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MONOGRAPH

Surgical Management of Colorectal Endometriosis

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FOREWORD
Endometriosis is one of the most frequent benign gynecological pathologies occurring in 7-10% of women in reproductive age and causing chronic pain and infertility. This is a young and healthy population otherwise. The diagnostic suspicion of this entity must be high and its management multidisciplinary.
Colorectal endometriosis represents a highly disabling condition and needs more aggressive treatment for its resolution. Faced with this we ask ourselves, what role does surgery have? What would be its advantages and disadvantages? Why should we choose it as a therapeutic method?
The present monograph was inspired by all patients who raised this controversy, motivated interdisciplinary consultations, meetings, bibliography search, generated discussions, doubts and uncertainties, and made us leave the role of surgeons we are used to, and taught us to accompany when we could not heal.

INTRODUCTION

Endometriosis is a gynecological condition pathology caused by the presence of functional endometrial tissue, both glands and stroma, outside the uterine cavity. It affects approximately 10-15% of women in reproductive age, and is the most frequent cause of chronic pelvic pain in this population.

Colorectal endometriosis, with an incidence of 5-12% is one of the most severe and disabling forms of the disease. Its treatment can be both medical and surgical and, in any setting, a multidisciplinary approach is of fundamental importance to achieve better results. From a surgical point of view, there are still controversy regarding the best to offer these patients.

We carry out a review on the disease and the existing therapeutic alternatives, as well as an update on an issue with an important impact on the lives of those who suffer from it.

DEFINITION

Endometriosis is a gynecological pathology caused by the presence of functional endometrial tissue, both glands and stroma, outside the uterine cavity that induces a chronic inflammatory response in adjacent tissues. Intestinal involvement is observed in 3-37% of cases.[1] It is estimated that deep infiltrating endometriosis, defined by the European Society for Human Reproduction and Embryology (ESHRE) as infiltration of endometriotic tissue more than 5 mm below the peritoneum, affects more than 20% of women with endometriosis.

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Epidemiology

This disease affects approximately 15% of women in reproductive age, being the most frequent cause of chronic pelvic pain in this population.[1] There is a peak incidence in women between 25 and 35 years old. A lower percentage of cases is observed in girls before menarche and in postmenopausal women.[2,3]

Etiopathogenesis

The etiology is considered multifactorial, and some factors associated with the increased risk of its development such as nulliparity, prolonged exposure to endogenous estrogens (early menarche, late menopause, menstrual cycles <27 days), low body weight, among others are described.

On the other hand, multiparity, prolonged lactation, and the use of oral contraceptives are factors associated with a decrease in risk.[4-6]

Many theories try to explain the etiopathogenesis of this disorder. The theory of retrograde menstruation postulates that there would be a retrograde flow of endometrial cells to the peritoneal cavity that, under certain environmental conditions, could settle and thus begin a cycle of adhesion, invasion and proliferation, involving varied structures. Although it explains most of the cases, is not enough to understand the compromise of distant structures, such as the lung, or some skin scars, that would be explained by the hematogenous and/or lymphatic spread responsible for the transport of these implants. Since there are also cases of endometriosis in patients who have not yet menstruated, new research emerged that revealed that celomic metaplasia (stem cells in the rectovaginal septum) could be the source of the disease.[7-9]

Whatever its origin, ectopic endometrial tissue foci proliferate in various anatomical structures (ovaries, uterosacral ligaments, peritoneum, Douglas cul-de-sac, rec-

tum, lung, scars, among others) generating a chronic inflammatory response (fig. 1).[10] The increase in the production of inflammatory mediators, as well as the neuronal dysfunction produced by the implants, would result in an increase in the number of nerve fibers and sensory receptors, and an imbalance in the sympathetic response to stimuli.[11] Furthermore, estrogens would have a direct role modulators in pain signals.[12] As for fertility disorders, they would be explained by both the anatomical changes in the reproductive organs and pelvis due to adhesions and endometriomas, as well as the production of inflammatory mediators (prostaglandins, cytokines and growth factors) that determine the hostility of the environment for the fertilization, implantation and embryonic growth.

Colorectal endometriosis

Colorectal endometriosis is one of the most severe forms of presentation of the disease and is observed, as previously mentioned, in 5-12% of affected patients. The most frequent locations are the rectum and the rectosigmoid junction (70-93%), the appendix and the ileocecal region (3-18%). Small bowel involvement is rare and can be seen in 2-5% of cases.[14,15]

Among the different clinicopathological variants, there is a deep infiltrating, aggressive and disabling endometriosis, which occurs when the disease involves more than 5 mm of the peritoneal surface.[1] This entity in particular is responsible, in a large percentage of cases, of chronic pelvic pain and infertility refractory to medical treatments. For this variant, the surgical treatment becomes particularly important. However, it should not be forgotten that, in 70-80% of cases, colorectal endometriosis is associated with extra-intestinal involvement (ovaries, utero-sacral ligaments, among others), therefore a multidisciplinary approach is essential to achieve better results.[16,17]

Diagnosis

Clinical picture

The clinical presentation of endometriosis is highly variable. Many women never experience symptoms and the diagnosis arises from a finding after a study requested for another reason. However, most frequently it presents with abdominal and pelvic pain related to menstrual cycles (dysmenorrhea and dyspareunia), and fertility disorders. Other less common symptoms are: impaired defecation, bladder irritation, heavy uterine bleeding, back pain and chronic fatigue, many of which are related to the site affected by the implants. Proctorrhagia and bowel perforation (or more specifically, appendicular perforation) is rare, since mucosal involvement is not common.

Multiple clinical scores have been described (ENZIAN, Adamyan, among others) that classify the disease in different stages, in some cases according to the severity of the intestinal compromise, but they are only descriptive and would not have an impact on the choice of therapy.

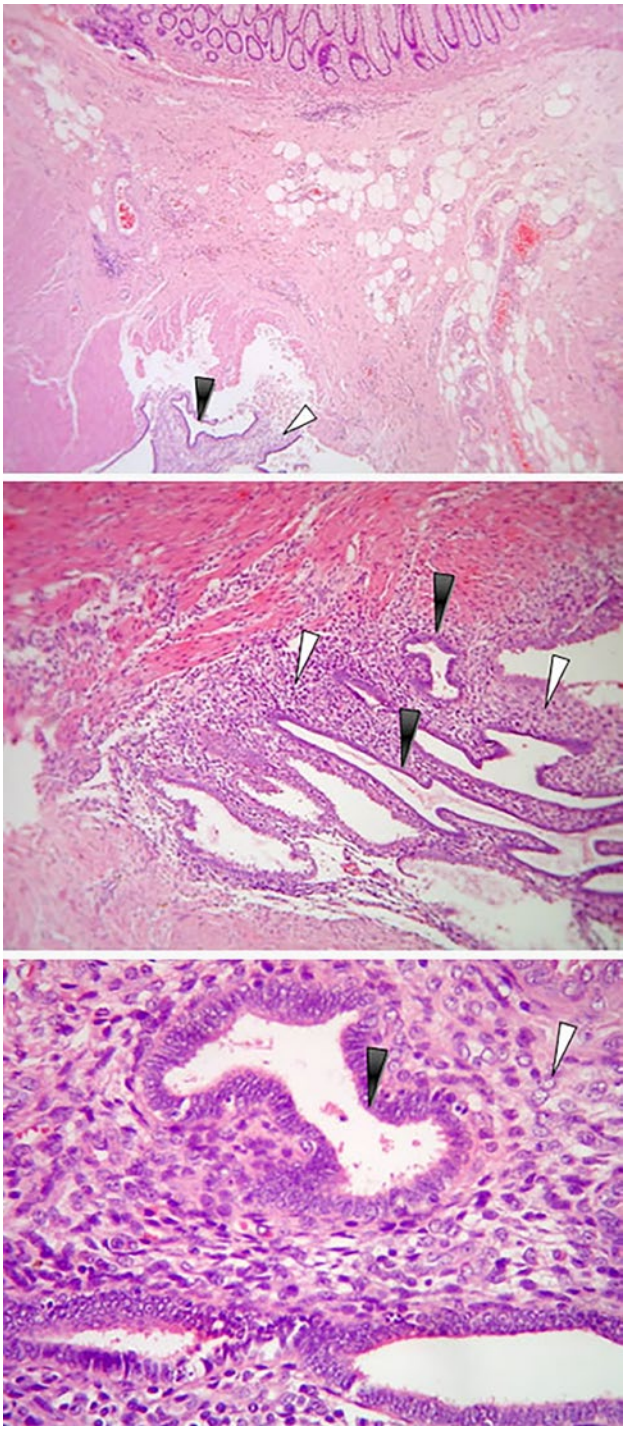

Figure 1: Histological sections of the colon and rectum. Endometrial stroma (White arrows). Glandular structures (Black arrows).

Complementary studies

One of the biggest challenges with regard to managing the patient with endometriosis is making a correct diagnosis without too much delay between the onset of symp-

toms and the diagnosis of the disease. This delay can even be up to 7 to 10 years, according to some series. A large number of patients will confirm the diagnosis of endometriosis only after a "diagnostic laparoscopy". Because of its nonspecific presentation, high clinical suspicion at the time of diagnosis is of fundamental importance.

a. Anamnesis

The preparation of a detailed medical history that verifies the abdominal and pelvic symptoms, their relationship with menstrual cycles and the presence of fertility disorders will be essential to guide the diagnosis.

b. Physical examination

The physical examination has low sensitivity in the diagnosis of endometriosis in general and colorectal in particular. Abdominal palpation may reveal the presence of abdominal/adnexal masses suggestive of compromise at this level. Gynecological examination may reveal vaginal nodules, deviation of the cervix, or decreased uterine mobility. When involvement of the rectovaginal septum is suspected, bimanual rectal and vaginal examination should be the choice.[18]

c. Laboratory

Laboratory tests are usually not useful in this pathology. Urinary sediment and urine culture may be requested to rule out urinary tract pathology, in case of diagnostic doubt.

d. Ultrasound

Transvaginal ultrasound is considered the main diagnostic method of colorectal endometriosis, although its utility diminishes in the proximal involvement. It has a high sensitivity (91%) and specificity (98%), a positive predictive value of 98 and negative predictive value of 95 to show the involvement of the rectovaginal septum and Douglas cul-de-sac. visualizing the lesions as hypoechoic and heterogeneous nodules in these locations (fig. 2). Sensitivity increases when performing the study with saline solution or vaginal gel.[18,19]

Some studies have demonstrated the utility of transrectal ultrasound in the evaluation of colorectal endometriosis, which presents a sensitivity of 78-100% and a specificity of 66-100%.[20] When comparing the usefulness of transvaginal and transrectal ultrasound in the evaluation of colorectal compromise, the results do not show significant differences between the two methods.[21] However, transvaginal ultrasound allows better visualization of retro-uterine lesions, is better tolerated by the patient and can be performed without sedation in all cases. For this reason, transvaginal ultrasound would be the first choice as a diagnostic method and the use of endorectal ultrasound should be subject to its findings.[18]

e. Barium enema

This study is useful mainly in those cases in which an obstructive lesion is suspected, since it can delimit the sector/s of stenosis, showing an extrinsic compression image (fig. 3). However, it offers no pathognomonic signs, nor suggestive of endometrial origin.[18,22]

f. Colonoscopy

It has a low return in the diagnosis of colorectal endometriosis since mucosal compromise is infrequent. If it exists, usually presents as rigidity or a retraction in the wall, which can make it difficult for the endoscope passing through the lesion (fig. 4). This method is useful to rule out other colorectal pathologies, such as a neoplastic lesion or inflammatory bowel disease, among others.[18]

g. Computed tomography

Although there are studies that report good results

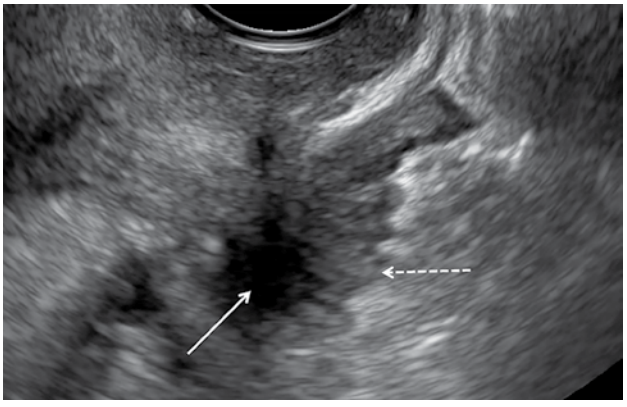

Figure 2: Ultrasound, sagittal plane. Hypoechoic nodule in the rectovaginal septum.

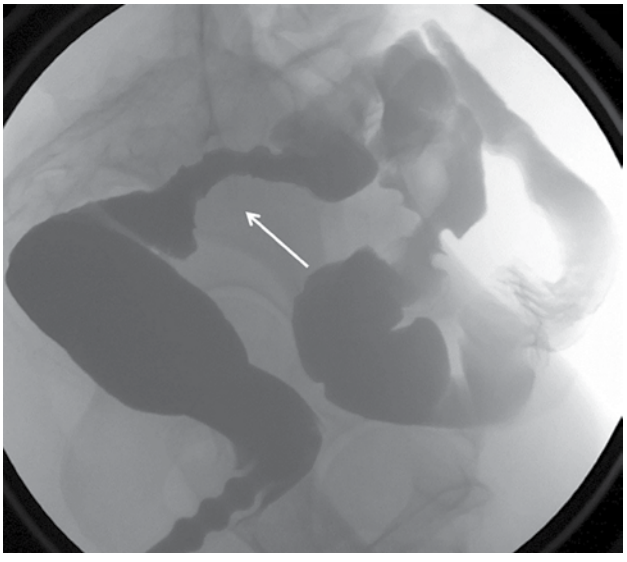

Figure 3: Barium enema shows rectosigmoid stenosis.

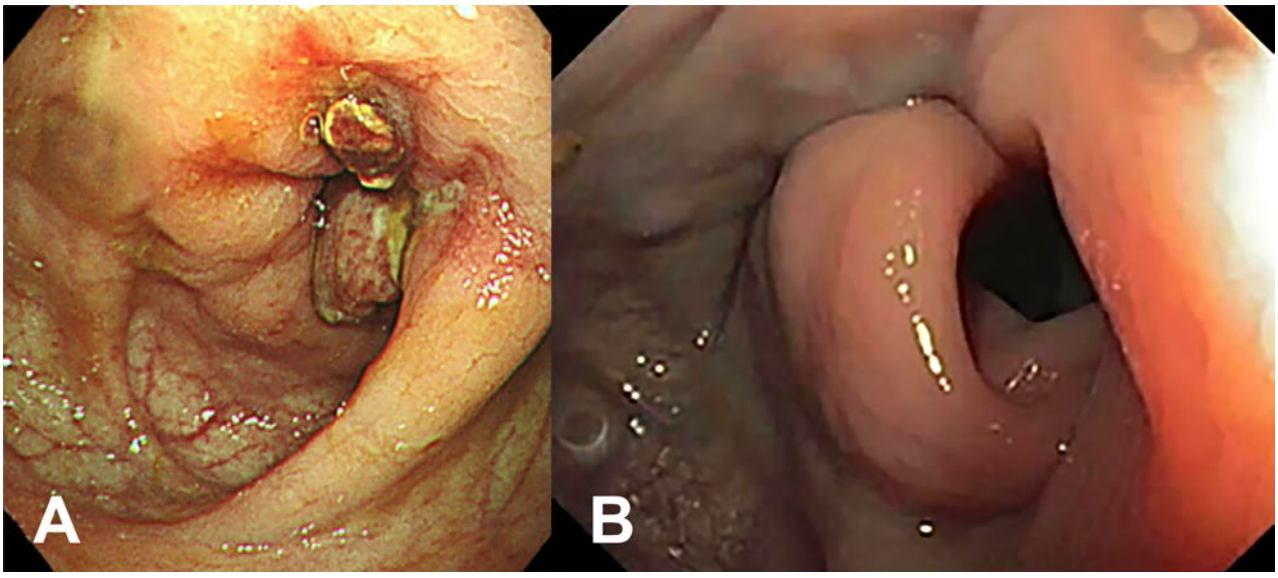

Figure 4: Colonoscopy. A) Endometrial tissue infiltrating the mucosa. B) Stenosis due to parietal involvement.

in the diagnosis of endometriosis by tomography, it has not been shown to be superior to ultrasound. In addition, exposure to radiation must be taken into account.[23]

b. Magnetic resonance

Both the sensitivity (77-100%) and the specificity (93-100%) of the MRI in the diagnosis of endometriosis are similar to that of transvaginal and transrectal ultrasound. Its indication is limited to a few scenarios; when the suspicion of endometriosis is high and the physical examination or the ultrasound does not reveal any findings, when it is necessary to evaluate the colon proximal to the rectosigmoid junction, or when multiple non pelvic lesions and/or ureteral involvement are suspected (fig. 5). In a retrospective study published in 2017, the positive predictive value of the magnetic resonance imaging was superior to that of endorectal ultrasound (100% versus 93%) to detect invasion of the muscular layer, as well as infiltration of the mucosa/submucosa. In contrast, endorectal ultrasound showed a higher sensitivity than magnetic resonance imaging in detecting mucosal infiltration.[37]

It is important to note that, finally, the diagnosis of certainty is obtained thanks to laparoscopy and pathological anatomy.

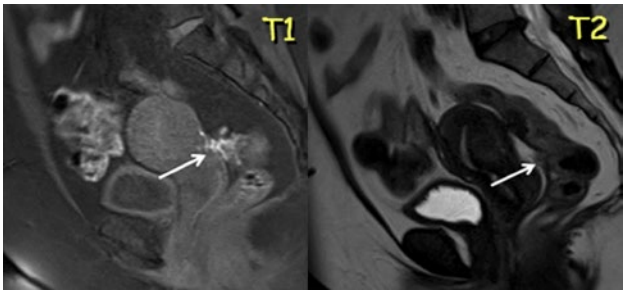

Figure 5: Nodules in the pouch of Douglas involving the anterior aspect of the rectum on magnetic resonance imaging.

Treatment

Treatment should be planned according to the patient's symptoms, with different treatment steps related to pelvic pain and infertility. As in all chronic inflammatory diseases, prolonged medical treatment is important and should be aimed at symptomatic improvement and control of the lesions.[39]

Treatment can be both medical and surgical. When choosing between the two, various variables must be taken into account, such as the patient's symptoms and their impact on quality of life, the anatomical location of the lesions, the extent of involvement, the association with disorders of fertility and the pregnancy wishes of the patient. The surgical approach becomes particularly relevant when the disease presents with colorectal involvement.

The treatment of the disorders generated by this entity usually begins with dietary indications and analgesics to alleviate the symptoms. If this is insufficient, it progresses to a more complex stage with the use of hormonal therapies. More than 50% of patients respond to them and so the possible complications of surgical treatment are avoided. However, the symptomatic improvement is not always achieved and many women must continue this treatment until menopause (at which time the disease usually subsides) for adequate control of the disease. On the other hand, when fertility disorders are associated, the approach should be more aggressive. It is in these settings that surgical treatment has proven to be decisive.[24]

Medical treatment

Hormonal treatment should be considered in women

with superficial peritoneal disease (asymptomatic or oligosymptomatic) and as adjuvant treatment after surgery, although there is still little evidence of the efficacy of this approach. When the involvement is more extensive or involves ureters, colon and rectum, medical treatment is usually insufficient. In this setting, the advantages and disadvantages of indicating a prolonged hormonal therapy that entails long-term adverse effects and supposes the impossibility to conceive should be evaluated.[18] The therapeutic alternatives are:

- Oral contraceptives: estrogens/progestins: There is evidence that progestins, or estrogens plus progestins regimens decrease the symptoms of patients with rectovaginal endometriosis at 12 months.[25]
- Others: GNRH agonists, aromatase inhibitors, Danazol. These are treatments with a low level of evidence regarding their effectiveness and which carry considerable adverse effects after prolonged use.[18-3]

Surgical treatment

Surgical treatment is the first line of treatment against symptomatic infiltrating rectovaginal and colonic endometriosis. The aim is the symptomatic relief, the complete removal of all implants and the restoration of the pelvic anatomy, which directly affects fertility.[18]

When considering this therapeutic option, a multidisciplinary approach is of fundamental importance. The radicality of the resection and the most appropriate approach for each individual patient will be evaluated, taking into account the possibility of recurrence and the potential postoperative complications. It should not be forgotten that these patients represent a challenge for the surgeon since the anatomical distortion generated by the disease poses significant technical difficulties.

The variables to consider when choosing one or the other will be the size and number of implants, their location, and the degree of infiltration of the intestinal wall, the morbidity of the technique and the experience of the treating team. At the moment, the series published with different techniques are not comparable with each other given the heterogeneity in the criteria for patient selection and the poorly standardized description of the location of the disease.[1]

a. Shaving

Indicated for superficial and small nodules (less than 2 cm), and absence of compromise of the muscular layer and multifocal disease. The technique consists of electrofulguration of the lesion, or its treatment with CO2 laser. Used in the aforementioned cases it achieves good clinical results (recurrence of 7% at three years) with a low rate of complications, such as intraoperative perforation (81.4%), ureteral injury (0.8%) and urinary retention (0.8%).[11,26,27]

In recent years, different authors have published their results with this therapeutic approach. Donnez and Squifflet[27] published a prospective series of 500 cases of rectovaginal endometriosis treated surgically using the shaving technique. In this series with a median follow-up of 3.1 years, the authors revealed four main complications:

1. Rectal perforation (1.4%)
2. Ureteral injury: (0.8%)
3. Blood loss >300 ml: (0.2%)
4. Urinary retention: (0.8%)

In those women who wished pregnancy either naturally or through in vitro fertilization, the pregnancy rate was 84%. Among these 500 women, the recurrence rate was 8%, demonstrating that conservative surgery can be a good option to treat young patients suffering from rectal endometriosis.[38,41]

b. Discoid resection

Indicated for nodules <2-3 cm and absence of multifocal disease, when there is compromise of the muscular layer. It consists of local resection of the lesion, including all layers of the intestine and closing it transversely with a stapled or manual suture (fig.7). This technique supposes a higher risk of complications, mainly perforation and rectovaginal fistula, the latter even more frequent than the ones cause by shaving in lesions of the anterior aspect of the low rectum. However, complications of discoid resection remain lower compared to those of more radical techniques. Additionally, this resection allows rectal preservation causing less functional disorders.[1,27,42]

c. Transanal resection

This technical variant of discoid resection consists of a transanal approach, useful for lesions >2 cm involving less than one third of the circumference.[1,18,28] This can be done in combination with a laparoscopic resection of abdominal and pelvic lesions, thus completing the treatment in a mini invasive way.[29]

d. Colorectal resection

Indicated for nodules >3 cm or more than 50% of the circumference involved, multifocal disease, impossibility of a more economical resection due to possible devascularization of the affected segment, and suspicion of neoplasia (impossible to rule out by complementary methods). The anatomical distortion that surgery can generate, the approach to be used in each case and the experience of the center must be taken into account, since this are technically difficult surgeries.[1]

Laparoscopic segmental resection for the surgical treat-

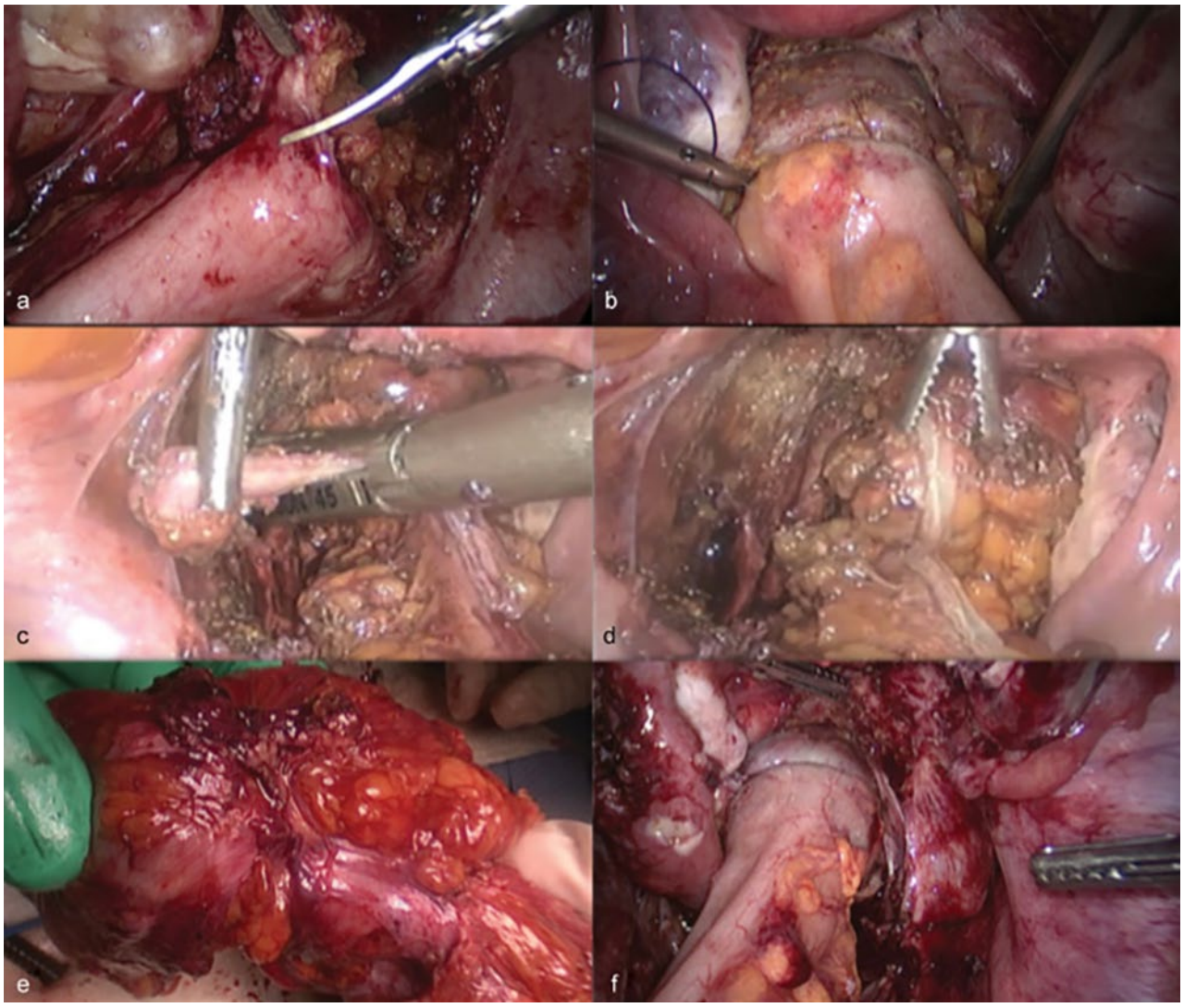

Figure 6: A) Shaving. B) Discoid resection. C and D) Resection with linear stapler. D) Segmental resection. F) End-to-end anastomosis.

Figure 7: Discoid resection.

ment of intestinal endometriosis was first described by Redwine and Sharpe.[43,44] Since then, the technique has evolved to minimize complications and morbidity of the procedure. In anterior resection and low anterior resection due to endometriosis, morbidity is not negligible. The anastomotic dehiscence rate is lower when compared to surgery for colorectal cancer (1-6% vs. 3-15%). One possible explanation is that tissues to be anastomosed in endometriosis do not undergo prior radiotherapy as tissues of patients who undergo surgery for malignancy. For this reason, the need to perform a protective ileostomy in these patients is questionable. Other postoperative complications are: bladder dysfunction (8%), stenosis of the anastomosis (3%), rectovaginal fistula (2.7%) and anterior resection syndrome.[1,16,18]

Regarding the results, surgery has been shown to have

high rates of symptomatic improvement. The papers show disappearance of pain in 71-93% of patients at one year of follow-up, with a significant improvement in quality of life scores. Disease recurrence was observed in up to 23% of cases at three years of follow-up. On the other hand, the fertility rate also improved in 24-57% of patients. The accumulated fertility rate at one, two and three years was 44%, 58% and 73% respectively.[1,18,30,31]

Local resections, such as shaving and discoid resection, present better long-term functional results than colorectal resection.[32,45] When analyzing the results on fertility, it has been observed that surgical treatment would improve rates of pregnancy either spontaneous, or after in vitro fertilization. In addition, it has been proposed as an alternative prior to perform ovarian hyperstimulation methods, since hormones stimulate endometriotic foci and could trigger episodes of bowel obstruction.[33]

The laparoscopic approach is presented as the option of choice in these cases (fig. 8). It offers not only the benefits of a mini-invasive approach, such as a shorter hospital stay, less postoperative pain, less incidence of surgical site infections, but also offers a better (magnified) view of the pelvis. This allows resection of lesions that would not be seen with the conventional approach and generates less adhesions and anatomical distortion, which has a high impact on the improvement of fertility rates.

The success rates are high and the morbidity of the surgery acceptable. (34)When comparing the results obtained with conventional and laparoscopic approaches, no significant differences were observed in the resolution of symptoms and in the quality of life scores. Intraoperative bleeding and the rate of postoperative complications are lower in patients operated laparoscopically. The pregnancy rate is significantly higher after the laparoscopic approach (cumulative rate of 60%).

Currently, the robotic approach is beginning to be used in this pathology, even without evidence of its long-term results.[35,46]

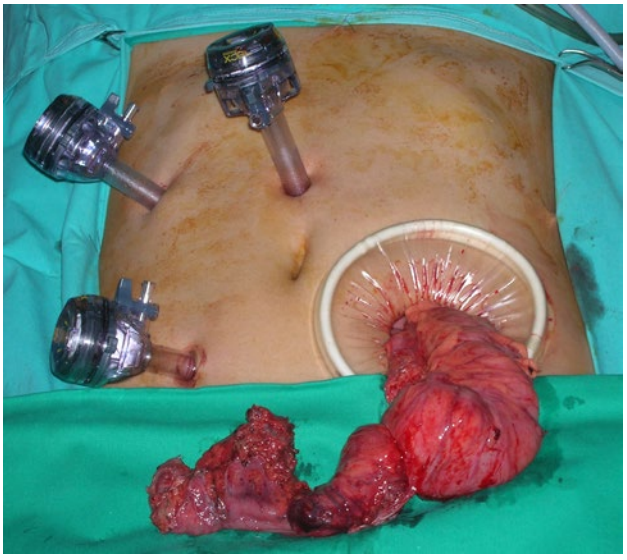

Figure 8: Laparoscopic approach.

CONCLUSIONS

Endometriosis is a pathology with a high impact on the quality of life of those who suffer from it. Although colorectal compromise is not frequent, when present, is often invalidating. It should be suspected in women in reproductive age with chronic and cyclical abdominal and pelvic pain associated with fertility disorders, although it may also appear in other populations. A complete physical examination and the use of ultrasound will be essential in the initial evaluation. However, the gold standard continues to be laparoscopy with biopsy.

The choice of treatment should be evaluated on a case-by-case basis, taking into account, among other things, the patient's quality of life and fertility wishes.

Generally, hormone treatment is the first approach. Surgery constitutes a therapeutic pillar, especially in women with rectovaginal and/or colorectal involvement and in those with multifocal disease. Alternatives range from local resections to complete colonic resections. Whatever the choice in each case, postoperative results are favorable and morbidity acceptable. The laparoscopic approach in particular has also shown improvements in postoperative fertility rates and is therefore currently the approach of choice.

Bibliography allows us to make some conclusions. In the context of benign pathology such as colorectal endometriosis, there is a general trend towards more conservative surgical techniques. This trend is based on the evidence that more radical rectal surgery is associated with an increased risk of complications. The results of multiple papers show that shaving is feasible even in advanced disease with lower rates of immediate complications, allowing better functional results. The alleged increased risk of recurrence related to shaving has not been demonstrated. For these reasons, it should be considered as one of the first-line treatments for the surgical resolution of colorectal endometriosis regardless of the size of nodules or the association with other digestive tract locations. Segmental resection should be reserved for advanced lesions responsible for severe stenosis, or multiple nodules that compromise the rectosigmoid junction or sigmoid colon.

As a final comment, and not a minor one, it must be remembered that the management of these patients should always be multidisciplinary to obtain better results in all the affected areas.

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