

SURGICAL TREATMENT ANO-RECTUM CARCINOMA

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Professor Mitsuno and members of the Society of Gastroenterological Surgery, thank you for the honor you gave me in inviting me to speak at this most important meeting. I will try to share with you our experience at Memorial Sloan Kettering Cancer Center with the treatment of ano-rectal cancer. I will speak first of the treatment of rectal cancer and then anal cancer.

RECTUM

There is wide variation in defining the rectum. A practical clinical definition, which has been very useful is the distal 10 cms. of the large bowel measured from the anal verge by preoperative proctosigmoidoscopy. This is the portion of the bowel which is at or below the peritoneal reflexion. The problems encountered here are quite different from those of the intra-peritoneal colon. Anatomy imposes limitations on the applications of the basic principles of cancer surgery for bowel cancer which are wide removal of the cancer bearing bowel segment and wide removal of the lymphatic drainage performed with a minimum of cancer cell contamination.

The bony pelvis imposes lateral limits of extent of tissue that can be removed. The pelvic floor, including the levator ani muscles and the perineal structures limit the wide removal of a low lying cancer unless they are removed. Furthermore there are differences in the lymphatic drainage of the rectum. In the upper rectum, that is above six or seven centimeters, the lymphatic drainage is entirely upward or cephalad whereas in the distal rectum it may be cephalad, distal or caudad, and lateral. These factors must be taken into consideration in deciding the proper operation to remove, as well as possible, the tissues at risk. In the upper rectum an adequate distal section of bowel below the tumor can be removed leaving the pelvic floor intact. Also in this area since the lymphatic drainage is upward or cephalad it is unnecessary to remove the distal portion because of potential lymphatic metastases. However, in the lower rectum where the low rectal cancer approaches the pelvic floor, the levator muscles, distal rectum and anus and perineal contents must be sacrificed to obtain an adequate margin below the tumor and to remove the lymphatic drainage which is cephalad, distal and lateral.

In practice, in the upper rectum where one cannot or can barely feel the lower border of the tumor on digital examination, one can almost always perform a resection with a primary anastomosis. In the distal rectum where the entire tumor is readily felt as it approaches the pelvic floor, an abdomino-perineal resection of the Miles' variety is the only procedure which adequately removes the tissues at risk. In the middle rectum, the uncertain area at 6 cms. or higher where the lower border of the tumor can be easily felt, the procedure must be determined at operation after complete abdominal and pelvic mobilization has been performed. In these circumstances the patient is warned preoperatively of the possibility of a permanent or temporary abdominal colostomy.

At operation after thorough abdominal exploration, a complete abdominal and pelvic dissection is performed regardless of the location of the lesion. The peritoneum is incised on both sides along the ureters bilaterally. These incisions are eventually continued anteriorly across the mid-line on the back of the seminal vesicles or the vagina. The inferior mesenteric vessels are ligated at or near the origin of the artery. A level for transection on the sigmoid is selected. If the tumor is in the mid rectum and we are uncertain as to the procedure

an umbilical tape is tied rather than divide the bowel. The mesentery is then divided. The mesosigmoid and meso-rectum are dissected free from the aorta and common iliacs. The tissues at the aortic bifurcation are dissected free to the presacral fascia and then freed from the pre-sacral fascia by blunt and sharp dissection into the deep pelvis. A specific incision of Waldeyer's fascia which runs from back of the rectum onto the levator muscles facilitates complete mobilization of the distal rectum. The lateral stalk with its mid-hemorrhoidals are transected without prior clamping to remove lateral tissues at risk. Ordinarily the mid-hemorrhoidals stop bleeding very promptly, but if necessary they can be subsequently clamped and ligated.

After mobilization has been completed we then decide the operation. If we are able to place two fingers below the palpable lower border of the tumor without tension, place a right angle clamp below those fingers, divide the bowel below the clamp and have enough stump left for an anastomosis, we will perform an anterior resection with anastomosis. If we can place two fingers below the tumor, but do not have an adequate stump for an anastomosis, we will do a "pull-through" type of abdomino-perineal proctosigmoidectomy. If we are unable to get two fingers below the tumor, we will do a Mile's type abdomino-perineal resection.

When we decide on an anterior resection Carmalt clamps are placed across the sigmoid and the umbilical tape removed. The bowel is divided. We then place the right angle clamp below the tumor, place stay sutures in the lateral sides of the rectal stump below the clamp, then divide the bowel, remove the specimen and aspirate and swab with skin antiseptic the lumen of the distal bowel. The pelvis following removal of the tumor is irrigated with at least 1000cc of distilled water. The anastomosis is performed with one layer interrupted atraumatic catgut placing all of the posterior row before approximating the bowel ends. After they are all in place the bowel ends are approximated and the sutures tied. The anterior row is either a single layer of interrupted sutures or a running continuous atraumatic chromic catgut to approximate the bowel ends, reinforced by an outer layer of interrupted catgut. We do not extraperitonealize the anastomosis. We use drains for the low anastomosis. At present we do not have an ideal method of draining, having used simple Penrose drains, medium or large hemovac. Currently we are using a Shirley Sump type of drain. We usually perform a proximal transverse loop colostomy in the physiologically elderly patient with a very low anastomosis as they do not tolerate infection well. A colostomy is also advisable when the anastomosis has not been optimal technically, or when there has been poor bowel preparation.

When we elect a pull-through type of abdomino-perineal proctosigmoidectomy, the descending colon and splenic flexure must be mobilized adequately to insure adequate length of bowel to reach the perineum. The perineal phase is performed with the patient in the lithotomy position. A preliminary posterior sphincterotomy extending to the coccyx is performed. Sutures taken in the perineal skin to the external hemorrhoid producing eversion of the rectum are very useful in maintaining exposure. A purse-string suture is then placed in the mucosa of the distal bowel just above the mucocutaneous junction. The mucocutaneous junction is incised usually with a scissors just below the purse string. The anal mucosa is then freed from the underlying sphincter by blunt and sharp dissection to above the pubo-rectalis muscle. By blunt and sharp dissection the distal rectum is freed completely. The bowel is then pulled down through the sphincter muscle to the umbilical tape. The distal bowel is then excised. The sigmoid is held by suturing the appendices epiploicae to the perineal skin. A large rubber drain is placed through a stab wound in the ischio-rectal fossa into the pelvis. A large rubber tube is inserted into the sigmoid and held in place with several sutures.

When an abdomino-perineal resection is to be done we divide the proximal bowel at the point previously selected and remove the redundant sigmoid specimen above the tumor placing the stump in the pelvis. The peritoneal floor is closed with a running atraumatic chromic catgut suture. The perineal phase should be as wide as possible to remove tissues at risk. The skin incision extends from the tip of the coccyx to the ischial tuberosities

to an arbitrary point on the perineum, usually in the region of the transverse perineus muscle or the rectovaginal septum. The entire content of the ischio-rectal fossa should be removed by incising along the ischial tuberosities until the gluteus maximus edges are exposed and the levator muscles. The incision is carried around to the tip of the coccyx and after the levator muscles are exposed and the bleeding is controlled a stab wound is made anterior to the coccyx into the pelvis through the levator muscles. The levator muscles are then drawn between fingers medially and the attachment of the levator muscles is transected from the bony pelvis. The specimen is then withdrawn and by careful blunt and sharp dissection the dissection is continued anteriorly removing it from the posterior vaginal wall or from the lower end of the prostate and the membranous urethra. The transverse perineus muscle serves as protection. The specimen is removed. The pelvis is left wide open. No attempt is made to close is, as the only tissue left to be closed is skin. While complete healing of the perineum may be prolonged the patients are not incapacitated and it does not interfere with the patient's return to useful occupation⁶).

Our experience with these procedures in the treatment of cancer of the rectum may be summarized as follows.

We have employed abdomino-perineal resection for 90% of tumors below 6 cms. We find that in the infrequent patient who has a tumor below 6 cms. on the posterior wall after mobilization an adequate stump can be obtained permitting either a pull-through or an anterior resection. In the upper rectum between 6 and 11 cms. less than a quarter had an abdominoperineal resection and over three quarters had a sphincter preserving procedure, usually anterior resection. The operative mortality is presented in Table I. The survival rates following different procedures for all resected rectal carcinoma are shown in Table II. (Overall survival is based on all five-year survivors and all having curative resection. The determinate survival is based on all five-year survivals eliminating from the total number of resections those patients who died of other causes without evidence of cancer in less than five years. NEC—No Evidence of Cancer is determined by deletion from the five-year survivals any who had recurrent cancer at any time in their follow up. Insofar as possible this represents "cure" rate.) It is apparent that there is no statistically significant difference in the five-year survival following these procedures.

The controversial area for employment of sphincter preserving procedures is the upper rectum, that is between 6 and 11 cms. Our results are shown in Table III. It is apparent that our five-year survivals in this area are essentially the same regardless of the type of resection within the indications and limitations that I have described⁹).

Local Methods for Cancer of the Rectum

Primarily because of the ill-fame of colostomies with patients and physicians, compounded by the practice of performing colostomies when they are not really essential, there has been much interest in local methods of

Table I. Operative Mortality Below 11 cms.

	Total number	Postop deaths	Operative mortality
Abdominoperineal	227	8	3.5%
Anterior resection	225	12	5.3%
Pull through	43	1	2.3%

Table II. Survival and Operation 1957-1967 Below 11 cms.

	APR	A.R.	P.T.
Number resections	227	225	43
Indeterminate	37	34	3
5-year survivors	110	125	30
Cancer after 5 years	13	11	8
5 year survival—%			
Overall	48	56	70
Determinate	58	65	75
N.E.C.	51	60	55

Table III. Survival and Operation 1957-1967
6-11 cms.

	APR	AR	PT
Total resections	72	217	33
Indeterminate	9	32	1
5-year survivors	37	120	24
Cancer after 5 years	2	10	8
5-year survival %			
Overall	51	55	72
Determinate	59	65	75
N.E.C.	55.5	59.5	50

Table IV. Survival and Location of Primary
Regional Nodes 1957-1967

	Negative		Positive	
	Below 6 cm	6-11 cm	Below 6 cm	6-11 cm
Number resections	112	193	61	129
Indeterminate	20	30	12	12
5-year survivors	67	130	17	51
Cancer after 5-years	8	12	4	8
5-year survival %				
Overall	60	67	28	40
Determinate	73	80	35	44
N.E.C.	64	72	26.5	37

treatment of rectal cancer. Deddish²⁾ reported his results from local excision of 87 patients over a period of 25 years in whom he had an 85% five-year survival. These were in highly selected patients. Similarly Papillon⁵⁾ has reported very satisfactory results in highly selected patients with low-voltage, high-dose radiation therapy performed on an ambulatory basis.

Opposed to careful selection has been the attitude of Madden and Kandalaf⁹⁾ and Crile and Turnbull¹¹⁾ who urge that the treatment of choice of most rectal cancer is by electrocoagulation or fulguration. Crile believes that the local control of rectal cancer with fulguration is as good as with resection, and that if lymph node metastases are present the survival following resection is so poor that it does not justify the operative mortality of abdomino-perineal resection applied to all patients. Table IV shows our survival for carcinoma of the rectum with and without metastases at the various levels. Thus when lymph node metastases were present in patients whose tumors were in the upper rectum the five-year survival was 37%. Translated in terms of patients, this means that of 117 determinate patients with nodal metastases, 43 were cured. These patients would not have been cured had they been treated with fulguration. However, in the lower rectum the survival was less 25%. We reviewed these patients (Table V) and found that the operative mortality for patients under 70 having abdomino-perineal resection was 1.3% whereas in those 70 and over it was 8.5%. Translated into terms of survival, in the patients under 70 years of age, of 158 who were operated on there were 2 deaths and of 60 patients who had nodal metastases 16 were cured. Thus there were 14 patients who were salvaged in this group above the operative deaths. However, in the older age group of 71 we had 6 deaths, of 27 patients with nodal metastases only 4 were cured, a net loss. Thus there is question as to whether abdomino-perineal resection should always be carried out in this older group of patients if they have a lesion amenable to local treatment based only on our ability to cure those with lymph node metastases.

As to the question of whether electrocoagulation can control the local tumor as well as resection does Crile reported salvage related to configuration of the primary tumor. With polypoid lesions, a relatively infrequent presentation and which usually do not infiltrate deeply into the wall, he reported an 88% five-year survival. Whereas in a Memorial Sloan Kettering Cancer Center series reported by Berg following resection 82% were five-year survivals (Table VI). However, in the typical ulcerated lesion which is infiltrating and in the typical carcinoma of the rectum, Crile reported 31% five-year survival, while Berg reporting Memorial Sloan Kettering Cancer Center results following resection reported 57% five-year survival rate (Table VII). It would appear that while there may be good control following local procedure with the large polypoid lesion, this does not follow local procedures for the typical ulcerated, infiltrating cancer.

We believe that there are indications for local procedures when the local lesion is amenable to local treatment, that is, the lesion should not be annular, nor infiltrate deeply into the rectovaginal septum:

Table V. Age-Mortality-Cures

	Under 70	70 and Over
Total resections	158	71
Post-op. deaths	2 (1.3%)	6 (8.5%)
With nodal metastases	60 (38%)	27 (38%)
"Cured"	16 (29%)	4 (24%)

Table VI. Polypoid

Crile (5 yr.)	Madden (ave. 50 mos)	Berg (5 yr.)
25 of 27	21 of 34	
1 - APR	1 - APR	
24 of 27	20 of 34	47 of 57
88%	59%	82%

Table VII. Ulcerative

Crile (5 yr.)	Madden (ave. 35 mo.)	Berg (5 yr.)
18 of 35	13 of 32	
7 - APR	1 - APR	
11 of 35	12 of 32*	943 of 1654*
31%	37.5%	57%

includes annular

Table VIII. Epidermoid Carcinoma '44-'63
Local Excision-Local Recurrence

	No local recurrence	With local recurrence
Number of patients	11	19
Indeterminate	3	1
DOD less than 5 years	1	5
Living over 5 years (DOD after 5 years)	7 (4)	13 (1)
Five year survival		
Overall	64%	68%
Determinate	78%	72%
No evidence disease	66%	67%

1) villous adenoma with superficial non-invasive carcinoma: 2) a bulky polypoid carcinoma with very little clinical invasion of bowel wall 3) a physiologically old patient who simply could not cope with a colostomy: 4) patient with significant distant metastases, where a colostomy which is not absolutely necessary simply adds another problem: 5) a patient who absolutely refuses an abdominal colostomy even after it has been discussed thoroughly with him.

Local procedures are contra indicated in the usual good risk patient with a typical infiltrating cancer.

ANAL CANCER

Anal cancer is usually considered to be epidermoid carcinoma. However, if one considers all cancers of the anal canal and the distal 2 cms. of the rectum, two-thirds of these will be adenocarcinoma.

Considerable confusion regarding anal cancer has resulted from the great variety of names applied to these lesions. Squamous, basosquamous, basaloid, muco-epidermoid, transitional cell, cloacogenic, and a number of others have been used but these are all variants of epidermoid carcinoma. The histologic variation has no influence on clinical treatment.

The best treatment for epidermoid carcinoma has not been firmly established. In Europe radiation therapy has been used much more than it has in the United States, where the principal method of treatment is surgical. Because of the relative infrequency of these lesions it has been impossible to carry out any controlled alternate method series. Our experience at Memorial Sloan Kettering Cancer Center has been basically with surgery. Our results reflect that approach^{7,8,10}.

There are two main problems associated with surgical treatment of epidermoid carcinoma of the anus, the first being whether local excision is ever warranted and secondly the management of the inguinal nodes which are the frequent site of metastases.

It has been our practice when a lesion is superficial and does not infiltrate the anal musculature, to employ

Table IX. Epidermoid Carcinoma '44-'63
Primary Treatment

	Local excision	Abdomino perineal
Number of patients	30	59
Indeterminate	4	3
DOD less than 5 years	6	22
Living over 5 years (DOD after 5 years)	20 (4)	34 (3)
Five year survival		
Overall	66%	58%
Determinate	78%	61%
No evidence disease	67%	55%

Table X. Epidermoid Carcinoma '44-'63
Groin Metastasis

Surgically treated	96
Groin metas. when first seen	14*
Candidates elective groin dis.	82
Groin metas. subsequently	21**
Groin dissection no value	61

*All had groin dissection. All DOD
-two lived over 5 years

**One treated by x-ray only

Table XI. Epidermoid Carcinoma '44-'63
Groin Metas-2

Possible salvage by elect. groin	20
DOD less than 5 years	5*
Living over 5 years	15**
Overall 5 year survival	75%
Determinate NED	60%
Deaths possibly attributable to failure to do elective bilat rad. groin	5
or 6% of 82	

*3 had pelvic and/or mesenteric node
metas - probably not salvageable

**3 DOD after 5 years - potentially
salvageable by initial elective groin
dissection

local excision. Our results are shown in Table VIII Of 30 patients who had local excision 11 had no local recurrence. Of those who had local recurrence 8 were treated by repeated local excision of whom 3 died of disease (2 had refused more radical surgery) 11 of them had major resection of whom 2 died of distant disease. Thus there were possibly 4 who might have died because initial local excision was performed rather than radical resection. This has to be weighed against performing abdomino-perineal with colostomy for all such patients.

When the lesion is infiltrating the musculature then abdomino-perineal resection is indicated with the result as shown in Table IX.

The question of management of the inguinal nodes relates to advisability of elective or prophylactic groin dissection. Our experience is summarized in Tables X and XI. Thus of 96 patients who were surgically treated, groin metastases were present in 14 when first seen. All of the 14 had groin dissections, but all died of disease, although 2 lived over five year. There were then 82 patients who were candidates for bilateral radical groin dissection of whom 21 subsequently developed groin metastases. Thus we would have done 61 bilateral radical groin dissections without benefit to the patient other than the associated morbidity of bilateral radical groin dissection. Of the 21 who did develop groin metastases 20 were subsequently treated by radical groin dissection on the side involved. 5 of these subsequently died of their disease and 15 were living over five years, although 3 died after five years of their disease. Thus even in the group who did have groin metastases that appeared subsequently 60% were salvaged. It continues to be our practice to perform therapeutic groin dissections, but not elective or prophylactic groin dissections.

Within the past few years for patients with advanced and recurrent epidermoid carcinoma of the anus we have been using a combination of radiation therapy, Mitomycin and Fluouracil which has proved to be more effective than any other palliative agent we have used to date⁴).

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