Local Recurrence Following Abdominoperineal Excision and Anterior Resection for Rectal Carcinoma

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Amato A, Pescatori M, Butti A. Local recurrence following abdominoperineal excision and anterior resection for rectal carcinoma. Dis Colon Rectum 1991;34:317–322.

The aim of this retrospective study is to compare the outcome of abdominoperineal excision (APE) and anterior resection (AR) for rectal cancer in terms of local tumor recurrence. A further comparison has been carried out between hand-sewn and stapled anastomosis; 147 patients have been followed for at least 2 years: 69 after APE and 78 after AR, 40 being stapled. The following variables potentially related to the risk of recurrence were evaluated: age, grading, staging, and site of the tumor. An overall 2-year local recurrence rate of 11 percent after APE and 12 percent after AR was observed, whereas it was 13 and 11 percent following stapled and hand-sewn sutures, respectively. Both differences were not statistically significant. A similar local recurrence rate was noted after APE and AR when the patients were matched for Dukes' stage and grading of the lesion. A trend toward an increased risk of recurrence following AR ($P = 0.07$) was shown when comparing the two procedures if mid and upper rectal cancers were grouped together. In the patients with anastomotic leaks after AR, no increase of local recurrence was observed. In conclusion, AR is unlikely to be followed by an increased risk of local recurrence and, therefore, when oncologically indicated, may be considered the operation of choice in the treatment of rectal cancer, although the possible risk of its overuse should be taken into account. [Key words: Abdominoperineal excision; Anterior resection; Rectal cancer; Local recurrence]

Local recurrence represents a major clinical problem following rectal excision for carcinoma. The rate varies between 5 and 31 percent according to the different series.[1,2] Different recurrence rates have been reported following low anterior resection (AR) and abdominoperineal excision (APE) by some authors,[3] whereas a similar rate has been reported by many others.[4,5] Moreover, the introduction of stapling instruments and their increasingly frequent use may lead to an incomplete cure of cancer due to a less wide surgical excision of diseased tissues. The literature is divided on this matter: an increased local recurrence rate following stapling anastomosis is reported by some authors,[6] whereas most of the others could not show any significant difference between manual and stapled sutures after low anterior resection.[7,8] Moreover, there is some evidence of a correlation between anastomotic leaks after AR and local recurrent disease,[9] possibly due to the spillage of viable neoplastic cells.

The aim of this study is to compare local recurrence rates in patients with rectal cancer treated wither by APE or AR; a further comparison has been carried out to determine whether local recurrence is more frequent after stapled than after hand-sewn anastomosis following low AR, or after anastomotic leakage.

METHODS

All patients suffering from rectal adenocarcinoma and treated by radical surgery between January 1981 and June 1985 in our institution have been included in this retrospective study. The lower edge of the lesion was located not more than 15 cm from the anal verge at sigmoidoscopy, or level with or below the sacral promontory at laparotomy. Neoplasms of the anus or anal canal were not considered in the present study. Patients who had concomitant inflammatory bowel disease, adenomatous polyposis, or a second large bowel tumor were excluded. Patients with emergency presentation were also excluded.

Clinical records were reviewed; age and sex were recorded. Operative details and pathologic findings were analyzed; all specimens were classified according to Dukes' classification, *i.e.*, A: when the tumor did not spread through the bowel wall,

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B: when the tumor penetrated through the bowel wall, and C: when regional lymph nodes were involved. Tumor grading was also considered and classified as: well, moderately, and poorly differentiated. The distance of the lower margin of the neoplasm from the anal verge was also considered. A rectal tumor was classified as lower if its inferior margin at sigmoidoscopy was no more than 5 cm from the dentate line, middle up to 10 cm, upper up to 15 cm.

All patients underwent both mechanical preparation and short-term antibiotic prophylaxis (nebicine and metronidazole in 84 percent of cases) before surgery. Preoperative radiotherapy was not performed on any patient. The operations were performed by senior staff surgeons; selection of the type of intervention was not based upon the preoperative biopsy grading. Resectability was assessed after laparotomy by inspection and careful palpation of the tumor and adjacent organs. If the tumor strongly adhered to the sacrum, urinary bladder, ureters, uterus, or iliac vessels, this was considered criteria for unresectability, particularly in patients with poor general conditions. Sixty-nine patients had APE, whereas 78 had AR, the colorectal anastomosis being manual in 38, and stapled in 40 of them. The rectum was irrigated, in most patients with povidone iodine before anastomosis. The EEA gun was used throughout. A minimum distal margin of clearance of 5 cm was always the aim, but a distance of 2 cm was considered acceptable. At histology the lower edge of the sections was free of tumor in all cases. An inferior mesenteric lymphadenectomy was carried out in all patients and as wide a lateral clearance as possible was also performed. Postoperative water-soluble contrast enemas were performed when the suspicion of anastomotic leak was aroused. Both clinical and radiologic leaks were considered.

One hundred thirty-five patients (92 percent) have been followed for at least 2 years by means of clinical, laboratory, endoscopic, and radiologic investigations. Most patients underwent determination of blood CEA levels, clinical examination, and sigmoidoscopy every 3 months, liver ultrasound every 6 months, and chest x-ray and colonoscopy every year. Further investigations, *i.e.*, intrarectal ultrasound and CT scan, were carried out when suspicion of recurrence was aroused. Recurrence was considered local when it occurred within the pelvis.

Statistical Analysis

Local recurrence-free survival data, calculated by the life table method, did not consider operative mortality; statistical differences in survival rates (expressed as mean ± SEM) were determined by the Z-test.[10] Cumulative recurrence rate was calculated up to 2 years postoperatively and was compared by the chi-square test, with continuity correction where appropriate. Patients lost to follow-up and those dead of unrelated causes or of distant metastases were included but censored in the life table analysis. Fisher's exact test was used to compare proportions.

RESULTS

Patient Distribution According to Treatment

Age and sex. No significant difference was found between APE and AR groups as far as age and sex were concerned. Age was 58.8 ± 11.6 years (mean ± SDM) in the APE group, 62.3 ± 12.1 years in the AR group. Male : female ratio was 1.2 for APE, 1.1 for AR patients.

Grading and Staging. There was no significant difference in patient distribution in the two groups, as shown in Table 1.

Tumor Site. As shown in Table 2, about two-thirds of the patients who underwent APE had tumors located in the lower rectum (64 percent). Most of the neoplasms treated by AR were located in the upper rectum (73 percent).

Operative Mortality and Morbidity. Operative mortality, *i.e.*, mortality during the first 30 days after surgery, was 4 percent (3 patients) following APE, and 1.5 percent (1 patient) following AR. The

Table 1.
Staging and Grading of Tumors According to Type of Operation Performed

	APE		AR	
	n	(%)	n	(%)
Stage				
A	10	(14)	12	(15)
B	33	(48)	38	(49)
C	26	(38)	28	(36)
Grade				
Well	16	(23)	13	(17)
Moderately	41	(59)	56	(72)
Poorly differentiated	12	(18)	9	(11)

APE: abdominoperineal excision; AR: anterior resection.

Table 2.
Site of Tumor According to Type of Operation Performed

Site	APE		AR	
	n	(%)	n	(%)
Lower rectum	44	(64)	2	(3)
Middle rectum	20	(29)	19	(24)
Upper rectum	5	(7)	57	(73)

APE: abdominoperineal excision; AR: anterior resection.

overall postoperative complication rate was 9 percent, mainly related to wound infection, anastomotic leakage, urinary, and pulmonary infections. A total of 13 (17 percent) clinical and radiologic leaks were detected, 5 (13 percent) after hand-sewn AR, 8 (20 percent) after stapled AR, the difference not being statistically significant (Fisher's $P = 0.30$, Table 3).

Local Recurrence-Free Survival (LRFS). The actuarial LRFS for the APE patients was 97 ± 2 percent at 1 year, 88 ± 4 percent at 2 years; for the AR patients it was 93 ± 3 percent at 1 year, 87 ± 4 percent at 2 years (Fig. 1). No statistically significant difference was found between the two groups at 2 years (Z test = 0.12, n.s.). Within the AR group, the patients with manual anastomoses had a LRFS of 97 ± 4 percent at 1 year and 88 ± 5 percent at 2 years (Fig. 2). The patients with stapled anastomoses had a LRFS of 92 ± 4 percent at 1 year and 87 ± 6 percent at 2 years, the difference being not statistically significant at 2 years (Z test = 0.28, n.s.).

Local Recurrence. Seven (11 percent) of APE patients developed a local recurrence within 2 years, compared with nine (12 percent) of AR patients. The difference was not statistically significant (chi-square = 0.04, $df = 1$, $P > 0.05$). Four (11 percent) of manual AR and five (13 percent) of stapled AR developed a local recurrence, again the difference not being significant (chi-square = 0.09, $df = 1$, $P > 0.05$).

Recurrence Related to One Pathologic Variable. Tumor staging, grading, and site did not determine any significant difference in local recurrence rate between APE and AR. The same finding was recorded comparing normal with stapled AR. The results are shown in Tables 4 and 5.

The site of the tumor within the rectum was different between patients undergoing APE and AR. As very low rectal tumors are well known to have a greater risk of local recurrence than higher tumors, and as simple analysis introduced a bias in favor of AR, a further analysis was performed for patients with middle and upper rectal tumors only. There were no local recurrences in the 24 patients treated by APE whereas 9 of the 75 (12 percent) were treated by anterior resection ($P = 0.073$, Fisher's exact test).

One of the nine patients (11 percent) who developed a local recurrence after AR had had an anastomotic leak, compared with a total of eight anastomotic leaks in the remaining group of 69 patients (11.6 percent) with no local recurrence (Fisher's $P = 0.7$).

DISCUSSION

The increasing popularity of sphincter-saving operations for the treatment of rectal cancer has changed the ratio between anterior resection and abdominoperineal excision from 1:3 to 1:1.5,[11] causing much anxiety among surgeons dealing with such patients. This concern is due to the potential risk of reducing the perirectal clearance during a restorative procedure, thus leading to an increased risk of local recurrence. Furthermore, a 2-year recurrence rate of 31 and 60 percent was observed after anterior resection for low rectal

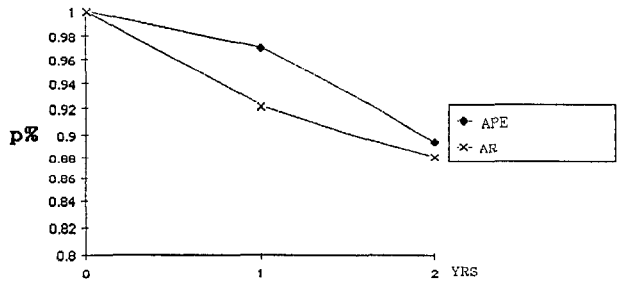

Figure 1. Local recurrence-free survival for APE and AR patients. APE: abdominoperineal excision; AR: anterior resection.

Table 3.
Anterior Resections and Their Outcome

Hand-sewn Anastomoses (n = 38)			Stapled Anastomoses (n = 40)		
Leaks	Recurrence	No Recurrence	Leaks	Recurrence	No Recurrence
5	4	34	8	5	35

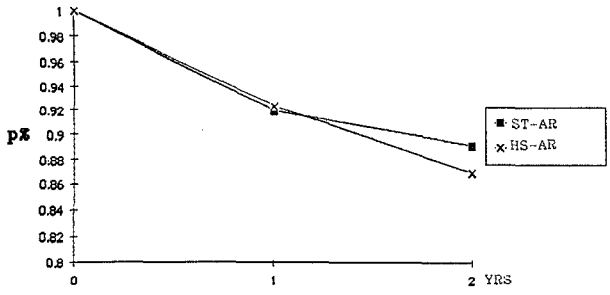

Figure 2. Local recurrence-free survival for manual AR and stapled AR patients. ST-AR: anterior resection, stapled anastomosis; HS-AR: anterior resection, hand-sewn anastomosis.

cancer with manual and stapled anastomosis, respectively.[12] On the other hand, other authors deny an increased recurrence risk after restorative procedures, reporting similar rates following AR and APE.[8] Our results seen partly to confirm the latter findings.

An adequate answer to this clinical controversy would need a prospective study, which is not the case of the present report. It should be noted, however, that in our series the two groups of patients who underwent AR or APE showed no difference, even if retrospectively examined, as far as

Table 4.
Local Recurrence in Relation to One Pathologic Variable

	APE		AR		Chi-square*	*P*
	n	(%)	n	(%)		
Stage						
A	0/10	0	0/12	0	—	—
B	4/31	13	6/38	16	0.04	ns
C	3/25	12	3/27	11	0.14	ns
Grade						
Well	0/16	0	1/13	8	0.012	ns
Moderately	4/38	10.5	7/55	13	0.0001	ns
Poorly differentiated	3/12	25	1/9	11	0.057	ns
Site						
Low	7/42	17	0/2	0	0.12	ns
Mid	0/19	0	2/19	10.5	0.52	ns
Upper	0/5	0	7/56	12.5	0.011	ns
Mid + upper rectum	0/24	0	9/75	12	2.27	ns

APE: abdominoperineal excision; AR: anterior resection.
* *df* = 1, Yates' correction; ns: not significant.

Table 5.
Local Recurrence in Relation to One Pathologic Variable

	Manual AR		Stapled AR		Chi-square*	*P*
	n	(%)	n	(%)		
Stage						
A	0/6	0	0/6	0	—	—
B	3/19	16	3/19	16	—	—
C	1/12	8	2/15	13	0.04	ns
Grade						
Well	0/6	0	1/7	14	0.006	ns
Moderately	3/28	14	4/27	15	0.003	ns
Poorly differentiated	1/4	25	0/5	0	0.014	ns
Site						
Low	0/0	0	0/2	0	—	—
Mid	2/7	28.5	0/12	0	1.39	ns
Upper rectum	2/31	6.5	5/56	20	1.24	ns

AR: anterior resection; ns: not significant.
* *df* = 1, Yates' correction.

age, sex, staging, and grading of the tumor were concerned. A further anatomic feature did show a difference in the two groups, *i.e.*, the site of the neoplasm. The height of the tumor in the rectum, in fact, plays a major role in the selection of the surgical procedure, whether AR or APE, and in our series most of the patients with low rectal cancer underwent APE.

No difference both in overall LFRS and in local recurrence rate was noted between APE and AR in the present study, thus confirming the data reported by moth authors.[2,13-15] The same finding was also observed when the patients were matched for stage, grade, and tumor height. When examining the patients who underwent either manual or stapled AR, matched for the above-mentioned variables, again no difference in LRFS and local recurrence rate was noted, thus suggesting that the anastomosis *per se* may not increase the risk of developing secondary disease, which is in agreement with most other authors[7,8,16,17] (although contrary to a few[6,12,18,19]). However, as emphasized by Rosen *et al.*[12] most of these contrary studies were retrospective, and a sort of patient selection bias could have accounted for the difference. The lack of correlation between anastomotic leak and recurrence in our series does not seem conclusive, as not all the dehiscences might have been detected due to the nonroutine use of Gastrografin enemas.

Our overall results do not seem fully to support the view that AR may be a less effective operation for cancer when compared with APE, even when stapled anastomoses are considered. This development could be explained by several factors influencing rectal cancer pelvic recurrence. Among them: the adherence to a 2-cm distal margin clearance rule[20]; procedures that involve a wider pelvic lymphadenectomy[5]; particularly, a wide mesorectal clearance needed to remove microscopic foci of cancer around the rectum[21]; removal of the mesorectum at the level of the tumor, actually, even if adequate in extent, is reported not to decrease the risk of local recurrence, as cancer deposits were found within the mesorectum distal to the clinically detectable growth, thus explaining the wide variations in the reported incidence of local recurrence after AR.[22] These considerations are more important in the case of the deep, narrow, male pelvis. Irrigation of the residual rectal stump with cancericidal agents has been emphasized again recently and, although not extensively performed in this series, might be expected to reduce further the incidence of local recurrence due to viable exfoliated cancer cells. Moreover, the use of adjuvant radiotherapy may be of some help in reducing pelvic recurrent disease.

The evidence presented suggests that, given comparable mortality, morbidity, and local recurrence rates, sphincter preservation should be performed when technically feasible in cases of rectal cancer. However, the trend toward an increased risk of local recurrence following AR when mid and upper rectal cancers are considered together suggests a warning against the abuse of restorative procedures. This trend would need larger series to be confirmed. Anyway, the importance of complete removal of the mesorectum should be emphasized again, including adequate clearance distal to the tumor.

Better preoperative selection of patients at increased risk of local recurrence and thus unsuitable for a sphincter-saving operation seems necessary. Long-term follow-up from large series and other diagnostic procedures (intrarectal ultrasound, nuclear cytofluorimetry, radioimmunoscintigraphy) may help in this selection.

ACKNOWLEDGMENTS

The authors are indebted to Mr. Robin K. Phillips and to Dr. Victor W. Fazio for kindly reviewing the manuscript.

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