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ORIGINAL CONTRIBUTIONS

Rectal Mucosectomy in the Treatment of Giant Rectal Villous Tumors

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PURPOSE: Rectal mucosectomy, a technique adapted from restorative proctocolectomy, has been used to treat large rectal villous tumors. We compared morbidity, tumor control, and functional outcome following rectal mucosectomy with the results of more conventional transanal excision and piecemeal snaring and fulguration in patients with large rectal villous tumors. **METHODS:** We retrospectively reviewed the charts of inpatients who had undergone transanal surgery for villous tumors. **RESULTS:** Between 1983 and 1993, rectal mucosectomy, transanal excision, and snaring and fulguration were performed, respectively, in 12, 26, and 23 patients with large rectal villous tumors. Tumors treated by rectal mucosectomy had a larger mean diameter (8.5 cm) than those treated by transanal excision or snaring and fulguration (4.5 cm and 4.2 cm, respectively; $P < 0.0001$, analysis of variance). After a mean follow-up of 47 months, incidence of tumor persistence was 17 percent following rectal mucosectomy, 20 percent following transanal excision, and 40 percent following snaring and fulguration ($P = 0.04$, chi-squared). Tumor recurrence was 8 percent after rectal mucosectomy compared with 36 and 44 percent, respectively, after transanal excision ($P = 0.09$, chi-squared) and snaring and fulguration ($P = 0.04$, chi-squared). Clinically significant postoperative bleeding did not occur after rectal mucosectomy; 17 percent of patients had persistent mild incontinence. **CONCLUSIONS:** Rectal mucosectomy for villous tumors, a new application of an established technique, is safe and associated with low rates of tumor persistence and recurrence. Rectal mucosectomy may result in mild incontinence and should be reserved for large or circumferential lesions. For smaller lesions, transanal excision results are more reliable tumor eradication than snaring and fulguration. [Key words: Mucosectomy; Villous adenoma; Rectum; Transanal excision]

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Rectal villous tumors may be large or even circumferential, arising at the dentate line and extending into the mid or upper rectum. Even though some tumors present incidentally, larger lesions often cause severe symptoms including diarrhea, which can lead to fluid and electrolyte depletion. Approximately 20 percent of sessile villous adenomas contain foci of invasive cancer,¹ and random biopsies are unreliable in detecting malignancy. For these reasons, surgical management of large rectal villous tumors may be particularly difficult, thus explaining the variety of surgical approaches that have been described in the management of these lesions.¹⁻⁵

Smaller villous lesions can be removed by a combination of snaring and fulguration (SF) or transanal excision (TE) described by Parks and Stuart.¹ The posterior transsacral approach of Kraske has been recommended,² particularly for anterior lesions, although this technique appears to be associated with a significant incidence of fecal fistula. The transsphincteric approach, initially reported by Bevan,³ popularized by Mason,⁴ and summarized by Criado and Wilson,⁵ provides good access to the rectum; however, most surgeons are reluctant to divide the anal sphincter. In most patient series, a subgroup of patients have undergone low anterior resection, or even abdominoperineal resection, for benign villous tumors. More

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recently, transanal endoscopic microsurgery,⁶ a form of minimal access surgery, has been used to treat a variety of rectal lesions including villous tumors, and an endoscopic technique using a urologic resectoscope also has been reported.⁷

Rectal mucosectomy (RM), a technique adapted from restorative proctocolectomy for ulcerative colitis or familial polyposis, is based on the principle established by Parks and Stuart¹ that the submucosal plane is readily distensible and the mucosa of the mid or upper rectum may be mobilized and sutured to the dentate line without tension. It is an approach somewhat analogous to Delorme's procedure for rectal prolapse.⁸

Thomson⁹ suggested that there may be a "particular instability of the mucosa," or a field change, in the rectum of patients with extensive villous tumors, which may explain high recurrence rates after local tumor excision. RM results in complete removal of the distal rectal mucosa, and, therefore, lower rates of tumor persistence and recurrence may be expected. To the best of our knowledge, this is the first report to detail the results of RM in a series of patients with rectal villous tumors and to compare this operation with the more conventional TE or SF.

MATERIALS AND METHODS

Rectal Mucosectomy Surgical Technique

Patients underwent full mechanical bowel preparation and were given oral and intravenous antibiotics. Surgery was performed in either the lithotomy or the prone jackknife position. A Lone StarTM retractor (Lone Star Medical Products, Inc., Houston, Texas) was used, which provides exposure by effacement of the anal canal with minimal anal dilatation.¹⁰ A solution of 1:200,000 epinephrine in saline was injected into the submucosa in all quadrants for hemostasis and to facilitate the dissection (Fig. 1). This was begun at or just above the dentate line, and, once a plane was established, Allis forceps were used to grasp the circumferential cut edge of the mucosa (Fig. 2). By use of electrocautery or scissors, the rectal mucosa was separated from the underlying muscle to a point at least 1 cm above the upper extent of the tumor (Fig. 3). The rectal mucosal tube then was bivalved, away from the tumor if possible, to allow sutures to be secured between the proximal mucosa and the dentate line to prevent retraction of the proximal mucosa (Fig. 4). The proximal mucosa was progressively divided as a circumferential anastomosis of interrupted absorbable sutures was made (Fig. 5). At the end of

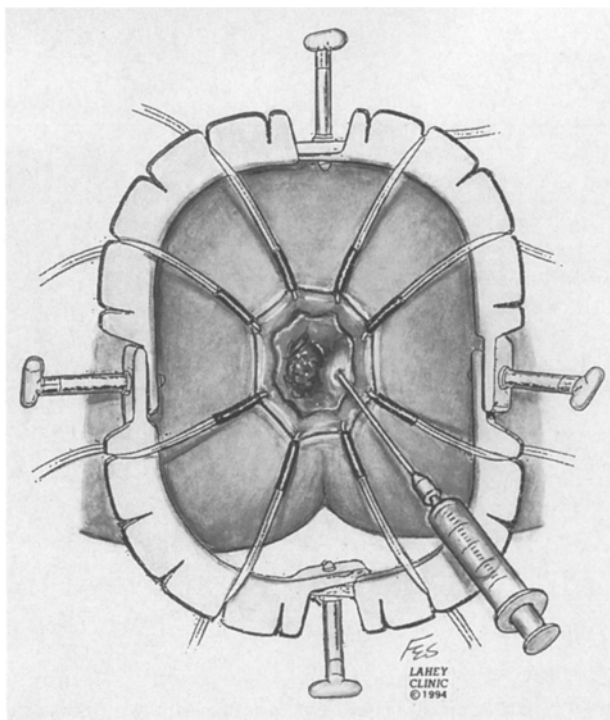


Figure 1. The Lone Star self-retaining retractor provides exposure of the anal canal and lower rectum by effacement with minimal anal dilatation. A solution of 1:200,000 epinephrine in saline is injected into the submucosal plane to aid in hemostasis and facilitate dissection. (Reprinted with permission of Lahey Clinic.)

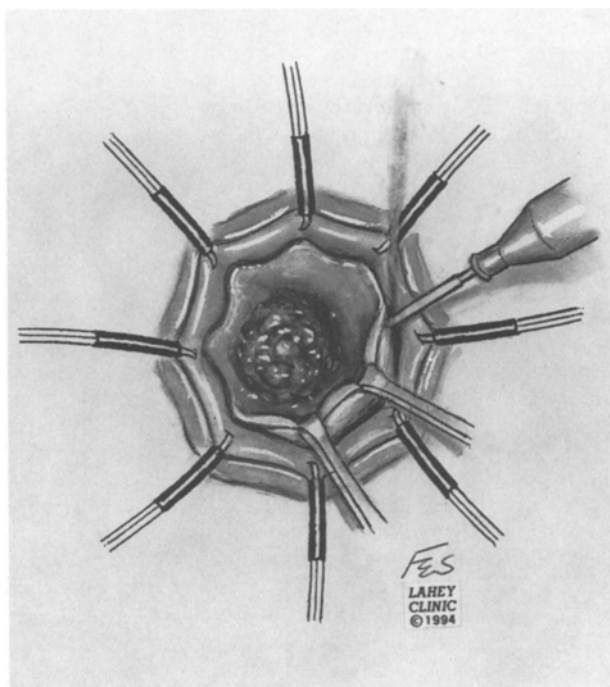


Figure 2. An incision is made at or just above the dentate line. (Reprinted with permission of Lahey Clinic.)

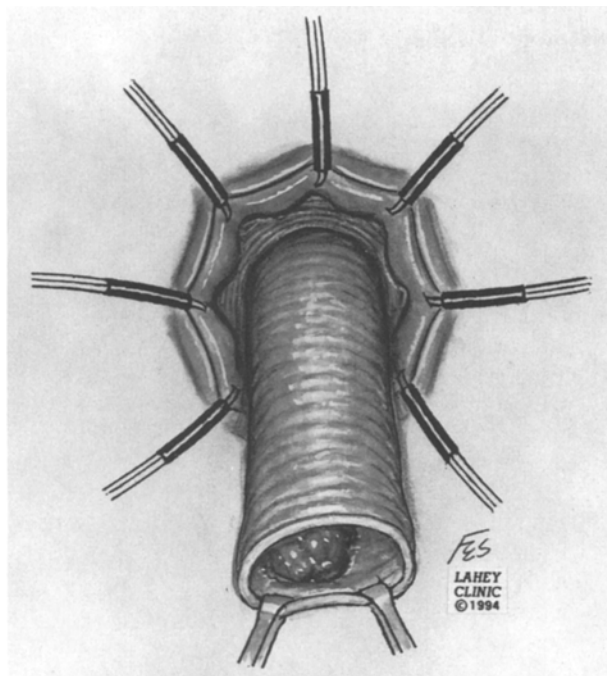


Figure 3. A sleeve or tube of rectal mucosa is dissected to a point at least 1 cm above the upper extent of the tumor. (Reprinted with permission of Lahey Clinic.)

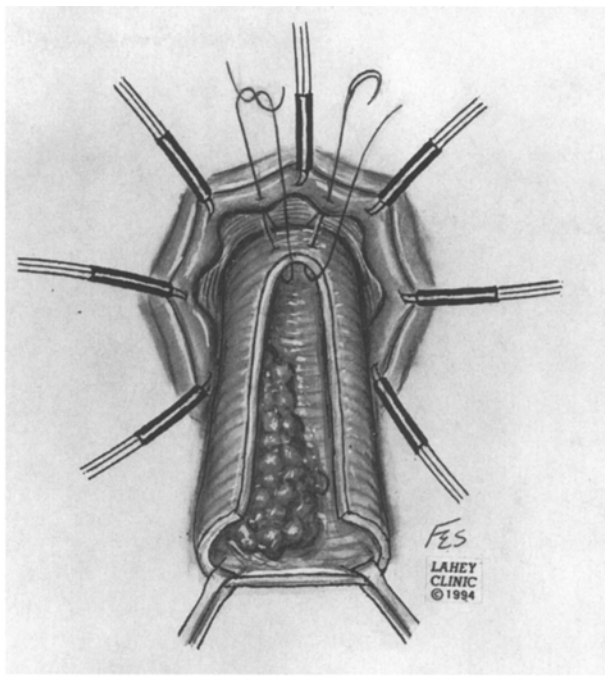


Figure 4. The rectal mucosal tube is bivalved, and sutures are placed between the proximal rectal mucosa and the dentate line to prevent retraction of the proximal mucosa. (Reprinted with permission of Lahey Clinic.)

the operation, a Penrose drain usually was placed in the rectum and secured to the perianal skin (Fig. 6).

Patients

This study is based on a retrospective chart review of all in patients who underwent transanal surgery for rectal villous tumors at the Lahey Clinic between 1983 and 1993. Tumors included villous adenomas and sessile tubulovillous adenomas, which were believed to be benign. Patients who underwent colonoscopic excisions and those with known or frank carcinomas were excluded. Patients were treated by one or a combination of three techniques: RM, TE, or SF.

Based on the report of Sakamoto and colleagues,¹¹ tumor persistence was defined as tumor presence at the same location within six months of the original surgery. Tumor recurrence was defined as tumor presence in the same location more than six months postoperatively, after an apparently disease-free interval.

Statistical Analysis

Tumor characteristics, including size and level within the rectum, were compared using analysis of variance. Presenting symptoms and surgical results, including complications, tumor persistence, and recurrence, were compared using chi-squared analysis.

RESULTS

A total of 58 patients (30 females, 28 males) underwent 61 transanal surgical procedures for rectal villous tumors. Mean age was 66 (range, 23–86) years. Overall mean follow-up was 47 (range, 2–144) months. There was no difference in mean age or mean length of follow-up among patients who underwent RM, TE, or SF.

RM was performed in 12 patients, TE in 26, and SF in 23. Sixteen patients had undergone prior surgery at other institutions before being referred to the Lahey Clinic for persistent or recurrent disease. Three patients initially treated with SF at the Lahey Clinic were subsequently treated by RM (2) and TE (1). Complications and tumor persistence and recurrence were analyzed following both initial and subsequent operations in these three patients.

Presenting symptoms and tumor characteristics are summarized in Table 1. Some patients who presented with diarrhea also had tenesmus, passage of mucus, incontinence, or hypokalemia. Diarrhea was significantly more common in patients who were ultimately treated by RM ($P = 0.003$). Tumors in patients undergoing RM were significantly larger in diameter ($P < 0.0001$) and area ($P = 0.003$), more likely to occupy greater than one-half of the rectal circumference, or to

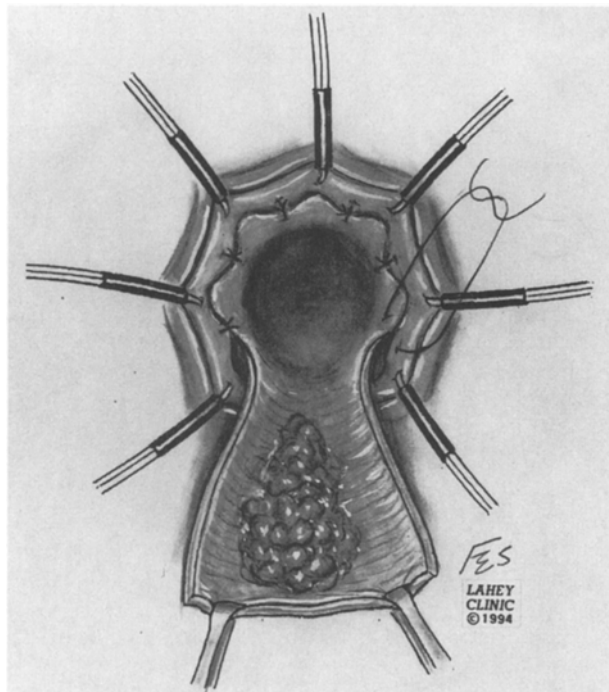


Figure 5. Rectal mucosa above the tumor is progressively divided, and an anastomosis is made with interrupted absorbable sutures. (Reprinted with permission of Lahey Clinic.)

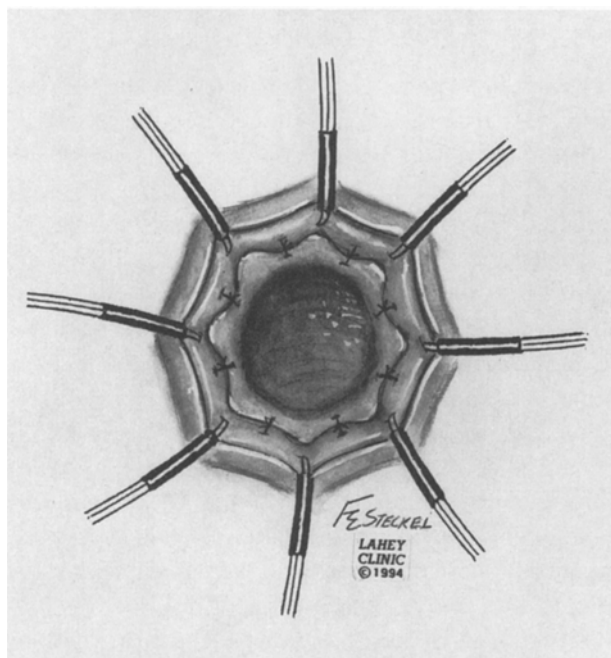


Figure 6. The completed anastomosis. (Reprinted with permission of Lahey Clinic.)

be circumferential, and they arose closer to the anal verge.

Operative complications and rates of tumor persistence and recurrence are shown in Table 2. Postop-

Table 1.
Tumor Presentation and Characteristics

	No. of Patients (%)		
	RM (n = 12)	TE (n = 26)	SF (n = 23)
Tumor presentation			
Bleeding	3 (25)	9 (35)	11 (48)
Diarrhea	6 (50)	6 (23)	1 (4)
Incidental finding	3 (25)	11 (42)	11 (48)
Tumor characteristics			
Diameter (cm)	8.5*	4.5	4.2
Area (cm ²)	32.4†	17.5	13.9
Occupying > 50% of rectal wall (%)	100	23	9
Occupying 100% of rectal wall (%)	33	4	0
Mean lowest to mean highest vertical extent (cm from anal verge)	4-7	5-9	6-9

RM = rectal mucosectomy; TE = transanal excision; SF = snaring and fulguration.

* $P < 0.0001$.

† $P = 0.003$.

Table 2.
Complications of Surgery and Tumor Eradication

	No. of Patients (%)		
	RM (n = 12)	TE (n = 26)	SF (n = 23)
Bleeding	0	3 (12)	2 (9)
Incontinence			
Immediate	5 (42)*	2 (8)	2 (9)
Persistent	2 (17)	1 (4)	1 (4)
Rectal stricture	0	1 (4)	0
Tumor persistence	2 (17)	5 (20)†	10 (44)§
Tumor recurrence	1 (8)‡	9 (36)†	10 (44)

RM = rectal mucosectomy; TE = transanal excision; SF = snaring and fulguration.

* $P = 0.02$ RM vs. TE or SF.

† Percent calculated on the basis of 25 patients.

Follow-up data unavailable for one patient.

§ $P = 0.04$ SF vs. RM or TE.

‡ $P = 0.04$ RM vs. SF; $P = 0.09$ RM vs. TE.

erative hemorrhage requiring readmission or further surgery did not occur following RM, although the size of the series is too small to determine whether this is a significant difference. Some degree of impaired fecal continence was present immediately postoperatively in five patients (42 percent) following RM. With further follow-up, two patients (17 percent) had persistent changes, consisting of imperfect control of gas

and urgency in a 55-year-old woman, and incontinence to liquid stool, well controlled by antidiarrheal agents, in a 66-year-old woman.

No deaths occurred following transanal surgery for rectal villous tumors, although an obstructing rectal stricture developed in one patient following TE, which required a colostomy and subsequent rectal excision. This patient died of myocardial infarction after colostomy closure.

Rates of tumor persistence were significantly lower for RM ($P = 0.04$) and TE ($P = 0.04$) compared with SF. Tumor recurrence was less common after RM than after either TE ($P = 0.09$) or SF ($P = 0.04$).

Severe dysplasia was reported in 18 operative specimens and invasive cancer in another six specimens following transanal surgery. The distribution of dysplasia and cancer was similar in the three operative groups. Cancers were treated by conversion to abdominoperineal resection in two patients, by TE alone in two patients, by RM in one patient, and by SF in one patient. These patients with cancer are alive and without evidence of recurrent disease a mean of 54 (range, 12–120) months postoperatively.

In one patient, rectal cancer developed during follow-up, a colloid cancer occurring four and one-half years after TE of a 4-cm tubulovillous adenoma without dysplasia. This patient was treated by abdominoperineal resection but died 21 months later of recurrent disease.

Operative difficulty during RM was assessed from the operation note. In five patients, the submucosal plane was difficult to develop, and the excision included a part of the rectal muscular wall. In four of these patients, there had been previous attempts at either TE or SF, with resultant fibrosis and scarring. In one patient, an underlying carcinoma was present at the area of difficulty. In another patient, difficulty was encountered in extending the dissection beyond the midrectum for a tumor extending above 8 cm from the anal verge. In six patients, dissection was straightforward, including two who had undergone SF previously.

DISCUSSION

Parks¹² first described TE for rectal villous tumors. His work and that of Nivatvongs and colleagues^{13–15} popularized this operation. More recently, Sakamoto and colleagues¹¹ from the Ferguson Clinic reported results of successful TE in 117 patients.

Parks and Stuart¹ reported that, in 30 patients with large rectal villous tumors, nine had lesions thought to be too extensive for simple TE. In six of these, a

technique similar to RM was used, with the lower rectal mucosa removed in strips. The proximal rectal mucosa then was sutured to the dentate line, with imbrication of the rectal muscle. Another three patients were treated by a combined abdominal and transanal approach, with pull-through anastomosis of full-thickness rectal wall to the anal canal. In the original description by Parks and colleagues¹⁶ of RM as part of the surgical treatment of ulcerative colitis and polyposis, the rectal mucosa also was removed in strips. Groff and associates¹⁷ described removing the distal rectal mucosa as a complete cylinder to treat a circumferential villous tumor in one patient. This is the technique used in the present study.

Parks and Stuart¹ did not provide data about operative complications in their series. Our patients had no bleeding, stenosis, or rectal perforation following RM. In contrast, bleeding that required readmission or reoperation was seen in three patients (12 percent) who underwent TE, despite primary closure of the rectal wound in each case, and in two patients (9 percent) who underwent SF. Postoperative bleeding also was seen in 8.5 percent of patients in the Ferguson Clinic series.¹¹

Changes in fecal continence were common immediately following RM. This is predictable considering patient age and known incidence of leakage and seepage after RM as part of ileal pouch surgery for ulcerative colitis or familial polyposis. Permanent alterations in continence were seen in only two patients, and these were of mild severity. It also should be noted that in one elderly man, who presented with watery diarrhea and incontinence, normal continence was restored following RM.

Following transanal surgery for rectal villous tumors, tumor persistence and recurrence are relatively common problems that may result from an inadequate initial operation. However, it is also likely that the entire rectal mucosa is unstable in patients with large villous tumors. For this reason, RM is attractive because it removes a substantial amount of potentially malignant mucosa. In the present study, RM resulted in significantly lower persistence and recurrence rates when compared with SF ($P = 0.04$) and lower rates of recurrence when compared with TE (8 percent *vs.* 36 percent; $P = 0.09$). Parks and Stuart¹ reported one recurrence following mucosectomy, imbrication in six patients, and no recurrences following pull-through procedures in three patients. Our results compare well with the large Ferguson Clinic series,¹¹ in which tumor persistence and recurrence rates were 27 and

30 percent, respectively, at a mean of 55 months following TE.

Dysplastic changes, including carcinoma *in situ*, often are described in association with villous adenomas; however, true malignancy is defined by invasion of the muscularis mucosa. With use of this criterion, cancer was present in 10 percent of our patients, less than the 20 percent incidence estimated by Parks and Stuart¹ in their review of earlier literature. In a Cleveland Clinic report of villous and tubulovillous adenomas of the rectum and colon,¹⁸ the overall incidence of invasive cancer was approximately 10 percent. However, for lesions larger than 4 cm in diameter the incidence rose to 32 percent. Lower cancer incidence in our series, in which the overall mean tumor diameter was 5.1 cm, may be partly explained by exclusion of patients with known or frank carcinoma. It also may be significant that 40 percent of tumors in our series were found incidentally, often in the course of screening for colorectal cancer.

RM can be technically demanding, and the best predictor of operative difficulty in our experience is previous attempts at surgical removal, with resultant fibrous obliteration of the submucosal plane. In one patient, height of the lesion within the rectum presented difficulty; however, in other patients we were surprised at the ease of submucosal dissection in the mid and upper rectum. The Lahey Clinic approach to restorative proctocolectomy, which has been used in almost 600 cases to date, has incorporated mucosal proctectomy in the vast majority. An advantage of this approach is familiarity with endoanal dissection and anastomosis, facilitating performance of rectal mucosectomy for rectal villous lesions and also of coloanal anastomosis for a variety of lesions, including some patients with rectal cancer.

CONCLUSIONS

We found RM to be a feasible and safe operation for large rectal villous tumors. It is associated with low rates of tumor persistence, and, in particular, tumor recurrence, when compared with TE or SF. RM may result in some degree of immediate or persistent alteration in fecal continence, and for this reason it should be reserved for treatment of larger lesions. For smaller tumors, TE results in a lower rate of tumor persistence than SF.

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