Clinical Study

Long-Term Outcome after Laparoscopic Bowel Resections for Deep Infiltrating Endometriosis: A Single-Center Experience after 900 Cases

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Received 3 November 2013; Accepted 1 April 2014; Published 29 April 2014

Academic Editor: Giulia Montanari

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Background. Laparoscopic bowel resections for endometriosis are safe and effective but only short-term follow-up has been evaluated. In the present study long-term outcome in terms of intestinal and urinary function, fertility, chronic pain, and recurrence was assessed. Materials and Methods. From January 2002 to December 2010 nine hundred patients underwent laparoscopic bowel resection for endometriosis, and on 774 (86%) a questionnaire was administered. Patients were divided into 3 groups on the strength of the operation date. Postoperative diarrhea, constipation, rectal bleeding, tenesmus, dyschezia, dysuria, dyspareunia, fertility, and recurrence of disease were assessed. Results. The median follow-up was 54 months (range 1–120). All the evaluated symptoms significantly improved over time, with \( P = 0.0001 \) for dyspareunia, constipation, and pelvic pain and \( P = 0.004 \) for diarrhea. Nonsignificant improvement was reported for dysuria and rectal bleeding (with \( P = 0.452 \) and \( P = 0.097 \), resp.). Conclusions. The present results confirm that bowel resections for endometriosis are correlated with an acceptable complication rate even at long-term follow-up and that symptoms significantly improve over time, except for rectal bleeding and dysuria, the latter associated with a neurological damage.

1. Introduction

Endometriosis is a benign disease but it can seriously worsen quality of life. Its incidence is quite high, affecting 6–10% of women in childbearing age [1, 2]. Deep infiltrating endometriosis (DIE) is a form of endometriosis in which the pathologic tissue can penetrate up to 5 mm under the surface of the affected structure [1, 2]. The incidence of DIE is reported in 20% of all cases of endometriosis and the gastrointestinal tract results involved in 5.3–12% [3, 4]. The most frequent localization is the rectosigmoid junction and it has been estimated in 65% of cases; other common localizations are the ileocaecal junction in 20% and the rectum in 15%. The endometriotic tissue can involve the submucosal layer but the infiltration of the mucosa is very rare.

Bowel endometriosis may cause severe symptoms such as diarrhea, constipation, abdominal pain, bleeding, dyschezia, and rarely bowel obstruction. The best therapeutic approach is still controversial but several studies have demonstrated that surgery offers improvement of symptoms, better quality of life, and acceptable postoperative fertility rates [5–7]. For this purpose it is essential to establish a long-term outcome to evaluate intestinal and urinary dysfunctions, quality of life, and fertility rate [8, 9].

Recently, a nerve-sparing approach laparoscopic bowel resection for DIE was proposed to preserve bladder, rectal, and sexual functions [10, 11].

Since Nezhat described in 2001 the first laparoscopic bowel resection for endometriosis [12], many studies have been published on this topic and recently, Darai et al. have...
demonstrated, in a prospective trial, that laparoscopy is a safe option in the treatment of bowel endometriosis and offers a high pregnancy rate and a good quality of life [13].

In our division, since January 2002, we performed 1023 colorectal resections for bowel endometriosis; after 10 years, on the basis of this experience, we decided to analyse retrospectively our results. The aim of this study was to investigate bowel and urinary dysfunction and fertility rate in a large series of bowel laparoscopic resection for DIE.

2. Materials and Methods

Between January 2002 and December 2010, 1023 women underwent laparoscopic bowel resections for DIE at the Departments of General Surgery and Gynecology, Ospedale “Sacro Cuore-Don Calabria,” Negrar, Verona. Discoid and transvaginal resections were excluded from the present study and 900 patients were considered eligible for the investigation.

All patients were postoperatively interviewed by telephone between January 2011 and March 2011 by three male surgeons, and a questionnaire was filled in forms for each patient, dividing the whole population into three subgroups of 300 patients; the first group included patients treated between 1 January 2002 and 31 March 2006, the second from 1 April 2006 to 1 February 2009, and the third up to 31 December 2010.

The questionnaire is made up of questions regarding intestinal and gynaecological symptoms: presence of diarrhea or constipation, rectal bleeding, postoperative pregnancy, dyspareunia, dysuria, and pelvic or back pain, evaluated using a 10-point visual analogue scale (0 = absent, 10 = unbearable) [14]. All the data obtained by the questionnaire were investigated and inserted in a computerized database.

One-way ANOVA was performed to compare all variables in the two study groups. Categorical variables were compared by using $\chi^2$ test. Wilcoxon Signed Rank test was adopted to compare paired scale variables. Statistical analyses were performed using SPSS for Windows 16.0 package (SPSS Inc., © Copyright IBM Corporation 2010 IBM Corporation, Route 100 Somers, NY).

3. Results

After a median follow-up of 54 months (range 1–120), 900 women were called by telephone; long-term follow-up data were available for 774 patients (86%), 210 for the first period (70%), 267 for the second (85%), and 297 for the third (99%). No significant differences in demographic data between the three groups were reported (Table 1). Median age was 27.5 (range 22–51) and median BMI (body mass index) was 23.7 (range 18.5–31.5). All women were at fertile age and 123 (15.8%) of them reported a previous pregnancy before surgery. Five hundred and eighty-three (64.8%) patients had previous abdominal surgery, laparotomy in 252 cases and laparoscopy in 331. The data related to the operation are reported in Table 2. Among the whole population (900
women), sixty-three percent of patients (567) underwent a rectosigmoid resection, 25% (225 patients) underwent a rectal resection, 5% (45 patients) underwent an ileo-caecal resection, 61 patients (6.8%) underwent a double resection (rectosigmoid and ileo-caecal), and 2 patients (0.2%) underwent a triple resection (rectosigmoid, ileal, and ileo-caecal). One hundred and fifty-six (21.3%) patients required an ileostomy. In 5 cases the ileostomy was still present at the time of follow-up. In 60 cases (7.7%) a ureteral reimplantation was performed. The results were divided per period and reported in Table 3. After the operation, we registered 128 (16.5%) pregnancies, among which 35 (5.3%) were in the nulliparous group that consisted of 651 women; twenty-four patients (3.5%) reported at least one miscarriage. Forty-eight patients were reported in the first period, 65 in the second, and 15 in the third. One hundred and sixteen patients (14.9%) reported dyspareunia (median VAS 6, range 1–10), 9 in the first period (4.2%), 29 in the second (10.8%), and 78 in the third (26.2%). Ninety-five percent of patients reported tenesmus in the first month following surgery but all of them described this symptom as completely settled at the time of follow-up. One hundred and sixty-two patients (21%) reported constipation, 18 in the first period (8.5%), 54 in the second (20.2%), and 90 in the third (30.3%); all of them underwent a rectosigmoid resection (157 anterior rectal resections with low anastomosis in 143 cases and ultralow in 14) except in 5 cases, 2 ileocolic resections and 3 combined ileo-colic and rectal resections. Fifty-seven (7.3%) patients reported diarrhea; 55 of them had a rectosigmoid resection and two an ileo-caecal resection. This symptom was present in 4 cases (1.9%) in the first period, in 16 cases (5.9%) in the second, and in 27 cases (9.1%) in the third. Forty-seven (6.0%) women reported mild rectal bleeding: one of them had an ileo-caecal resection and 46 had a rectal resection. This symptom was present in 19 cases (9.0%) in the first period, in 12 cases (4.5%) in the second, and in 16 cases (5.3%) in the third. Sixty-four (8%) women reported pelvic pain, 3 in the first period (1.4%), 18 in the second (6.7%), and 46 in the third (15.4%); median VAS was 6 (range 1–10). One hundred and fourteen (14.7%) women described dysuria, 31 in the first period (14.7%), 34 in the second (12.7%), and 49 in the third (16.4%); median VAS was 5.5 (range 1–10). Among the 60 patients who underwent a ureteral reimplantation, only 2 of them complained of this symptom. Twenty-three women (2.9%) reported a relapse; in 16 cases (2%) it involved the gynaecological apparatus, in 5 cases (0.6%) the urinary system, and in 2 cases (0.2%) the intestinal tract. Five of them (0.5%) were reoperated on but no bowel resection was necessary. At univariate analysis for the different periods, symptoms as dyspareunia, constipation, and pelvic pain statistically improved over time with $P = 0.0001$, as well as diarrhea with $P = 0.004$. As regards dysuria and rectal bleeding, no improvement was reported over time, with $P = 0.452$ and $P = 0.097$, respectively.

4. Discussion and Conclusion

Several studies demonstrate that colorectal resection for DIE is a safe and effective procedure with an acceptable postoperative complication rate and that it improves significantly quality of life; however, only short-term postoperative outcome has been evaluated [2, 4].

Many records analysed functional results after sphincter preserving colorectal resection, low anterior rectal resection, and abdominoperineal resection in treatment of rectal cancer [15]. In case of surgery for malignant disease the bowel function is related to the length of bowel resected, to preoperative chemoradiotherapy, and to the surgical technique applied as demonstrated by several studies [16]. Bowel function disorders, such as constipation and diarrhea, after colorectal resection for cancer are very common [17]. In case of colorectal resection for DIE the bowel dysfunction rate is significantly lower, probably because of the young age of the patients, because radiochemotherapy is not necessary, and because, in the majority of cases, the length of the resected colorectal segment is shorter and limited to the affected tract; in fact oncological radicality is not necessary.

Bowel movements disorders are difficult to evaluate since the latter depend on several factors among which the surgical technique can be considered the most important. Postoperative constipation can be correlated to the hypertension of the puborectalis sling, which can be frequently investigated by a radiological defecography. At our institution, patients who suffer from this type of dysfunction undergo a phystiatic evaluation and a biofeedback pelvic floor therapy, which proved to be very useful for many women. Very few patients complained of rectorrhagia in our series; among them no cases of recurrence were recorded. Probably this symptom is correlated to a concomitant proctological disease; in fact its incidence in the three periods is homogeneous and it is not influenced by the length of the follow-up.

The urinary disorders after colorectal resection for endometriosis worsen significantly quality of life and the incidence is reported between 0.5 and 19.5% [8, 9]. In our series patients who suffered from dysuria were 114 (14.7%) and its rate is homogeneous in the three periods. Many studies describe urinary dysfunctions after intestinal resection for endometriosis as for laparoscopic surgery for malignant diseases; they are most probably correlated to

| Table 1: Demographic data. |
|---------------------------|
| Age (years) | 27.5 (22–51) |
| BMI (Kg) | 23.7 (18.5–31.5) |
| Previous pregnancies | 123 (15.8%) |
| Previous abdominal surgery | 583 (64.8%) |

| Table 2: Types of operations. |
|-----------------------------|
| Rectosigmoid | 567 (63%) |
| Rectal | 225 (25%) |
| Ileoecal | 45 (5%) |
| Rectosigmoid + ileoecal | 61 (6.8%) |
| Rectosigmoid + ileoecal + ileal | 2 (0.2%) |
| Ileostomy | 156 (21.3%) |
| Ureteral reimplantation | 60 (7.7%) |
Table 3: Results.

|                               | Total 774 patients | First period January 2002–March 2006 (n = 210) | Second period April 2006–February 2009 (n = 267) | Third period March 2009–December 2010 (n = 297) | P value |
|-------------------------------|--------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|---------|
| Pregnancies                   | 128 (16.5%)        | 48 (22.8%)                                    | 65 (24.3%)                                    | 15 (5.0%)                                     | P < 0.0001 | S |
| Dyspareunia                   | 116 (14.9%)        | 9 (4.2%)                                      | 29 (10.8%)                                    | 78 (26.2%)                                    | P < 0.0001 | S |
| Constipation                  | 162 (21%)          | 18 (8.5%)                                     | 54 (20.2%)                                    | 90 (30.3%)                                    | P < 0.0001 | S |
| Diarrhoea                     | 57 (7.3%)          | 4 (1.9%)                                      | 16 (5.9%)                                     | 27 (9.1%)                                     | P = 0.004  | S |
| Rectal bleeding               | 47 (6.0%)          | 19 (9.0%)                                     | 12 (4.5%)                                     | 16 (5.3%)                                     | P = 0.097  | NS |
| Pelvic pain                   | 64 (8%)            | 3 (1.4%)                                      | 18 (6.7%)                                     | 46 (15.4%)                                    | P < 0.0001 | S |
| Dysuria                       | 114 (14.7%)        | 31 (14.7%)                                    | 34 (12.7%)                                    | 49 (16.4%)                                    | P = 0.452  | NS |

As regards complications as dyspareunia, constipation, diarrhea, and pelvic pain, these symptoms significantly improve over time, rising at a very low rate at long-term follow-up. In conclusion the present study confirms that bowel resections for endometriosis have an acceptable postoperative complication rate even at long-term follow-up and symptoms improve over time, although our data concern a very wide range of follow-up time, which can be considered as a bias. For this reason we believe that further studies are needed to confirm our results.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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