Original Research

A STUDY ON CORRELATION BETWEEN PRE OPERATIVE CLINICAL DIAGNOSIS AND POST OPERATIVE PATHOLOGICAL DIAGNOSIS IN PATIENTS UNDERGOING TOTAL ABDOMINAL HYSTERECTOMY

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ABSTRACT

Introduction: The present study addresses the correlation between preoperative clinical diagnosis and postoperative pathological diagnosis in patients undergoing total abdominal hysterectomy (TAH) for benign gynecological conditions. Hysterectomy remains one of the most common surgical procedures among women, with total abdominal hysterectomy being frequently performed despite the availability of less invasive alternatives. Accurate preoperative diagnosis is critical for optimal surgical planning and patient management, especially for conditions like adenomyosis which pose diagnostic challenges. **Objectives:** The primary objective of the present study is to determine the histopathological diagnosis of TAH specimens and to correlate these findings with preoperative clinical diagnoses, thereby assessing the accuracy and reliability of clinical evaluation in guiding surgical intervention. **Methodology:** This prospective observational study was conducted at KMCT Medical College, Kozhikode, Kerala, from 2022 to 2025. A total of 100 patients undergoing TAH for benign indications were enrolled using consecutive sampling. Data collection included demographic details, clinical history, imaging findings, intraoperative observations, and postoperative histopathological examination performed by a single pathologist. Statistical analysis involved descriptive statistics and Pearson correlation to assess concordance between clinical and pathological diagnoses, with significance set at $p < 0.05$. **Results:** The study population predominantly comprised women aged 41–50 years (76%), with multiparity (P2L2) in 55%. Heavy menstrual bleeding was the chief complaint (64.36%). Leiomyoma was the most common clinical diagnosis (61%), followed by fibroid uterus (30%) and adenomyosis (17%). Histopathology confirmed leiomyoma (70%) and adenomyosis (34%) as leading pathologies. Correlation rates were highest for hyperplasia (100%) and leiomyoma (87.14%), while adenomyosis showed a lower correlation (50%). Total abdominal hysterectomy with bilateral salpingo-oophorectomy was the predominant surgical procedure (73%), with minimal postoperative complications. **Conclusion:** The present study demonstrates strong concordance between preoperative clinical diagnosis and postoperative histopathological findings for most benign uterine conditions, validating clinical and imaging assessments for leiomyoma and hyperplasia. The lower diagnostic accuracy for adenomyosis underscores the need for enhanced preoperative diagnostic tools. Routine histopathological examination remains essential to confirm diagnoses and guide postoperative management. These findings support comprehensive preoperative evaluation combined with histopathological confirmation to optimize patient outcomes in total abdominal hysterectomy.

Keywords: Total Abdominal Hysterectomy, Preoperative Clinical Diagnosis, Postoperative Histopathological Diagnosis, Leiomyoma, Adenomyosis.

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INTRODUCTION

Hysterectomy is the most frequent surgical procedure performed by gynaecologists and the second most frequent surgical procedure conducted on women.[1,2] India's hysterectomy rates are alarming, as indicated by the National Family

Health Survey 2019- 2021 report which revealed that 3.3% of Indian women have undergone hysterectomy procedures.[3]TAH (Total abdominal hysterectomy) is a surgery to remove the uterus along with its outer walls and cervix by making an incision in the abdominal walls.[4] Indications for this surgical procedure include abnormal or excessive vaginal bleeding that cannot be managed with alternative treatments, extreme menstrual discomfort that cannot be alleviated by other treatments, Leiomyomas or uterine fibroids, intense pelvic pain associated with your uterus that has not been alleviated by other interventions, uterine prolapse (uterus that has "fallen" into the vaginal canal as a result of diminished support muscles) that can cause urinary incontinence and bowel dysfunction, for cancer prevention, cervical or uterine cancer or abnormalities that may contribute to cancer, conditions affecting the uterine lining, such as hyperplasia, recurrent uterine lesions, and adenomyosis.[6,7] It is served as an effective treatment for gynaecological conditions such as fibroids, DUB, endometriosis, and adenomyosis.[8]The surgical approach is determined by a number of factors, including the size and shape of the uterus, the extent of extra-uterine diseases, the accessibility of the uterus, the surgeon's preferences and experience, the indications for surgery, the nature of the disease, the patient's characteristics, and any concurrent procedures.[9] Despite the fact that vaginal hysterectomy (VH) is the most recommended procedure, followed by minimally invasive hysterectomy, it has limitations such as infeasibility and technical challenges hence abdominal hysterectomy is still the most common approach.[10] Despite, undergoing a hysterectomy should be considered as a final option when all the other organ preserving measures fails and when the risk of preserving the uterus is greater than the risk of removal and there is no successful medical treatment available.

Histopathological examination of hysterectomy tissues is required for diagnosis and to analyse the pattern of lesions seen in the uterus. The significance of histological examination is seen, particularly in patients with genital cancer, where adjuvant treatment is determined by the grade and degree of disease invasion. Adenomyosis can only be diagnosed through histological examination, whereas DUB is an exclusion diagnosis. On pre-operative evaluation, certain individuals may be suspected of having a cancer; histological investigation may aid to rule out this suspicion.[11]The aim of this study is to determine the histopathological diagnosis of TAH specimen, and to correlate the clinicopathological findings and thereby determining the accuracy of indication for surgery.

METHODOLOGY

a. Study Design and Setting

The present study is a prospective observational study conducted at the Department of Obstetrics and Gynaecology and the Department of Pathology, KMCT Medical College, Kozhikode, Kerala. The study duration spanned from 2022 to 2025. Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC), ensuring adherence to ethical standards in human research.

b. Study Population

Inclusion Criteria: All patients who underwent Total Abdominal Hysterectomy (TAH) during the study period for benign gynecological conditions were included.

Exclusion Criteria: Patients who underwent vaginal hysterectomy (VH), minimally invasive hysterectomy, or emergency hysterectomy were excluded from the study.

Sample Size Calculation: The sample size was calculated using the formula:

$$n = Z^2 P(1-P)/d^2$$

where (Z = 1.96) (for 95% confidence interval), (P = 0.04) (expected prevalence), and (d = 0.04) (precision). This yielded a sample size of approximately 92.16, rounded to 100 participants.

Sampling Technique: Consecutive sampling was employed, where all eligible patients meeting the inclusion criteria and undergoing TAH during the study period were enrolled after detailed documentation of history, clinical examination, and investigations.

c. Data Collection

Study Tools: Data were collected using a structured proforma that recorded demographic details, clinical history, examination findings, laboratory investigations, imaging reports, intraoperative observations, and postoperative histopathological examination (HPE) results. Hysterectomy specimens were fixed in 10% neutral buffered formalin and processed for histopathological analysis using Hematoxylin and Eosin staining. All histopathological evaluations were performed by a single pathologist to maintain consistency.

Statistical Analysis

Descriptive Statistics: Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages. Data visualization included tables and figures to depict distributions and patterns.

Inferential Statistical Analyses: Pearson correlation coefficients were calculated to assess the association between clinical diagnoses and histopathological findings. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study was conducted following ethical guidelines with approval from the Institutional Ethics Committee of KMCT Medical College. Informed consent was obtained from all participants prior to enrolment. Confidentiality and privacy of participant data were strictly maintained throughout the study.

RESULT

The present study analyzed the correlation between pre-operative clinical diagnosis and post-operative pathological diagnosis in patients undergoing total abdominal hysterectomy (TAH) for benign gynecological conditions. The majority of participants were aged between 41 and 50 years, with the highest frequency observed in the 46-50 years age group (43%), consistent with the known age-related prevalence of uterine pathologies. The most common parity status was P2L2 (55%), indicating a predominance of multiparous women.(Fig1)

Clinically, heavy menstrual bleeding was the predominant presenting complaint, reported by 64.36% of patients, followed by pain abdomen/dysmenorrhea (19.80%) and postmenopausal bleeding (12.87%). The majority of patients sought medical attention within six months of symptom onset (56%). Comorbidities were present in 38% of cases, and 13% had a history of anemia.(Table 1)

Preoperative abdominal and vaginal examinations revealed that most patients had a bulky or enlarged uterus, typically corresponding to a size of 14-16 weeks gestation. Ultrasonographic findings supported these clinical observations, with 72% of patients having a bulky uterus and 26% an enlarged uterus. Endometrial thickening or polyps were noted in 40% of cases, while myometrial abnormalities were present in 17%. Fibroids larger than 5 cm were common (47%), and the FIGO classification indicated that type 4 (intramural) and type 2 (submucosal with ≥50% intramural extension) fibroids were most frequent. (Table 2)

The final clinical diagnosis identified abnormal uterine bleeding associated with leiomyoma (AUB-L) as the most common indication for surgery (61%), followed by fibroid uterus (30%) and adenomyosis (17%). Polyps and hyperplasia were less frequently diagnosed (10% and 4%, respectively). (Table 3)

Intraoperative findings corroborated clinical and imaging diagnoses, with 72% of uteri enlarged and 90% of specimens showing fibroids. Adnexal abnormalities were observed in 22% of cases. The majority of surgical procedures were total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH + BSO) performed in 73% of patients. No intraoperative complications were reported. (Table 3)

Histopathological examination confirmed leiomyoma as the most prevalent pathology (70%), followed by adenomyosis (34%), polyps (8%), and hyperplasia (4%). Multiple fibroids were present in 69% of cases. Ovarian abnormalities were identified in 25% of patients, predominantly benign paraovarian cysts (40%).(Table 4)

The correlation between clinical and histopathological diagnoses varied by pathology. Hyperplasia demonstrated a perfect correlation of 100%, indicating accurate clinical suspicion and effective preoperative evaluation. Leiomyoma showed a high correlation of 87.14%, reflecting reliable clinical and imaging diagnosis. Polyps had an 80% correlation, while adenomyosis had the lowest correlation at 50%, underscoring the diagnostic challenges associated with this condition. (Table 5)

Postoperative complications were minimal, with only one patient experiencing any immediate or late complication.

Overall, the present study highlights the strong concordance between preoperative clinical diagnosis and postoperative histopathological findings for most benign uterine pathologies, particularly leiomyoma and hyperplasia. The relatively lower correlation for adenomyosis emphasizes the need for improved diagnostic modalities. The findings support the continued use of thorough clinical evaluation combined with imaging and histopathological confirmation to guide surgical management in patients undergoing TAH.

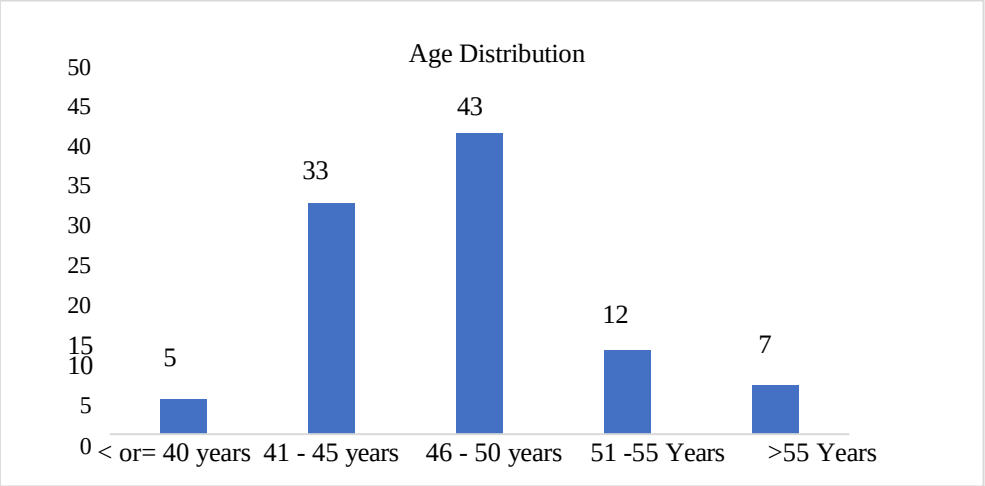

Figure 1: Age Distribution of Study Population

The majority of participants were in the 46-50 years age group (43%), followed by 41-45 years (33%). This distribution aligns with common age-related prevalence of gynecological conditions requiring hysterectomy.

Table 1: Chief Complaints of the Participants

Chief Complaints	Frequency	Percentage
Mass per abdomen	2	1.98
Pain abdomen/dysmenorrhoea	20	19.80
Heavy menstrual bleeding	65	64.36
Irregular menstrual cycles	1	0.99
Postmenopausal bleeding	13	12.87

The most frequently reported complaint was heavy menstrual bleeding, affecting 65 individuals (64.36%). Pain abdomen/dysmenorrhoea was reported by 20 individuals (19.80%), while postmenopausal bleeding was noted in 13 individuals (12.87%). Mass per abdomen and irregular menstrual cycles were the least reported complaints, with 2 (1.98%) and 1 (0.99%) cases, respectively.

Table 2: Final Clinical Diagnosis

Final clinical diagnosis	Frequency	Percentage (%)
AUB -L	61	61
Fibroid uterus	30	30
Adenomyosis	17	17
Polyp	10	10
Hyperplasia	4	4

The most common diagnosis was abnormal uterine bleeding (AUB-L) in 61 individuals, followed by fibroid uterus in 30 individuals and adenomyosis in 17 individuals. Polyps were diagnosed in 10 individuals, while hyperplasia were seen in 4.

Table 3: Intra-Op gross findings

Uterus size	Frequency	Percentage (%)
Atrophic/normal size	2	2
Bulky	26	26
Enlarged	72	72
Fibroid present		
Yes	90	90
No	10	10
Adnexa		
Normal	78	78

Abnormal	22	22
Procedure		
TAH + BSO	73	73
TAH + BS	18	18
TAH + LSO + RS	6	6
TAH + RSO + LS	3	3

The majority of patients presented with an enlarged uterus (72%), consistent with the presence of significant uterine pathology such as fibroids or adenomyosis. A bulky uterus was noted in 26% of cases, while only 2% had an atrophic or normal-sized uterus. Fibroids were identified intraoperatively in 90% of the specimens, underscoring their predominance as an indication for total abdominal hysterectomy. Adnexal abnormalities were observed in 22% of cases, highlighting the importance of thorough intraoperative assessment of adnexal structures. The most common surgical procedure performed was total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH + BSO) in 73% of patients, reflecting clinical decisions based on patient age, pathology, and risk factors. No intraoperative complications were reported, indicating a safe surgical profile in this cohort.

Table 4: Histopathological Diagnosis

Histopathological diagnosis	Frequency	Percentage (%)
Leiomyoma	70	70
Adenomyosis	34	34
Polyp	8	8
Hyperplasia	4	4

Leiomyoma was the most common histopathological diagnosis, seen in 70 individuals, followed by adenomyosis in 34 individuals. Polyps were noted in 8 cases, while hyperplasia were observed in 4.

Table 5: Correlation between HPE diagnosis and Clinical findings

Diagnosis	Correlation percentage
Leiomyoma	87.14
Adenomyosis	50.00
Polyp	80.00
Hyperplasia	100.00

The correlation between clinical diagnosis and histopathological examination (HPE) findings varied across different uterine pathologies. The highest level of correlation was observed in cases of hyperplasia, with a 100% match**,** indicating that all clinically suspected cases were confirmed on histopathology. Leiomyoma showed a high correlation of 87.14%**,** reflecting the reliability of clinical and imaging findings in diagnosing fibroids. In contrast, the correlation for polyps was slightly lower, at 80%**,** suggesting that while most cases were correctly identified pre-operatively, a few may have been missed or misdiagnosed. The lowest correlation was seen in adenomyosis, at 50%, highlighting the diagnostic challenge it poses due to its subtle clinical presentation and similarity with other uterine conditions. These findings underscore the importance of histopathological confirmation, especially in ambiguous or overlapping clinical scenarios

DISCUSSION

In the present study, the demographic profile and clinical characteristics predominantly involved patients aged 41–50 years, with the largest segment (43%) in the 46–50 years age group, and a majority being multiparous with parity P2L2 accounting for 55%. The principal presenting complaint was heavy menstrual bleeding (64.36%), followed by pain abdomen/dysmenorrhea (19.80%) and postmenopausal bleeding (12.87%). Clinical evaluation and ultrasonography revealed bulky or enlarged uteri, with fibroids larger than 5 cm found in 47% of cases, while primary clinical diagnoses included abnormal uterine bleeding associated with leiomyoma (61%), fibroid uterus (30%), and adenomyosis (17%). Intraoperatively, enlarged uteri were confirmed in 72% and fibroids in 90%, with adnexal abnormalities in 22%.

These findings align closely with reported demographics in comparable studies. For instance, in a randomized controlled trial comparing postoperative analgesia in total abdominal hysterectomy patients, the participant age and parity

distributions were similar, with mean age groups clustering around the fourth to fifth decades and comparable multiparity rates[12]. Furthermore, the predominant indication of heavy menstrual bleeding and fibroid uterus aligns with clinical diagnoses found in other cohorts undergoing abdominal hysterectomy[13], underscoring fibroid-related abnormal uterine bleeding as a common surgical indication.

However, your findings demonstrate a higher proportion of fibroid presence intraoperatively (90%) compared to some studies where fibroids were noted in slightly lower percentages. For example, a meta-analysis evaluating laparoscopic versus abdominal hysterectomy for endometrial carcinoma noted uterine pathologies but focused more on malignancy-related cases with differing age distributions[14], making direct comparisons challenging. Additionally, your identification of adnexal abnormalities in 22% may be comparatively higher than reported in general benign disease-focused hysterectomy studies, which sometimes report adnexal pathology incidences closer to 15% or less[15].

In contrast, demographic differences are more pronounced in special population studies. For example, hysterectomy performed in transgender men showed substantially younger mean age (23.9 ± 13.8 years) and different clinical indications predominantly related to gender affirmation rather than gynecological pathologies such as fibroids or adenomyosis[16]. This highlights that age and parity distributions in the present study are representative of typical gynecological patients undergoing total abdominal hysterectomy for benign uterine conditions.

Moreover, the clinical profile of presenting symptoms focusing on heavy menstrual bleeding (64.36%) in your study corresponds with established literature indicating it as a leading symptom warranting surgical intervention. This concurs with the clinical impression of bulky uterus and fibroids seen on ultrasonography and surgery, consistent with other observational data where fibroid-related abnormal bleeding constitutes the majority of preoperative presentations[13].

In summary, the present study's demographic and clinical characteristics concur with established findings highlighting middle-aged, multiparous women presenting predominantly with heavy menstrual bleeding due to fibroids as the main surgical indication. Some variations in fibroid and adnexal pathology prevalence relative to comparative studies may reflect differences in patient selection, diagnostic criteria, or regional population characteristics. These consistencies and disparities contribute valuable context to the clinical spectrum encountered in total abdominal hysterectomy patient population[12,13,16].

In the present study, total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH + BSO) was the predominant surgical procedure, performed in 73% of patients without intraoperative complications. Histopathological examination identified leiomyoma as the most prevalent pathology (70%), followed by adenomyosis (34%), polyps (8%), and hyperplasia (4%). Correlation between clinical diagnosis and histopathology was highest for hyperplasia (100%) and leiomyoma (87.14%), while adenomyosis demonstrated the lowest diagnostic concordance (50%), highlighting the challenges in preoperative clinical identification of adenomyosis. Postoperative complications were minimal, with only one patient affected. This underscores a strong concordance between preoperative clinical and postoperative pathological diagnoses for most benign uterine conditions, supporting comprehensive clinical, imaging, and histopathological assessment to guide surgical management.

These findings are consistent with previous literature emphasizing the frequent use and safety of TAH + BSO in benign gynecological conditions. The study by Swenson et al. et al.[17] reported a substantial proportion of benign hysterectomies involving bilateral salpingo-oophorectomy, stressing its role in reducing ovarian cancer risk and indicating its common application in clinical practice. Similarly, in the Ontario cohort, a large-scale population study by Smith et al. et al. [18] demonstrated bilateral salpingo-oophorectomy at the time of benign hysterectomy in 24% of cases, significantly reducing ovarian cancer incidence and mortality, with a median patient age of 45 years that approximates the demographic in the present study. These populations reflected a similar surgical approach, justifying the predominance of BSO alongside hysterectomy as noted in your findings.

The observed pathology distribution favoring leiomyoma as the leading cause (70%) aligns with other clinical data where fibroids constitute the most common indication for hysterectomy, consistent with reports by Johnson et al. et al.[19] who highlighted leiomyomas as a foremost benign indication. The adenomyosis prevalence (34%) concurs with literature indicating its diagnostic difficulty, as preoperative clinical and imaging assessments often underdiagnose this condition, reflected by your lower correlation rate (50%) for adenomyosis compared to higher concordance rates for hyperplasia and leiomyoma. This pattern generally supports the notion that adenomyosis presents more subtle clinical features, necessitating histopathology for definitive diagnosis, as emphasized by Lee et al. et al.[20]

Moreover, the strong clinical-pathological concordance observed for hyperplasia (100%) and leiomyoma (87.14%) in the present study is in line

with findings from Baker et al. et al.[21] where clinical selection and imaging were reliable predictors for these pathologies, enabling better surgical planning and patient counseling. The minimal postoperative complication rate aligns with national datasets reporting low intra- and postoperative morbidity in elective benign hysterectomy with BSO[19], thereby confirming the safety profile of this surgical approach.

However, some dissimilarities emerge when compared with broader epidemiological cohorts involving different age groups and indications. For example, in younger populations undergoing hysterectomy, especially those aged below 45, the rate of BSO tends to be lower due to concerns over premature menopause and associated morbidities[22]. Additionally, the prevalence of pathological correlates such as polyps (8%) and hyperplasia (4%) in your cohort may differ slightly from other studies where endometrial polyps vary widely by population characteristics[23]. Furthermore, studies focusing on malignant gynecologic conditions, such as ovarian or uterine cancer cohorts, present different surgical inputs and pathological spectra, which are not comparable to your benign-focused population[24].

In summary, the present study's demographic and clinical-pathological findings regarding the predominance of TAH + BSO, leiomyoma as the chief pathology, and high clinical-pathological concordance resonate with multiple large, comparative studies. The diagnostic challenge of adenomyosis remains a consistent theme across research, highlighting the ongoing need for improved preoperative diagnostic modalities. The safety and efficacy profile demonstrated reinforces current guidelines advocating combined surgical management with histopathological confirmation for benign uterine diseases[17,18,19].

The present study has several limitations. First, it is a single-center study with a relatively small sample size, which may limit the generalizability of the findings to broader populations. Second, the exclusion of patients undergoing vaginal, minimally invasive, or emergency hysterectomies restricts the applicability of results to only those undergoing total abdominal hysterectomy for benign conditions. Third, the reliance on a single pathologist for histopathological evaluation, while ensuring consistency, may introduce observer bias. Additionally, the study did not incorporate advanced imaging modalities or molecular diagnostic tools that could potentially improve preoperative diagnostic accuracy, particularly for adenomyosis. Lastly, the follow-up period was limited, restricting assessment of long-term postoperative outcomes and complications. These limitations highlight the need for multicentric studies with larger cohorts and inclusion of diverse surgical approaches to validate and expand upon the present study's findings.

The present study recommends maintaining a comprehensive preoperative clinical evaluation combined with detailed imaging to enhance diagnostic accuracy, particularly for conditions like adenomyosis that show lower clinical-pathological correlation. Total abdominal hysterectomy with bilateral salpingo-oophorectomy remains a safe and effective surgical approach for benign uterine pathologies, especially leiomyoma and hyperplasia. Histopathological examination should be routinely performed to confirm diagnoses, guide postoperative management, and identify any unexpected pathologies. Efforts to improve non-invasive diagnostic modalities for adenomyosis are essential to optimize patient selection and surgical planning, ultimately improving clinical outcomes in hysterectomy patients.

The present study demonstrates a strong correlation between preoperative clinical diagnosis and postoperative histopathological findings in patients undergoing total abdominal hysterectomy for benign uterine conditions. Key results indicate high concordance rates for leiomyoma (87.14%) and hyperplasia (100%), validating the accuracy of clinical and imaging evaluations for these pathologies. However, adenomyosis showed a notably lower correlation (50%), highlighting diagnostic challenges. The predominance of total abdominal hysterectomy with bilateral salpingo-oophorectomy as a safe and effective surgical approach is confirmed by minimal postoperative complications. The study underscores the essential role of histopathological examination in confirming diagnoses, guiding postoperative care, and detecting unexpected pathologies. Overall, these findings emphasize the importance of comprehensive preoperative assessment and histopathological confirmation to optimize patient management and surgical outcomes. The present study contributes valuable insights into improving diagnostic precision, particularly for conditions with lower clinical-pathological concordance, thereby enhancing clinical decision-making in hysterectomy patients.

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