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Laparoscopic Rectal Resection of Deep Infiltrating Endometriosis

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Abstract

Purpose: Deep infiltrating endometriosis with colorectal involvement is a complex disorder, often requiring segmental bowel resection. Complete removal of all visible lesions is considered the adequate treatment of infiltrating endometriosis in order to reduce recurrence. In this article, we describe our experience with laparoscopic management of deep infiltrating endometriosis with involvement of the rectum.

Methods: A retrospective analysis of data from patients with deep infiltrating endometriosis with rectal involvement who underwent a laparoscopic surgery in the years 2002–2009 at the Department of Obstetrics and Gynecology at our institution was done.

Results: Between 2002 and 2009, a laparoscopic partial rectal resection was performed in 52 patients, and laparoscopic disk resection was performed in 4 cases with deep infiltrating endometriosis. The mean age of patients was 34.4 years (range, 22–62 years). Preoperative symptoms included dysmenorrhea, dyspareunia, chronic pelvic pain, and infertility. The laparoscopic procedure was converted to formal laparotomy in 3 patients (5.4%). The mean duration of surgery was 145 minutes. Postoperative complications included 3 cases of anastomotic leakage with rectovaginal fistula in two cases and intraabdominal bleeding in 1 case. The mean hospital stay was 7 days. Postoperatively, nine patients had a normal delivery, two of them after *in vitro* fertilization treatment.

Conclusion: Laparoscopic rectal resection for deep infiltrating endometriosis is a relatively safe procedure, when performed by a surgeon and a gynecologist with sufficient experience in laparoscopic colorectal surgery.

Introduction

ENDOMETRIOSIS IS ONE of the most common benign diseases of women in their reproductive age and is defined as presence of endometrial glands and stroma in an ectopic site outside the uterine cavity.¹ The three forms of endometriosis are peritoneal, ovarian, and deep infiltrating endometriosis, when the lesions infiltrate deeper than 5 mm in the retroperitoneum. Deep pelvic endometriosis is considered as a separate clinical entity. It affects sacro-uterine ligaments, rectovaginal septum, rectum, terminal ileum, appendix, bladder, and ureters. Up to 5%–10% of patients with endometriosis have an infiltrating endometriosis of the recto-uterine pouch, and in up to 76% of these patients the rectum is involved.² In most cases, endometrial lesions involve superficial layers of the bowel; rarely, a full-thickness infiltration can be found. Clinical presentation includes dysmenorrhea, dyspareunia, lower back pain, painful defecation, rectal bleeding, diarrhea, and constipation.

Transvaginal and transrectal ultrasound are useful in detecting endometriosis. The lesions are detected as hypoechoic irregular areas surrounded by a hyperechoic rim.³ Transrectal ultrasound can also determine the distance of a lesion from the anal margin. Magnetic resonance imaging has been demonstrated to be highly accurate in diagnosing deep infiltrating endometriosis involving the uterosacral ligaments, the pouch of Douglas, and the rectal wall.^{4,5} Unfortunately, preoperative rectoscopy is seldom useful because infiltration of the muscularis propria is reported in only 10% of histologically confirmed cases of intestinal endometriosis, and infiltration of the mucosa is rare.⁶ Laparoscopy is an invasive technique and should be performed after imaging techniques have been made.

Because of inadequacy of medical treatment, many authors have advocated the complete and radical resection of all endometrial lesions in rectovaginal disease, even if this involves extensive surgery of the rectum. Rectal endometriosis can therefore be treated surgically either by local resection of a

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focus or by partial segmental resection of the intestine.^{7,8} The laparoscopic approach achieves the same results as open surgery in terms of outcomes, with less surgical trauma.⁹⁻¹¹

Patients and Methods

A retrospective analysis of patients who underwent laparoscopic surgery for deep infiltrating endometriosis with rectal involvement at our institution between January 2002 and December 2009 was done. The diagnosis was established on the basis of clinical symptoms and previous laparoscopy. To assess the extent of the disease, transvaginal and transrectal ultrasounds were performed in all patients, and additionally magnetic resonance imaging was performed in seven of them. Abdominal ultrasound was carried out to exclude ureteral involvement. Rectal examination and rectoscopy were performed for all patients. Patients were examined by a dedicated surgeon, and the location for a protective ileostomy was marked prior to surgery for prophylactic purposes.

Surgical technique

All patients had clear fluid diet, and an enema was performed 1 day prior to the planned surgery. Prophylaxis of deep venous thrombosis with low-dose molecular-weight heparin was given the evening before the operation, and prophylactic antibiotic therapy (gentamicin 120 mg and metronidazole 500 mg administered intravenously) was given at the beginning of the procedure.

The primary surgical access route was laparoscopic, performed by a gynecologist and a surgeon with sufficient experience in laparoscopic colorectal surgery. The procedures were performed with the patient under general anesthesia. The patient was given a urine catheter and was positioned in the lithotomic position. During the procedure the surgeon was positioned on the right side of the patient, with the assistant holding the camera standing on the left and the monitor positioned by the patient's legs. In most cases four ports were used. The first was positioned next to the umbilicus after pneumoperitoneum has been created with CO₂. In patients with previous abdominal surgery, the open technique of primary port introduction was used. Then, a 12-mm trocar was positioned in the right hypogastrium, and two 5-mm trocars were introduced in the left hypogastrium and in the median suprapubic area. For better exposure during dissection of the rectovaginal septum, a retractor (manipulator) was inserted into the uterus.

The procedure began with exploration of the peritoneum and the intestines for endometriotic lesions. Simultaneously, adhesiolysis was performed. Often the endometriosis was the cause of adhesions between the sigmoid colon and the left-side adnexes. During the procedure sacro-uterine ligaments, both ureters, and parametria were identified and dissected to allow resection of the endometriotic nodes at the level of the cervix.

When endometriotic nodes were small, it was necessary to remove the whole thickness of the bowel wall. The defect was sutured with interrupted absorbable sutures in a transverse fashion to avoid stenosis.

In cases of a large node in the rectum or rectovaginal septum that could not be safely removed by simple excision, a laparoscopically assisted low anterior rectal resection was performed. Adequate mobilization of the sigmoid colon was achieved by dividing the sigmoid and superior rectal arteries with surgical clips or a vascular stapler, taking care to avoid

injury to the left ureter. Mobilization of the rectosigmoid was performed as posteriorly and laterally as possible by elevating the rectum anteriorly and superiorly. During dissection in the paraproctial area the splanchnic nerves should be preserved to avoid urinary bladder paresis after the procedure. Dissection of the rectovaginal septum was often difficult because of intense scarring and inflammatory reaction in this area in most patients. The anterior rectal dissection was performed within the posterior muscular wall of the vagina until a soft area distal to any palpable abnormalities was encountered. The rectum was divided with the Endo Gia™ stapler system (Covidien, Dublin, Ireland) introduced through a 12-mm trocar in the right hypogastrium. A minilaparotomy (5–6 cm) over the 5-mm trocar incision above the symphysis (Pfannenstiel incision) was used to exteriorize the rectosigmoid. Lesions extending through the vagina were treated with *en bloc* resection of the posterior vaginal wall. The posterior vaginal wall was closed transvaginally. The diseased part of the bowel was resected, and a circular suture was placed on the proximal part of the resected bowel and tied over the head of the circular stapler. The bowel was returned to the abdomen, and the minilaparotomy was closed. An end-to-end colorectal anastomosis was created using a rectally introduced stapler. A drain was placed in the presacral space. To test the bowel wall for integrity, the pelvis was filled with warm saline, and the air-filled bowel was observed for air leaks. Gynecare Interceed® (Ethicon, Johnson and Johnson, Cincinnati, OH) was used to cover deperitonealized areas. The postoperative care included resumption of oral intake with fast track recovery.

Results

Between January 2002 and December 2009, laparoscopic surgery for deep infiltrating endometriosis with rectal involvement was performed in 56 women (Table 1).

Laparoscopically assisted anterior rectal resection was performed in 52 patients, and anterior rectal wall excision was performed in 4 patients. Additional procedures were ileocolic resection in 3 patients, small bowel resection in 3 patients, partial excision of vaginal wall in 3 patients, sigmoid colon resection in 2 patients, and appendectomy in 1 patient. The laparoscopic procedure was converted to formal laparotomy in 3 patients (5.4%). The causes were difficulty in placement of the Endo Gia stapler due to increased thickness of the bowel wall in two patients and injury to the left ureter in one patient. The left ureter injury was treated with ureteral catheter and

TABLE 1. HISTORY AND PREOPERATIVE SYMPTOMS OF THE PATIENTS

<i>History or symptom</i>	
Median age (years)	34.5 (26–62)
Previous operations (<i>n</i>)	47 (1–3 [83.9%])
Dysmenorrhoea	48 (85.7%)
Dyspareunia	36 (64.3%)
Lower abdominal pain	30 (53.6%)
Infertility	14 (25.0%)
Painful defecation	31 (55.35%)
Rectal bleeding during menstruation	8 (14.28%)

Data are mean (range) or number (%) as indicated.

TABLE 2. EARLY POSTOPERATIVE SURGICAL COMPLICATIONS

Complication	
Postoperative bleeding	1 (1.8%)
Colorectal anastomotic leakage	3 (5.4%)
Rectovaginal fistula	2 (3.6%)

sutures. Two patients required temporary ileostomy because of very low colorectal anastomosis. The mean duration of surgery was 145 minutes (range, 125–245 minutes). The mean hospital stay was 7 days (range, 5–10 days).

Three patients (5.4%) developed a postoperative anastomotic leakage, two of them with rectovaginal fistula, which required a temporary ileostomy in two patients. In one patient with rectovaginal fistula a new anastomosis was made, and the fistula was oversewn. In one patient laparotomy was performed later on the same day because of bleeding in the lower pelvic region. The ileostomy was closed 8 weeks after the first procedure in all cases (Table 2).

All patients were interviewed regarding the symptoms of dysmenorrhea, dyspareunia, and cyclic-infiltrating pain. In most of them symptoms decreased immediately after surgery. All patients were symptom-free 4–6 months after surgery. The relapse of endometriosis after the resection of rectum was not observed. In 1 patient with recurrent pain in the right lower quadrant after laparoscopic rectal resection, endometriosis of the appendix was found. Laparoscopic appendectomy was performed after 6 months, and histological examination confirmed the diagnosis. An endometrioma was removed from the left rectus abdominis muscle in the Pfannenstiel incision in 1 patient and in the region of the primary port in another patient. There were two anastomotic strictures, which were treated successfully with repeated balloon dilatation with the patient under sedation (Table 3).

Eight out of 14 infertile patients became pregnant spontaneously, two of them twice. Two patients had a successful attempt of *in vitro* fertilization treatment.

Discussion

Deep infiltrating endometriosis can cause many different symptoms. The most important symptoms are dysmenorrhea, dyspareunia, and lower abdominal pain. Different authors have reported improvement in infiltrating pain, dysmenorrhea, dyspareunia, and dyschesia in women who had undergone segmental rectal resection.^{12,13} In our series 83.9% of women had undergone at least one laparoscopy elsewhere before referral to our clinic. This was attributed to either incomplete previous excision or a need for tertiary referral by those less experienced in laparoscopic management of deep infiltrating endometriosis. Previous laparoscopies were associated with more extensive rectal involvement. Better results

TABLE 3. POSTOPERATIVE OUTCOMES (6 MONTHS–1 YEAR AFTER THE PROCEDURE)

Outcome	
Endometriosis of the appendix	1 (1.8%)
Endometrioma of the left rectus abdominis muscle	1 (1.8%)
Anastomotic stricture	2 (3.6%)

are obtained in women who undergo segmental resection as opposed to debulking surgery, because of a more complete excision of the disease or because of denervation.¹⁴

In our experience, conversion to laparotomy was required in 3 cases (5.36%) because of complications that could not be managed laparoscopically. The reported conversion rate varies from 3.2% to 7.8%.^{11,15} At the beginning of our experience we performed conversion in 2 patients, in whom the placing of the Endo Gia stapler was impossible because of the thickness of the rectal wall, most probably due to the insufficient mobilization of the rectum. Later on in our experience, we performed only one conversion due to left ureter injury, which was treated with ureteral catheter and sutures.

In most of our cases, nonobstructive ureteral involvement was observed, which was resolved with ureterolysis. Endometriosis of the bladder was not observed. Two patients (3.6%) required temporary ileostomy because of leakage in very low colorectal anastomosis. In the literature reports protective ileostomy or colostomy rates vary from 0% to 5% after a partial bowel resection for severe endometriosis.^{16,17} A policy of avoiding temporary stoma seems appropriate in younger, healthy patients with nonmalignant disease.¹⁸

There were three anastomotic leakages (5.4%), two of them with rectovaginal fistula. The rectovaginal fistula occurred in two women who had concomitant vaginal and rectal resection without protective ileostomy. In the first case with rectovaginal fistula rectal re-resection and vaginal closure without ileostomy were performed through an enlarged Pfannenstiel incision. In the other two cases of anastomotic leakage we performed lavage, drainage through mini-laparotomy, and temporary ileostomy.

Because of bleeding in the lower pelvic region, laparotomy was performed later on the same day in 1 patient. The bleeding site was not identified; however, the bleeding ceased spontaneously.

In laparoscopic rectal resection an inadequate cutting angle may necessitate a long stapling line, which increases the risk for anastomotic leakage. Multiple applications of linear endostaplers may also increase this risk, although articulated linear staplers are now available.¹⁹

The average duration of the surgical procedure was 145 minutes (range, 125–245 minutes), which is consistent with other reports.²⁰ The mean hospital stay was 7 days (range, 5–10 days).

In 4 cases with small infiltrating nodules with diameter <1 cm, laparoscopic disk excision was performed. Landi et al.²¹ demonstrated good results with laparoscopic disk resection for bowel endometriosis using a circular stapler. The only limitation for this procedure is the size of the lesion, which should not exceed 2–3 cm and should not involve more than one-third to one-half of the total circumference of the rectum.

There was no recurrence of endometriosis at the site of original resection in any patient. This is an advantage of segmental bowel resection. The disk resection may not remove microscopic or multifocal disease. Kavallaris et al.²² found multifocal disease in 62% of rectal specimens. Anaf et al.²³ demonstrated that endometriosis infiltrates the bowel wall preferentially along the nerves, at a distance of up to 3 cm from the palpated lesions. The recurrence rate of rectal endometriosis is higher with disk resection (5%–74%) compared with partial bowel resection (0%–4%).^{24–26}

In our series 2 patients (3.6%) developed a stricture of the anastomosis, which was treated successfully with balloon dilatation. Strictures of the colorectal anastomosis occur in 3%–30% of all patients after low anterior rectal resection.²⁷

Eight out of 14 infertile patients became pregnant spontaneously, two of them twice, and two patients had a successful attempt of *in vitro* fertilization. The success rate was 57%. A similar success rate was observed by others with pregnancy rates between 43% and 100%.²⁰

In conclusion, we confirm that laparoscopic segmental colorectal resection for deep infiltrating endometriosis improves both gynecologic and digestive symptoms. The quality of life of our patients improved significantly. Successful pregnancies are possible after these surgical procedures. Since the beginning of the 1990s, several studies have considered laparoscopic colorectal resection for deep infiltrating endometriosis as the first-line treatment.^{8,28} Our team considers this approach very safe for the patients. The operation should be done by an experienced surgeon and gynecologist. However, all patients must be informed of the risk for potentially severe complications.

Disclosure Statement

No competing financial interests exist.

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