

Laparoscopic Excision of Lesions Suggestive of Endometriosis: A clinicopathological evaluation

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ABSTRACT

OBJECTIVE: Diagnoses of endometriosis are based on observation of endometriotic lesions by means of laparoscopy, along with the pathological findings. The aim of this study was to evaluate the sensitivity and specificity of the laparoscopic findings in relation to the histopathological findings. More specifically, we aimed to test the efficacy of laparoscopy alone for diagnosing endometriosis and to evaluate the clinical parameters of endometriosis among the study population.

MATERIAL AND METHODS: A retrospective study was conducted on 90 women undergoing diagnostic and operative laparoscopy for evaluation of pelvic pain and/or infertility, at Govt. Doon Medical College, Dehradun, between 2019 to 2022. All areas suggestive of endometriosis on laparoscopy were excised and examined pathologically.

The positive predictive value, sensitivity, negative predictive value and specificity were determined for identified endometriosis versus the histological findings.

RESULTS: The mean prevalence of abnormalities visually consistent with endometriosis was 73.3% while 65.5% confirmed histologically. Taking the histopathological findings to be definitive for the diagnosis of endometriosis, the clinical suspicion and laparoscopic findings presented 97.68% sensitivity, 79.23% specificity, 72% positive predictive value, 98.42% negative predictive value, and 85.75% accuracy.

CONCLUSION: Laparoscopy should be used in conjunction with histopathology for diagnosing endometriosis.

Key words: Endometriosis, Histology, Infertility, Laparoscopy, Pelvic pain.

INTRODUCTION

Endometriosis is described as a benign disease of the female genital system, principally characterized by endometrium-like tissue, consisting of glands and stroma, found outside the uterine cavity. Although implanted ectopically, this tissue presents histopathological and physiological responses that are similar to the responses of the endometrium.[1]

The clinical presentations of the disease are varied and are susceptible to progress and recurrence. [2, 3] It includes chronic pelvic pain, dysmenorrhea, infertility, dyspareunia and also can be associated with gastrointestinal symptoms (nausea, vomiting, bloating, altered bowel habits).[4,5]

Three theories have been proposed to explain the histologic genesis of endometriosis:

1. Ectopic transplantation of endometrial tissue.
2. Cellomic metaplasia.
3. Induction theory.

Women with shorter intervals between menstruation periods and longer duration of menses are at higher risk for endometriosis. Obesity and smoking are associated with the low risk of endometriosis.[3]

The diagnostic hypothesis of endometriosis is based on the clinical history, along with the results from gynecological examinations, laboratory tests and transvaginal ultrasound. [6, 7] Some clinical characteristics, the physical examination itself, laboratory test results and evidence from imaging examinations may suggest the diagnosis. [8] The greatest difficulty lies in diagnosing minimal and mild lesions. In these cases, the ideal access for confirmation is always laparoscopic since the complementary examinations available do not offer the necessary specificity. [9]

Diagnosis by means of laparoscopy, which is considered the gold standard, may depend on confirmation by means of histopathological assessment.

Assessment of the accuracy of laparoscopy for diagnosing endometriosis has demonstrated that it is highly precise in ruling out the disease. [10] Recent studies have shown that endometriosis is principally diagnosed by laparoscopy combined with histopathological examination, although a negative result does not rule out the possibility of the disease.[11] Our study is designed for evaluation of diagnostic power of visual inspection by laparoscopy according to histopathology.

OBJECTIVE

The objective of this study was to:

1. Assess the sensitivity and specificity of the macroscopic findings (at least 2 of 3) : (a) endometrial glands, (b) endometrial stroma, (c) hemosiderin-laden macrophages) from laparoscopy, in relation to histopathological confirmation of endometriosis.
2. Test the efficacy of laparoscopy alone for diagnosing endometriosis and
3. To evaluate the clinical presentation of endometriosis among the study population.

MATERIALS AND METHODS

It was a retrospective study where 90 women who underwent laparoscopy due to pelvic pain and/or infertility at Govt. Doon Medical College, Dehradun, between 2019 to 2022 were considered based on inclusion criteria. We analyzed the laparoscopic and histopathological findings from all the patients. Of these 90 patients, 66 presented laparoscopic findings suggestive of pelvic endometriosis and 34 patients did not

present endometriosis (but had other gynecological conditions).

The inclusion criteria for performing laparoscopy were females after menarche presenting with:

- Pelvic pain
- Dyspareunia
- Dysmenorrhea or
- Infertility; and
- Results from complementary tests such as CA125 determination and ultrasound needed to reveal pelvic masses or blood in the pelvic cavity.

The exclusion criteria for the study was-

- Patients who had not yet reached the menarche or had reached the menopause with associated pelvic pain
- Cases of laparoscopic re-intervention performed due to pelvic pain.

During the laparoscopy, biopsies were performed on anatomical abnormalities that presented the macroscopic appearance of endometriosis, i.e. typical lesions such as "powder burn", of reddish color (light or dark), light color (yellow or brown) or dark color (black or blue), or even on fibrotic lesions and endometriotic cyst. The lesions suggestive of endometriosis were biopsied and histopathologically examined. The endometriosis was staged in accordance with the 1985 American Fertility Society (AFS) classification system, and the staging was compared with the result from the histopathological analysis on the biopsies.¹¹

Pearson's chi-squared test and Fisher's exact test were used to assess any proportional differences between the groups with and without endometriosis. Differences between the continuous variables were studied using analysis of variance (ANOVA). The significance level was set at $P \leq 5\%$ for all tests and the power test was 90%.

RESULTS

The sample consisted of 90 patients who underwent laparoscopic evaluation based on the inclusion criteria.

The mean age of these patients was 30.85 ± 5.54 years. The frequency of endometriosis of any stage was found to be highest among patients between the ages of 20 and 40 ($P = 0.001$).

Patients presented with acute or chronic pelvic pain (84.44%), dysmenorrhea (87.77%), primary infertility (48%) and secondary infertility (6.66%). (Table 1)

TABLE 1: PREVALENCE OF COMPLAINTS FOR ENDOMETRIOSIS		
COMPLAINTS	PATIENTS (n=90)	
	No.	%

Acute or chronic pelvic pain	76	84.44
Primary infertility	44	48
Secondary infertility	6	6.66
Dysmenorrhea	79	87.77

A tendency towards higher frequency of dysmenorrhea was found among patients with the more severe forms of endometriosis, whereas the frequency of primary or secondary infertility was comparable at all stages of the disease.

Among 66 cases (73.3%) presenting with clinical and laparoscopic profiles suggestive of endometriosis, 59 cases (65.5%) were confirmed by histopathology. (Table 2)

TABLE 2: HISTOPATHOLOGICAL AND LAPAROSCOPIC CORRELATION			
	HISTOPATHOLOGY POSITIVE	HISTOPATHOLOGY NEGATIVE	
VISUAL POSITIVE	59	7	66
VISUAL NEGATIVE	0	24	24

Taking the histopathological findings to be definitive for the diagnosis of endometriosis, the clinical suspicion and laparoscopic findings presented 97.68% sensitivity, 79.23% specificity, 72% positive predictive value, and 98.42% negative predictive value.

DISCUSSION

The laparoscopic diagnosis of endometriosis as described in the literature varies widely because of the presence of a wide range of presumably characteristic lesions.[12-17] .The promptness and accuracy of diagnosis is an important contribution to the application of early treatment and the prevention of scarring and adhesion and compromise of fertility.

Clinical parameters such as pelvic pain, dysmenorrhea, dyspareunia, and infertility are insufficient to confirm the diagnosis. Likewise, combining laboratory tests such as CA125 level determinations with imaging methods such as ultrasonography, tomography and magnetic resonance provides relative value for reaching a conclusive diagnosis in the initial stages of endometriosis. [18-20]

Combining laparoscopy with histopathological examination yields greater sensitivity for the definitive diagnosis of the disease and decreases the diagnostic errors.[21]

In our study sample consisting of 90 patients who underwent laparoscopic evaluation, the prevalence of visually detected abnormalities was 73.3% (66 patients) (FIGURE 1,2).



FIG 1: ENDOMETRIOTIC CYST IN OVARY

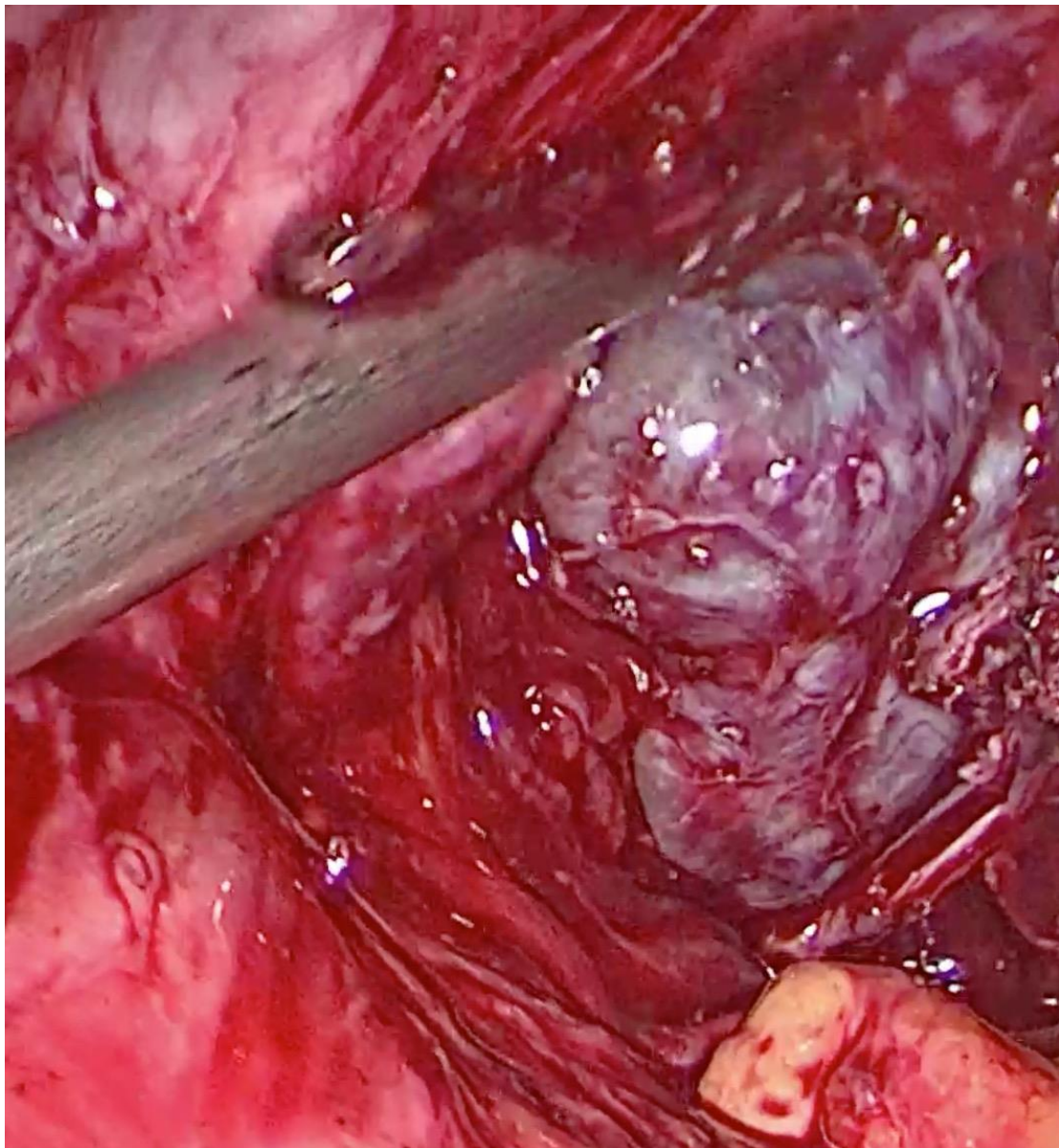


FIG 2: LAPAROSCOPIC VIEW OF ENDOMETRIOTIC CYST IN OVARY

In another study done in Scotland by Walter (1997-1999), from 44 cases suspected to have endometriosis, only 36% had visual abnormal lesions.

The prevalence of histologically diagnosed endometriosis for our patients with visual diagnosis of endometriosis was 65.5% (59 patients), comparable to a case study done in 2004 at the Kiel University by Mettler et al to define the correlation between the visual and histological diagnoses of endometriosis (84.1%). [22]

In 2005 in Toronto University another study on 54 patients was carried out with laparoscopic evaluation in which 54% of visual diagnoses were confirmed by histopathology. So, histological confirmation in endometriosis diagnosis is clearly needed (FIGURE 3).

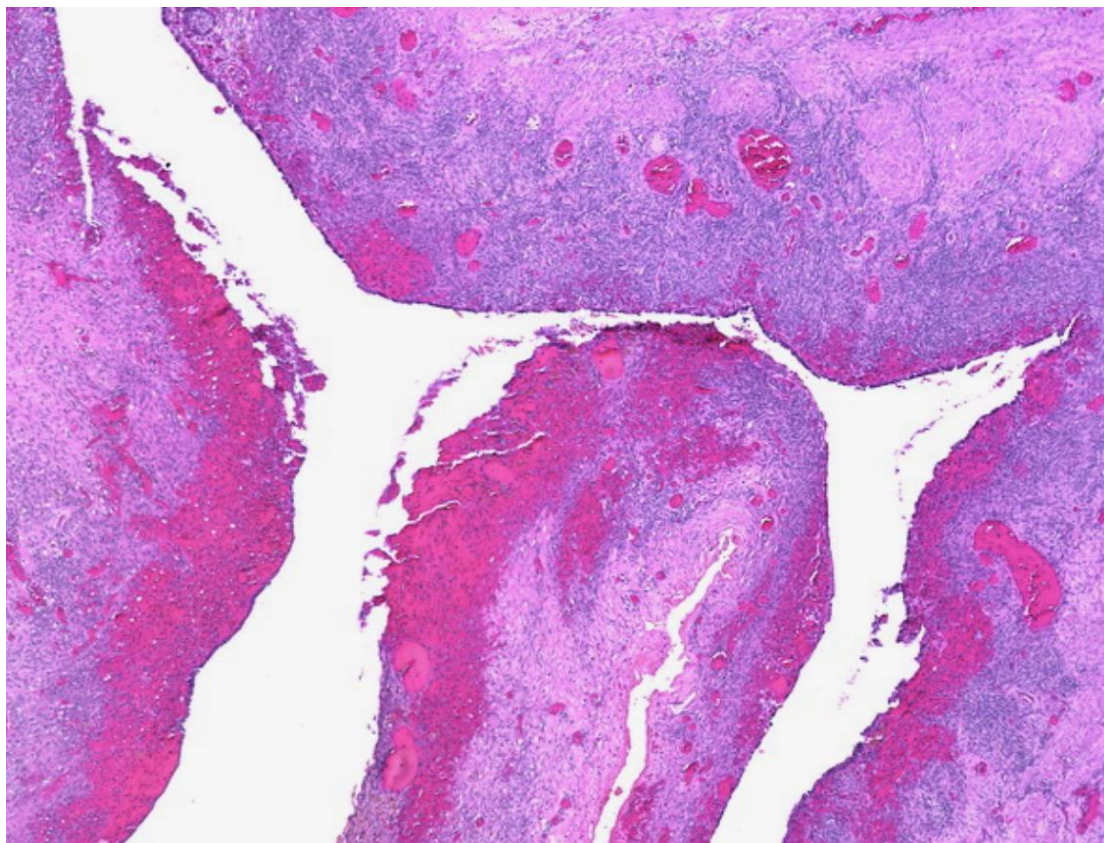


FIG 3: HISTOPATHOLOGY OF ENDOMETRIOTIC CYST OF OVARY SHOWING ENDOMETRIAL GLANDS AND STROMA

There is not any prominent difference in both latter studies with the present research, depicting the accuracy of our study. (Table 3,4)

TABLE 3: COMPARTIVE ANALYSIS OF SIMILAR STUDIES			
STUDY	SAMPLE SIZE	POSITIVE CASES ON LAPAROSCOPY (%)	POSITIVE CASES ON HISTOPATHOLOGY (%)
Walter et al	44	36	18
Mettler et al	164	84.1	15.99
Salehpour et al	30	63	42

Pereira et al	976	47.95	34.5
Our study	90	73.3	65.5

TABLE 4: COMPARTIVE ANALYSIS OF SIMILAR STUDIES		
STUDY	SENSITIVITY	SPECIFICITY
Walter et al	97	77
Mettler et al	92	70
Salehpour et al	88.8	47.6
Pereira et al	97.6	79.2
Our study	96	80

The diagnosis of histopathology-confirmed endometriosis presented a statistically significant association with chronic pelvic pain. However, according to the findings of Wardle and Hull, [23] acute pelvic pain, dysmenorrhea, primary infertility, and secondary infertility had no statistically significant influence on the diagnosis of endometriosis.

To date, there is no consensus on the relationship between the extent of endometriosis and the intensity of pelvic pain.[24] It has been shown that there is a correlation between certain histopathological findings (a well-differentiated pattern or a diagnosis of stromal disease) and the intensity of pelvic pain.[25] In the present study, 84.4% of all patients (regardless of endometriosis stage) reported pelvic pain. Pelvic pain was found to correlate significantly with endometriosis stage (P = 0.03).

Topalski Fistes et al. [26] carried out a comparative study with a control group of 200 fertile women. They found that the frequency of endometriosis was 32% among infertile women and 5% among fertile women, which was a statistically significant difference (P = 0.001). In the present study, the frequencies of primary infertility (48%) were comparable to above studies regardless of the severity of the disease.

In a study done by Wardle PG et al, assessing macroscopic findings of anatomical abnormalities and confirmation of endometriosis, it was found that 85.7% of the patients presented pelvic anatomical abnormalities consistent with endometriotic lesions and that 31.1% of them were identified through histopathology as endometriosis.[23] In our study, 90 patients presenting pelvic pain and anatomical abnormalities typical of endometriosis were evaluated, and the diagnosis of endometriosis was confirmed in 66 (73.3%).

Comparative analysis of various studies along with our study reveals that despite the validity of laparoscopy for diagnosing endometriosis, its use without histopathological confirmation gives rise to discrepancies in relation to the macroscopic findings (FIGURE 4, 5).

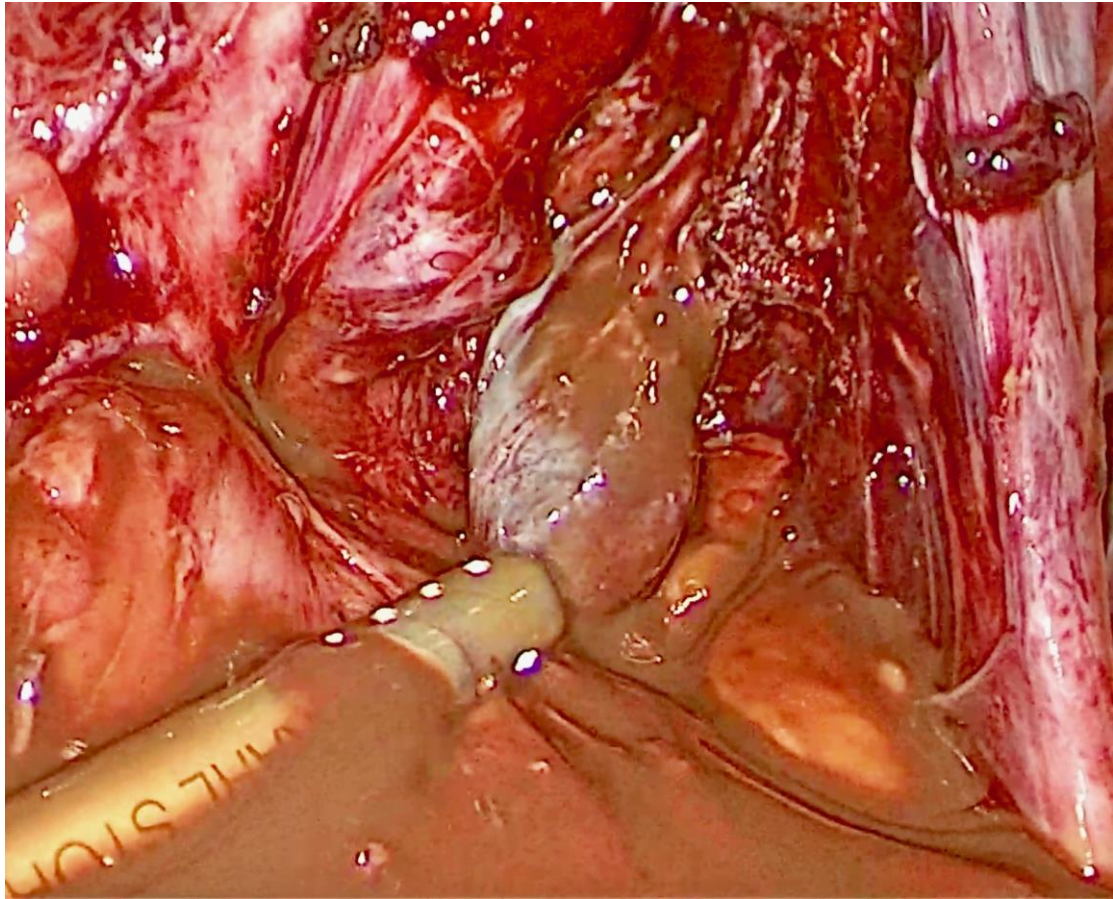


FIG 4: CHOCOLATE FLUID RELEASED FROM ENDOMETRIOTIC CYST

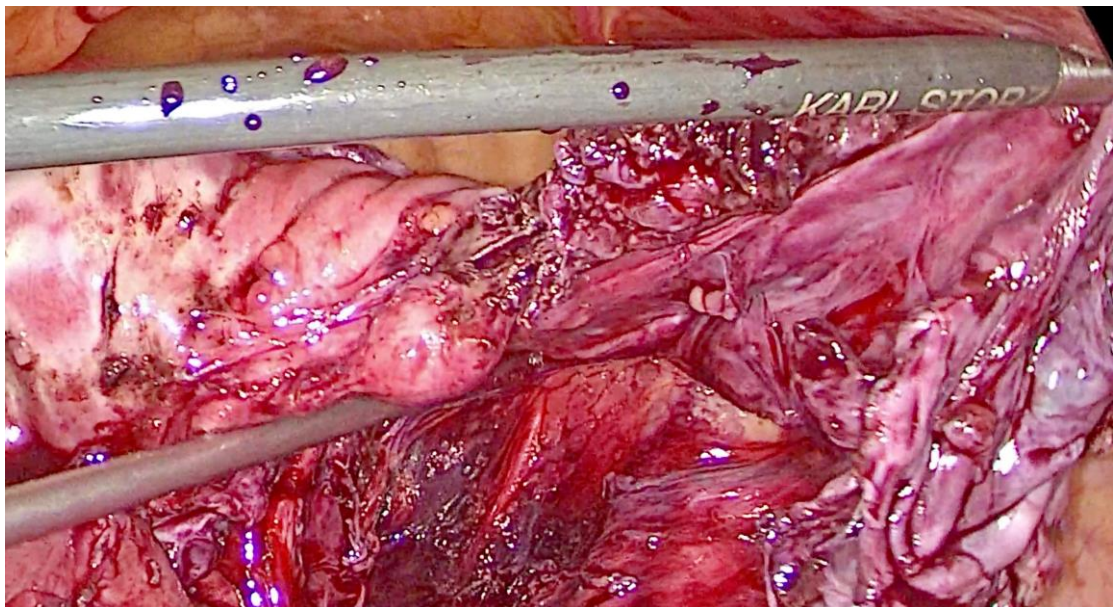


FIG 5: ENDOMETRIOTIC CYST WALL SENT FOR HISTOPATHOLOGICAL EVALUATION

There is a need for good surgical practice supported by detailed documentation to systematize the diagnosis.[11]

According to our study sensitivity and specificity of visual findings was 97.68% & 79.23% respectively. These results were comparable with the study done in 2006 in

China and Walter's study (97% and 77% respectively) [21]. Positive predictive value (PPV) of visual findings was 72% and Negative predictive value (NPV) was 98.42% in our study, comparable to findings by Pereira et al (PPV=97.6, NPV=79.2) and Walter et al (PPV=97, NPV=77), suggesting that visual diagnosis have a high Negative predictive value for diagnosis of endometriosis, and normal appearance of peritoneum is highly reliable for the absence of endometriosis. [21, 27] On the other hand, visual diagnosis has a lower predictive value (PPV) for diagnosing endometriosis and definitive diagnosis of endometriosis has not been reliable by visualization of typical or atypical lesions.

It is therefore recommended to histologically confirm the visually detected abnormalities suggestive of endometriosis before a definitive diagnosis is made. Because of diversity of endometrial lesions, the diagnosis of endometriosis should be established only after histological confirmation.

CONCLUSIONS

Endometriosis has a multiple appearance, and the lesions may be confused with other non-endometriotic lesions. It is also clear that a non-histology-based diagnosis may lead to unnecessary, prolonged medical treatment and operations and may delay the proper treatment measures from being applied. The results obtained from our study suggest that laparoscopy alone is of limited efficacy and needs to be combined with histopathological examination to achieve diagnostic confirmation of endometriosis.

Therefore, laparoscopy is the easiest diagnostic tool for the diagnosis of endometriosis. However, a meticulous histological confirmation should still be the first step in the laparoscopic diagnosis and treatment of suspected endometriosis.

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