

Fertility Considerations in Laparoscopic Treatment of Infiltrative Bowel Endometriosis

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ABSTRACT

Objective: The purpose of this study was to examine our experience with laparoscopic and laparoscopically assisted management of bowel endometriosis and to recommend treatment approaches, considering patient goals for both pain mitigation or fertility, or both.

Methods: The medical records of 187 women treated laparoscopically for intestinal endometriosis were reviewed retrospectively for presenting symptoms, methods of surgical treatment, complications, and efficacy of treating pain and infertility. The extent of resection was determined by the severity of the endometriotic lesion, tempered by the patient's fertility goals.

Results: The most common patient complaint preceding surgery was pelvic pain. In addition, 58 (31%) patients experienced impaired fertility. Of the patients available for long-term follow-up, 152 (85%) reported complete or significant long-term pain relief. Complete pain relief in the immediate postoperative period was significantly more likely with partial bowel resection compared with shaving only, 92% vs 80%, respectively, $P < 0.04$. The least invasive procedure, shaving, was associated with a significantly lower complication rate, 6%, compared with 23% for disc excision ($P < 0.007$) and 38% for segmental resection ($P < 0.001$), and higher

pregnancy rates. The incidence of pregnancy in patients with a history of infertility was 34% during the follow-up period.

Key Words: Laparoscopy, Bowel endometriosis, Endometriosis, Infertility.

INTRODUCTION

Historically, great variation has existed in the treatment of intestinal endometriosis.¹⁻³ Traditional definitive treatment has consisted of suppression or removal of ovarian function, either medically or surgically, and ablation of major pelvic endometriotic lesions without resection of deep lesions in the colon or rectum for fear of complications.^{4,5} However, in light of more recent experience with treatment of endometriosis, many surgeons currently support an approach that involves resecting all visible and detectable endometriosis, and preserving fertility whenever feasible and desired by the patient.⁶⁻²¹ Although for many surgeons laparotomy remains the procedure of choice when bowel is involved,^{6,7} advanced laparoscopy centers, such as those of the authors, are achieving comparable relief of symptoms with minimally invasive techniques.⁸⁻²¹

Potential morbidity of the resection and anastomosis are the major arguments against colorectal resection for endometriosis.² A second concern is that even with minimally invasive laparoscopic techniques, the increased incidence of adhesions with bowel resection may also negatively impact fertility. This is undesirable, because most patients with endometriosis are young and wish to preserve, or achieve fertility.¹² Because of these concerns, it is crucial that any surgical approach for benign disease have a low associated morbidity, and that the surgical approach chosen be in alignment with the patient's goals for fertility or pain relief.

The authors feel that although complete resection of all endometriotic bowel lesions may prevent local recurrence and the need for subsequent surgery, in patients for whom achieving or restoring fertility is initially more important than pain relief, a near-term, more conservative

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laparoscopic shaving of the lesion may be performed with the understanding that re-operation may be needed later for a more extensive resection.

The purpose of this study was to review of the authors' experience with a more conservative approach to treatment of bowel endometriosis. The size of the series may assist other surgeons with a framework for deciding on the risk-benefit of laparoscopic and laparoscopically assisted surgical techniques aimed at achieving minimal morbidity with optimal treatment of the endometriotic bowel lesion.

METHODS

The patient population included the 187 patients who were diagnosed with, and surgically treated for, refractory endometriosis of the small or large bowel between March 1990 and March 1997. Refractory bowel endometriosis was defined, as suggested by Baily et al,² to be a disease that has histologically or clinically, or both histologically and clinically, invaded the muscularis of the intestine and is unresponsive to hormonal or previous surgical therapy, or both. Patients who met these inclusion criteria are a subgroup (6%) of the 3201 women who underwent laparoscopic surgery to treat endometriosis at our Centers in Atlanta, Georgia, and the San Francisco Bay Area, California, during the reviewed years. This practice consisted of 3 experienced laparoscopic gynecological surgeons, with extensive experience in treating endometriosis in collaboration with physicians in other disciplines, such as colorectal surgeons and urologists when necessary. All patients in this series were referred for evaluation. This therefore represents a referral practice, heavily weighted toward patients with complicated endometriosis and would not necessarily be representative of most single institutions' experience.

The median postoperative follow-up was 24 months, with a range of 2 to 81 and a mean±SD of 28.2±19.6. Follow-up was obtained by office visit, contact with the referring physician, patient questionnaires, and telephone calls. Only 9 patients (5%) were followed for less than 2 months. These patients were excluded from outcome comparisons of groups.

The median age was 35 years (range, 21 to 56). The median gravity was 0 (range, 0 to 6) with a median parity of 0 (range, 0 to 5). The majority (92%) had undergone prior abdominal or gynecological surgery.

Previous medical history revealed surgically confirmed endometriosis in 165 (88%) patients, with a range of 0.5

years to 19 years and a median of 3 years since diagnosis. The patients had been previously treated with GnRH analogues in 80 (43%) cases, oral contraceptive pills in 64 (34%), danazol in 49 (26%), oral progesterone in 9 (5%), estrogen replacement therapy in 8 (4%), and injectable progesterone (Depo-Provera, UpJohn) in 6 (3%) women.

The chief presenting symptoms of the women are summarized in **Table 1**. All patients underwent the authors' standard outpatient mechanical and antibiotic bowel preparation, in-patient management, a multipuncture laparoscopic surgery, and follow-up as described in Nezhat et al.¹² Approval from the Institutional Review Board (IRB) was not obtained, because this study examines results of a routine treatment protocol. Patients received a detailed explanation of the possible risks associated with the procedure. Informed consent was obtained in all cases. In general, the most conservative surgery that met the patient's goals was performed. Therefore, in each case, the surgical techniques used were a function of the size, depth, position, and severity of the lesion as follows:

1. Shaving is the least invasive procedure, consisting of a layer by layer combined CO₂ laser vaporization and excision of the lesion, without full-thickness resection. Shaving was used in cases where the lesion had partially

Table 1.
Presentation of Patients Undergoing Laparoscopic Surgery for Bowel Endometriosis

Symptom	Total (%)*
Pain	186/187 (99%)
Pelvic pain	184/186 (99%)
Pain with bowel movement	131/177 (74%)
Back pain	95/173 (55%)
Infertility†	58/181 (32%)
Bowel Symptoms	128/173 (74%)
Constipation	95/173 (55%)
Diarrhea	70/173 (41%)
Melena	28/173 (16%)
Posterior cul-de-sac Nodularity	81/187 (43%)
Pelvic mass	22/187 (12%)
Abnormal Uterine Bleeding	17/187 (9%)
Nausea	14/187 (8%)

*Total number of patients for whom data were available in regard to these specific symptoms.

†Considered the patient's primary concern if present; all but one were also experiencing pain.

invaded the muscular layers, but not the full thickness of the bowel wall. Reinforcement sutures were applied when most of the muscularis layer was removed.^{13,14}

2. Disc excision consists of full-thickness excision of the lesion on the bowel wall with a transverse repair. Disc excision was performed in cases where the lesion did involve the full thickness, but not more than 1/3 of the circumference of the bowel. In addition, transanal or transvaginal disc excisions were performed for isolated lesions in the lower rectum.^{15,16}
3. Anterior rectosigmoid segmental resection with end-to-end anastomosis was performed in cases with multiple lesions or single lesions that involved more than one third of the bowel circumference. In addition to entirely laparoscopic resections, mini-laparotomy and anal or vaginal prolapse of the bowel were used.^{16,17}

In all cases, ablation, dissection, and mobilization of the bowel was achieved with a combination of CO₂ laser (Coherent, Palo Alto, CA) and hydrodissection, or scissors and blunt dissection. Repairs were achieved using linear and circular staplers or hand-sewn full thickness sutures, depending on access and position of lesions.^{18,19}

The most common locations of the lesions for which these techniques were used were the rectum and rectosigmoid colon, with 13 (7%) cases where more than one location was involved. In these cases, a combination of procedures was performed. Two cases of segmental resection required conversion to laparotomy. In one case, conversion was required to rectify an unsuccessful attempt to tie the purse-string suture on the stapler anvil, and in the other to take down and hand re-sew a stapled anastomosis judged to be unacceptable because of the possibility of ischemia. **Table 2** summarizes the location of the lesions with the most invasive procedure performed indicated. Whenever endometriosis was present on the appendix, the appendix was removed. The size of the lesions' involvement varied from 0.5 cm to 20 cm. All patients were thought to have infiltrative bowel endometriosis at the time of laparoscopy. Infiltrative bowel endometriosis was confirmed histologically in all but 6 patients. In 4 women, the histology was fibrosis with hemorrhage or inflammation, or both. In 2 women, the endometriosis was superficial and involved the serosa/subserosa or fatty tissue, and in one of these two, muscle hypertrophy was present.

Treatment for pain or infertility was the primary indication

Table 2.
Anatomical Distribution of the Endometrial Lesions and Procedures Performed

Lesion Location	Shave	Disc Excision	Segmental Resection	Total (%)
Rectum only	72	16	15	103 (55%)
Rectum/Small bowel	2	—	—	2 (1%)
Rectum/Appendix	2	—	1	3 (1.6%)
Rectum/Cecum/Small bowel	1	—	—	1 (0.5%)
Rectum/Cecum/Appendix	—	—	1	1 (0.5%)
Rectum/Cecum	—	—	1	1 (0.5%)
Rectosigmoid only	22	18	18*	58 (31%)
Rectosigmoid and Small Bowel	—	—	1	1 (0.5%)
Rectosigmoid/Cecum	—	1	—	1 (0.5%)
Sigmoid only	—	3	8	11 (6%)
Sigmoid/Small Bowel	—	—	1	1 (0.5%)
Sigmoid/Cecum	—	—	1	1 (0.5%)
Small bowel only	1	—	—	1 (0.5%)
Small bowel/Appendix	—	—	1	1 (0.5%)
Cecum	—	1	—	1 (0.5%)
Total	100	39	48	187

*Two were converted to laparotomy.

for surgery in all patients. Therefore, most patients had additional procedures performed along with direct excision and ablation of the pelvic and bowel endometriotic lesions to provide better pain relief. Procedures like bilateral salpingo-oophorectomy (BSO) or hysterectomy, or both, which had the potential to prevent recurrence or more definitively treat pain, but would render the patient infertile, were generally deferred in patients for whom infertility was the primary concern. These procedures are summarized in **Table 3**, as a function of the primary presenting symptom. As pain is a very characteristic symptom of endometriosis (186/187), and all but one patient with a chief complaint of infertility also had significant pain (57/58), for the purpose of analysis, patients were classified by chief complaint as belonging to one of 2 groups: “pain” or “pain with infertility”

We used the 2-sided Fisher’s exact test for all comparisons of rates between groups in this study or between overall

rates for this study and those of other studies. All calculations were done using SAS, version 8.

RESULTS

Long-term results were evaluated for the 178 women who were available for follow-up. The results were assessed in terms of relief from pain and achievement of fertility where indicated in the early postoperative period, and the need for re-operation for return of symptoms in the later postoperative period. The rate of complications was evaluated on the entire patient population. The results as a function of the types of laparoscopic and laparoscopically assisted surgeries performed are summarized in **Tables 4 through 6**.

Pelvic Pain Relief

Complete or significant pain relief was reported by 152 (85%) patients, partial pain relief by 21 (12%), and no pain

Table 3.

Significant Associated Procedures Performed During Treatment of Bowel Endometriosis by Primary Presenting Symptom Grouping

Procedure	Pain Group (%)	Pain With Infertility Group (%)	Total (%)
Treatment of endometriosis rectovaginal septum	71 (55%)	30 (52%)	101 (54%)
Ureterolysis	61 (47%)	23 (40%)	84 (45%)
Enterolysis and lysis of severe adhesions	17 (13%)	7 (12%)	24 (13%)
Myomectomy	15 (12%)	8 (14%)	23 (12%)
Partial upper vaginectomy	17 (13%)	3 (5%)	20 (11%)
Treatment of endometriosis of the ureter	17 (13%)	9 (16%)	26 (14%)
Treatment of endometriosis of the bladder	8 (6%)	8 (14%)	16 (9%)
Treatment of endometriosis of the diaphragm	4 (3%)	1 (2%)	5 (3%)
Removal of cervical stump	3 (2%)	—	3 (2%)
Ovarian cystectomy	4 (3%)	4 (7%)	8 (4%)
Presacral neurectomy	9 (7%)	2 (3%)	11 (6%)
Unilateral salpingo-oophorectomy (USO)	9 (7%)	4 (7%)	13 (7%)
Bilateral salpingo-oophorectomy (BSO)	2 (2%)	—	2 (1%)
Hysterectomy and USO	9 (7%)	—	9 (5%)
Hysterectomy and BSO	14 (11%)	3 (5%)	17 (9%)
Hysterectomy	5 (4%)	—	5 (3%)
Uterine suspension	2 (2%)	—	2 (1%)
Appendectomy	5 (4%)	4 (7%)	9 (5%)
Ablation of the endometrium	3 (2%)	—	3 (2%)
Removal of ovarian remnant	3 (2%)	—	3 (2%)
Partial bladder resection	2 (2%)	—	2 (1%)
Total	129 (69%)	58 (31%)	187 (100%)

Table 4.
Relief of Symptoms in the Postoperative Period in 178 Women With More Than 2-months Follow-up

Type of Resection	N (%)	Median Age (Range)	Median Hospital Stay (Range)	Complete Relief (%)	Partial Relief (%)	No Relief (%)	2nd Surgery for Symptoms (%)
Shaving	93 (52%)	35 (21–56)	1 day (0–5)	74/93 (80%)	17/93 (18%)	2/93 (2%)	13/93 (14%)
Disc Excision	38 (21%)	36 (23–48)	3 days (1–12)	36/38 (95%)	0/38 (0%)	2/38 (5%)	9/38 (24%)
Segmental Resection	47 (26%)	34 (25–47)	4 days (0–18)	42/47 (89%)	4/47 (9%)	1/47 (2%)	16/47 (34%)
Total	178 (100%)	35 (21–56)	2 days (0–18)	152/178 (85%)	21/178 (12%)	5/178 (3%)	38/178 (21%)

relief or worsening pain by 5 (3%) (Table 4). Complete pain relief in the immediate postoperative period was significantly more likely with more aggressive surgery for segmental resection or disc excision compared with shaving only (92% vs 80%, respectively, $P=0.0322$). No significant difference occurred between rates of complete pain relief or the incidence of second procedures between the “pain” and “pain with infertility” analysis groups (84% vs 89% and 21% vs 21%, respectively).

Follow-up Procedures

During this period of time, 38 women (21%) had follow-up procedures for persistent or recurrent pelvic pain (excluding complications from the original surgeries) for a surgical ‘cure’ rate with the original surgery as defined by Urbach⁷ of 76% (135/178). Of the patients with follow-up procedures, 18 requested extirpative surgery (BSO or hysterectomy plus BSO) and treatment of residual endometriosis if any. Details of follow-up procedures are summarized in Table 5. Two women who had endometriosis initially shaved off of the rectum or rectosigmoid colon had a recurrence of symptoms. One subsequently underwent laparoscopic full-thickness local resection (disc ex-

cision), resulting in complete pain relief. The other woman underwent 2 subsequent procedures for the treatment of bowel endometriosis. At her second procedure, a full-thickness local excision of the rectosigmoid was performed, but her pain returned after a few months. During the third procedure, she was found to have severe adhesions and endometriosis involving the rectosigmoid colon. She underwent total laparoscopic hysterectomy, BSO, and anterior rectosigmoid resection, resulting in complete pain relief.

One patient declined complete bowel resection, and therefore underwent partial treatment of rectosigmoid endometriosis by local resection and ablation of her disease. She had recurrent pelvic pain postoperatively and subsequently underwent segmental rectosigmoid resection and total abdominal hysterectomy with BSO at another center.

Fertility

Among patients available for follow-up, 28 pregnancies occurred in 23 women, including 22 full-term pregnancies, 5 miscarriages, and 1 termination. Three of the women had 2 pregnancies and 1 woman had 3 pregnan-

Table 5.
Follow-up Procedures in 38 Women Who Had Second Surgery for Persistent or Recurrent Symptoms

Type of Initial Procedure	Lysis of Adhesions Without Endoscopy	Ablation of Recurrent Endometriosis	Hysterectomy	BSO*	Hysterectomy and BSO*	Unknown†	Total
Shave	3	5	—	—	5	—	13/38 (34%)
Disc excision	4	—	—	1	4	—	9/38 (24%)
Segmental resection	2	—	4	1	7	2	16/38 (42%)
Total	9/38 (24%)	5/38 (13%)	4/38 (11%)	2/38 (5%)	16/38 (42%)	2/38 (5%)	38

*BSO=Bilateral salpingo-oophorectomy.

†Follow-up procedures for pain were performed at another center. In both cases, previous definitive surgery had been done before the patients came to our center.

cies. Of these 23 women, 19 had a history of infertility before treatment with a pregnancy rate of 34% (19/56) during this period of time. Excluding patients with less than 1 year of follow-up, the incidence of pregnancy in women with previous infertility was 42% (18/42). Pregnancy by treatment option and indication is summarized in **Table 6**.

Complications

Complications included 24 minor and 9 major ones for combined complication rates across all procedures of 13% and 5%, respectively. Four patients (3%) required an additional surgical procedure to address a complication. These are summarized in **Table 7**. The least invasive procedure, shaving, had a significantly lower overall complication rate (6%) compared with 23% for disc excision ($P<0.007$) and 38% for segmental resection ($P<0.001$). Temporary changes in bowel habits in the postsurgical period were not considered complications because they largely resolved within a year of surgery.

DISCUSSION

Treatment of endometriosis infiltrating the bowel remains a great challenge. It is therefore essential that treatment be tailored to the individual patient's disease, desires, and expectations. In many cases, achieving complete resolution of the patient's symptoms, including pelvic pain, may require not only complete treatment of pelvic endometriotic lesions themselves, but in some patients may require hysterectomy or BSO. These procedures should be performed in patients who have no desire for future pregnancy and have involvement of the uterus with adenomyosis and leiomyomas. Although no significant difference occurred in pain relief in the immediate postoperative period with more invasive procedures, our data support Urbach's⁷ and Bailey's²⁰ findings that a nonreproductive preserving

surgical approach is more effective at producing long-term pain relief than is one that preserves fertility. Of the 178 patients available for long-term follow-up, 4 of the 43 women (9%) who either had definitive therapy in the form of hysterectomy and BSO, or had had definitive surgery before coming to our center, required re-operation for pain, compared with 34 of 135 women (25%) who did not have (or had not previously had) definitive surgery. In our series, 21 of the 34 (62%) patients without prior extirpative surgery who underwent re-operation for pelvic pain required hysterectomies, BSO, or both.

Furthermore, both endometriosis and surgery may independently contribute to significant adhesion formation. The more extensive the surgical operation, the more severe the adhesion formation and its consequences. Partial treatment may be an alternative for patients who desire to achieve pregnancy and whose bowel endometriosis is asymptomatic. This can be accomplished by ablating the endometriosis and lysing existing adhesions without entering the lumen of the bowel and thus decreasing the possibility of pelvic infection and adhesion formation. Ablation/shaving rather than resection has a significantly lower procedure-specific major complication rate [0% vs 12.5% ($P<0.001$)], and it is a relatively safe procedure for the first stage of a planned 2-stage procedure designed to give the patient a window of opportunity in which to bear children. These patients must be followed and may need surgical intervention when they have finished their child-bearing. Pregnancy might have a treatment effect in patients with endometriosis.

Re-operation for recurrence of pelvic pain is not uncommon in patients with pelvic endometriosis. That incidence may vary with the duration of follow-up, the patient's age, and other symptoms, such as abnormal uterine bleeding or the presence of an adnexal mass. However, our results revealed that in 38 (21%) patients with recurrent symp-

Table 6.
Incidence of Pregnancy During the Follow-up Period in 178 Women by Chief Complaint

Type of Treatment	N	Pain Group	Pain With Infertility Group	Pregnancy in Pain Group (%)	Pregnancy in Pain With Infertility Group (%)	Pregnancy Total (%)*
Shaving	93	57	36	3/57 (5%)	13/36 (36%)	16/93 (17%)
Disc Excision	38	29	9	0/29 (0%)	4/9 (44%)	4/38 (11%)
Segmental Resection	47	36	11	1/36 (3%)	2/11 (18%)	3/47 (6%)
Total	178	122	56	4/122 (3%)	19/56 (34%)	23/178 (13%)

*Women with more than one pregnancy were counted only once.

Table 7.
Complications in 187 Women Classified by Most Invasive Procedure

Complications	Shaving (n=100)	Disc Excision (n=39)	Segmental Resection (n=48)	Total Number (n=187)
Minor				
Temporary femoral neuropathy	1/100 (1%)	—	—	1/187 (0.5%)
Mild rectal stricture requiring dilatation	—	—	1/48 (2%)	1/187 (0.5%)
Small bowel ileus	—	—	1/48 (2%)	1/187 (0.5%)
Upper respiratory infection with fever	1/100 (1%)	3/39 (8%)	—	4/187 (2%)
Pneumonia	—	—	1/48 (2%)	1/187 (0.5%)
Urinary tract infection	1/100 (1%)	—	1/48 (2%)	2/187 (1%)
Urinary retention	—	—	1/48 (2%)	1/187 (0.5%)
Unexplained postoperative fever	1/100 (1%)	1/39 (3%)	1/48 (2%)	3/187 (1.5%)
Wound breakdown	—	—	1/48 (2%)	1/187 (0.5%)
Rectal prolapse	—	1/39 (3%)	—	1/187 (0.5%)
Unexplained pelvic/abdominal pain	1/100 (1%)	—	1/48 (2%)	2/187 (1%)
Postoperative nausea	—	1/39 (3%)	—	1/187 (0.5%)
Drug allergy reaction	—	—	2/48 (4%)	2/187 (1%)
Endometritis	1/100 (1%)	—	—	1/187 (0.5%)
Unexplained leg pain	—	1/39 (3%)	1/48 (2%)	2/187 (1%)
Major				
Pelvic abscess and infection	—	2/39 (5%)	—	2/187 (1%)
Ureterovaginal fistula	—	—	1/48 (2%)	1/187 (0.5%)
Rectovaginal fistula	—	1/39 (3%)	—	1/187 (0.5%)
Anastomotic stricture	—	—	2/48 (4%)	2/187 (1%)
Intraoperative bladder perforation	—	—	1/48 (2%)	1/187 (0.5%)
Rectal bleeding requiring transfusion	—	—	1/48 (2%)	1/187 (0.5%)
Anastomotic leak req. temp colostomy	—	—	1/48 (2%)	1/187 (0.5%)
Combined Complication Rates				
Minor	6/100 (6%)	6/39 (15%)	12/48 (25%)	24/187 (13%)
Major	0%	3/39 (8%)	6/48 (12.5%)	9/187 (5%)
Additional procedure	1/100 (1%)	2/39 (5%)	1/48 (2%)	4/187 (2%)

toms and re-operation, only 3 (2%) had a recurrence of bowel endometriosis, of which all had undergone shaving. In 1 patient, the bowel endometriosis had been partially treated, but in the other 2 it was thought to have been treated completely, and the recurrence of endometriosis at the second surgery was unexpected. All 3 of these patients initially underwent conservative treatment with preservation of ovarian function at the first procedure. The rapid recurrence despite apparently adequate

treatment suggests that a real need exists to advance our understanding of the natural history of endometriosis.

Our approach results are comparable to those reported for laparotomy by Bailey (n=130),²⁰ and Coronado (n=77)²¹ for each of long-term pain relief (85% [152/178] versus 83% [103/130 and 68/77 combined] *P*=0.489), pregnancy rate after 1 year or more (43% [18/42] versus 45% [24/49 and 13/33 combined] *P*=0.850), and major complications

[4.8% (9/187) versus 3.4% (5/130 and 2/77 combined) $P=0.611$].^{20,21}

Despite adequate treatment of the disease, some patients may continue to be symptomatic. Symptoms, such as pelvic pain, painful bowel movements, constipation, diarrhea, or back pain, are not specific, and other causes of such symptoms must be considered. The patient must also understand that in spite of successful and complete treatment of her bowel endometriosis, complete relief of symptoms is not always possible.

Currently available hormonal therapy may decrease inflammation and provide temporary improvement of symptoms. However, nonsurgical treatment cannot cure the disease and suppresses fertility during treatment. At present, only surgical resection can successfully treat these fibrotic lesions.

CONCLUSION

We have described herein our experience with laparoscopic and laparoscopically assisted treatment of intestinal endometriosis. Using a multidisciplinary approach, we were able to achieve symptom control and fertility comparable to that achieved by laparotomy with acceptable morbidity. Surgery for endometriosis infiltrating the bowel must be carefully tailored to each individual, with special consideration to the patient's desire for fertility. While definitive surgery is demonstrably more effective at alleviating pain, conservative treatment limited to resection of the endometriosis is an alternative that should be considered for patients who wish to preserve ovarian function. If infertility is of primary concern, the authors feel that the lower complication rates and better chance for fertility offered by the less invasive shaving approach justifies initially using this technique. Re-operation may then be performed after childbearing is complete or if symptomatic relief is considered insufficient by the patient.

While a high index of suspicion is required to diagnose women with bowel endometriosis, it must be remembered that the symptoms associated with this condition overlap with symptoms of many other conditions. Relief of pain and preservation of fertility do not necessarily need to be mutually exclusive in working with patients with endometriotic bowel lesions, and careful discussion of options and alternatives should be undertaken so that the patient is optimally served.

References:

1. Gray LA. Endometriosis of the bowel: role of bowel resection, superficial excision and oophorectomy. *Ann Surg.* 1973; 177:580–587.
2. Bailey HR. Colorectal endometriosis. *Perspect Colon Rectal Surg.* 1992;5:251–259.
3. Weed JC, Ray JE. Endometriosis of the bowel. *Obstet Gynecol.* 1987;69:727–730.
4. Prystowsky JB, Stryker SJ, Ujiki GT, Potich SM. Gastrointestinal endometriosis: incidence and indications for resection. *Arch Surg.* 1988;123:855–858.
5. Badaway SZ, Freeman L, Numann P, Bonaventura M, Kim S. Diagnosis and management of intestinal endometriosis: a report of five cases. *J Reprod Med.* 1988;33:851–855.
6. Martin DC, O'Conner DT. Surgical management of endometriosis-associated pain. *Obstet Gynecol Clin North Am.* 2003; 30(1):151–162.
7. Urbach DR, Reedijk M, Richard CS, Lie KI, Ross TM. Bowel resection for intestinal endometriosis. *Dis Colon Rectum.* 1998; 41(9):1158–1164.
8. Redwine DB, Koning M, Sharpe DR. Laparoscopically assisted transvaginal segmental resection of the rectosigmoid colon for endometriosis. *Fertil Steril.* 1996;65(1):193–197.
9. Duepree HJ, Senagore AJ, Delaney CP, Marcello PW, Brady KM, Falcone T. Laparoscopic resection of deep pelvic endometriosis with rectosigmoid involvement. *J Am Coll Surg.* 2002; 195(6):754–758.
10. Possover M, Diebolder H, Plaul K, Schneider A. Laparoscopically assisted vaginal resection of rectovaginal endometriosis. *Obstet Gynecol.* 2000;96(2):304–307.
11. Jerby BL, Kessler H, Falcone T, Milsom JW. Laparoscopic management of colorectal endometriosis. *Surg Endosc.* 1999; 13(11):1125–1128.
12. Nezhat C, Nezhat F, Nezhat C, Admon D. Endometriosis of the intestine and genitourinary tract. In: Nezhat CR, Berger GS, Nezhat FR, Buttram VC Jr., Nezhat CH, eds. *Endometriosis.* New York, NY: Springer-Verlag; 1995:137–158.
13. Nezhat CR, Nezhat FR, Luciano AA, Siegler AM, Metzger DA, Nezhat CH, eds. *Operative Gynecologic Laparoscopy: Principles and Techniques.* New York, NY: McGraw-Hill; 2000.
14. Nezhat C, Nezhat FR. Safe laser endoscopic excision or vaporization of peritoneal endometriosis. *Fertil Steril.* 1989; 52(1):149–151.
15. Nezhat C, Pennington E, Nezhat F, Silfen SL. Laparoscopically assisted anterior rectal wall resection and reanastomosis for deeply infiltrating endometriosis. *Surg Laparosc Endosc.* 1992;2: 106–108.

16. Nezhat F, Nezhat C, Pennington E, Ambroze W Jr. Laparoscopic segmental resection for infiltrating endometriosis of the rectosigmoid colon: a preliminary report. *Surg Laparosc Endosc*. 1992;2:212–216.
17. Nezhat F, Nezhat C, Pennington E. Laparoscopic proctectomy for infiltrating endometriosis of the rectum. *Fertil Steril*. 1992;57:1129–1132.
18. Nezhat C, Nezhat F, Pennington E. Laparoscopic treatment of lower colorectal and infiltrating rectovaginal septum endometriosis by the technique of videolaseroscopy. *Br J Obstet Gynaecol*. 1992;99:664–667.
19. Nezhat C, Nezhat F, Ambroze W, Pennington E. Laparoscopic repair of small bowel and colon: a report of 26 cases. *Surg Endosc*. 1993;7:88–89.
20. Bailey HR, Ott MT, Hatendorp P. Aggressive surgical management for advanced colorectal endometriosis. *Dis Colon Rectum*. 1994;37:747–753.
21. Coronado C, Franklin RR, Lotze EC, Bailey HR, Valdes CT. Surgical treatment of symptomatic colorectal endometriosis. *Fertil Steril*. 1990;53:411–416.