

Surgery for deep endometriosis without involvement of digestive or urinary tracts: do not worry the patients!

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Objective: To report postoperative outcomes after surgery for deep endometriosis without involvement of the digestive or urinary tracts.

Design: Retrospective study using data prospectively recorded in the North-West Inter Regional Female Cohort for Patients with Endometriosis (CIRENDO) database.

Setting: University tertiary referral center.

Patient(s): One hundred thirty consecutive patients whose follow-up ranged from 1 to 6 years.

Intervention(s): Laparoscopic excision of deep endometriosis nodules.

Main Outcome Measure(s): Postoperative complications were recorded in the CIRENDO database and medical charts. Postoperative digestive function was assessed using standardized gastrointestinal questionnaires: the Gastrointestinal Quality of Life Index and the Knowles-Eccersley-Scott Symptom Questionnaire.

Result(s): Deep endometriosis nodules involved uterosacral ligaments, rectovaginal space, and vagina and spared the bowel, the bladder, and the ureters. Nodule size was <1 cm, 1–3 cm, and >3 cm in diameter in 20.8%, 64.6%, and 14.6% of cases, respectively. Clavien-Dindo 1, 2, and 3b complications occurred in 0.8%, 4.6%, and 5.4% of cases, respectively. Among Clavien-Dindo 3b complications, most involved pelvic hematoma. Gastrointestinal scores revealed significant improvement in digestive function or defecation pain at 1 and 3 years after surgery. The pregnancy rate was, respectively, 43.3% and 56.7% at 1 and 3 years postoperatively, among which 66.7% and 64.7% were spontaneous conceptions.

Conclusion(s): Our data suggest that surgery for deep endometriosis without involvement of the digestive or urinary tracts provides a low rate of postoperative complications and satisfactory fertility outcomes. (Fertil Steril® 2018;109:1079–85. ©2018 by American Society for Reproductive Medicine.)

Key Words: Deep endometriosis, digestive function, fertility, pain, postoperative complications, pregnancy

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The main goal of deep endometriosis surgery is to relieve pain and unpleasant symptoms, improve quality of life, and minimize the risk of postoperative complications and functional disorders. However, when deep endometriosis involves the digestive and the urinary tracts, surgery may be followed by a rate of immediate complications or functional unfavorable outcomes that cannot be overlooked (1, 2). On the other hand, deep severe endometriosis always results

from the development of deep endometriosis nodules progressively growing for several years (3, 4). In fact, nobody is born with stage 4 endometriosis (5), and deep endometriosis is rare in adolescents, suggesting that it occurs progressively during adult life (6). In women with major lesions, such as those responsible for bowel occlusions or atrophy of the kidney, the disease could probably have been diagnosed and managed at earlier stages (7). Early management of endometriosis could also lead to lower rates of postoperative complications; however there is a lack of specific data in the literature on this topic. The surgery of deep endometriosis involving the digestive tract, the bladder, and the ureters has been evaluated in the literature through a myriad of retrospective case series, most of them noncomparative (8). However, there are fewer data on patients managed for deep endometriosis but free of digestive and urinary tract involvement; and yet, these locations represent most deep lesions (9).

The aim of our case series was to assess postoperative complications, improvement of pelvic pain, digestive complaints, and fertility outcomes in a series of consecutive patients managed by surgery for deep endometriosis without involvement of the digestive or urinary tracts.

MATERIALS AND METHODS

We included consecutive patients managed by surgery for deep endometriosis without involvement of the digestive or urinary tracts in the Department of Gynecology and Obstetrics of Rouen University Hospital (France) from June 2009 to December 2014, respecting a minimal follow-up of 12 months. Inclusion criteria were deep endometriosis revealed by clinical examination, transvaginal ultrasound, and magnetic resonance imaging (MRI), intraoperatively confirmed (Supplemental Fig. 1, available online); the involvement of the digestive or urinary tracts was ruled out by preoperative assessment and laparoscopy. Patients presented with at least one deep nodule located on the vagina, uterosacral ligaments, or parameters, sparing the bowel, the bladder, and the ureters.

Patients were prospectively enrolled in the CIRENDO database (the North-West Inter Regional Female Cohort for Patients with Endometriosis), a prospective cohort financed by the G4 Group (The University Hospitals of Rouen, Lille, Amiens, and Caen, France) and coordinated by the corresponding author of the present study (H.R.). Information was obtained from surgical and histologic records and from self-questionnaires completed before surgery. Data recording, patient contact, and follow-up were carried out by a clinical research technician. Postoperative follow-up was based on data from the self-questionnaires completed at 1 and 3 years. Prospective data recording and analysis were approved by the French authorities Commission Nationale de l'Informatique et des Libertés (the French data protection commission) and Comité Consultatif pour le Traitement de l'Information en matière de Recherche dans le domaine de la Santé (the advisory committee on information technology in healthcare research).

One senior gynecological surgeon with experience in surgery of deep endometriosis made decisions on the type

of surgery to carry out. Postoperative treatment by continuous contraceptive pill intake in women not intending to conceive was systematically recommended.

The surgery was performed laparoscopically (Video 1). Ureterolysis was usually the first step of the surgery, followed by the opening of pararectal spaces on contact with lateral rectal walls using plasma energy. Once the rectum was pushed upward, the excision of deep endometriosis nodules was done using plasma energy, close to the macroscopic limits of the fibrous lesions and sparing the hypogastric nerves, the inferior hypogastric plexus, and the splanchnic nerves at least on one pelvic side. The deep endometriotic nodules were removed along with the vaginal cul de sac, the uterine torus, and the uterosacral ligaments whenever required. Ovarian endometriomas were managed by ablation using plasma energy.

Postoperative complications, fertility outcomes, and recurrences were recorded in medical charts and the CIRENDO database. Complications were recorded using the Clavien-Dindo classification (10).

When recurrence of endometriosis was suspected on the basis of recurrent pelvic or digestive complaints and/or clinical examination, patients underwent MRI assessment. Then patients with symptomatic evidence of deep endometriosis and inefficacy of medical therapy were offered a second surgery.

Postoperative digestive function was assessed using two gastrointestinal standardized questionnaires, the usefulness of which has previously been discussed (11, 12). For diagnosis of constipation we used the Knowles-Eccersley-Scott Symptom Questionnaire (KESS) (11), composed of 11 individual items with a maximum of 39 points. The KESS questionnaire was designed in such a way as to be completed in less than 5 minutes. Each question has four or five possible answers, scored on an unweighted linear integer scale to produce a range of between 0 and 3 or 0 and 4 points. Lower scores represent symptom-free states, whereas higher scores represent increased symptom severity. The KESS score differentiates patients with constipation for whom overall values are >10 from healthy controls for whom the median value averages 2 (range, 0–6).

The Gastrointestinal Quality of Life Index (GIQLI) (12) is a self-administered questionnaire including 36 questions concerning digestive symptoms, physical status, emotions, social dysfunction, and effects of medical treatment. Consequently, it not only includes questions on gastrointestinal symptoms but also on other aspects of quality of life and has been validated for various gastrointestinal diseases. The 36 items of the GIQLI are scored from 0 to 4, with the total score ranging from 0 (worst) to 144 (best quality of life). Total score median values vary around 126 for healthy controls.

Women were advised to take continuous contraceptive pill until menopause, unless they intended to get pregnant. In patients with pregnancy intention, full assessment was performed before discontinuation of contraception, on the basis of biological assessment and symptomatology.

Statistical analysis was performed using Stata 9.0 software (StataCorp, College Station, TX). Variables were

compared using either the Kruskal-Wallis test (continuous variable) or the Fisher exact test (qualitative variables). The analysis of intraoperative findings, surgical procedures, and postoperative complications was stratified on three distinct groups according to nodule size (>1 cm, 1–3 cm, and >3 cm). A *P* value of <.05 was considered statistically significant. The present case series study was approved by the Institutional Ethics Committee for Non Interventional Research.

RESULTS

We enrolled 130 patients managed for deep endometriosis sparing the colon, rectum, and urinary tract from June 2009 to December 2014. The flow diagram of the study is presented in Figure 1. Mean postoperative follow-up was 45.9 months. During the same period, 241 patients were managed for deep endometriosis infiltrating the bowel and 66 for deep endometriosis of the urinary tract and were not enrolled in our series (13, 14).

Mean age of patients (\pm SD) was 33 ± 6.6 years at the time of inclusion, with a body mass index around 23.1 ± 4.5 kg/m². Primary dysmenorrhea affected 121 patients (93.1%). A majority of patients were nullipara: 89 (68.5%). Sixty-five patients (50.4%) had various antecedents of gynecological surgery (14 laparotomies, 51 laparoscopies) for pelvic pain, infertility, or ovarian cysts.

Table 1 presents baseline main pain symptoms related to pelvic endometriosis. Despite the absence of bowel involvement, the patients presented with various digestive complaints, and overall values of KESS and GIQLI scores revealed high rates of constipation and impaired gastrointestinal quality of life (Table 2). There was significant improvement in overall values of GIQLI score and embarrassment by bowel frequency at 1 and 3 years, and of KESS score at 1 year.

Table 3 presents intraoperative findings, surgical procedures, and postoperative complications. Severe postoperative complications were rare; however, they required a second surgical procedure under general anesthesia in 5.4% of cases (Clavien 3b complications). The main postoperative complications were essentially pelvic hematoma with immediate favorable postoperative outcomes.

Postoperative outcomes are presented in Tables 1 and 2. Despite an improvement recorded at 1 year, the KESS score failed to show significant improvement in constipation 3 years after surgery. However, the GIQLI score showed a significant improvement in overall gastrointestinal quality of life, abdominal pain, and bowel frequency.

We recorded one patient with postoperative deep endometriosis recurrence, requiring a second surgical procedure 2 years after inclusion in the study (0.8%). We recorded 14 re-interventions for hysterectomy (7 cases), adhesiolysis (3 cases), laparoscopic assessment of recurrent pelvic pain (2 cases), endometrioma ablation (1 case), and oophorectomy (1 case).

Among 120 patients followed up over 1 year, 52 (43.3%) attempted to conceive during the first year of follow-up, resulting in 27 pregnancies (52%), among which 18 (66.7%) were spontaneous.

Among 84 patients followed up over 3 years, 30 (35.7%) attempted to conceive during the interval from 1 to 3 years, resulting in 17 pregnancies (56.7%), among which 11 (64.7%) were spontaneous. Thus, the cumulative pregnancy rate 3 years after surgery was 53.7%, whereas spontaneous conception was recorded in 66% of patients. Mean conception time after surgery was 16.6 months.

DISCUSSION

Our study demonstrates that surgical management of patients presenting with deep endometriosis without involvement of the digestive or urinary tracts provides a low rate of postoperative complications and satisfactory fertility outcomes. When the patient reports preoperative digestive complaints, the excision of deep endometriosis nodules sparing the digestive tract does not automatically improve these symptoms. The low risk of severe postoperative complications, short operative time, and overall postoperative improvement of pain are arguments challenging the policies refuting the surgery of symptomatic deep nodules on the basis of presumed intra- and postoperative risks.

Our study presents several weaknesses. One of them concerns the lack of a control group allowing for comparison of complications rates. Although our database includes a large number of patients with various localizations of endometriosis, direct comparison would be jeopardized by obvious differences in their baseline characteristics, such as the severity of preoperative symptoms, urinary and digestive tract localizations, and specific complications related to urinary and digestive surgical procedures. On the other hand, there is a wealth of data in the literature in terms of series of patients managed for either digestive or urinary tract endometriosis, thus postoperative complication rates in these cases are well known. Consequently, despite the lack of a control group,

FIGURE 1

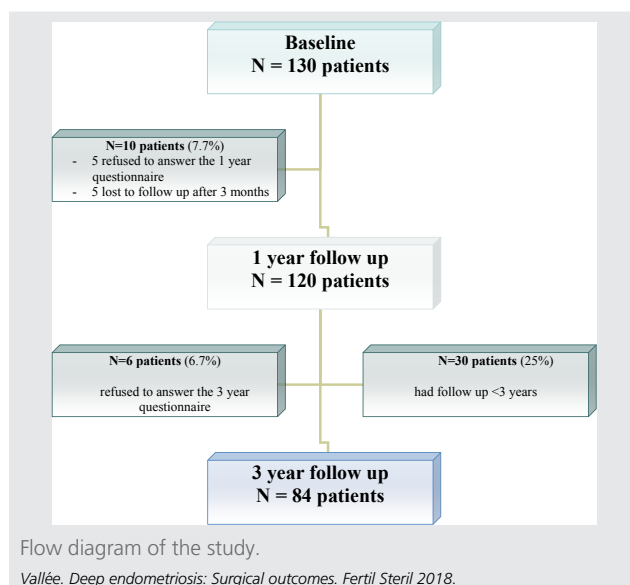


TABLE 1

Main painful symptoms related to pelvic endometriosis preoperatively and 1 year and 3 years postoperatively.

| Symptom | Baseline (n = 130), n (%) | 1 y (n = 120), n (%) | P value | 3 y (n = 84), n (%) | P value |
|-------------------------------------------------------|---------------------------------|----------------------------|---------|---------------------------|---------|
| Routine analgesic therapy | 95 (73.1) | 38 (31.7) | < .001 | 12 (14.3) | < .001 |
| Routine periods | | | | | |
| Yes | 125 (96.1) | 52 (43.3) | < .001 | 34 (40.5) | < .001 |
| No | 5 (3.9) | 68 (56.7) | < .001 | 50 (59.5) | < .001 |
| Dysmenorrhea | | | | | |
| Yes | 121 (93.1) | 44 (36.7) | < .001 | 24 (28.6) | < .001 |
| No | 4 (3) | 15 (12.5) | .007 | 10 (29.4) | .020 |
| Intensity of dysmenorrhea (VAS scale >4) ^a | 97 (80.2) | 26 (59.1) | < .001 | 14 (58.3) | < .001 |
| Cyclic symptoms associated with dysmenorrhea | | | | | |
| Defecation pain ^a | 66 (54.5) | 16 (36.4) | .052 | 10 (41.7) | .271 |
| Rectorrhage ^a | 8 (6.6) | 1 (2.3) | .447 | 1 (4.2) | 1 |
| Constipation ^a | 48 (39.7) | 13 (29.5) | .276 | 7 (29.2) | .368 |
| Diarrhea ^a | 51 (42.1) | 15 (34.1) | .375 | 5 (20.8) | .066 |
| Appetite disorders ^a | 17 (14) | 6 (13.6) | 1 | 5 (20.8) | .367 |
| Bloating ^a | 8 (6.6) | 13 (29.5) | < .001 | 8 (33.3) | .001 |
| Urinary pain | 28 (23.1) | 0 | – | 0 | – |
| Having had sexual intercourse | 103 (79.2) | 95 (79.2) | 1 | 66 (78.6) | 1 |
| Deep dyspareunia ^b | 102 (99) | 45 (47.4) | < .001 | 33 (50) | < .001 |
| Intensity of dyspareunia (VAS >4) ^b | 69 (67.6) | 22 (48.9) | < .001 | 18 (54.5) | < .001 |

^a Among patients with dysmenorrhea.^b Among women with sexual intercourse.Vallée. Deep endometriosis: Surgical outcomes. *Fertil Steril* 2018.

we can affirm that postoperative outcomes of surgery for deep endometriosis sparing the urinary and digestive tracts are satisfactory and their complications rate is low.

Our study presents several strengths. We report a series of patients managed by surgery for deep endometriosis without involvement of digestive or urinary tracts, who were prospectively enrolled in a cohort and benefited from rigorous follow-up and detailed assessment of postoperative digestive outcomes. Recording of data was prospective and performed by a clinical researcher dedicated to managing follow-up data, which explains the low rate of patients without follow-up data. Assessment of baseline and postoperative digestive function was based on widely accepted and standardized gastrointestinal questionnaires, providing accurate data on the quality of life related to gastrointestinal symptoms.

In the literature there is a lack of studies focusing on the population of women with deep endometriosis without urinary and digestive lesions. A search on PubMed crossing

the terms “endometriosis” and “bowel” revealed that, beginning in 2007, more than 50 articles have been published yearly, whereas during the last 3 years (2014–2016) their number was more than 80 per year. Owing to the complexity of surgical procedures, authors are more interested in reporting their experience in the management of deep endometriosis infiltrating rather than sparing the digestive and urinary tract. The consequence is that the rate of postoperative complications related to bowel, bladder, and ureters sutures could be extrapolated to surgeries that do not require such procedures. Furthermore, surgical management in symptomatic patients with deep endometriosis sparing the bowel and the urinary tract may be refuted by patients or surgeons on the basis of a wrongfully presumed high risk of complications. Moreover, there are few reports in the literature on the complications of deep infiltrating endometriosis surgery without bowel infiltration. Only the impact of the surgery on pain or fertility has been reported (14–16). When such information is given to patients diagnosed with deep

TABLE 2

Postoperative digestive function preoperatively and 1 year and 3 years after surgery, according to gastrointestinal standardized questionnaires.

| Parameter | Baseline (n = 130), mean ± SD | 1-y follow-up (n = 120), mean ± SD | P value ^a | 3-y follow-up (n = 84), mean ± SD | P value ^b |
|--------------------------------|-------------------------------------|------------------------------------------|----------------------|-----------------------------------------|----------------------|
| KESS constipation score | 11 ± 6.6 | 9.3 ± 6.6 | .05 | 10.1 ± 6.4 | .38 |
| GIQLI score | 91.4 ± 21.2 | 105.7 ± 21 | < .001 | 103.2 ± 24.4 | < .001 |
| Embarrassed by bowel frequency | 2.9 ± 1.2 | 3.3 ± 0.9 | .004 | 3.3 ± 1.1 | .029 |

^a Comparison baseline vs. 1-y follow-up.^b Comparison baseline vs. 3-y follow-up.Vallée. Deep endometriosis: Surgical outcomes. *Fertil Steril* 2018.

TABLE 3

Intraoperative findings, stratified by nodule size.

| Variable | Baseline (n = 130) | < 1 cm (n = 27) (20.8%) | 1–3 cm (n = 84) (64.6%) | > 3 cm (n = 19) (14.6%) | P value |
|-------------------------------------------------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|---------|
| Age (y) | 33 ± 6.6 | 33 ± 5.6 | 33 ± 7 | 33 ± 5.6 | .98 |
| Preoperative assessment | | | | | |
| Deep endometriosis nodule clinically revealed | 67 (51.5) | 5 (18.5) | 50 (59.5) | 12 (63.2) | .001 |
| MRI | 110 (85.3) | 18 (69.2) | 74 (88.1) | 18 (94.7) | .042 |
| Endorectal ultrasound | 56 (43.1) | 8 (33.3) | 36 (43.9) | 12 (63.2) | .147 |
| Operative time (min) | 101.2 ± 50 | 88 ± 48 | 101 ± 44 | 122 ± 49 | .08 |
| Operative route | | | | | |
| Laparoscopy | 129 (99.2) | 26 (96.3) | 84 (100) | 19 (100) | .754 |
| Laparoscopy followed by open route | 1 (0.8) | 1 (3.7) | 0 | 0 | 1 |
| AFSr score | 36.2 ± 34.2 | 23 ± 24 | 40 ± 37 | 37 ± 32 | .09 |
| Douglas pouch complete obliteration | 19 (15.2) | 0 | 14 (17.3) | 5 (27.8) | .038 |
| Endometriosis lesions on the diaphragm | 12 (9.2) | 2 (7.4) | 9 (10.7) | 1 (5.3) | .681 |
| Management of ovarian endometriomas | | | | | |
| Right | 50 (38.5) | 10 (37) | 35 (41.7) | 5 (26.3) | .363 |
| Left | 60 (46.2) | 8 (29.6) | 42 (50) | 10 (52.6) | .485 |
| Adhesiolysis | 97 (75.8) | 18 (69.2) | 64 (77.1) | 15 (79) | .688 |
| Right adnexa | 66 (50.8) | 13 (48.1) | 43 (51.2) | 10 (52.6) | .940 |
| Left adnexa | 75 (57.7) | 13 (48.1) | 50 (59.5) | 12 (63.2) | .672 |
| Deep posterior endometriosis nodules | | | | | .170 |
| Left uterosacral ligament (USL) | 31 (23.8) | 11 (40.7) | 18 (21.4) | 2 (10.5) | – |
| Right USL | 18 (13.8) | 4 (14.8) | 10 (11.9) | 4 (21) | – |
| Rectovaginal septum | 26 (20) | 2 (7.4) | 18 (21.4) | 6 (31.6) | – |
| Left USL, right USL and rectovaginal septum | 18 (13.8) | 2 (7.4) | 12 (14.3) | 4 (21) | – |
| Vaginal infiltration | | | | | |
| 1 cm | 13 (10) | 9 (33.3) | 3 (3.6) | 1 (5.3) | <.001 |
| 1–3 cm | 17 (13.1) | 13 (48.1) | 0 | 4 (21.1) | <.001 |
| 3 cm | 13 (10) | 8 (29.6) | 2 (2.4) | 3 (15.8) | <.001 |
| Adenomyosis | 84 (64.6) | 18 (66.7) | 54 (64.3) | 12 (63.2) | .97 |
| Hysterectomy + colectomy | 13 (10) | 0 | 11 (13) | 2 (10.5) | – |
| Appendectomy | 2 (1.5) | 0 | 2 (2.4) | 0 | 1 |
| Treatment of peritoneal implants complete | 117 (90) | 24 (88.9) | 76 (90.5) | 17 (89.5) | .876 |
| Postoperative complications | | | | | |
| Bladder atony requiring 3 wk–6 mo autocatheterization | 1 (0.8) | 0 | 1 (1.2) | 0 | 1 |
| Weeks of atony | 4 | | 4 | | |
| Urinary tract infection | 3 (2.31) | 1 (3.7) | 1 (1.2) | 1 (5.3) | .285 |
| Pelvic hematoma | 7 (5.4) | 1 (3.7) | 5 (6) | 1 (5.3) | 1 |
| Subcutaneous abscess | 1 (0.8) | 0 | 0 | 1 (5.3) | .146 |
| Blood transfusion | 1 (0.8) | 1 (3.7) | 0 | 0 | .354 |
| Intraoperative complications | 1 (0.8) | 1 (3.7) | 0 | 0 | .354 |
| Clavien Dindo classification of postoperative complications | | | | | |
| 1 | 1 (0.8) | 0 | 1 (1.2) | 0 | .759 |
| 2 | 6 (4.6) | 1 (3.7) | 3 (3.6) | 2 (10.5) | .413 |
| 3a | 0 | 0 | 0 | 0 | – |
| 3b | 7 (5.4) | 2 (7.4) | 4 (4.8) | 1 (5.3) | .869 |
| Reintervention related to endometriosis | 14 (10.8) | 3 (11.1) | 8 (9.5) | 3 (15.8) | .727 |

Note: Values are number (percentage) or mean ± standard deviation. rAFS = revised American Fertility Society.

Vallée. Deep endometriosis: Surgical outcomes. *Fertil Steril* 2018.

endometriosis, they may easily be convinced that surgery represents a high risk for a doubtful benefit, especially if some pain is relieved by medical treatment.

Several years ago Kondo et al. reported a rate of postoperative complications of 1.5% in 342 patients with deep endometriosis without rectal involvement (8). This rate was significantly lower than that recorded in 226 patients undergoing various procedures for deep endometriosis infiltrating the bowel (9.3%). Although the rate of severe complications in our series was higher (5.4% of complications required secondary procedure), complications mainly involved pelvic hematoma or fluid collection, with straightforward management and no short- (except a quick second surgery) or

long-term consequences expected. Because the rate of intra- and postoperative complications represented their primary outcome, the study of Kondo et al. did not investigate postoperative midterm improvement of symptoms.

Angioni et al. (17) reported a series of 31 patients managed for deep rectovaginal endometriosis free of rectal involvement. Patients underwent resection of the vaginal posterior cul de sac; however, vaginal involvement was microscopic. Nevertheless, no postoperative complication was reported in this series, in which antibiotic vaginal suppositories were placed into the vagina very close to the suture for 7 days after operation to protect against ascending infections.

In 1999 Chapron et al. (18) reported a series of 110 patients with deep infiltrating uterosacral ligaments. Patients with a suspicion of endometriosis invading the rectovaginal septum and those for whom there was a doubt concerning bowel infiltration were excluded from the study. Complications occurred in nine women (8.2%). Eight were classified as minor. One patient experienced postoperative urine retention that required catheterization. Results on neurologic and physical examinations were normal, and the disorder resolved. The second patient had sensitivity problems and pain on the inside surface of the thigh on the side on which the uterosacral ligament had been resected. Neurologic examination showed that genitocrural and femorocutaneous nerves had been damaged. Two patients reported pelvic pain, and four patients reported vaginal injuries without more detail. One major complication was reported: a patient developed a rectovaginal fistula on postoperative day 10.

Our results suggest that the risk–benefit balance is favorable to early surgical management. Surgery for rectal, ureteral, or bladder localizations expose patients to the most severe complications, such as digestive or urinary tract fistula. We may suppose that, in several patients, natural growth of deep endometriosis may lead to digestive or urinary involvement. Thus, early surgery could prevent an evolution in digestive or urinary tract injury. However, to date, few data are available on the characteristics of deep endometriosis progression. Although we share the presumption of natural growth of deep endometriosis nodules during adult life, our study did not reveal a significant relationship between nodule size and women's age.

One year after surgery, assessment of digestive function revealed a significant improvement in overall gastrointestinal quality of life, bowel frequency, abdominal pain, and diarrhea. Then, improvement in symptoms remained unchanged during the following 2 years. Conversely, both KESS and GIQLI scores failed to show an improvement in constipation. These data may seem paradoxical in a series of patients free of digestive tract involvement. However, we previously showed that digestive complaints are frequently reported even in patients with deep or superficial endometriosis sparing the digestive tract (13).

Another important result of this study is the fertility rate of our operated patients, because deep endometriosis is known to be associated with a high risk of infertility (19, 20). A couple is considered infertile after 12 months of exposure risk, and this implies the conjunction of regular sexual intercourse and absence of contraceptive pill. Unfortunately, a patient with deep endometriosis whose pain has been relieved by oral contraceptive pill (especially if continuous) will often suffer anew from dyspareunia when trying to get pregnant. This regularly leads to an insufficient number of acts of sexual intercourse and can wrongly be considered as infertility. Relieving dyspareunia before attempting pregnancy is probably one of the explanations for our high rate of spontaneous pregnancy. Patients should be encouraged not to wait until they are infertile to have deep endometriosis surgery, which would also raise their chance of a spontaneous pregnancy and avoid wasting time.

Unfortunately, conservative surgery does not mandatorily cure pelvic pain. Despite complete resection of macroscopic lesions, patients may still present dysmenorrhea and dyspareunia. Although deep endometriosis recurrences should always be ruled out, we found that etiology of pain is much more subtle and may be related to adenomyosis, recurrences of endometriosis in other localizations (peritoneal, ovarian), to pelvic hypersensitivity, or to other unknown factors. These circumstances explain why the rate of second surgeries is lower than that of delayed dysmenorrhea or dyspareunia. Adenomyosis may be treated by hysterectomy; however, this solution cannot always be offered to young women. Ovarian endometriomas may be treated by second surgery; however, iterant surgeries negatively impact ovarian reserve and should be limited in women with further pregnancy intention. As regards pelvic hypersensitivity, its mechanisms are incompletely known (21, 22), and iterative surgery is useless in a majority of cases.

In conclusion, deep severe endometriosis reasonably results from the development of deep endometriosis nodules growing progressively for several years. Our results support the hypothesis that surgery for deep endometriosis without digestive or urinary involvement is a valuable procedure and offering low postoperative risk. Taking into account the low rate of postoperative complications, along with good improvement in digestive function and satisfactory fertility outcomes, surgical management may safely be offered to patients with deep endometriosis not infiltrating the rectum or the bladder, whenever medical treatment is not efficient or responsible for adverse effects.

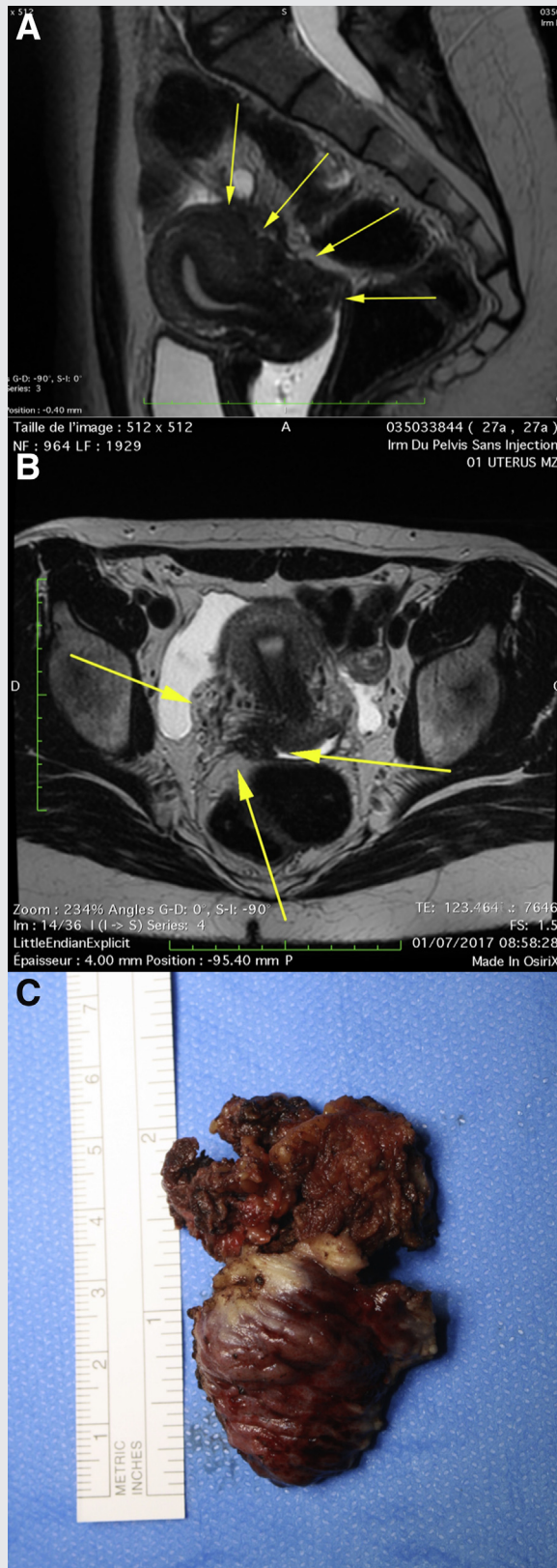
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SUPPLEMENTAL FIGURE 1



Deep endometriosis nodule infiltrating the posterior uterine isthmus and cervix, posterior vagina, and right uterosacral ligament, but sparing the rectum and right ureter. (A) T2 MRI sagittal view; yellow arrows show the nodule. (B) T2 MRI transversal view; yellow arrows show the nodule. (C) Specimen of deep endometriosis nodule.

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