Accepted Manuscript

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PII: S0301-2115(18)31073-X
DOI: https://doi.org/10.1016/j.ejogrb.2018.10.057
Reference: EURO 10605

To appear in: *EURO*

Received date: 26 July 2018
Revised date: 29 October 2018
Accepted date: 30 October 2018

Please cite this article as: Raffaelli R, Garzon S, Baggio S, Genna M, Pomini P, Laganà AS, Ghezzi F, Franchi M, Mesenteric vascular and nerve sparing surgery in laparoscopic segmental intestinal resection for deep infiltrating endometriosis, *European Journal of Obstetrics and Gynecology* (2018), https://doi.org/10.1016/j.ejogrb.2018.10.057

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Mesenteric vascular and nerve sparing surgery in laparoscopic segmental intestinal resection for deep infiltrating endometriosis.

Concise title: Mesenteric sparing surgery in laparoscopic intestinal resection for endometriosis.

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ABSTRACT

Objective(s): To investigate Mesenteric vascular and nerve Sparing Surgery (MSS) as surgical laparoscopic technique to perform segmental intestinal resection for deep infiltrating endometriosis (DIE).

Study Design: Prospective cohort study between January 2013 and December 2016. Consecutive patients with suspected intestinal DIE underwent clinical and imaging evaluation to confirm intestinal involvement. Indications for radical surgery and surgical technique (intestinal resection versus shaving) were consistent with Abrão algorithm. Surgeons aimed to perform MSS in all the consecutive patients that required intestinal

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resection. MSS consist in mesenteric artery, branching arteries, and surrounding nerve fibers preservation by dissecting mesentery adherent to the intestinal wall. Data about history, preoperative and post-operative evaluation, surgery and complications were recorded. Symptoms were evaluated before and 30–60 days after surgery with numeric rating scale for pain. Constipation was evaluated with the Constipation Assessment Scale (CAS). Patients with diagnosis of irritable bowel syndrome, inflammatory bowel diseases, diverticulitis, and previous segmental intestinal resection were excluded.

Results: Sixty-two out of 75 (82.7%) consecutive women with intestinal endometriosis underwent laparoscopic segmental intestinal resection performed with MSS. Major complications that required repeated operation occurred in 4 cases (6.5%). Anastomotic leakage occurred only 1 case (1.6%). Dysmenorrhea ($p<.001$; $r = -0.86$), dyspareunia ($p<.001$; $r = -0.80$), dyschezia ($p<.001$; $r = -0.86$) and dysuria ($p<.001$; $r = -0.56$) were significantly improved after surgery. After an average of 33.1 months from surgery, severe constipation was reported only by two patients (3.6%) (CAS: 13 – 16). The median time form surgery to intestinal function recovery (flatus or stool passage) was one day. Logistic regression analysis showed constipation related to the distance from anal verge and time since surgery.

Conclusion(s): MSS in laparoscopic intestinal resection for DIE may be reproducible, safe and effective. MSS could be combined with pelvic nerve-sparing surgery as an effective approach to improve intestinal symptoms after radical surgery for DIE that requires segmental intestinal resection.

Keywords: Nerve-sparing surgery; Vascular-sparing surgery; Deep infiltrating endometriosis, Segmental intestinal resection; Constipation.

INTRODUCTION

Endometriosis is a chronic estrogen-dependent disease affecting 6–10% of women in reproductive age, characterized by the presence of endometrial-like tissue, glands and stroma, outside the uterine cavity. Despite many efforts, its exact pathogenesis has not been clearly identified (1–3). Deep Infiltrating Endometriosis (DIE) is the most aggressive form, occurring in 20% of the cases. In these cases, intestinal involvement has a prevalence of 8–12%, and colorectal implants represent the 90% of intestinal localizations

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of DIE (4). In this population, pain symptoms and intestinal dysfunctions play a detrimental role quality of life (QoL) (5–8).

Although medical treatment is able to improve symptoms, surgical approach has a key role for the management of DIE (9,10), with an overall 85% of women showing improvement of symptoms and recurrence rate lower than 5% (11). Nevertheless, radical surgery for DIE may cause functional complications (urine retention, constipation, sexual dysfunction) that could severely affect QoL after surgery. On that basis, pelvic nerve-sparing technique has been successfully proposed to reduce functional complications: in particular, the preservation of hypogastric plexus and splanchnic nerves leads to a reduced rate of abnormal intestinal movement after surgery (4,12,13).

However, intestinal denervation is still an issue in case of intestinal DIE (14). Different surgical approaches have been proposed to achieve radicality depending on intestinal wall involvement: on the one hand, segmental bowel resection has been associated with lower recurrence rate and higher symptoms improvement respect to other techniques (11,15);. on the other hand, concerns about functional outcomes are still debated when segmental intestinal resection is compared with more conservative surgery, such as the shaving of the nodule (14,16–19). Indeed, robust evidence suggests that postoperative improvement does not apply to all symptoms: in this regard, constipation was reported to improve less than dyschezia (18).

These data may be explained by the fact that inferior mesenteric artery (IMA) and its branches are surrounded by the autonomic nerve fibers running from the inferior mesenteric preaortic plexus into the left colon and rectum. Sectioning the IMA proximally may cause sympathetic denervation of the rectal stump and the descending colon. Therefore, preservation of mesenteric arteries and branching arteries, sectioning the mesentery near intestinal wall, reduces the risk of intestinal denervation and may improve postoperative intestinal functions (20,21). On that basis, some studies have addressed preservation of IMA, branching arteries, and surrounding nerve fibers in selected patients with sigmoid tumors and with benign intestinal disease, confirming that this approach reduces the incidence of defecatory disorders after left hemicolectomy (20,22).

Although more than 70% of women with DIE underwent segmental intestinal resection (19), to date a standard technique to perform this surgery is not established. Considering this significant gap, in this study we aimed to analyze the reproducibility, safety and efficacy of intestinal resection for DIE performed with

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Mesenteric vascular and nerve Sparing Surgery (MSS). Similarly to pelvic nerve-sparing technique that ias able to improve functional outcomes preserving hypogastric plexus and splanchnic nerves (12), MSS preserves arteries and surrounding autonomic nerves of mesenteric plexus, sectioning the mesentery near intestinal wall. The rationale behind this approach is to reduce intestinal denervation, aiming to improve postoperative intestinal function in patients that require intestinal resection for DIE (20,21).

MATERIALS AND METHODS

We performed a prospective cohort study, from January 2013 to December 2016, at the AOUI Verona, University of Verona (Verona, Italy). Consecutive patients with suspected intestinal DIE were evaluated by the same multidisciplinary team: a gynecological surgeon expert in endometriosis and a general surgeon with expertise in minimally invasive intestinal surgery. All women had underwent vaginal examination as well as transvaginal ultrasound and magnetic resonance imaging. Computed tomography based virtual colonoscopy was used to measure the length and the height of nodules and to confirm the presence of digestive tract stenosis, only in patients with suspected bowel stenosis and/or with incomplete evaluation of bowel involvement by previous techniques.

We followed a study algorithm, consistent with the one described by Abrão et al. in 2015 (4). When intestinal DIE was confirmed, indications for radical surgery were severe pain [Numeric Rating Scale for pain (NRS) with a score > 7] refractory to medical treatments (daily progestin/estro-progestin for at least 6 months) (23,24), symptoms of bowel obstruction (sub-occlusive or occlusive symptoms such as nausea and vomiting, colicky pain with abdominal distension, emission of small-caliber stool) and/or severe intestinal stenosis (≥ 60%) (25), concomitant ureteral stenosis, and infertility with two previous in vitro fertilization failures (26).

Segmental intestinal resection with anastomosis was performed in cases of inner muscularis layer or deeper involvement, multiple nodules, nodule ≥ 3 cm, non-rectal implants, failure of shaving. Shaving of endometriotic nodules was performed in cases of single small (< 3 cm) rectal nodule infiltrating less than outer muscularis layer. In all the consecutive patients that required intestinal resection for DIE, the surgeons aimed to apply the MSS technique as standard approach.

For the purpose of investigating the safety and efficacy of MSS, patients that underwent shaving or intestinal

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resection without MSS were excluded from the current report. Furthermore, we excluded patients with history of diagnosed irritable bowel syndrome, inflammatory bowel diseases, diverticulitis, and previous segmental intestinal resection.

We included consecutive patients that underwent laparoscopic radical surgery for DIE with segmental intestinal resection performed with MSS. The procedures were performed using a 10-mm laparoscope through umbilical trocar and three 5-mm ancillary trocars placed in suprapubic, left iliac fossa, and right iliac fossa. When an endometrioma was present, stripping of endometrioma and temporary ovarian suspension were performed. Complete excision of all visible endometriotic lesions was obtained working retroperitoneally in healthy tissue using 5 mm bipolar scissors with nerve-sparing approach, according to the technique described by Redwine & Wright (8) and modified by Minelli's group (12,17). The intestinal surgery was performed by the general surgeon after the placement of a fourth trocar on the right side of the abdomen and the substitution of the 5-mm trocar in the right iliac fossa with a 12-mm trocar. In case of colorectal involvement, exposition of both pararectal spaces medial to the ureters and intrafascial dissection down, posteriorly to the cervix, in the rectovaginal septum were performed as deep as needed with Ultracision Harmonic Scalpel (UHS). Afterwards, the recto-sigmoid colon was mobilized by incising peritoneum along the white line of Toldt as much as needed to obtain adequate length to perform a tension-free anastomosis. MSS was performed with UHS, a window was made in the mesentery proximal and distal to the endometriotic lesion near the recto-sigmoid wall. Subsequently, the recto-sigmoid segment was detached from mesentery by performing dissection adherent to the intestinal wall, preserving mesenteric vascularization and innervation. The distal resection was performed with a linear stapler 1-2 cm below the endometriotic nodule, while the proximal one was performed after exteriorization of the colon through a mini-laparotomy (mini-Pfannenstiel). The end-to-end anastomosis was performed transanally with a 28- or 32-mm circular anastomosis following the Knight & Griffen double stapling technique (27). Anastomosis integrity was finally evaluated with pneumatic proof. Colorectal anastomoses were classified as ultralow (< 4 cm from the anal verge), low (4-8 cm from the anal verge), and high (> 8 cm from the anal verge). In case of ileal and/or cecal involvement, if necessary, the proximal colon was mobilized: with UHS, a window was made in the mesentery proximal and distal to the endometriotic lesion near the ileocolic wall, and dissection was performed and completed adherent to the intestinal wall; both distal and proximal resections were

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performed with a linear stapler 1-2 cm below and above the endometriosis nodule; the latero-lateral ileo-ileal or ileo-colic anastomosis was performed laparoscopically with linear stapler and reinforcing suture. A drainage was left in place. Pre- and post-operative management has already been reported in previous studies (12,28,29).

Data about history, preoperative evaluation, surgery, post-operative recovery, complications, and post-operative evaluation (30 – 60 days after surgery) were recorded. Dysmenorrhea, dyspareunia, dyschezia, and dysuria were evaluated before and 30 – 60 days after surgery with NRS for pain. Patients taking hormonal therapies were counseled to stop treatment at least 3 mouths before surgery (wash-out period), in order to avoid any bias regarding pain evaluation. Moreover, any post-surgical hormonal therapy, when indicated, was started after post-operative follow up and pain symptoms evaluation at 30 – 60 days after surgery. Patients that underwent bilateral adnexectomy and/or total hysterectomy were not evaluated for dysmenorrhea. Dyspareunia was not evaluated in patients with vaginal surgery that avoided sexual intercourses for 90 days. Intraoperative staging of endometriosis was evaluated with the revised American Fertility Society (rAFS) classification (30). Intra and postoperative complications were standardized using the Clavien-Dindo classification. Constipation was evaluated only after surgery with the Constipation Assessment Scale (CAS), recalling patients between January and March 2018, with the aim to asses bowel function after segmental intestinal resection (31).

Statistical Analysis

Descriptive statistics were reported according to data distribution as mean ± standard deviation (SD), or median and range for continuous variables; the categorical variables were reported as absolute number and percentage (%). Wilcoxon signed-rank test and Friedman test were used to compare non-parametric and ordinal variables, as appropriate. The effect size (r) was interpreted based on Cohen's criteria of 0.3 and 0.5 for a medium and large effect, respectively. Proportions were analyzed with Fisher's exact test. Spearman correlation coefficient was used to assess linear correlation between variables. Logistic regression analysis was used to investigate the relationships between a number of covariates and the occurrence of constipations using $p<0.1$ as statistically significant; p-values <0,05 were considered statistically significant in other tests.

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Ethics and methodological standards

The design, analysis, interpretation of data, drafting and revisions conform the Helsinki Declaration and the RECORD (reporting of studies conducted using observational routinely-collected health data) statement, available through the EQUATOR (enhancing the quality and transparency of health research) network (www.equator-network.org). The study was approved by the independent Institutional Review Board (IRB) of AOUI Verona, University of Verona (Verona, Italy). Each patient enrolled in this study signed an informed consent for all the procedures and to allow data collection and analysis for research purpose. The study was non-advertised, and no remuneration was offered to encourage patients to give consent for collection and analysis of their data. The study was not founded.

RESULTS

Intestinal DIE was diagnosed in 75 patients without previous bowel disease or bowel surgery. All patients underwent surgery between January 2013 and December 2016. Thirteen patients were excluded: three patients underwent intestinal resection performed without MSS based on general surgeon's decision to achieve adequate intestinal mobilization, and ten patients underwent shaving of endometriotic nodule because a single small (< 3 cm) rectal nodule infiltrating less than outer muscularis layer was intraoperatively diagnosed. Sixty-two patients (82.7% of patients with intestinal endometriosis and 95.4% of patients that underwent intestinal resection for DIE) underwent laparoscopic segmental intestinal resection for DIE with MSS (**Table 1**). **Table 2** describes intraoperative and early postoperative data. Mean rAFS score was 74.6 (SD 33.6). Sixty-one (98.4%) patients underwent complete excision of endometriosis. Single segmental intestinal resection was performed in 60 cases (96.8%), while multiple segmental intestinal resections were performed in 2 (3.2%) patients. In both patients, segmental colorectal resection was associated to segmental ileocecal resection. The median size of intestinal endometriotic implants was 5.0 cm (IQR 3.0 – 7.0; range 2.0 – 15.0), with a median of one implant per patient (range 1 – 4). The median length of the resected intestinal segments was 10.0 cm (IQR 8.0 – 15.0; range 4.0 – 20.0). The median distance of the distal resection from the anal verge was 8.0 cm (IQR 6.0 – 12.0; range 2.0 – 20.0). There was a significant direct correlation between the length of resected intestinal segment and the size of endometriotic implant (Spearman coefficient = 0.73; p<.001). **Table 3** summarizes the performed procedures.

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Temporary colostomy or ileostomy were performed in 5 (8.1%) cases, when colorectal anastomosis was ultralow (≤5.0 cm from the anus). In these cases, stomas were closed after a median of 49 days (range 32 – 95 days). Permanent stomas have not been necessary. Laparotomic conversion occurred in 1 (1.6%) case because of severe adhesions. No intraoperative complications were reported, such as uncontrolled bleeding, and ureteral or intestinal injuries. In one case, the maximum blood loss of 1450 mL was related to the extensive and long surgical procedure for severe DIE, without acute uncontrolled bleeding. Heterologous blood cell transfusions were not required in any case. The maximum hemoglobin level drop was -6.5 mg/dl in a patient with high hemoglobin level before surgery. The hemoglobin level dropped to 7.5 mg/dl, and for the clinical stability, this patient did not require blood transfusion.

Table 4 lists major complications. Overall, total postoperative complications were 8 (12.9%): fifty percent of the complications required surgical management (4/62; 6.5%). No patient required bladder evacuation by self-catheterization. Using the Clavien-Dindo classification, 60/62 patients (96.8 %) were classified as grade 1, and 2/62 patients (3.2 %) as grade 3B.

The median follow-up was 45 days (range 30 – 60). For all the patients [53/62 (85.5%) for dysmenorrhea, and 49/62 (79.1%) for dyspareunia], we found a significant improvement in symptoms (Wilcoxon signed-rank test). Dysmenorrhea ($p<.001$; $r = -0.86$) and dyspareunia ($p<.001$; $r = -0.80$) were significantly lower after surgery, as well as dyschezia ($p<.001$; $r= - 0.86$) and dysuria ($p<.001$; $r= - 0.56$). Values of pain symptoms before and after surgery are reported in **Table 5**.

Fifty-six women (90.3%) underwent constipation assessment (six patients were not contactable). Mean follow up interval was 33.1 months (SD 11; range 12.8 – 53.7). Constipation affected 14 (25%) patients. As showed in **Figure 1**, severe constipation (CAS 13-16) was reported in 2 (3.6%) patients. Mild (CAS 1 – 6) and moderate (CAS 7 – 12) constipation were found in 6 (10.7%) patients, respectively. In order to evaluate the independent contribution of endometriosis and surgical procedure on the occurrence of constipation after surgery, age, rAFS score, size of intestinal endometriotic implant, distance from anal verge, intensity of dyschezia before surgery, performed hysterectomy, and time since surgery were entered simultaneously into a logistic regression model. Resected intestinal segment length was excluded because correlated to endometriotic implant size. Distance from anal verge (cm, adjusted OR = 0.79, 90% C.I. = 0.63 – 0.98) and

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time since surgery (months, adjusted OR = 0.91, 90% C.I. = 0.84 – 0.99) remained the only predictors of constipation (**Table 6**).

COMMENT

The best results in terms of recurrence rate and improvement of symptoms in intestinal DIE are achieved by segmental intestinal resection (11,16,17,19). Nevertheless, bowel symptoms may persist even after surgery (18,32), although nerve-sparing techniques preserving hypogastric plexus and splanchnic nerves have been successfully proposed to reduce functional complications after surgery for DIE (urine retention, constipation, sexual dysfunction) (4,12,13).

Intestinal denervation is still an issue because sectioning the IMA and surrounding autonomic nerve fibers from inferior preaortic plexus may cause sympathetic denervation of the rectal stump and the descending colon (14,20,21). On that basis, some studies have addressed preservation of IMA, branching arteries, and surrounding nerve fibers in selected patients with sigmoid tumors and in patients with benign disease showing improved postoperative intestinal function (20,22). The preservation of mesenteric arteries and branching arteries, sectioning the mesentery near intestinal wall, may reduce the risk of intestinal denervation after intestinal resection and may explain the reported improved postoperative intestinal function. Considering this rationale, the preservation of IMA was recommended to reduce the incidence of defecatory disorders after left hemicolectomy for benign disease (22).

In endometriosis, segmental intestinal resection is not standardized, and different surgical techniques could be performed according to the clinical advice of each surgeon (15,33). In the case-control study investigating the impact of different surgical approaches on postoperative complications by Milone et al. (33), the occurrence of post-operative complications was not influenced by surgical technique; nevertheless, IMA ligation was associated with a higher incidence of intestinal dysfunction after surgery.

Our study reports a series of consecutive women underwent intestinal resection for DIE performed with standardized MSS technique. The surgeons were able to perform MSS in the 95.4% of patients that underwent intestinal resection, allowing to confirm the reproducibility of this approach as a potential standard technique to perform intestinal resection for intestinal DIE. Nevertheless, the three cases in which

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intestinal resection was performed without MSS may suggest that the objective to achieve adequate intestinal mobilization could limit the applicability of MSS approach.

Regarding safety, the overall complications rate was 12.9%. In particular, complications requiring further surgery occurred in 6.5% of cases, and urinary tract injury were the most frequent. Anastomotic leakage rate was 1.6%, supporting that MSS does not seem to be associated with a lower rate of anastomotic leakage (34). All these results are consistent with those reported in the literature for segmental intestinal resection performed without a standard technique, and they may support the safety of MSS (9,16,19,28,33). Our results report an improvement of pain symptoms after radical surgery for DIE and segmental intestinal resection performed with MSS. The obtained large effect size may confirm the good results in pain relief after intestinal resection and in general after radical surgery for endometriosis as reported in the literature (11,16,17,19,35). In our study, the large effect size achieved by surgery could be explained by the severe endometriosis that characterized women of the study population, as showed by the mean rAFS score. With a mean follow-up of 33.1 months, we reported severe constipation only in two patients (3.6%, 95% CI 0.4 – 12.3%), and the logistic regression showed that constipation prevalence decreases over time since surgery and increases with lower distance from anal verge. Intestinal function resumed in a median of one day after surgery and no cases of early constipation were recorded. These results suggest a low rate of intestinal dysfunction after MSS, potentially lower than the ones reported in other series and reviews; nevertheless, only few series reported data about this topic, and in most of cases with a short-term evaluation and different evaluation methods (12,14,18,28).

Our results may confirm MSS as safe and effective surgical technique to perform intestinal resection for DIE, limiting intestinal dysfunctions after surgery. The procedures performed by the same expert surgeons, with standardized surgical indications, and standard preoperative and postoperative management reinforce the results. Moreover, a long constipation follow-up was rarely reported. Nevertheless, the absence of a control group and the small sample size prevent to draw definitive conclusions about the safety, effectiveness on pain symptoms and improvements of intestinal dysfunction after segmental intestinal resection compared to other technique. Considering also the small sample size, we take the opportunity to solicit future controlled trials with larger population in order to evaluate the outcomes of MSS in case of DIE with bowel involvement.

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Conclusion

Our findings confirm that segmental intestinal resection for DIE performed with MSS is feasible in the majority of cases and suggest that it might be a safe and effective approach. Furthermore, our results suggest that MSS might be able to improve intestinal symptoms and dysfunctions after segmental intestinal resection for DIE, preserving mesentery arteries and surrounding autonomic nerve fibers that reduces bowel denervation (22,33). Nevertheless, the absence of control group does not allow to draw a firm conclusion. On that basis, prospective controlled studies are necessary to evaluate the outcomes of MSS in case of DIE with bowel involvement.

FUNDING

None

DISCLOSURE OF INTEREST

The authors have no proprietary, financial, professional or other personal interest of any nature in any product, service or company. The authors alone are responsible for the content and writing of the paper.

AUTHORS' CONTRIBUTION

PP and MG performed the surgeries; SG and SB collected and analyzed data; RR and SG wrote the manuscript, which was edited by ASL and FG; MF supervised and lead the development of the study.

All the authors conform the International Committee of Medical Journal Editors (ICMJE) criteria for authorship, contributed to the intellectual content of the study and gave approval for the final version of the article.

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FIGURE LEGEND

Figure 1. Constipation Assessment Scale.

Item	No problem	Some problem	Severe problem
Abdominal distention or bloating	0	1	2
Change in amount of gas passed rectally	0	1	2
Less frequent bowel movements	0	1	2
Oozing liquid stool	0	1	2
Rectal fullness or pressure	0	1	2
Rectal pain with bowel movement	0	1	2
Small stool size	0	1	2
Urge but inability to pass stool	0	1	2

TABLES LEGEND

Table 1. Baseline characteristics of study population.

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Table 1.Baseline characteristics of study population.

Variables	**n = 62**
Age (mean, SD)	36.5 (5.00)
BMI (mean, SD)	22.0 (2.83)
Parity	
0	38 (61.3)
1	14 (22.6)
2	10 (16.1)
Previous surgery for endometriosis	22 (35.5)
Main indication for surgery	
Infertility	11 (17.7)
No clinical response to previous medical therapy	27 (43.5)

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Ureteral stenosis	4 (6.5)
Intestinal stenosis (≥60%)	20 (32.3)

Nominal variables are described with number of cases (n) and percent (%); Standard deviation (SD).

Table 2. Intraoperative and early postoperative data

Variables	**n (%)**		
rAFS stage			
II	2 (3.2%)		
III	7 (11.3%)		
IV	53 (85.5%)		
Intestinal DIE			
Intestinal lesions ≥ 3 cm	53 (85.5)		
Multiple intestinal lesions	13 (21.0)		
Variables	**Median (IQR)**	**Range**	**Mean (SD)**
Intraoperative			
Blood loss (mL)	200 (100 – 275)	50 – 1450	
Hemoglobin variation (g/dL)	-2.2 (-2.6 – -2.4)	-6.5 – -0.3	
Operative time (min)			216.4 (80.1)
Postoperative			
Drainage (days)	5 (4.75 – 6)	4 – 7	
Foley catheter (days)	1 (1 – 1)	1 – 2	
Start of post-operative feeding (semi-solid)	1 (1 – 2)	1 – 3	
Time to resume urinary function (days)	1 (1 – 1)	1 – 2	
Time to resume intestinal function (days)	1 (1 – 1)	1 – 5	
Time to discharge (days)	6 (5 – 7)	3 - 22	

Standard deviation (SD); Interquartile range (IQR); revised American Fertility Society (rAFS); Deep infiltrating endometriosis (DIE).

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Table 3. Performed procedures

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Procedure	**n (%)**
Adhesiolysis	38 (61.3)
Cystectomy	21 (33.9)
Unilateral adnexectomy	6 (9.7)
Bilateral adnexectomy	4 (6.5)
Monolateral salpingectomy	12 (19.4)
Bilateral salpingectomy	4 (6.5)
Total hysterectomy	9 (14.5)
Rectovaginal septum endometriosis resection	54 (87.1)
Partial vaginal resection	13 (21.0)
Full-thickness bladder resection	3 (4.8)
Unilateral/Bilateral ureteral lysis	29 (46.8)
Ureteral anastomosis	0 (0.0)
Preoperative Ureteral stenting	1 (1.6)
Intraoperative Ureteral stenting	2 (3.2)
Appendectomy	7 (11.3)
Diaphragmatic endometriosis resection	3 (4.1)
Ileocolic resection	6 (9.7)
Rectosigmoid resection	58 (93.6)

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Table 4. Major complications

Complication	**n (%)**	**Re-intervention n (%)**
Fever	1 (1.6)	
Bladder/Vaginal Fistula	1 (1.6)	1 (100)
Ureteral lesion	3 (4.8)	1 (33.3)
Stoma stenosis	1 (1.6)	1 (100)
Hernia	1 (1.6)	
Anastomotic leakage	1 (1.6)	1 (100)

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Table 5: Preoperative and postoperative pain symptoms

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	Dysmenorrhea (n = 53/62)		**Dyspareunia (n = 49/62)**		**Dysuria (n = 62/62)**		**Dyschezia (n = 62/62)**	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Median	8	0	5	0	0	0	8	0
Max	10	6	10	7	10	3	10	5
Min	0	0	0	0	0	0	3	0
***N.* NRS > 7**	46	2	30	1	9	0	52	0
% NRS > 7	86.8	3.8	48.4	1.6	14.5	0	83.9	0
p	<.001		<.001		<.001		<.001	

Numeric Rating Scale (NRS) for pain.

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Table 6: Contribution of endometriosis and surgical procedure on the occurrence of constipation after surgery: logistic regression

	p	OR	90% CI – inferior OR	90% CI – superior OR
Distance from anal verge (cm)	**.088**	**0.79**	**0.63**	**0.98**
Age (year)	.787	0.98	0.85	1.12
Time since surgery (months)	**.057**	**0.91**	**0.84**	**0.99**
rAFS score	.649	1.01	0.98	1.03
Intensity of dyschezia before surgery	.916	1.01	0.84	1.23
Size of intestinal DIE implant (cm)	.205	1.21	0.95	1.54
Hysterectomy	.895	0.84	0.10	7.17
Constant	.550	9.88		

Odds ratio (OR); Confidence interval (CI); revised American Fertility Society (rAFS); Deep Infiltrating Endometriosis (DIE)

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