

Internal and External Endometriosis: Epidemiological, Diagnostic and Therapeutic Aspects at the Dominique Ouattara Mother and Child Hospital, Bingerville, Côte d'Ivoire

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Abstract

Background: Data on endometriosis in sub-Saharan Africa remain scarce. This study aimed to describe the epidemiological, clinical, diagnostic and therapeutic characteristics of women managed for internal and/or external endometriosis in a university hospital in Côte d'Ivoire. **Methods:** We conducted a retrospective descriptive study based on the medical records of women of reproductive age (15 - 49 years) managed for internal and/or external endometriosis at the Dominique Ouattara Mother and Child Hospital, Bingerville, from January 2018 to December 2023. Following the classical nomenclature, endometriosis was classified as internal (endometriosis interna, located within the myometrium) or external (located outside the uterus), and patients were classified into three groups: internal endometriosis only, external endometriosis only, or both. **Results:** A total of 205 patients were included, corresponding to a hospital-based frequency of 1.24% of the 16,487 women seen in gynecological consultations and emergencies. The mean age was 38.1 ± 6.1 years. Internal endometriosis alone was found in 85 patients (41.5%), external endometriosis alone in 63 (30.7%) and both forms in 57 (27.8%). The leading reason for consultation was a desire for pregnancy (45.9%), followed by pain (28.3%); 58.0% of patients reported at least one painful symptom and 27.8% had documented infertility. Ultrasound (77.6%) and magnetic resonance imaging (57.6%) were the main diagnostic investigations; histological examination was available for 18.0% of patients. The main external forms were ovarian endometrioma (36.6%) and deep endometriosis (17.6%). Medical treatment was given to 79.0% of patients, mainly

gonadotropin-releasing hormone agonists, and 24.4% underwent surgery, by laparoscopy in 84.0% of cases; 22 of the 23 hysterectomies were performed in women with internal endometriosis. **Conclusions:** In this hospital series, internal endometriosis, alone or combined with external endometriosis, accounted for most cases, and the desire for pregnancy was the leading reason for consultation. Diagnosis relied mainly on imaging, with limited histological confirmation, and management was predominantly medical. Prospective studies using standardized diagnostic criteria are needed.

Keywords

Endometriosis, Internal Endometriosis, Endometrioma, Côte d'Ivoire, Sub-Saharan Africa

1. Introduction

Endometriosis is a chronic, estrogen-dependent inflammatory disease defined by the presence of endometrium-like tissue outside the uterus. It affects approximately 10% of women of reproductive age worldwide and is commonly associated with pelvic pain, menstrual disorders and infertility [1]-[3]. Its pathophysiology remains incompletely understood, and the disease has a considerable impact on quality of life and a substantial socioeconomic burden [2]. Diagnosis is frequently delayed by several years after symptom onset, and management, which combines medical and surgical options, must be tailored to each patient [4] [5].

Endometriosis has classically been divided into internal endometriosis (endometriosis interna), in which endometrial glands and stroma are found within the myometrium, and external endometriosis, located outside the uterus [6]. The two forms share several symptoms dysmenorrhea, heavy menstrual bleeding and infertility and frequently coexist, which complicates their clinical and epidemiological description, particularly in settings where diagnosis relies mainly on imaging [7].

In sub-Saharan Africa, epidemiological data on endometriosis are scarce [4] [8]. A Nigerian study reported endometriosis in 48.1% of women undergoing diagnostic laparoscopy [9], whereas in Côte d'Ivoire published data are limited to a few imaging-based series [10]. This scarcity hinders the development of strategies for early diagnosis and appropriate management.

We therefore conducted this study to describe the epidemiological, clinical, diagnostic and therapeutic characteristics of women managed for internal and/or external endometriosis at the Dominique Ouattara Mother and Child Hospital of Bingerville, presenting the two forms separately.

2. Materials and Methods

2.1. Study Design and Setting

We conducted a retrospective descriptive study based on the review of medical

records in the Department of Obstetrics and Gynecology of the Dominique Ouattara Mother and Child Hospital of Bingerville, Côte d'Ivoire. This hospital, opened in March 2018, is a private non-profit university hospital with a public-service mission. The study covered a six-year period, from January 2018 to December 2023.

2.2. Study Population

We included women of reproductive age, defined as 15 - 49 years according to the World Health Organization, who were managed for internal and/or external endometriosis during the study period and whose diagnosis was established by at least one of the following: imaging (pelvic ultrasound, magnetic resonance imaging [MRI] or computed tomography [CT]), endoscopic or surgical exploration (laparoscopy, laparotomy, thoracoscopy, thoracotomy or bronchoscopy), or histological examination. Patients whose medical records contained insufficient data were not included. All eligible patients were included using exhaustive sampling. Patients were identified through the hospital electronic medical record system by searching the patient database using the following keywords: "endometriosis," Each retrieved medical record was then individually reviewed to verify that the patient met the predefined eligibility criteria for inclusion in the study. Data were extracted from the electronic medical records using a standardized data collection form.

2.3. Diagnostic Definitions

The final diagnosis was the one recorded in the medical record by the treating gynecologist, taking into account all available investigations. Imaging findings were extracted from the reports issued by radiologists and sonographers in routine practice; standardized criteria such as the Morphological Uterus Sonographic Assessment (MUSA) for myometrial lesions [11], the International Deep Endometriosis Analysis (IDEA) consensus for deep endometriosis [12] or the European Society of Urogenital Radiology (ESUR) guidelines for MRI [13] were not systematically documented. Diagnoses based on imaging alone are therefore reported as "diagnosed" rather than "confirmed". Findings of each investigation (imaging, surgical exploration and histology) are reported separately from the final diagnosis.

Following the classical nomenclature used in the study protocol [6], endometriosis was classified as internal endometriosis (endometriosis interna), defined by the presence of endometrial glands and stroma within the myometrium, and external endometriosis, defined by the presence of endometrium-like tissue outside the uterus. External endometriosis was further classified as ovarian endometrioma, deep endometriosis, superficial peritoneal endometriosis, tubal endometriosis, thoracic endometriosis or multifocal endometriosis. As a patient could have several forms, patients were classified into three mutually exclusive groups: internal endometriosis only, external endometriosis only, and internal associated with external endometriosis.

2.4. Variables

The variables studied were age; body mass index (BMI), categorized according to the World Health Organization classification; main reason for consultation (one per patient); medical, surgical and obstetric history; functional and physical signs; investigations performed and their findings; final diagnosis; and treatment (medical treatment, surgical approach and procedures). Infertility was recorded as documented in the medical record and classified as primary (no previous pregnancy) or secondary. The desire for pregnancy, recorded as the patient's main reason for consultation, was analysed separately from infertility.

2.5. Hospital-Based Frequency

The hospital-based frequency was calculated as the number of included patients divided by the number of women seen in the gynecology outpatient clinic and the gynecological emergency department during the same period ($n = 16,487$), as recorded in the hospital information system. This frequency does not represent the prevalence of the disease in the general population.

2.6. Statistical Analysis

Data were entered and analysed using Epi Info version 7.2 (Centers for Disease Control and Prevention, Atlanta, GA, USA) and Microsoft Excel. Categorical variables are presented as numbers and percentages, and continuous variables as mean $\pm$ standard deviation (SD), median and range. Unless otherwise stated, percentages were calculated on the whole cohort ($n = 205$); findings of each investigation were calculated among the patients who underwent that investigation, medications among the patients who received medical treatment, and surgical procedures among the operated patients. Several responses were possible for history, symptoms, investigation findings, diagnoses and procedures; totals may therefore exceed 100%. The analysis was descriptive, and no statistical comparison was performed between groups.

2.7. Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki. Authorization to access and use the hospital medical records for research purposes was granted by the Medical and Scientific Director after being advised by the heads of department's committee of the Dominique Ouattara Mother and Child Hospital of Bingerville (Research Authorization No. 06/03/24, dated March 21, 2024), acting as the ethical committee of the medical institution. We contacted each of the participants to give an informed consent by phone call.

3. Results

3.1. Frequency and Sociodemographic Characteristics

During the study period, 205 patients were included among the 16,487 women

seen in gynecological consultations and emergencies, corresponding to a hospital-based frequency of 1.24%. The mean age was 38.1 ± 6.1 years (median 38 years; range 19 - 49), and 55.1% of patients were aged 31 - 40 years. Overweight and obesity were observed in 40.0% and 27.3% of patients, respectively (**Table 1**).

Table 1. Sociodemographic characteristics of the patients (n = 205).

Characteristic	n	%
Age (years)		
19 - 30	20	9.8
31 - 40	113	55.1
41 - 49	72	35.1
Mean ± SD	38.1 ± 6.1	
Median (range)	38 (19 - 49)	
Body mass index (kg/m²)		
Underweight (<18.5)	2	1.0
Normal weight (18.5 - 24.9)	65	31.7
Overweight (25.0 - 29.9)	82	40.0
Obesity (≥30.0)	56	27.3

SD, standard deviation.

3.2. Reasons for Consultation and History

The leading reason for consultation was a desire for pregnancy (94 patients, 45.9%), followed by pain (58; 28.3%) and abnormal uterine bleeding (21; 10.2%) (**Table 2**). Among the 94 women who consulted for a desire for pregnancy, infertility was documented in 49 (52.1%). No medical history was reported by 157 patients (76.6%). A history of abdominopelvic surgery was found in 122 patients (59.5%), mainly myomectomy (38 patients; 18.5% of the cohort), cesarean section (35; 17.1%) and appendectomy (32; 15.6%). At least one induced abortion was reported by 74 patients (36.1%). Nulliparous women accounted for 56.1% of the cohort.

Table 2. Reasons for consultation and history of the patients (n = 205).

Variable	n	%
Main reason for consultation		
Desire for pregnancy (including requests for assisted reproduction)	94	45.9
Pain	58	28.3
Abnormal uterine bleeding	21	10.2

Continued

Abdominopelvic mass or fibroid	7	3.4
Other ^a	25	12.2
History of abdominopelvic surgery		
At least one procedure	122	59.5
Type of previous surgery (n = 122)^b		
Myomectomy	38	31.1
Cesarean section	35	28.7
Appendectomy	32	26.2
Ovarian cystectomy	16	13.1
Exploratory laparotomy	6	4.9
Laparoscopy for endometriosis	5	4.1
Salpingectomy	4	3.3
Uterine polypectomy	3	2.5
Gravidity		
0	57	27.8
1	28	13.7
2 - 3	73	35.6
≥4	47	22.9
Parity		
0	115	56.1
1	34	16.6
2 - 3	49	23.9
≥4	7	3.4
Obstetric history		
Induced abortion	74	36.1
Miscarriage	22	10.7
Ectopic pregnancy	10	4.9

^aInfertility (n = 6), referral for known or suspected endometriosis (n = 5), menstrual cycle disorders (n = 6), pneumothorax (n = 1) and other reasons (n = 7). ^bPercentages calculated among the 122 patients with previous surgery; several procedures possible per patient.

3.3. Functional and Physical Signs

At least one painful symptom was reported by 119 patients (58.0%), dysmenorrhea (37.6%) and chronic pelvic pain (28.3%) being the most frequent. Infertility

was documented in 57 patients (27.8%); it was primary in 27 (47.4%) and secondary in 30 (52.6%). Abnormal uterine bleeding included menometrorrhagia (9.3%), menorrhagia (8.8%) and metrorrhagia (6.8%). Catamenial cough and catamenial chest pain were each reported by two patients. The physical examination was normal in 156 patients (76.1%); the most frequent abnormal finding was a pelvic mass (17.6%) (**Table 3**).

Table 3. Functional and physical signs (n = 205)^a.

Sign	n	%
Painful symptoms		
At least one painful symptom	119	58.0
Dysmenorrhea	77	37.6
Chronic pelvic pain	58	28.3
Acute pelvic pain	27	13.2
Dyspareunia	9	4.4
Abdominal pain	5	2.4
Dyschezia	2	1.0
Dysuria	1	0.5
Infertility		
Documented infertility	57	27.8
Primary ^b	27	47.4
Secondary ^b	30	52.6
Abnormal uterine bleeding		
Menometrorrhagia	19	9.3
Menorrhagia	18	8.8
Metrorrhagia	14	6.8
Other functional signs		
Abdominal distension	5	2.4
Catamenial cough	2	1.0
Catamenial chest pain	2	1.0
Physical signs		
Normal examination	156	76.1
At least one abnormal sign	49	23.9
Pelvic mass	36	17.6

Continued

Pain on uterine mobilization	11	5.4
Uterosacral ligament nodule	9	4.4
Retroverted uterus	7	3.4
Violaceous vaginal lesions	4	2.0
Retrocervical lesions	4	2.0
Ascites	3	1.5
Nodule of the pouch of Douglas	3	1.5

^aSeveral signs possible per patient. ^bPercentages calculated among the 57 patients with infertility.

3.4. Investigations

Pelvic ultrasound was performed in 159 patients (77.6%), MRI in 118 (57.6%), hysterosalpingography in 30 (14.6%) and CT in 8 (3.9%); laparoscopic findings were documented in 31 patients (15.1%), and histological examination was available for 37 (18.0%). The findings of each investigation are reported in **Table 4**, with percentages calculated among the patients who underwent it. Internal endometriosis was the most frequent finding on ultrasound (53.5%) and MRI (64.4%), followed by ovarian endometrioma (34.0% and 42.4%, respectively). At laparoscopy, the main findings were adhesions (48.4%) and endometriomas (32.3%); an enlarged uterus suggestive of internal endometriosis was described in 11 patients (35.5%). Laparoscopic findings were documented for 31 patients, whereas 42 patients were operated on by laparoscopy: some laparoscopies were diagnostic, and operative findings were not recorded in a usable form for all procedures.

Table 4. Investigations performed and their findings^a.

Investigation and finding	n	%
Investigations performed (n = 205)		
Pelvic ultrasound	159	77.6
MRI	118	57.6
Histological examination	37	18.0
Laparoscopy (documented findings)	31	15.1
Hysterosalpingography	30	14.6
CT	8	3.9
Ultrasound findings (n = 159)		
Internal endometriosis	85	53.5
Uterine fibroids	68	42.8

Continued

Ovarian endometrioma	54	34.0
Tubal endometriosis	6	3.8
Ovarian dystrophy	6	3.8
MRI findings (n = 118)		
Internal endometriosis	76	64.4
Ovarian endometrioma	50	42.4
Uterosacral ligament	16	13.6
Tubal endometriosis	15	12.7
Uterine torus	15	12.7
Pouch of Douglas	5	4.2
Anterior peritoneum	4	3.4
Umbilicus	3	2.5
Rectum	2	1.7
Rectosigmoid junction	2	1.7
Anterior abdominal wall	1	0.8
Posterior peritoneum	1	0.8
Pleura	1	0.8
Ureter	1	0.8
Laparoscopic findings (n = 31)		
Adhesions	15	48.4
Uterine appearance suggestive of internal endometriosis ^b	11	35.5
Ovarian endometrioma	10	32.3
Bowel lesions	4	12.9
Superficial peritoneal lesions	2	6.5
Lesions of the pouch of Douglas	1	3.2

CT, computed tomography; MRI, magnetic resonance imaging. ^aPercentages calculated among the patients who underwent each investigation; several findings possible per patient.

^bLaparoscopy does not allow the diagnosis of internal endometriosis, which is located within the myometrium; this finding refers to the macroscopic appearance of the uterus.

3.5. Histological Findings

Histological examination was available for 37 patients. The specimens were hysterectomy specimens (22; 59.5%), myomectomy specimens (10; 27.0%), cervical biopsies (3; 8.1%), a biopsy of an intrauterine mass (1; 2.7%) and a cholecystec-

tomy specimen (1; 2.7%). Internal endometriosis was found in all 22 hysterectomy specimens and was associated with leiomyoma in 21 of them (95.5%); all myomectomy specimens showed leiomyoma. External endometriosis was histologically confirmed in two patients (uterine cervix and gallbladder). No histological result was available for the ovarian cystectomy specimens.

3.6. Final Diagnosis and Diagnostic Groups

Internal endometriosis was diagnosed in 142 patients (69.3%) and external endometriosis in 120 (58.5%). Internal endometriosis was isolated in 85 patients (41.5%), external endometriosis was isolated in 63 (30.7%), and both forms coexisted in 57 (27.8%) (**Table 5**). The most frequent external forms were ovarian endometrioma (36.6%) and deep endometriosis (17.6%); several forms could coexist in the same patient. Uterine myomatosis was associated in 97 patients (47.3%), including 70 of the 142 patients with internal endometriosis (49.3%).

Table 5. Final diagnoses and diagnostic groups (n = 205).

Diagnosis	n	%
Diagnostic groups^a		
Internal endometriosis only	85	41.5
External endometriosis only	63	30.7
Internal and external endometriosis	57	27.8
Final diagnoses^b		
Internal endometriosis	142	69.3
External endometriosis (all forms)	120	58.5
Ovarian endometrioma	75	36.6
Deep endometriosis	36	17.6
Tubal endometriosis	27	13.2
Superficial peritoneal endometriosis	21	10.2
Multifocal endometriosis	5	2.4
Thoracic endometriosis	2	1.0
Associated condition		
Uterine myomatosis	97	47.3

^aMutually exclusive groups. ^bSeveral diagnoses possible per patient.

3.7. Characteristics According to the Diagnostic Group

Patients with external endometriosis only were younger (mean age 35.9 ± 5.1 years) than those with internal endometriosis only (39.2 ± 6.1 years) or both forms (39.0 ± 6.6 years), and were more often nulliparous (77.8%) and infertile (41.3%). Asso-

ciated myomatosis was most frequent in the internal endometriosis only group (54.1%). Hysterectomy was performed in 12 patients with internal endometriosis only, 10 with both forms and one with external endometriosis only (**Table 6**).

Table 6. Characteristics of the patients according to the diagnostic group.

Characteristic	Internal endometriosis only (n = 85)	External endometriosis only (n = 63)	Both forms (n = 57)	Total (n = 205)
Age, years, mean $\pm$ SD	39.2 $\pm$ 6.1	35.9 $\pm$ 5.1	39.0 $\pm$ 6.6	38.1 $\pm$ 6.1
Age $\geq$ 41 years	38 (44.7)	9 (14.3)	25 (43.9)	72 (35.1)
Nulliparity	32 (37.6)	49 (77.8)	34 (59.6)	115 (56.1)
Desire for pregnancy as main reason	33 (38.8)	34 (54.0)	27 (47.4)	94 (45.9)
Documented infertility	15 (17.6)	26 (41.3)	16 (28.1)	57 (27.8)
Dysmenorrhea	33 (38.8)	25 (39.7)	19 (33.3)	77 (37.6)
Associated myomatosis	46 (54.1)	27 (42.9)	24 (42.1)	97 (47.3)
Treatment				
Medical only	50 (58.8)	42 (66.7)	34 (59.6)	126 (61.5)
Surgery (with or without medical treatment)	22 (25.9)	12 (19.0)	16 (28.1)	50 (24.4)
No treatment	13 (15.3)	9 (14.3)	7 (12.3)	29 (14.1)
Hysterectomy	12 (14.1)	1 (1.6)	10 (17.5)	23 (11.2)

Values are n (%) unless otherwise stated. SD, standard deviation. Descriptive data; no statistical test was performed.

3.8. Treatment

Medical treatment alone was given to 126 patients (61.5%), surgical treatment alone to 14 (6.8%) and a combination of both to 36 (17.6%); 29 patients (14.1%) received no treatment. Overall, 162 patients (79.0%) received medical treatment and 50 (24.4%) underwent surgery, *i.e.*, the 14 patients treated by surgery alone and the 36 who received combined treatment (**Table 7**). Among the patients receiving medical treatment, 65.4% were given gonadotropin-releasing hormone (GnRH) agonists, 46.3% progestins and 22.2% nonsteroidal anti-inflammatory drugs (NSAIDs). Surgery was performed by laparoscopy in 42 patients (84.0%) and by laparotomy in 8 (16.0%). The most frequent procedures were hysterectomy (46.0%), adhesiolysis (32.0%), myomectomy (20.0%) and ovarian cystectomy (18.0%); one cholecystectomy revealed gallbladder endometriosis. Indications for surgery were not systematically documented in the records; when recorded, they were abnormal uterine bleeding, pain (including painful fibroids), failure of hormonal treatment and diagnostic purposes. Hysterectomy was performed in women aged 41 to 49 years, none of whom had consulted for a desire for pregnancy, and 22 of the 23 hysterectomies concerned patients with internal endometriosis. Therapeutic abstention mainly concerned asymptomatic women or women approaching menopause.

Table 7. Treatment (n = 205).

Treatment	n	%
Therapeutic strategy		
Medical only	126	61.5
Surgical only	14	6.8
Medical and surgical	36	17.6
No treatment	29	14.1
Medical treatment (n = 162)^a		
GnRH agonists	106	65.4
Progestins	75	46.3
NSAIDs	36	22.2
Paracetamol	2	1.2
Surgical approach (n = 50)		
Laparoscopy	42	84.0
Laparotomy	8	16.0
Surgical procedures (n = 50)^a		
Hysterectomy	23	46.0
Adhesiolysis	16	32.0
Myomectomy	10	20.0
Ovarian cystectomy	9	18.0
Excision of superficial lesions	7	14.0
Excision of deep lesions	4	8.0
Cholecystectomy	1	2.0

GnRH, gonadotropin-releasing hormone; NSAIDs, nonsteroidal anti-inflammatory drugs.

^aSeveral treatments or procedures possible per patient.

4. Discussion

4.1. Hospital-Based Frequency

Patients managed for internal and/or external endometriosis represented 1.24% of the women seen in gynecological consultations and emergencies at our hospital. This figure is a hospital-based frequency and cannot be interpreted as the prevalence of the disease in the general population, estimated at approximately 10% of women of reproductive age [1] [2]. Nor can it be compared directly with the prevalences observed in selected populations, such as women undergoing laparoscopy 48.1% in a Nigerian study [9] or women attending a fertility clinic in South Africa, where endometriosis was less frequent among black (2%) than among

white women (7%) [14]. Reported estimates in Africa vary widely according to the population studied, access to care, diagnostic methods and disease classification, and research on endometriosis among women of different ethnic and social backgrounds remains limited [4]. Our frequency is probably underestimated: diagnosis relied mainly on imaging, laparoscopy was rarely performed, and common symptoms such as dysmenorrhea or heavy menstrual bleeding are often considered normal or attributed to other conditions by both patients and practitioners. Conversely, as a referral hospital, our centre may attract more complex cases.

4.2. Internal and External Endometriosis

We used the classical distinction between internal endometriosis (endometriosis interna) and external endometriosis, which reflects the nomenclature adopted in our study protocol. As noted by Guo, the condition located within the myometrium used to be called endometriosis interna, and whether it is simply endometriosis of the uterus remains an open question from both the pathogenic and the pathophysiological perspectives [6]. We acknowledge that recent international terminology restricts the term endometriosis to lesions located outside the endometrium and myometrium [15]; to allow comparison with studies using this terminology, internal and external forms are reported separately throughout this article. Internal endometriosis was present in 69.3% of our patients and was isolated in 41.5%, whereas 58.5% had external endometriosis, associated with internal endometriosis in nearly half of them (57/120). The frequent coexistence of the two forms is well documented [7].

The three groups had different profiles. Women with external endometriosis only were younger, more often nulliparous and more often infertile, whereas women with internal endometriosis, isolated or associated, were older, more often had associated fibroids and accounted for 22 of the 23 hysterectomies. These descriptive differences, which were not tested statistically, are consistent with the classical profile of internal endometriosis, traditionally diagnosed in older, parous women, although imaging now increasingly identifies it in younger women [7], and with the reproductive-age profile of external endometriosis [2]. The predominance of internal endometriosis in our series, which contrasts with surgical series limited to external endometriosis, is largely explained by our inclusion criteria and by the imaging-based diagnostic approach.

4.3. Sociodemographic Characteristics

The mean age of our patients was 38.1 years, and 55.1% were aged 31 - 40 years, in keeping with the literature, which reports a peak frequency between 30 and 40 years [16], and with the MRI series of Diallo *et al.* in Dakar, which reported a comparable mean age [17]. Our mean age was higher than that reported by Poupon in France (32 years) [18], whose series was limited to women operated on for deep endometriosis. The inclusion of internal endometriosis probably contributed to this difference: the mean age was 39.2 years in the internal endometriosis only

group, compared with 35.9 years in the external endometriosis only group. The diagnostic delay of 7 to 10 years reported worldwide, which is a particular challenge in Africa [4], may also shift the age at diagnosis upwards.

Overweight or obesity was observed in 67.3% of our patients. In the absence of a comparison group, this finding cannot be interpreted as an association between BMI and the disease. It contrasts with epidemiological studies reporting an inverse association between BMI and the risk of endometriosis [19] [20], and may partly reflect the relatively advanced age of our patients and the high proportion of internal endometriosis and uterine fibroids in our series.

4.4. Clinical Presentation

The desire for pregnancy was the leading reason for consultation (45.9%). This category reflects the patient's main request and does not equate to infertility, which was documented in 27.8% of patients, including 49 of the 94 women who consulted for a desire for pregnancy. The importance of reproductive concerns is consistent with the well-established association between endometriosis and infertility, which involves both anatomical distortion of the pelvis and an inflammatory environment unfavourable to fertilization and implantation [21]. In the Nurses' Health Study II, a prospective cohort of 116,429 American nurses, women with endometriosis had a twofold higher risk of incident infertility than women without endometriosis [22]. In our series, documented infertility was more frequent in women with external endometriosis only (41.3%) than in those with internal endometriosis only (17.6%).

A history of abdominopelvic surgery was found in 59.5% of our patients, mainly myomectomy, cesarean section and appendectomy, and 36.1% reported at least one induced abortion. This proportion of previous surgery is higher than the 31% reported by Poupon [18], possibly because of differences in the populations studied and the high frequency of fibroid surgery in our setting. Because our study had no comparison group, these characteristics describe the cohort and do not allow any conclusion regarding risk factors. Several hypotheses have nevertheless been proposed: cesarean scar endometriosis is well described [23] [24], and iatrogenic disruption of the endometrial-myometrial interface, for example during curettage or uterine surgery, has been hypothesized to promote internal endometriosis [6]. A history of induced abortion was reported in 39% of women with internal endometriosis in a Nepalese series [25]. Whether such procedures contribute to the development of internal or external endometriosis should be examined in analytical studies with appropriate control groups.

Women with endometriosis may present with a wide range of manifestations, from no symptoms to dysmenorrhea, chronic non-cyclic pelvic pain, dyspareunia, dyschezia or dysuria [26]. In our series, 58.0% of patients reported at least one painful symptom, and dysmenorrhea was reported by 37.6%, compared with 53% in Douala [27] and 83% in France [18]. In the literature, menstrual pelvic pain affects 70% - 88% of women with endometriosis and non-menstrual pelvic pain 47%

- 78% [28] [29]. The lower frequency of dysmenorrhea in our series may reflect the composition of our cohort, with a high proportion of internal endometriosis and of women consulting for fertility, the incomplete recording of symptoms in retrospective records and, possibly, differences in the perception of menstrual pain, which is often regarded as normal; the latter hypothesis could not be assessed in our study.

4.5. Diagnostic Approach

Several scientific societies have issued guidelines for the diagnosis and treatment of endometriosis, with notable differences between them [30]. The 2022 guideline of the European Society of Human Reproduction and Embryology (ESHRE) recommends imaging ultrasound or MRI in the diagnostic work-up and no longer considers laparoscopy the diagnostic gold standard, reserving it for patients with negative imaging results or in whom empirical treatment was unsuccessful or inappropriate [5]. The French CNGOF-HAS guidelines similarly recommend clinical examination and pelvic ultrasound as first-line investigations, followed, if necessary, by a pelvic examination by a referral clinician, MRI or expert transvaginal ultrasound [16] [31]. For typical endometriomas, ultrasound and MRI have similar performance, whereas ultrasound is less sensitive for deep vaginal and rectovaginal lesions [31].

In line with these recommendations, ultrasound (77.6%) and MRI (57.6%) were the main investigations in our series. For internal endometriosis, transvaginal ultrasound has a reported sensitivity of 72% - 79% and a specificity of 78% - 81%, and MRI has a sensitivity of about 80% and a specificity of 90%, junctional zone thickening greater than 12 mm being a key sign [32]; standardized sonographic criteria have been proposed by the MUSA group [11]. In our retrospective series, however, imaging diagnoses were extracted from routine reports without systematic use of these criteria, which limits their comparability with those of other series.

Laparoscopy does not allow the diagnosis of internal endometriosis, which is located within the myometrium; the uterine appearance suggestive of internal endometriosis reported in 11 laparoscopies refers only to the macroscopic aspect of the uterus. The main laparoscopic findings were adhesions (48.4%) and endometriomas (32.3%).

Histological examination was available for only 18.0% of our patients, mainly for hysterectomy specimens. Internal endometriosis was found in all 22 hysterectomy specimens and was associated with leiomyoma in 21. Bentefouet *et al.* in Dakar reported that hysterectomy specimens accounted for 87% of samples, with internal endometriosis in 86% and associated leiomyomas in 44% [33]. The coexistence of internal endometriosis and leiomyomas is common and may increase the severity of symptoms and the complexity of treatment [34]. In contrast, external endometriosis was histologically confirmed in only two of our patients. Most diagnoses of external endometriosis in our series therefore rest on imaging, which

should be kept in mind when interpreting our results.

4.6. Treatment

There is currently no curative treatment for endometriosis; management aims to relieve symptoms, preserve fertility when desired and treat associated conditions, using analgesics, hormonal therapies and surgery [5] [30]. Most of our patients (79.0%) received medical treatment, mainly GnRH agonists (65.4% of treated patients), progestins (46.3%) and NSAIDs (22.2%). In Douala, NSAIDs and GnRH agonists were prescribed to 18.1% and 21.7% of patients, respectively [27]. Current guidelines recommend progestogens or combined hormonal contraceptives as first-line hormonal treatments for endometriosis-associated pain, GnRH agonists or antagonists as second-line options [5] [16]. The predominance of GnRH agonists in our series may reflect the high proportion of internal endometriosis and uterine fibroids, for which these agents are also used to reduce uterine volume and bleeding, particularly before surgery. NSAIDs may relieve pain but should be prescribed with caution and are not recommended for long-term use because of their gastrointestinal and renal adverse effects [16].

Surgery was performed in 24.4% of our patients (6.8% surgery alone and 17.6% combined with medical treatment). When surgery is indicated, laparoscopy is the preferred approach [5] [16]; it was used in 84.0% of our operated patients, compared with 98% in Poupon's series [18]. Laparotomy remains indicated for extensive or complex lesions or when laparoscopy is not feasible. Hysterectomy accounted for 46.0% of the procedures in our series, compared with 16% in Poupon's series [18]. This difference is explained by the inclusion of internal endometriosis: 22 of the 23 hysterectomies were performed in women with internal endometriosis, frequently associated with fibroids, who were aged 41 to 49 years and had not consulted for a desire for pregnancy. Indications for surgery were not systematically documented in the records, which limits the interpretation of surgical choices. Therapeutic abstention (14.1%) mainly concerned asymptomatic women or women approaching menopause, in line with an individualized approach.

4.7. Limitations

This study has several limitations. First, its retrospective single-centre design exposed it to missing data, particularly for 2018, the first year of use of the electronic medical record system and to selection bias related to the referral role of the hospital; patients with incomplete records were not included. Second, diagnoses relied mainly on imaging reports produced in routine practice, without systematic use of standardized criteria, and histological confirmation was available for a minority of patients, so that some diagnoses may have been misclassified. Third, the classification into internal and external endometriosis follows a classical nomenclature that differs from recent international terminology [15], and the study was not designed to compare the two forms. Fourth, the frequency is hospital-based

and depends on the denominator used. Fifth, the absence of a comparison group precludes any conclusion regarding risk factors, and comparisons between groups were descriptive only. Finally, the indications for surgery were not systematically documented. Despite these limitations, this series provides local data on internal and external endometriosis in Côte d'Ivoire and may serve as a basis for prospective multicentre studies using standardized diagnostic criteria.

5. Conclusion

In this hospital series from Côte d'Ivoire, internal endometriosis, isolated or combined with external endometriosis, accounted for most cases, and the desire for pregnancy was the leading reason for consultation. Diagnosis relied mainly on ultrasound and MRI, with limited histological confirmation. Management was predominantly medical, whereas surgery, frequently hysterectomy, mainly concerned older women with internal endometriosis. Prospective studies using standardized imaging criteria and systematic histological documentation are needed to better characterize internal and external endometriosis in sub-Saharan Africa.

Availability of Data and Materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Author Contributions

All authors contributed to data collection and to the drafting or revision of the manuscript, read and approved the final version, and agreed to be accountable for all aspects of the work.

Conflicts of Interest

The authors declare no conflict of interest.

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