

Colorectal endometriosis. A proposal of complementary classification and surgical management in stages

Endometriosis colorrectal. Una propuesta de clasificación complementaria y de manejo quirúrgico por etapas

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Abstract

Objective: To organize the experience and international knowledge in the surgical management and staging of colorectal endometriosis, with a management proposal in stages. **Method:** An extensive non-systematic review of the literature was carried to organize the disease in stages (limited, intermediate and advanced) according to a scoring system, which considers the characteristics of the endometrioma, the personal history and surgical findings. We tested the proposed staging in a retrospective group of patients. **Results:** From January 2017 to April 2023, we collected 19 patients with a confirmed diagnosis of colorectal endometriosis, treated laparoscopically, by the same group of surgeons, in whom we found a strong correlation between the stage of the disease and the presence of complications that required reinterventions. **Conclusions:** We suggest a sequence of colorectal surgical management in stages according to the staging of the disease and we hope that this work will be followed by joint efforts to test it prospectively in order to compare results between hospital centers and make planned decisions.

Keywords: Colorectal endometriosis. Intestinal endometriosis. Deep endometriosis.

Resumen

Objetivo: Organizar la experiencia y el conocimiento internacional en el manejo quirúrgico y la estadificación de la endometriosis colorrectal, con una propuesta de manejo por etapas. **Método:** Se realizó una revisión amplia no sistemática de la literatura para organizar la enfermedad en etapas (limitada, intermedia y avanzada) de acuerdo con un sistema de puntuación que considera las características del endometrioma, los antecedentes personales y los hallazgos en la cirugía. La estadificación propuesta se probó en un grupo retrospectivo de pacientes. **Resultados:** De enero de 2017 a abril de 2023 recopilamos 19 pacientes con diagnóstico confirmado de endometriosis colorrectal, tratadas por vía laparoscópica, por el mismo grupo de cirujanos, en las que encontramos una fuerte correlación entre el estadio de la enfermedad y la presencia de complicaciones que requirieron reintervenciones. **Conclusiones:** Sugerimos una secuencia de manejo quirúrgico colorrectal en etapas de acuerdo con la estadificación de la enfermedad y esperamos que el presente trabajo sea seguido de esfuerzos compartidos por probarla de manera prospectiva para poder comparar resultados entre centros hospitalarios y tomar decisiones planificadas.

Palabras clave: Endometriosis colorrectal. Endometriosis intestinal. Endometriosis profunda.

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Introduction

Endometriosis is a chronic inflammatory disease caused by endometrial tissue growing outside the uterus. It is estimated to affect 2% to 10% of the female population overall, rising up to 50% in women with infertility, affecting, at least, 190 million reproductive-age women and some beyond menopause¹.

A prevalence of 8% to 12% has been estimated for colorectal endometriosis, with almost 90% of all intestinal lesions being found in the rectum and sigmoid colon².

The main symptoms of endometriosis include chronic pelvic pain related to the menstrual cycle and infertility. When the condition affects the intestines, additional symptoms such as abdominal bloating, changes to bowel habits (constipation or diarrhea), passage of mucus with bowel movements, rectal bleeding, urgency to defecate, and feeling of incomplete evacuation may occur, often worsening with the menstrual cycle. Additionally, endometriotic nodules can cause narrowing of the intestinal lumen leading to obstructive symptoms, and eventually to reduced quality of life affecting not only women with endometriosis but also their partners and families^{3,4}.

Medical treatment of deep endometriosis involving the colorectum is an option for many women, with symptomatic relief probabilities ranging from 70% to 80%⁵ and increased overall pregnancy rates from 42% up to 80%³. However, there is a group of patients who will require surgical management, including those who have not responded favorably to medical management, those with contraindications or intolerance to hormonal therapy, those with intestinal obstructive symptoms, and couples seeking natural conception or preferring surgery⁶.

Two distinct approaches have been described in the management of colorectal endometriosis, with different rates of complications, long-term side effects, and recurrences:

- A radical approach with segmental colorectal resection and anastomosis.
- A more conservative approach involving local transmural and non-transmural resections, with reconstructions using manual or mechanical sutures^{5,6}.

The balance between the conservative or the radical approach regarding complications and recurrence rates has led to a debate among different surgical

schools, with no current consensus on the standard surgical technique⁵.

We believe that the problem arises when discussing colorectal endometriosis as a uniform condition without recognizing the significant differences in treating limited vs advanced disease. Currently, there is no standardized classification to design staged therapies that can be compared among different working groups regarding cure outcomes, morbidity/mortality, and recurrence.

Therefore, we decided to develop a staging classification for colorectal endometriosis, considering the cumulative global experience in its management, including the treating surgeon's criteria for choosing the extent and type of surgery, associated complications, disease recurrence rates, and need for reinterventions. We retrospectively tested this classification on a group of patients treated at Instituto Nacional de Perinatología, Mexico City, Mexico from 2017 through 2023.

Method

The group of authors, including 6 national and 1 international member of various backgrounds (gynecologists, urogynecologists, reproductive biologists, colorectal surgeons, and general surgeons), all experienced in advanced pelvic surgery, both laparoscopic and open, worked collaboratively, both in-person and online, to conduct a non-systematic review of the literature. This review included the clinical practice guidelines from the European Society of Human Reproduction and Embryology (ESHRE)⁷, the German guidelines from 2014⁸, and meta-analyses, randomized and non-randomized controlled clinical trials, prospective and retrospective studies since 2006 through 2022. Overall, these sources included a total of 16 846 patients, aiming to review the factors involved in the surgeons' decisions when treating patients with colorectal endometriosis, the factors associated with intra- and postoperative complications, and the factors associated with disease recurrence.

Once these factors were identified, they were grouped into categories, being the most relevant those associated with tumor characteristics (T), with the patients' medical history (H) and with surgical factors (S), creating the acronym THS.

After defining the categories, they were categorized into 3 groups, being the first one the best clinical-surgical scenario and the third one being the worst scenario and defining an intermediate group in terms of technical difficulty, complications, and recurrences.

Each group was assigned a numerical parameter representing it, allowing for proper differentiation of each group. This resulted in defining an unclassifiable stage due to lack of data, an initial stage or THS 1, an intermediate stage of evolution or THS 2, and an advanced stage of the disease or THS 3.

Due to the nature of the disease and the difficulties in diagnosis, an initial preoperative classification (for surgical planning purposes) will be performed, which will be complemented with intraoperative findings and defined postoperatively with histopathological results (both with prognostic purposes).

The version thus obtained is retrospectively evaluated using data from electronic health records from a group of consecutive patients treated at Instituto Nacional de Perinatología from January 2017 through April 2023 (including the years of the COVID-19 pandemic, which limited non-emergency surgeries due to hospital restructuring), with a confirmed histopathological diagnosis of colorectal endometriosis.

Based on the findings made, the group provides recommendations for the staged surgical treatment of patients with colorectal endometriosis.

Results

Characteristics to be assessed by the surgeon for surgical decision-making in patients with colorectal endometriosis

After reviewing the literature on factors impacting the surgeon's decision-making on the surgical treatment of patients with colorectal endometriosis, factors associated with intra- and postoperative complications, and factors associated with disease recurrence, we stay with the following elements as the characteristics that should be evaluated: those that are endometrioma-dependent, those dependent on the patients' past medical history, and those dependent on surgery (Table 1):

- Tumor or endometrioma: size, number, location, depth of invasion of colorectal wall, and presence or absence of intestinal lumen obstruction.
- Patient history: age, body mass index, thromboembolic risk, and health status.
- Surgery: previous surgeries for endometriosis, type of current surgery, intraoperative bleeding, and histopathological examination of resected material.

Table 1. Characteristics to be evaluated by the surgeon for surgical decision-making in a patient with colorectal endometriosis

Tumor (characteristics of colorectal endometrioma)	Size
	Number
	Location
	Depth of invasion
	Intestinal lumen obstruction
Background	Age
	BMI
	Caprini (thromboembolic risk classification)
	ASA (American Society of Anesthesiologists) health status classification
Surgery	History of previous surgeries for endometriosis
	Type of surgery performed in the current procedure
	Intraoperative bleeding
	Histopathological resection

ASA: American Society of Anesthesiologists; BMI: body mass index.

Once the characteristics to be considered by the surgeon in decision-making were defined and grouped, a table was created to score their importance in 3 categories, from 0 to 3, based on the importance of each characteristic and its specific weight in decision-making process (Table 2).

Regarding the characteristics of the endometrioma or tumor, we considered as the most favorable scenarios the presence of only 1 lesion, size < 3 cm, location above the rectum, depth of invasion not exceeding the serosa, and no evidence of colorectal lumen obstruction. Conversely, the least favorable characteristics include endometrioma or tumor size > 3 cm, presence of 3 or more lesions, lower rectum location, involving the full thickness of the wall, and causing some form of colorectal lumen obstruction.

Regarding the patient's past medical history, the most favorable scenarios are said to be age younger than 40 years, a body mass index (BMI) under 34, low-to-moderate thromboembolic risk, and a healthy-to-stable and controlled comorbidity status (American Society of Anesthesiologists [ASA] I-II). Conversely, the least favorable scenarios include age older than

Table 2. Auxiliary table for scoring characteristics based on their importance for decision-making in the treatment of a patient with colorectal endometriosis

Item	0 points	1 point	3 points
Tumor	Size: < 3 cm	No scoring	Size: > 3 cm
	Number: 1	Number: 2	Number: > 3
	Location: above rectum	Location: rectosigmoid junction	Location: lower rectum
	Depth: serosal	Depth: muscular	Depth: full thickness
	Obstruction: no	No scoring	Intestinal lumen obstruction: yes
History	Age: < 40 years	Age: > 40	No scoring
	BMI: < 34	BMI: > 35	
	Caprini: low, medium	Caprini: high or very high	
	ASA: I-II	ASA: > III	
Surgery	Previous surgeries for endometriosis: no	Previous surgeries for endometriosis: yes	No scoring
	Current surgery: nodules resection	Current surgery: includes hysterectomy	Current surgery: includes urinary tract opening or extrapelvic involvement
	Hemorrhage: < 500 mL	No scoring	Hemorrhage: > 500 mL
	Pathology: complete resection	Pathology: residual endometriosis	No scoring

ASA: American Society of Anesthesiologists; BMI: body mass index.

40 years, BMI > 35, high-to-very high thromboembolic risk, and ASA > III health status. The patient's past medical history was scored from 0 to 1 point as it was considered by the surgeons to be of lesser importance in intraoperative decision-making vs tumor characteristics or surgical factors.

Regarding surgical factors, the most favorable scenario is when the patient has no history of previous surgeries for endometriosis, only undergoing resection of endometriotic nodules in the current surgery, with intraoperative bleeding of < 500 mL, and pathology reporting complete resection of the endometrioma margins. In contrast, the least favorable scenario includes a history of previous surgeries for endometriosis, current surgery involving opening the genital or urinary tracts or with extrapelvic involvement, intraoperative bleeding > 500 mL, and residual endometriosis on the histopathological examination.

Having defined the importance of these characteristics and grouped them for scoring, patients were categorized into 4 stages. The first stage including those for whom sufficient information was not available for classification, while the remaining stages include those with limited, intermediate, and advanced disease (Table 3).

Table 3. Stage categorization of patients with colorectal endometriosis

Stage	Meaning	Score
U	Unclassifiable	Missing data for classification purposes
THS 1	Limited	0-2
THS 2	Intermediate	3-4
THS 3	Advanced	> 5

Retrospective assessment of patients treated with a confirmed diagnosis of colorectal endometriosis

From January 2017 through April 2023, we collected data from 19 patients diagnosed with colorectal endometriosis, treated laparoscopically by the same group of lead surgeons (Table 4).

According to the Enzian classification, 17 of our patients were considered to have C1 colorectal involvement, 1 patient had C2 involvement, and another one, C3 involvement. When categorized based on the THS system, patients fell into THS 1 (8 patients), THS 2 (6 patients), and THS 3 (5 patients) (Table 5).

Table 4. Retrospective evaluation of patients treated at Instituto Nacional de Perinatología with a confirmed diagnosis of colorectal endometriosis

Patient	THS score	THS stage	Enzian classification*	Surgical management	Complications and observations
1	4	2	C1	LNTR	No
2	4	2	C1	LNTR	No
3	4	2	C1	LNTR	No
4	1	1	C1	LNTR	No
5	6	3	C1	SRA	No
6	4	2	C1	LNTR	No
7	0	1	C1	LNTR	No
8	8	3	C1	LNTR	Yes [†]
9	4	2	C1	LNTR	No
10	4	2	C1	LNTR	No
11	2	1	C1	LNTR	No
12	5	3	C1	LNTR	Yes [‡]
13	4	2	C1	LNTR	No
14	4	2	C1	LNTR	No
15	1	1	C2	LNTR	Yes [§]
16	12	3	C3	SRA	Yes [¶]
17	2	1	C1	LNTR	No
18	6	3	C1	LNTR	Yes ^{**}
19	2	1	C1	LNTR	No

LNTR: local non-transmural resection; SRA: segmental resection with anastomosis.

*Only Enzian stage is considered for colorectal involvement.

[†]Intestinal perforation as a complication not detected intraoperatively, requiring intestinal resection and emergency stoma in a 2nd surgical act.[‡]Surgical wound infection. Six colorectal nodules, each 1 cm in size, were resected during a 6-hour surgery.[§]Surgical drainage of pelvic hematoma via laparoscopy.[¶]3rd degree burn due to equipment use, requiring escharotomy and double interpositional flap.^{**}Intraoperative hemorrhage (1800 mL) and 6-hour surgical time.

Regarding the type of surgical management used, 17 patients underwent local non-transmural resection (LNTR), and 2 patients underwent segmental resection with colo-colo segmental resection with anastomosis (SRA) without protective stoma.

We encountered complications in 5 patients, accounting for 26% of the sample, with 74% of the patients progressing uneventfully.

Among patients treated with SRA, 1 progressed uneventfully, while another one suffered a third-degree burn due to equipment use, which required escharotomy and a double interpositional flap in a 2nd surgical act.

Among the patients operated on with LNTR, we had 4 cases with complications: 1 had an intraoperative undetected intestinal perforation, which required intestinal resection and emergency stoma in a 2nd surgical

act, 1 had a surgical wound infection, 1 required surgical laparoscopic drainage of a pelvic hematoma, and finally, 1 experienced intraoperative bleeding (1800 mL) and a 6-hour surgical procedural time.

Four out of the 5 patients with complications had advanced colorectal disease with THS 3, which accounted for 80% of the sample. Additionally, we observed that a THS 3 level positively correlated with the presence or absence of surgical complications, 80% and 93% sensitivity and specificity rates, respectively (Table 6).

Discussion

Endometriosis is a condition estimated to affect 190 million reproductive-aged women worldwide, with

Table 5. Distribution of patients based on colorectal endometriosis damage

Enzian		THS	
Stage	Patients	Stage	Patients
C1	17	1	8
C2	1	2	6
C3	1	3	5

Table 6. 2 × 2 table for the sensitivity and specificity of THS 3 and surgical complications

	Current complication	Absent complication
Present THS 3	4	1
Absent THS 3	1	13

Sensitivity: 80%.
Specificity: 93%.

a prevalence of colorectal involvement of 8% up to 12%, accounting for approximately 19 million women in this age group². Colorectal complications in patients with endometriosis are challenging for the medical team, requiring the availability of special resources including human expertise (experienced pelvic surgeon, urologist, and general or colorectal surgeon) and material resources (advanced laparoscopic equipment and instrumentation with intestinal endographe).

Therefore, preoperative management planning is crucial, based on the patient's clinical presentation, including bimanual, rectal, and speculum examination, supported by diagnostic aids such as transvaginal ultrasound and occasionally magnetic resonance imaging with rectal and vaginal contrast⁹.

Currently, the most widely used classification for endometriosis is the Enzian classification, which specifically considers only the size of the lesion (C1 = 1 cm, C2 = 1-2 cm, and C3 > 3 cm)¹⁰. However, upon analyzing the international literature for this study on 16 846 patients, we found that the surgical management decision-making process for the surgeon involves other factors besides the size of the nodule, such as the number and depth of lesions, the presence or absence of intestinal lumen obstruction, the opening of genital, urinary, and digestive tracts in the same surgical act, intraoperative blood loss, history of previous surgeries for endometriosis, the patient's overall health status, specific surgical risk, and the

possibility of clinically relevant disease recurrence. Therefore, we decided to include these factors in a classification system we coined THS (tumor or endometrioma characteristics, the patients' medical history and observations during surgery)

We categorized our patients into 3 stages of disease (limited, intermediate, and advanced) and tested the staging classification in a group of patients retrospectively treated at Instituto Nacional Perinatología from January 2017 through April 2023. We found a strong correlation within our group between high THS scale values (advanced colorectal endometriotic disease) and the presence of complications requiring subsequent surgical management. Based on this correlation, we suggest a staged surgical management scheme:

- For all stages:
 - Management in centers experienced in the management of endometriosis.
 - Preoperative definition of Enzian and THS stage as accurately as possible based on experience and available institutional resources (physical and bimanual vaginal examination with speculoscopy and transvaginal ultrasound, supplemented, if necessary, with magnetic resonance imaging with rectal and vaginal contrast).
 - Appropriate informed consent. Do not operate if the patient does not agree and is not aware of the benefits and risks of the procedure, or if the risks due to comorbidities outweigh the expected benefits.
 - Availability of complete human team (gynecological, general, urological, and colorectal surgeons) and technical equipment to address unforeseen events (staplers, blood products, etc.)
 - Preoperative intestinal preparation.
- THS 1 stage (limited): local non-transmural extirpations or resections.
- THS 2 stage (intermediate): transmural discoid resection. No more than 2 in segments < 10 cm.
- THS 3 stage (advanced): segmental colon resection with anastomosis, preferably without a stoma.

We believe that the present study contributes to a staged surgical management plan for patients with colorectal endometriosis, in addition to serving as a basis for comparing results between centers and opening new avenues for prospective research.

Conclusions

Colorectal endometriosis is a common condition that requires a planned and comprehensive approach to reduce complications from overtreatment or suboptimal management, which should be based on a good preoperative diagnosis including comprehensive physical examination, bimanual examination, digital rectal examination, and speculscopy, complemented by transvaginal ultrasound and sometimes magnetic resonance imaging with rectal and vaginal contrast.

Currently, the most widely used classifications for endometriosis, such as Enzian, especially for colorectal involvement, only consider the size of the nodule, which we believe to be insufficient for surgical decision-making. Therefore, we propose a classification that considers a more comprehensive approach based on the patient's history, nodule characteristics, and intraoperative conditions.

In our patients, advanced endometriotic disease determined by THS classification positively correlated with the presence of complications, so we consider the present staged classification for colorectal endometriosis an approach to achieve disease staging by organizing the international experience already available in the management of these patients, allowing us to define stage-based treatments and compare results between hospitals.

Due to its limitations, this study should pave the way for prospective studies that, with appropriate statistical analysis, should allow us to refine the scale and increase its utility, to offer patients the best option for personalized surgical management and perform planned interventions with a multidisciplinary team in a single procedure.

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Conflicts of interest

None declared.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for analysis and publication of routinely acquired clinical data and informed consent was not required for this retrospective observational study.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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