

Abdominosacral Resection for Midrectal Cancer

A Fifteen-Year Experience

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From 1966 to 1981, 646 patients underwent resection for primary adenocarcinoma of the rectum by one surgeon (S.A.L.) in one hospital. The operation, selected by preoperative sigmoidoscopic measurement, was anterior resection (ASR) in 320 patients, abdominosacral resection (ASR) in 175 patients, and abdominoperineal resection (APR) in 151 patients. The operative mortality rate was 2% following each of the operations. Anastomotic complications occurred in less than 2% after AR and in 9.7% after ASR. All patients were completely continent of stool and flatus after AR and ASR. Follow-up is complete in 419 of 427 patients treated from 1966 to 1976. Five-year survival for curative resection (no distant metastases) was 66.2% after AR (129/195), 62.9% after ASR (56/89), and 43.4% after APR (33/76). For patients with no tumor in lymph nodes, survival rates were 73.9% in AR, 75% for ASR, and 59.5% for APR. With involvement of regional lymph nodes, survival fell to 45.2% in AR, 37.9% for ASR, and 17.7% for APR. Pelvic recurrence was detected in 13.3% after AR, 14.6% after ASR, and 13.2% after APR. The authors believe that for midrectal cancer, ASR is the most reliable sphincter-saving procedure. It affords maximum exposure for wide resection of the tumor and safe anastomosis without disrupting the anal sphincters and their innervation. Sphincter preservation can be consistently preserved with no apparent increase in the risk of local recurrence or death from cancer.

SPHINCTER-SAVING operations have played an increasing role in the treatment of rectal cancer. A recent survey of rectal cancer surgery, conducted by the American College of Surgeons, revealed an increase in the proportion of patients treated by anterior resection (AR).¹⁰ AR is widely practiced for lesions in the upper third of the rectum. For lesions in the lower third of the rectum, abdominoperineal resection (APR) with permanent colostomy is required for radical resection. It is in the treatment of lesions of the midrectum that the most controversy remains. In some patients, particularly

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thin females, AR will be feasible even for midrectal lesions. In obese females and even thin males, safe and adequate resection and anastomosis by an entirely abdominal approach will usually be impossible. We have found that abdominosacral resection (ASR) provides exposure for radical resection and safe end-to-end anastomosis to the very limit for sphincter-saving resections, namely the levator ani muscles. This report presents a 15-year experience with ASR and compares long-term results of this operation with those of parallel series of AR and APR.

Materials and Methods

From 1966 to 1981, 646 patients with primary adenocarcinoma of the rectum underwent operation by one surgeon (S.A.L.). The operation was AR in 320 patients, ASR in 175 patients, and APR in 151 patients. Four hundred and twenty-seven patients who were treated from 1966 to 1976 were reported previously, but sufficient time has now elapsed for analysis of long-term survival in this group.⁵

Selection of operation and surgical techniques have been described previously.⁴ Men with lesions 7 to 11 cm from the anal verge and women with lesions at 5.5 to 10 cm were candidates for ASR. Patients with lesions above these limits were treated by AR and those with lesions below these limits by APR. All measurements were made by two observers on sigmoidoscopy in the knee-chest position. The distances were measured from the anal verge to the lowest gross extension of the tumor.

Patients scheduled for ASR were explored in the lateral position. In 35 patients, the operation could be completed instead by AR after mobilization of the tumor. In seven patients, ASR was abandoned because of the inability to obtain an adequate distal margin; instead,

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TABLE 1. Sex, Age, Site of Growth, and Operation in 646 Patients with Rectal Cancer (1966–1981)

Operation	Number, Sex	Age (yrs.)	Site of Growth (cm. from Anal Verge)
Anterior resection	162 M, 158 F 320	23–92 mean: 64.9	above 7.5 mean: 12.5
Abdominosacral resection	96 M, 79 F 175	39–85 mean: 63.7	5.5–11 mean: 8.7
Abdominoperineal resection	98 M, 53 F 151	32–86 mean: 63.4	1–8.5 mean: 5.2

an APR was performed. All three operations can be accomplished in the lateral position without the need for repositioning and redraping.

Data on age, sex, site of growth, and Dukes' classification are summarized in Tables 1 and 2. The APR group consisted of more men, more Dukes' C lesions, and the largest and lowest tumors. These factors may each adversely affect prognosis. The preponderance of men in the APR group is a result of selection of sphincter-saving operation at a lower limit in women.

Operative mortality and morbidity and functional results were examined in all 646 patients. Long-term survival rates and recurrence rates were determined for 427 patients treated from 1966 to 1976. Differences were examined for statistical significance by the chi-square test.

Follow-up was by regular office visits, supplemented by telephone calls to referring physicians. Follow-up was complete in 419 of 427 patients treated before 1976.

Results

Operative Mortality

Fourteen patients died after 646 operations, yielding an overall mortality rate of 2.2%. The mortality rate was 2.2% after AR, 2.3% after ASR, and 2.0% after APR. The morbidity following the three operations was also comparable, except for the incidence of anastomotic complications (Table 3).

Anastomotic Complications

Anastomotic leaks were detected in 4% of 495 patients after AR and ASR. There were three leaks after 320 ARs (1%) and 17 leaks after 175 ASRs (9.7%). In the first 100 patients undergoing ASR, the leak rate was 12%; for the subsequent 75 patients it was 6.7%. Most of the leaks after ASR (13 of 17) resulted in well-controlled posterior fistulas. However, four patients developed peritoneal signs requiring emergency colostomy. One of the four deaths after ASR was due to fecal peritonitis.

Anastomotic leaks occurred more frequently in men (12.5%) than in women (6.3%). The leak rate was highest in men 65 years or younger; therefore, protective colostomy is employed routinely in this group. In all, protective colostomy was employed in 25 patients after ASR and in nine patients after AR.

Continence

Sphincter function is preserved in all patients following AR and ASR. All patients are continent of flatus and stool immediately after operation. As in all low rectal resections, the rectosigmoid reservoir has been sacrificed, and patients complain of frequent small stools in the early postoperative period. These symptoms disappear over a 6- to 12-week period.

Long-term Survival

Of the 427 patients treated from 1966 to 1976, eight operative deaths and 59 palliative resections were excluded, leaving 360 patients for analysis of long-term survival. Eight patients were lost to follow-up, four each after AR and APR, and were considered dead of disease.

The overall crude five-year survival rate was 218 of 360 patients or 60.6% (Table 4). Five-year survival rates for patients with Dukes' A, B, and C lesions were 88.6% (101/114), 57% (77/135), and 36% (40/111), respectively.

The crude five-year survival rate was 66.2% for AR, 62.9% for ASR, and 43.4% for APR (Table 5). For patients with no tumor in lymph nodes, survival rates were 73.9% for AR, 75% for ASR, and 59.5% for APR. With

TABLE 2. Dukes' Classification and Operation of 646 Rectal Cancers (1966–1981)

	Dukes' Classification								Total
	A		B		C		Palliative		
	No.	%	No.	%	No.	%	No.	%	
Anterior resection	83	25.9	109	34.1	74	23.1	54	16.9	320
Abdominosacral resection	50	28.6	58	33.1	52	29.7	15	8.6	175
Abdominoperineal resection	35	23.2	48	31.8	55	36.4	13	8.6	151

tumor in regional nodes, survival fell to 45.2% for AR, 37.9% for ASR, and 17.2% for APR.

Five-year survival rate was 59% for men and 62.2% for women.

Pelvic Recurrence

Pelvic recurrence, as determined by tumor at or near the suture line, mass in the lower abdomen or pelvis, ureteral obstruction, defect on bone scan or computerized tomography, or sacral nerve pain, was detected in 13.3% after AR, 14.6% after ASR, and 13.2% after APR (Table 6). Pelvic recurrences occurred in 2.6% of Dukes' A cases, 13.3% of B cases, and 25.2% of C cases.

Cause of Late Death

Recurrent cancer accounted for 72.4% of the late deaths after AR, 78.1% after ASR, and 88.7% after APR. Thirteen patients died of cancer after 5 years: five patients after AR, three after ASR, and three after APR.

Discussion

An American College of Surgeons survey of more than 27,000 cases of rectal cancer treated through 1979 reveals a trend toward sphincter-saving operations.¹⁰ The proportion of patients undergoing AR increased from 18.6% of those treated before 1973 to 28% of those treated in 1978. AR is a well-established operation for cancer of the upper third of the rectum. Mortality and morbidity rates are low, continence is preserved, and long-term survival is as good or better than that achieved by APR. Tumors in the lower third of the rectum require APR for radical resection.

Treatment of tumors in the middle third of the rectum remains controversial. Depending on the sex and the build of the patient, AR may still be feasible for mid-rectal lesions. AR may be possible in the thin female, but some other method will usually be necessary in the obese female and most males if the sphincter is to be preserved.^{3,8,9} The development of mechanical staplers have led some surgeons to apply AR to lesions lower than they would attempt by hand-sutured anastomosis.^{2,3} However, the questions of safety, continence, recurrence, and long-term survival must still be answered satisfactorily. In our experience, these needs are best answered by ASR which permits direct posterior exposure of the rectum for wide resection, measurement of the distal margin, and sutured end-to-end anastomosis, without disturbing the sphincters or their innervation. The judgement as to whether adequate lateral and distal clearance is achievable may be very difficult by the abdominal approach, particularly in the narrow

TABLE 3. *Anastomotic Leaks and Deaths in 646 Patients with Rectal Cancer (1966-1981)*

	Operation	Anastomotic Leaks	Deaths
Anterior resection	320	3 (1%)	7 (2.2%)
Abdominosacral resection	175	17 (9.7%)	4 (2.3%)
Abdominoperineal resection	151	— —	3 (2.0%)

male pelvis, where much of the dissection may be blind. The transsacral approach avoids much of this uncertainty, permitting resection of midrectal tumors and restoration of intestinal continuity to the limit of sphincter-saving resections, namely, the levator ani muscles. The use of ASR made a sphincter-saving operation possible in more than 75% of all patients in this series and in more than 50% of the tumors lying below the upper third of the rectum. Operation in the lateral position allows a change to AR when conditions permit and to APR when necessary without the need to reposition or redrape.

The risk of ASR is comparable to that incurred for AR and APR. The operative mortality rate for each operation was 2%. Likewise, the morbidity of the three operations is also comparable, with the exception of the incidence of anastomotic complications. Anastomotic leak rate for AR was only 1%, as compared to 9.7% for ASR. No specific diagnostic studies were employed to identify subclinical leaks. The presence of the posterior wound undoubtedly increased the detection rate for small leaks after ASR because of the easy egress of fecal matter by this route. In fact, most of the leaks following ASR resulted in well-controlled posterior fistulas. Nonetheless, the anastomosis after ASR is inherently more tenuous than after AR, since it is lower. In addition, the posterior wound in close proximity to the suture line may also predispose to leakage. For this reason, the omentum is mobilized and interposed between the anastomosis and posterior wound whenever possible. Early results revealed that anastomotic leaks after ASR were most frequent in men 65 years or younger. Protective

TABLE 4. *Crude Five-Year Survival Rate: 360 Curative Resections for Rectal Cancer (1966-1976)*

Dukes' Classification	No. of Patients	Five-Year Survivors	Per cent Five-Year Survivors
A	114	101	88.6
B	135	77	57.0
C	111	40	36.0
All	360	218	60.6

TABLE 5. Crude Five-Year Survival after 360 Curative Resections for Rectal Cancer (1966–1976)

Operation	Dukes' Classification	No. of Patients	Five-Year Survivors	Per cent Five-Year Survivors
Anterior resection	A	62	57	91.9
	B	80	48	60.0
	C	53	24	45.3*
	All	195	129	66.2†
Abdominosacral resection	A	31	27	87.1
	B	29	18	62.1
	C	29	11	37.9
	All	89	56	62.9†
Abdominoperineal resection	A	21	17	80.9
	B	26	11	42.3
	C	29	5	17.2*
	All	76	33	43.4†

* Dukes' C: APR vs. AR $p < 0.02$.

† Overall: APR vs. AR $p < 0.001$; APR vs. ASR $p < 0.02$.

colostomy, therefore, is employed routinely after ASR in this group and also whenever the integrity of the anastomosis is in doubt. There has been some improvement in the leak rate from 12% of the first 100 patients to 6.7% of the last 75 patients.

The transsacral approach to the rectum leaves the sphincter mechanism completely intact. Sphincter function is consistently preserved. Patients usually experience frequent small bowel movements in the early post-operative period due to loss of the rectosigmoid reservoir. Some patients may even have an occasional

accident due to urgency, but the ultimate functional result is indistinguishable from that following AR.

The long-term survival rate in large numbers of patients following resection for rectal cancer is available from several sources. Lockhart-Mummery et al.⁷ reviewed the records of 3163 patients operated on for primary tumors of the rectum at St. Mark's Hospital from 1948 to 1972. The crude 5-year survival rate for 1931 patients surviving radical resection for cure was 56.6%. Survival rate was 52.7% after APR and 66.7% after AR. The overall 5-year survival rate in 360 patients surviving curative operation in this series was 60.6%. Survival rates were 43.4% for APR and 66.2% for AR, which are comparable to the St. Mark's Hospital results. Survival rates for 89 patients following ASR was 62.9%, which falls between the rates for AR and APR in this series and the St. Mark's Hospital series. These survival rates are consistent with the known relationship between site of growth and prognosis. The survival rate for APR was significantly worse than for ASR ($p < 0.02$) and for AR ($p < 0.001$). However, the APR group consisted of more C cases, more men, and the lowest lesions. When the patients were stratified according to nodal involvement or Dukes' class, there was a trend for decreased survival for the lower lesions, but these differences failed to achieve statistical significance except for APR versus AR with positive nodes ($p < 0.02$). Within each of the three operation groups, differences in survival rate according to nodal status was highly significant ($p < 0.001$). Survival rate was dependent upon the stage of disease, but not the operation performed. The observed poorer survival following APR is due primarily to site of growth and other selection factors.

Particular attention was paid to local recurrence as an early indicator of failure to control disease. It is impossible to determine the true incidence of pelvic recurrence except by autopsy or reoperation. Nonetheless, the best estimates of pelvic recurrence rates were the same for each of the three operations. The pelvic recurrence rate, like the survival rate, was determined primarily by the stage of disease.

The high rate of local failure in patients with perirectal fat invasion or nodal involvement has led to renewed interest in adjuvant therapy in these groups. Our early results in the group of patients treated since 1976 suggests some improvement in disease free survival for patients receiving post operative radiation therapy after resection for Dukes C lesions at 6 cm or lower⁶

Conclusions

ASR is the most reliable radical sphincter-saving operation for cancers of the midrectum that are too low

TABLE 6. Pelvic Recurrences after 360 Curative Resections for Rectal Cancer (1966–1976)

Operation	Dukes' Classification	No. of Patients	Pelvic Recurrences	Per cent Pelvic Recurrences
Anterior resection	A	62	2	3.2
	B	80	11	13.8
	C	53	13	24.5
	All	195	26	13.3
Abdominosacral resection	A	31	1	3.2
	B	29	4	13.8
	C	29	8	27.6
	All	89	13	14.6
Abdominoperineal resection	A	21	0	0
	B	26	3	11.5
	C	29	7	24.1
	All	76	10	13.2

for AR. It provides maximum exposure for wide resection of the tumor, a measured distal margin, and an accurate anastomosis. The procedure may be carried consistently to the pelvic floor without disrupting the anal sphincters and their innervation. Sphincter function is consistently preserved. Mortality rate is no higher than other radical rectal resections. Morbidity can be minimized by the selective use of protective colostomy. Finally, ASR provides the exposure for maximum clearance around the tumor, and long-term follow-up has revealed no greater risk of local recurrence or death from cancer as compared to APR.

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DISCUSSION

DR. CLAUDE E. WELCH (Boston, Massachusetts): There are three important contributions Dr. Localio has made to this operation. First, his figures speak for themselves. He has succeeded in retaining sphincters and obtaining a 5-year survival rate commensurate with the combined abdominoperineal resection of Miles. In addition, he has contributed a new way of exposure of these tumors that, for the initiated, furnish no problems; and finally, he has used a decompressive colostomy in only about one out of seven cases, a surprisingly low figure.

Our own experience at the Massachusetts General Hospital, which was reported by Dr. Donaldson and associates a few years ago, showed a much more modest experience with the operation, and as the years have gone by, perhaps, a somewhat decreased interest in it, due to the emergence of the EEA stapler. And as a consequence of our own observations, and the fact that a discussant is supposed to pose some questions that probably can't be answered, I would like to ask the authors about three particular items.

No. 1, what about the local recurrence rate? According to the figures, pelvic recurrence happens in 15% of their cases. It has been our thought that much of this recurrence rate was due to implantation at the line of anastomosis, but it can occur extramurally as well. I would like to know how many of these recurrences were anastomotic, and whether any of the patients could be saved by a secondary Miles operation.

No. 2, concerning the frequency of colostomy, we have been accustomed to using a decompressive colostomy in every case. Their experience is quite different. They do report that there were controlled fistulas in about 10% of the cases with their operation. What does "controlled fistula" mean? Are they controlled by a diaper, or by something else?

This may not be a very important point, but it seems to me that it will attain some more significance in the future, because so many of the Class C patients now will be treated with early postoperative radiation. And if a fistula is present, one would be rather reticent about hurrying with the radiation therapy.

As a matter of fact, their figures showed that about 30% of their cases with the abdominosacral resection were Class C Dukes, and therefore probably would profit from postoperative radiation therapy.

And, finally, inasmuch as the stapler is assuming a great deal more

importance, I would like the authors to comment. They will not have any figures on this, but do they have any arguments to prove that their procedure here will be superior to the use of the stapler?

DR. KENNETH ENG (Closing discussion): Dr. Welch's first question concerned local recurrence rate. It is very difficult to know when you do have a local recurrence whether this was suture-line implantation or ingrowth from the surrounding pelvis. We take some comfort from the fact that there was no difference in the recurrence rate among the three operations. Even after APR, where there is no anastomosis at all, we had a similar recurrence rate.

I suspect that most of these were recurrences that occurred by ingrowth from the pelvis. In fact, only two of these were resectable for cure secondarily. I think with the use of a synchronous approach we probably resect some recurrent tumors that probably were considered unresectable in the past by abdominoperineal resection.

As far as what we mean by a controlled fistula, we mean a patient who does not go into septic shock and develop peritoneal signs and require an emergency operation for peritonitis. As a matter of fact, one or two of these patients came back to the office and noted that they had some fecal soilage, and on examination were found to have a fistula.

The vast majority of these patients had not had a protective colostomy. Most underwent colostomy to aid in healing of the fistula. We had one patient who healed a fistula spontaneously without a colostomy, but they all healed.

We do not use the stapler. After all, the stapler is only one means of putting two pieces of intestine together. When we try to save the sphincter, we must keep in mind that we must remove the cancer adequately. As you all know, in the male with the midrectal lesion this decision is not always easy, especially since very often the dissection is blind. Abdomino-sacral resection provides the posterior exposure to insure the adequacy of the resection. You can get wide margins. You actually divide the lower parts of the lateral ligaments from the posterior approach, and you have a measured distal margin. After you have done that, how you join the intestine is your choice. I personally prefer the control of the sequential sutures, so that if things go wrong I can adjust it, rather than to have one snap of the stapler.