3. The retractor has been repositioned to allow a further strip of mucosa to be excised. (Photograph courtesy of the Royal College of Surgeons of England.)

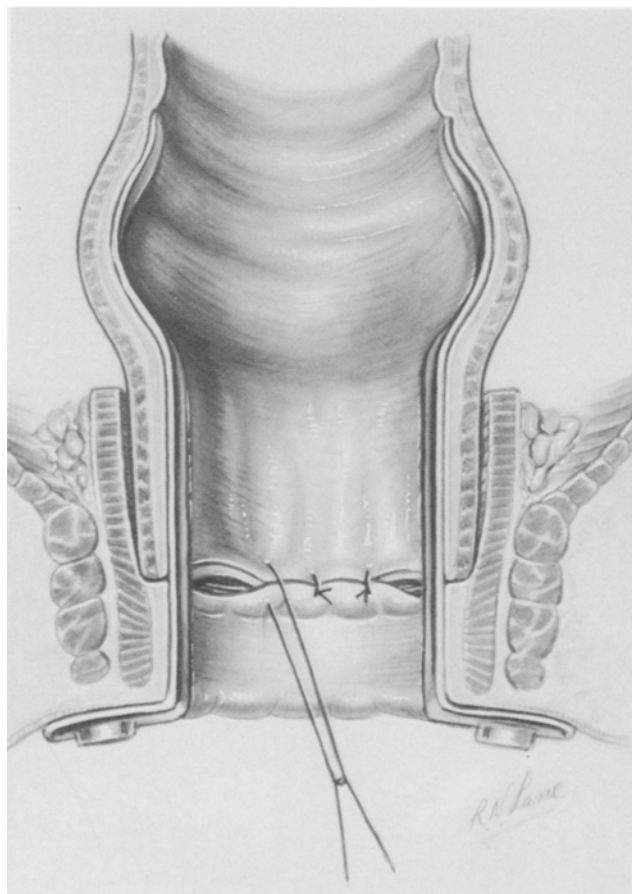


FIG. 4. The colon is anastomosed to the anal canal with interrupted sutures of 3-0 polyglycolic acid, or 2-0 chromic catgut. (Photograph courtesy of the Royal College of Surgeons of England.)

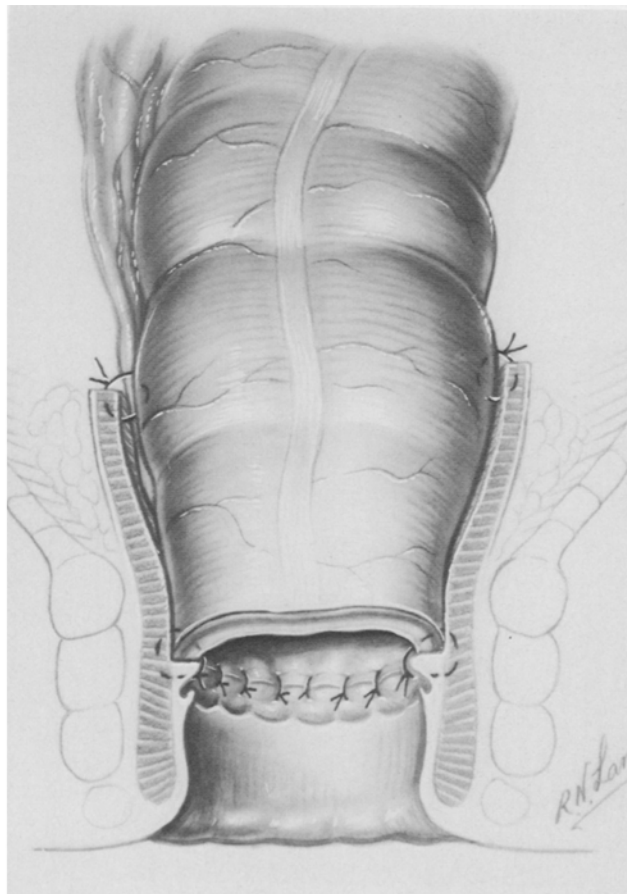


FIG. 5. The complete anastomosis lying within a "sleeve" of denuded rectal stump. (Photograph courtesy of the Royal College of Surgeons of England.)

TABLE 2. *Mortality, Morbidity and Outcome in 13 Patients*

Death	(1) pulmonary embolus 7th day
Ileocolic fistula	(1) closed
Subacute small bowel obstruction	(1) bypass
Anastomotic stricture	(1) dilatation (EUA)*
Anastomotic stricture	(4) dilatation (operation)
Not fully continent	(2)
Failure to construction anastomosis	(2)

*EUA—examination under anesthesia.

tary and external beam radiation. Such radiation injury carries a poor prognosis, and the dire consequences are particularly disappointing when, as in many cases, there appears to have been no recurrence of the primary tumor.

The management of bowel disease after radiation is difficult. Schofield *et al.*⁵ reviewed 40 patients requiring surgery. Of the 12 with disease affecting the rectum, eight underwent abdominoperineal resections and an additional two had colostomies only performed. Thus, a high proportion of patients were left with permanent stomas. Clearly, if a functioning colorectal anastomosis can be constructed, this must be to the advantage of the patient.

The coloanal sleeve operation is a time-consuming and difficult procedure to perform in the presence of the com-

plications of radiation damage. In a highly selected group of patients where complications are severe, however, this operation has no competition as an alternative to a stoma.

Mr. Chairman, using the words written by Professor John C. Goligher⁶ in closing the Memorial Symposium of the 19th of November 1983 at The Royal College of Surgeons, London, England, "It has been an honor and a privilege to be allowed to offer this small personal appreciation and tribute to a truly great surgeon, whose innovations have so enormously enriched the branch of surgery held so dear to me."

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