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Summary: The following is a description of the first series of laparoscopic partial proctectomies performed without a separate surgical incision. Sixteen women were treated for extensive endometriosis invading the rectal wall. This original series of patients tolerated the procedure well, with no major intraoperative or postoperative complications noted. Key Words: Operative laparoscopy—Partial proctectomy—Endometriosis.

Five percent of endometriosis cases involve the colon, 76% of which involve the rectum or rectosigmoid junction (1). Symptomatic lesions with deep penetration into the bowel have traditionally required open laparotomy for bowel resection and reanastomosis (2), but this procedure is associated with increased morbidity and hospitalization when compared with laparoscopic removal of lesions. Use of the laparoscope in gastrointestinal surgery, including laparoscopically assisted bowel resections, is increasing (3–9). Techniques for laparoscopically assisted bowel resection have been limited to extracorporeal resections following laparoscopic mobilization and delivery of the bowel to a separate, although smaller, abdominal incision. Because rectal lesions cannot or should not be mobilized to the anterior abdominal wall, they cannot be resected in this manner. Recent reports have described laparoscopic mobilization of the lower colon, transanal prolapse, anterior resection, and reanastomosis (4).

The following is a description of the first series of laparoscopic partial proctectomies performed without a separate surgical incision. All these procedures were performed for extensive endometriosis invading the rectal wall.

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MATERIALS AND METHODS

Sixteen females (mean age 32 years) with extensive symptomatic pelvic endometriosis underwent diagnostic and therapeutic laparoscopy under general anesthesia. All patients had preoperative mechanical bowel preparation (Golytely, Braintree Laboratories, Inc., Braintree, MA, U.S.A.) and 2 g metronidazole orally the night before surgery in addition to perioperative intravenous cefoxitin. With the patients in modified lithotomy position, pneumoperitoneum was induced and the laparoscope inserted infraumbilically (5). Three 5-mm suprapubic trocars (Ethicon, Somerville, NJ, U.S.A.), one each in the midline and right and left lower quadrants, were used to place grasping forceps, Endoloop (Ethicon) suture applicators, probes for suction and irrigation, and bipolar electrocoagulator. The CO_2 laser (Coherent, Palo Alto, CA, U.S.A.) was used for dissection and vaporization of the lesions, and hemostasis was accomplished using the CO_2 laser and bipolar electrocoagulator (4–11). The operating room setup and techniques have been extensively described before (4–9).

After the laparoscope was inserted, the entire abdomen and pelvis were visually inspected and major lesions laparoscopically biopsied. Endometrial lesions were systematically vaporized or excised using the CO_2 laser (Table 1). Eleven patients required either unilateral or bilateral ureterolysis to remove lesions partially obstructing the ureters. One patient underwent laparoscopic right salpingo-oophorectomy and appendectomy for an ovarian cyst and appendical endometriosis (10,11).

Endometriosis invading deep into or through the muscularis propia of the rectum was present in each patient, resulting in rectal stricture in 10 patients and invasion deep into the anterior rectal wall in five patients (Table 1). Using operative laparoscopic techniques described before (4–11), the entire rectum was mobilized, lesions in the rectovaginal septum vaporized or excised, the lateral rectal pedicles fulgurated, and the presacral space mobilized to the level of the levator ani muscles (4,6). In the six patients with anterior rectal lesions, the rectum was prolapsed via the anal canal and transected using two applications of an RL30 or RL60 stapler (Ethicon) and reinforced using interrupted 2-0 vicryl sutures (4). In the 10 patients with circumferential lesions, using Babcock clamps, the rectum was transected proximal to the lesion, and the proximal limb was prolapsed through the anorectum. The anvil of the ILS 33 stapler (Ethicon) was detached and secured in the proximal limb with an 0 polypropylene suture placed around the circumference of the bowel. The proximal limb was then returned to the abdominal cavity. The rectal segment with the lesion was prolapsed out the anus and stapled closed with the RL60. The segment of rectum containing the lesion above the staple line was amputated (or was amputated above the staple line). The rectum was returned to its normal position by reducing the prolapse transanally, then the ILS 33 was placed into the rectum and the trocar was opened to pass through the stapled end of the rectal stump. Using the laparoscope, the anvil in the proximal limb was reattached to the trocar staft. Next, the bowel ends were approximated and the stapler fired to create a double-stapled end-to-end anastomosis. "Donut" margins were inspected to be sure the rings were complete.

A proctoscope was used to inspect each anastomosis for structural integrity and bleeding. Saline was placed into the pelvis and visualized with the laparoscope as air was insufflated into the rectum to check for leakage. In two patients, air leaks were corrected using three transanally placed 2-0 vicryl sutures.

One patient first underwent a laparoscopic hysterectomy (12). Then the rectosigmoid colon was mobilized as described before and prolapsed via the vaginal cuff. The prolapsed segment was extracorporeally transected proximal to the lesion. A 2-0 polypropylene purse-string was placed around the circumference of the proximal limb of the bowel. Then the anvil of a no. 33 ILS Stapler (Ethicon) was placed through the pursestring into the proximal bowel and the proximal limb of bowel replaced into the pelvis. Using Babcock clamps, the distal rectal segment was further prolapsed through the vagina. A 15-cm segment of fibrotic, narrowed bowel was resected distal to the lesion and proximal to the anal canal using the RL60 stapler (Ethicon) (4).

The rectal stump was replaced through the vaginal cuff in the pelvis. A wet lap pack was placed in the vagina to prevent escape of the pneumoperitoneum. The anastomosis was created and inspected as described previously. Then the vaginal pack was removed and the vaginal cuff closed as previously described (12).

RESULTS

Table 1 summarizes each operation. Fifteen of the 16 women had endometrial lesions of the rectosigmoid colon resected without laparotomy. One patient had partial proctectomy performed, but laparotomy was necessary for anastomosis due to an unsuccessful attempt to place a purse-string suture around the patulous rectal ampulla.

In addition to the resection of rectal lesions, laparoscopic vaporization and/or excision of endometrial lesions involving the adnexae, uterosacral ligaments, vaginal wall, ureters or peritoneum was necessary. These procedures increased the total operating time.

Excluding the patient requiring laparotomy, the average operating time was 190 min (range, 90–420 min). Blood loss averaged 77 ml (range, 30–300 ml). The average length of hospitalization was 3.4 days (range, 2–5 days). No visceral injuries, anastomotic leaks, or pelvic sepsis occurred. Patients were discharged following spontaneous bowel movement and toleration of full diets.

DISCUSSION

The first question a surgeon will ask when hearing about a bowel resection done by operative lap-

TABLE 1. *Summary of patient information*

Case no.	Age (yr)	Indication	Procedure	Operating time (min)	Est. blood loss (ml)	Hospital stay (days)	Complications
1	28	Extensive pelvic endometriosis w/external endometriosis of left ureter and rectum	Vaporization or excision of endometriosis, ureterolysis, partial proctectomy w/stapled anastomosis	210	60	5	None
2	28	Extensive pelvic endometriosis w/invasion into anterior rectal wall	Vaporization or excision of endometriosis, resect portion of anterior rectal wall w/primary closure	160	90	4	None
3	31	Extensive pelvic endometriosis w/bilateral, external endometriosis, rectal stricture	Vaporization or excision of endometriosis, bilateral ureterolysis, partial proctectomy w/stapled anastomosis	190	50	4	None
4	27	Extensive pelvic endometriosis, rectal stricture	Vaporization or excision of endometriosis, partial proctectomy, laparotomy for stapled end-to-end anastomosis	420	400	9	Open laparotomy for rectal stricture
5	38	Extensive pelvic endometriosis, bilateral ureteral strictures, rectal strictures	Vaporization or excision of endometriosis, bilateral ureterolysis, partial proctectomy w/stapled anastomosis	210	80	4	None
6	40	Extensive pelvic endometriosis, bilateral ureteral strictures, rectal stricture, right ovarian cyst, and appendicial endometriosis	Vaporization or excision of endometriosis, bilateral ureterolysis, appendectomy, right salpingo-oophorectomy, partial proctectomy w/stapled anastomosis	220	100	4	None
7	40	Extensive pelvic endometriosis w/external endometria of left ureter and rectum	Vaporization or excision of endometriosis, ureterolysis, partial proctectomy w/stapled anastomosis	190	50	3	None
8	39	Extensive pelvic endometriosis w/external endometria of left ureter and rectum	Vaporization or excision of endometriosis, ureterolysis, partial proctectomy w/stapled anastomosis	140	40	3	None
9	45	Extensive pelvic endometriosis w/invasion into anterior rectal wall	Vaporization or excision of endometriosis, resection portion of anterior rectal wall w/primary closure, ureterolysis	180	30	3	None
10	46	Extensive pelvic endometriosis w/invasion into anterior rectal wall	Vaporization or excision of endometriosis, resection portion of anterior rectal wall w/primary closure	120	70	2	None
11	28	Extensive pelvic endometriosis w/invasion into anterior rectal wall	Vaporization or excision of endometriosis, resection portion of anterior rectal wall w/primary closure	174	50	3	None
12	42	Extensive pelvic endometriosis w/bilateral, external endometriosis, rectal stricture	Vaporization or excision of endometriosis, bilateral ureterolysis, partial protectomy w/stapled anastomosis, laparoscopically assisted vaginal hysterectomy	240	50	4	None
13	38	Extensive pelvic endometriosis w/invasion into anterior rectal wall	Vaporization or excision of endometriosis, resection portion of anterior rectal wall w/primary closure, ureterolysis	145	65	2	None
14	33	Extensive pelvic endometriosis, rectal stricture	Vaporization or excision of endometriosis, partial proctectomy, stapled end-to-end anastomosis	420	300	4	None
15	39	Extensive pelvic endometriosis w/external endometria of left ureter and rectum	Vaporization or excision of endometriosis, ureterolysis, partial proctectomy w/stapled anastomosis	140	40	3	None
16	38	Extensive pelvic endometriosis, bilateral ureteral strictures, and rectal strictures	Vaporization or excision of endometriosis, bilateral ureterolysis, partial proctectomy w/stapled anastomosis	210	80	3	None

Est., estimated.
w/, with.

aroscopy is, "Why do it?" Conventional surgery seems successful for most patients, so why consider the change? The answer must include recognition that surgical techniques have continued to change since the beginning of this century, resulting in numerous benefits for our patients, including a significant decrease in operative morbidity from bowel resections during the past several years.

With the advent of videolaparoscopy (13) and many new instruments that have made complex dissection possible through operative laparoscopy, the question of whether these techniques should be used to treat endometriosis requiring bowel resection is raised. For such new procedures to be effective, two fundamental principles must not be violated. First, the extent of the surgery must not be compromised by the new technology; that is, the exploratory information and the specimen removed must be as adequate as could be achieved in the optimal conventional surgery. Second, morbidity from a new procedure must be no greater—and hopefully less—than with conventional techniques.

With these principles in mind, the authors have performed several laparoscopic bowel resections using operative videolaparoscopy techniques. Details of pelvic anatomy are more clearly visible with videolaparoscopy than with conventional surgery, particularly in an obese patient with a deep pelvis. It is no longer possible to impugn laparoscopic surgery as limited to the peritoneal cavity. With operative laparoscopy, the length of the resected bowel can be equal to that achieved with conventional surgery. We would therefore presume that the end results of laparoscopic bowel surgery are comparable to those yielded by current surgical techniques. In addition, the possibility of de novo adhesion formation with this technique is substantially lower than with laparotomy (14,15).

Before a fair assessment of morbidity from operative laparoscopic surgery can be made, more experience with similar cases is necessary. The learning curve for new procedures applies to laparoscopy as it does to any new surgical procedure. Operative time will certainly decrease in the future, as more experience is gained with pelvic dissection techniques. Our patients were discharged from the hospital within 2 to 5 days (mean, 3.4 days) after surgery. Additional parameters measuring postoperative morbidity in subsequent cases will need to be compared.

The laparoscopic bowel resection was identical to a laparotomy except bipolar electrocoagulator and the laser replaced sutures and scissors. No unusual short- or long-term ill effects were evident with this laparoscopic technique. We identified and dissected the tissue planes in a manner similar to the techniques used by most colorectal surgeons. Pressure from the pneumoperitoneum usually prevents bleeding and oozing of small vessels. The CO_2 laser seals the small blood vessels while cutting, which, along with the magnification produced on the video monitor helps to better identify pelvic anatomy better.

This procedure has been performed safely in this initial series, with no apparent compromise in the adequacy of the resections. Morbidity was less than would have been expected from bowel resections by laparotomy. The positive results in these first cases lead us to believe that this procedure will be recommended for additional patients. A thorough knowledge of pelvic and abdominal anatomy, combined with expertise in operative laparoscopy, is required to perform such procedures and cannot be overemphasized. An entire surgical team is needed. Although doubt exists that many surgeons will have sufficient training and experience to make this procedure common in the near future, the speed in transferring some technological advances has often been surprising. For now, we should all expectantly wait and see.

REFERENCES

1. Prystowsky JB, Stryker SJ, Ujiki GT, et al. Gastrointestinal endometriosis. *Arch Surg* 1988;123:855–8.
2. Coronado C, Franklin R, Lotze F, et al. Surgical treatment of symptomatic colorectal endometriosis. *Fertil Steril* 1990; 53:411–6.
3. Cooperman AM, Zucker KA. Laparoscopic guided intestinal surgery. In: Zucker KA, ed. *Surgical laparoscopy*. St. Louis: Quality Medical Publishing, 1991.
4. Nezhat C, Pennington E, Nezhat F, Silfen SL. Laparoscopically assisted anterior rectal wall resection and reanastomosis for deeply infiltrating endometriosis. *Surg Laparosc Endosc* 1991;1:2:106–8.
5. Nezhat FR, Silfen SL, Evans D, Nezhat C. Comparison of direct insertion of disposable and standard reusable laparoscopic trocars and previous pneumoperitoneum with Veress needle. *Obstet Gynecol* 1991;78:148–50.
6. Nezhat F, Nezhat C, Pennington E. Laparoscopic proctectomy for infiltrating endometriosis of the rectum. *Fertil Steril* 1992;57:1129–32.
7. Nezhat C, Silfen SL, Nezhat F, Martin D. Surgery for endometriosis. *Curr Op Obstet Gynecol* 1991;3:385–93.
8. Nezhat C, Nezhat F, Silfen SL. Videolaseroscopy: the CO_2 laser for advanced operative laparoscopy. *Obstet Gynecol Clin N Am* 1991;18:3:585–604.
9. Nezhat C, Nezhat F, Pennington: Laparoscopic treatment of

lower colorectal and infiltrative rectovaginal septum endometriosis by the technique of videolaseroscopy. *Br J Obstet Gynecol* 1992, Vol. 99 (in press).
10. Nezhat F, Nezhat C, Silfen SL. Videolaseroscopy for oophorectomy. *Am J Obstet Gynecol* 1991;165:1323–30.
11. Nezhat C, Nezhat F. Incidental appendectomy during videolaseroscopy. *Am J Obstet Gynecol* 1991;165:559–64.
12. Nezhat C, Nezhat F, Gordon S, Wilkins E. Laparoscopic versus abdominal hysterectomy. *J Reprod Med* 1992;37: 247–50.
13. Nezhat C. Videolaseroscopy: a new modality for the treatment of endometriosis and other diseases of reproductive organs. *Colposc Gynecol Laser Surg* 1986;2:221–4.
14. Nezhat C, Nezhat F, Metzger DA, Luciano AA. Adhesion reformation after reproductive surgery by videolaseroscopy. *Fertil Steril* 1990;53:6:1008–11.
15. Operative laparoscopy study group. Postoperative adhesion development after operative laparoscopy: evaluation at early second-look procedures. *Fertil Steril* 1991;55:700–04.

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