Histopathological extent of rectal invasion by rectovaginal endometriosis

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BACKGROUND: We aimed to evaluate the microscopic extent of endometriosis in surgical en-bloc specimens of vaginal skin, rectovaginal septum, cul-de-sac, and part of the rectosigmoid bowel. METHODS: From December, 1997 to October, 2001, 50 patients with the trias of intestinal pain, palpable disease in the rectovaginal septum, and laparoscopic diagnosis of endometriosis of the cul-de-sac and/or rectosigmoid colon underwent combined laparoscopic–vaginal en-bloc resection of the cul-de-sac with partial resection of the posterior vaginal wall and rectum with reanastomosis by minilaparotomy. All surgical specimens were histopathologically evaluated in a standardized fashion. RESULTS: The mean length of the bowel specimen was 7.48 cm. Endometriosis involved the serosa and muscularis propria in all patients, the submucosa in 17 patients (34%), and the mucosa in five patients (10%). After a mean follow-up of 32 months, 90% of patients reported a considerable improvement or were completely free of symptoms and the rate of recurrence was 4% (two patients). CONCLUSIONS: Partial bowel resection indicates the depth and multifocality of endometriosis affecting the recto-sigmoid colon. Such extensive surgery appears justified by the extent of the lesions and the long-term relief of symptoms achieved.

Key words: histopathological evaluation/rectovaginal endometriosis

Introduction

Rectovaginal endometriosis can be treated by ablative or resective surgery using laparoscopic, laparotomic, transvaginal or a combined approach (Martin, 1988; Reich et al., 1991; Candiani et al., 1992; Nezhat et al., 1992; Donnez et al., 1995; Possover et al., 2000). Involvement of the bowel by endometriosis may lead to bowel obstruction or bleeding (Fernandez et al., 2000; Hopkisson, 2000; Mosca et al., 2000; Musanda et al., 2000), but the majority of patients do not report rectal bleeding, and involvement of the bowel musosa is rarely found by rectosigmoidoscopy. Therefore, the majority of surgeons prefer an ablative procedure using either laser or local excision of the bowel wall (Gray, 1973; Wheeler and Malinak, 1989; Redwine, 1991; Donnez et al., 1995; Crosignani et al., 1996; Koninckx and Martin, 1997; Marcoux et al., 1997; Garry et al., 2000). By ablation and local excision, fertility may be more easily preserved, whereas in case series where bowel resection is performed hysterectomy rates vary between 43 and 76% (Gray, 1973; Coronado et al., 1990; Turnwald et al., 1998). In addition, endometriosis is a ‘benign disease’ and incomplete resection may not necessarily lead to recurrence.

There is no study which evaluates the histopathological findings of bowel specimens resected for rectovaginal endometriosis in a standardized fashion. Such data are mandatory in order to discuss the appropriate surgical approach. We evaluated the histopathological pattern of endometriosis in surgical specimens removed by en-bloc resection of rectovaginal endometriosis which included the adjacent part of the rectosigmoid in order to define the extent of disease.

Materials and methods

Between December 1997 and October 2001, 50 patients with the diagnosis of rectovaginal endometriosis underwent surgery at our Institution. By our definition all patients showed the trias of rectovaginal endometriosis: (i) bowel symptoms such as abdominal cramps, chronic obstipation, and/or painful defaecation; (ii) rectovaginal examination under anaesthesia suspicious for disease involving the bowel; and (iii) laparoscopic evaluation showing endometriosis in the cul-de-sac and/or on the rectosigmoid colon.

With a combined laparoscopic vaginal technique an en-bloc surgical specimen of the posterior vaginal wall, cul-de-sac, rectovaginal septum, and part of the rectosigmoid was obtained (Figure 1). The procedure is started by vaginal excision of the involved vagina which is left on the rectum followed by bilateral dissection of the para- and retrorectal space. Para- and retrosigmoidorectal spaces are developed laparoscopically along the coccygeosacral bone and medially of the pelvic splanchnic nerves toward the para- and retrorectal opening which had been developed transvaginally. Rectal transection is done using a laparoscopic stapling device caudally to the endometriotic lesion. Using a suprapubic minilapar-
otomy the bowel is eviscerated and transected cranial to the lesion, reintroduced into the abdomen, and a transanal circular stapler anastomosis (47 patients) or handsawn anastomosis with continuous sero-muscular sutures in two layers (three patients) is performed (Possover et al., 2000). Histopathology was performed in order to evaluate resection margins, multifocality and multicentricity, and growth pattern of endometriosis in the resected part of the bowel (Figure 2). The largest lesion was defined as the main lesion and all other lesions as satellite lesions. We took tissue sections from the main lesion and all satellite lesions. In addition, every 2 cm a tissue section was taken from the macroscopically normal bowel wall. Clean margins were defined as absence of endometriosis if the tissue rings from the circular stapler were free of endometriosis (94 specimens). In the three patients with handsawn anastomosis the aboral and oral resection margin of the bowel specimen were used for evaluating the resection status (Figure 2). The tissue sections taken from the bowel specimen encompassing an area of $1\times1$ cm were paraffin-embedded and three histological sections of $4 \mu m$ thickness were cut from the blocks and stained with haematoxylin–eosin. A total of 804 histological sections were evaluated for number, size, localization and extension of microscopic endometriotic lesions.

The resection length of the adjacent part of the rectosigmoid was 7.5 cm in 27 patients, 7.6–10 cm in four patients, and 10.1–21 cm in 19 patients. The mean distance of the anastomosis was 4 cm above the anus. Thus, 62% of resections included the rectum and 38% of resections the rectosigmoid colon. The area of the biggest endometriotic lesions was measured in each specimen using a microscope mounted with a measuring device.

Multifocal involvement was defined as presence of endometriotic lesions within a 2 cm area to the main lesion which was differentiated from multicentric involvement where endometriotic lesions were found $>2$ cm from the main lesion. This differentiation was done since a stapling anastomosis includes resection of a 2 cm area from the main

Figure 1. Sagittal section through the pelvis showing rectovaginal endometriosis.

Figure 2. Topographic definition of resection margins (aboral resection margin, oral resection margin), nomenclature of lesions, and site of tissue sections.
lesion. Thus, multifocal disease is resected with clear margins by the stapling technique which is, however, not the case for multicentric disease.

In May 2002, all patients underwent a telephone interview. The questionnaire asked about presence or absence of symptoms such as dyspareunia, dysmenorrhoea or bowel symptoms, history of fertility, and diagnosis of recurrence of disease. All demographic data such as age, menarche, duration of menstruation, fertility, use of nicotine, hormonal treatment, history of surgeries, symptoms of bowel and menstruation, histopathological data, and data of the telephone interview were registered in an electronic format (Excel; Microsoft).

**Results**

**Demographic data**

Eleven patients (22%) reported non-specific bowel symptoms, 24 patients (48%) reported obstipation, tenesmic pain or pain with defaecation, and 15 patients (30%) reported blood-stained defaecation or rectal bleeding during menstruation. With the exception of one patient, all reported dysmenorrhoea, 25 patients (50%) dyspareunia, and three patients (6%) dysuria. All but five patients had a history of previous surgery for endometriosis: 26 patients one laparoscopy, 13 patients two laparoscopies, three patients four laparoscopies, four patients five laparoscopies, seven patients one laparotomy, and one patient two laparotomies. Endometriosis in the cul-de-sac had been removed by local resection using CO2 laser in 15 patients, and by electro-surgery in an additional 30 patients. Thirty-one patients (62%) reported one previous hormonal treatment and six patients (12%) several previous hormonal treatments, of which use of GnRH analogue for >6 months was most common (24 patients, i.e. 48%). Mean age of patients was 29.3 years. 76% of patients had a history of primary sterility and 4% of secondary sterility. Six patients (12%) had one child and four patients (8%) had two children.

**Surgical data**

End-to-end anastomosis was performed in 47 patients using a circular stapler device and in three patients by sutures. Two patients experienced leakage of the colorectal anastomosis and underwent laparoscopic assisted protective ileostomy which could be taken down after 3 months in both patients.

**Histopathological data**

Endometriosis involved serosa and muscularis propria in all patients, invaded up to the submucosa in 17 patients, and reached the mucosa in five patients (Figure 3). The mesocolon was involved by endometriosis in four patients. Laparoscopically the rectum was always involved by endometriosis. Additional endometriotic lesions were identified after evisceration of the transected rectosigmoid colon by palpation.

Multifocal disease was found in 31 patients (62%) and multicentric disease in 19 patients (38%). Overall, six resection margins in a total of 100 tissue sections showed presence of endometriosis by microscopy. Since in two bowel specimens two resection margins were involved, this accounts for a total of four R1 resections. All patients with involvement of the oral and aboral resection margins (patients 21, 25, 36, 49) and all patients with involvement of the lateral resection margins (patients 19, 28, 39, 40) showed multicentric disease.

In each patient only the biggest endometriotic lesion was measured histopathologically: the size of the individual endometriotic lesion was ≤0.6 cm² in 91.8% and >0.6 cm² in 8.2%.

**Follow-up data**

After a mean follow-up of 32 months the majority of patients (72%) were free of symptoms (Table 1). Of 25 patients with dyspareunia, 20 patients (80%) were free of symptoms, four patients (16%) reported considerable improvement, and one patient (4%) found no change. Two patients (4%) reported recurrent disease in the bowel which was diagnosed by rectovaginal palpation and sigmoidoscopy. In both patients resection had been performed with histopathologically clean margins. One of the patients reported mild improvement of symptoms. Thirty-eight (76%) patients had a history of primary sterility of which 17 patients (44.7%) tried to become pregnant post-operatively and eight of these (47%) became pregnant: four patients delivered healthy newborns (in two patients IVF had been used), three patients had an abortion in the first trimester, and one patient was pregnant at the time of the interview.

**Discussion**

Rectovaginal endometriosis has to be differentiated from retrocervical endometriosis (Martin and Batt, 2001). Whereas in rectovaginal endometriosis the rectal wall is infiltrated, in retrocervical endometriosis the rectum is disease-free.

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<tr>
<td>Free of symptoms</td>
<td>36 (72)</td>
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<tr>
<td>Considerable improvement of symptoms</td>
<td>9 (18)</td>
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<tr>
<td>Mild improvement of symptoms</td>
<td>4 (8)</td>
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<td>Unchanged</td>
<td>1 (2)</td>
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<tr>
<td>Became worse</td>
<td>0 (0)</td>
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<td>Total</td>
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Rectovaginal endometriosis can be treated by bowel resection versus local excision or ablation respectively.

Partial bowel resection has been used for treatment of rectovaginal endometriosis in three major case series (Gray et al., 1973; Coronado et al., 1990; Turnwald et al., 1998). The extent of disease was not evaluated histopathologically in any of these studies.

In our series, all patients showed involvement of the bowel wall at least to the level of the muscular layer. Involvement of the serosa exclusively was not found in our patients. Therefore, superficial excision or ablation does not result in complete removal of disease in patients with rectovaginal endometriosis. In 62% of surgical specimens we found multifocal disease and in 38% we found multicentric disease. This shows that in more than one-third of patients a distance of 2 cm from the main lesion is not sufficient to obtain clean margins. There was no patient with a unicentric, unilocular endometriotic lesion. Thus, the extent of lesions cannot be macroscopically assessed with certainty and ≥2 cm of surrounding tissue must be removed in order to obtain clear margins in two-thirds of patients. In four patients (8%) involvement of the resection margins was found. Only 4% (two patients) developed recurrent disease. It remains to be seen whether additional patients will develop recurrence, especially since the telephone interview we used may have underdiagnosed recurrent disease. The two patients who reported clinical signs of recurrent disease were in the group of patients with clean margins.

In 45 of the 50 (90%) patients interventions were secondary, i.e. following laser or electrosurgical procedures. It may be speculated whether an incomplete first excision induces a rebound phenomenon and a more aggressive growth. History of unsuccessful ablative surgery in 90% of patients, the depth of infiltration, the multifocal or multicentric nature of disease, and involvement of resection margins in 8% of our patients indicate that resection with reanastomosis was most probably the best treatment option in these series. However, since we did not perform a systematic histopathological evaluation of the whole circumference of the involved bowel, we cannot rule out that some of our patients may have been candidates for a discord resection with removal of part of the muscularis or resection including the mucosa with suture of the defect.

The main argument against partial bowel resection and in favour of local excision or ablation is the rate of intra- and post-operative complications. Severe intra- or post-operative complications were reported in 15 and 17% respectively in studies with partial bowel resection (Coronado et al., 1990; Turnwald et al., 1998) compared with 4% in our study. In studies where local excision or ablation was performed, the complication rate varied between 1.2 and 24% (Donnez et al., 1995; Crosignani et al., 1995; Marcoux et al., 1997; Garry et al., 2000). Thus, there is no obvious difference in complications between resection and ablation. However, recurrence rate is significantly higher when local excision or ablation is performed: after partial bowel resection the rate of recurrence varies between 0% (Coronado et al., 1990) and 4% in our series as compared with 3.7, 5, 19, 32 or 74.7% in studies with local excision or ablation (Wheeler and Malinak, 1989; Redwine, 1991; Crosignani et al., 1996; Donnez et al., 1997; Koninckx and Martin, 1997). It may be concluded that, with similar complication rate and lower recurrence rate, local resection of the cul-de-sac with partial resection of the posterior vaginal wall and rectum is a valid therapeutic option. This conclusion, however, has to be made with caution: the patients included in the various studies might be different and any comparison could be rather a comparison of the surgeon than of the technique.

Our data show that, in patients with macroscopically visible endometriosis of the rectosigmoid colon and a history of bowel symptoms and positive rectovaginal examination, bowel resection with a distance of ≥2 cm from the main lesion is justified. This en-bloc resection can be done with complete preservation of the reproductive organs.

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