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Original Research Article

EXPLORING ENDOMETRIAL PATTERNS IN HYSTERECTOMY SPECIMENS WITH MYOMETRIAL LESIONS AMONG REPRODUCTIVE AGE GROUP PATIENTS: A HISTOPATHOLOGICAL STUDY

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ABSTRACT

Background: The uterus is composed of two primary layers: the myometrium and the endometrium. The endometrium undergoes cyclical transformations during the menstrual cycle, influenced by steroid hormones. Uterine leiomyomas, also known as fibroids, are benign tumors found in many women of reproductive age. These tumors are hormone-sensitive, particularly to steroids, which drive their growth and persistence. Consequently, the endometrium can show reactive changes in the presence of these uterine tumors.
Objectives: This study aims to assess the histopathological alterations in the endometrium in the context of myometrial abnormalities, with a focus on identifying features that may help differentiate leiomyomas, adenomyosis, or coexisting conditions using endometrial curettage samples.
Materials and Methods: This cross-sectional study involved 200 hysterectomy specimens obtained from women of reproductive age presenting with myometrial pathology. Upon receipt, each specimen underwent a thorough gross examination after fixation in formalin. Standard tissue processing techniques were applied, and sections of 5 microns thickness were prepared for microscopic analysis using hematoxylin and eosin (H&E) staining.
Results: Leiomyomas were predominantly seen in women aged between 40 and 49 years, especially those with a history of multiple childbirths. Menorrhagia emerged as the most common presenting symptom. The endometrial histology varied with age and underlying lesion, with secretory phase changes being more frequent in women aged 45–49 years, and proliferative changes more commonly observed in the 40–44 age group. Degenerative features were noted in cases with both leiomyomas and adenomyosis.
Conclusion: Given their dependence on steroid hormones, leiomyomas are typically associated with a proliferative or hyperplastic endometrium, reflecting an estrogen-dominant milieu. The link to multiparity suggests a contributory role of progesterone in tumor stability. Endometrial curetting showing features such as hyperplasia, cystically dilated or elongated glands, and interspersed smooth muscle fibres may point towards a diagnosis of leiomyoma, adenomyosis, or both.
Keywords: Myometrial Lesions, Histopathology, Reproductive Age Group, Leiomyoma, Adenomyosis, Endometrial changes.

INTRODUCTION

Uterine myometrial lesions, including leiomyomas, adenomyomas, and rare malignancies, have become a significant public health issue, affecting women worldwide.[1] These lesions, marked by abnormal uterine muscle growth, present with a range of symptoms from asymptomatic to severe, impacting reproductive health and well-being.[2] Studies show variations in lesion occurrence based on age, ethnicity, and geography, emphasizing the importance of tailoring interventions.[3] Their complex etiology involves genetic, hormonal, and environmental factors.[4]

The impact of benign myometrial lesions on women's quality of life is substantial, especially for those experiencing symptoms like abnormal uterine bleeding, pelvic pain, and reproductive issues.[2] The psychological effects of these symptoms further underline the need for a holistic management approach.[5] Advances in diagnostic imaging, such as MRI and ultrasound, have transformed the diagnosis of myometrial lesions, offering insights into lesion characteristics and aiding clinical decision-making.[6] Despite this, challenges in distinguishing between different lesion types persist, requiring ongoing refinement of diagnostic methods.[7]

This study aims to provide a comprehensive analysis of myometrial lesions, focusing on their prevalence, clinical presentations, and diagnostic pathways. By synthesizing current knowledge and offering new insights, it seeks to guide healthcare practitioners in providing patient-centered care. This is increasingly relevant as personalized medicine evolves, allowing for interventions tailored to individual patient profiles.[8] In summary, this exploration into myometrial lesions highlights their epidemiology, clinical implications, and diagnostic challenges, contributing to the existing literature and guiding future research. The goal is to equip healthcare professionals with the knowledge needed for accurate diagnosis, effective management, and improved patient outcomes.

Hence this study was conducted to examine the histopathological features of the endometrium associated with myometrial lesions, to determine the distribution of different types of myometrial lesions in hysterectomy specimens and to analyze the histopathological features of myometrial lesions.

MATERIALS AND METHODS

Study Design: This research employed a cross-sectional study design to investigate the endometrial patterns and myometrial lesions in hysterectomy specimens from patients in the reproductive age group. The study was conducted at the Department of Pathology, Sri Manakula Vinayagar Medical College and Hospital, Puducherry, over a period of one and a half years, from November 2014 to May 2016. Ethical clearance was obtained before commencing the study.

Sample Size: The sample size was calculated using a 95% confidence interval, 80% power, absolute precision of 7%, 10% non-response data, and a relative precision of 20%. The corrected formula for sample size (n) is given by: $n=Z2xp(1-p)/d2$. Where, Z is the Z statistic corresponding to the confidence level, p is the estimated prevalence and d is the margin of error. From a previous study (9) with an estimated prevalence of 69%, the sample size was calculated using the corrected formula. The final sample size was determined to be 200.

Sampling: This study examined 200 hysterectomy specimens from the reproductive age group. Encompassing diverse hysterectomy types—abdominal, transvaginal, and laparoscopic (with or without bilateral adnexa)—the inclusion criteria targeted patients within the reproductive age bracket displaying myometrial lesions. Postmenopausal patients, hysterectomies related to obstetric complications, procedures involving normal myometrium, and autolyzed specimens were excluded based on predefined criteria.

Data Collection: Clinical data was retrieved from patient records, focusing on age, clinical presentation, marital status, parity, and family history. Relevant investigations, including cervical PAP smear and preoperative endometrial curettage, were considered. Hysterectomy specimens received in the Department of Pathology were appropriately labelled, numbered, and fixed in 10% formalin for 24-48 hours.

Gross Examination: A detailed gross examination was conducted, assessing the location and size of leiomyoma, as well as secondary changes such as cystic change, red degeneration, calcification, mucoid degeneration, or fatty degeneration. The status of the endometrium and any associated endometrial polyp was also noted.

Histopathological Examination: Tissue bits from representative areas of the leiomyoma and endometrium were collected for histopathological examination. These specimens were processed, and paraffin blocks were created. Sections, cut at a thickness of 5 microns, were stained with haematoxylin and eosin for microscopic analysis. Histologic features recorded included endometrial parameters (endometrium, phase, appearance of glands, and stromal changes) and myometrial parameters (presence or absence of adenomyosis, type or variant of leiomyoma, and secondary or degenerative changes in the leiomyoma).

Statistical Analysis: SPSS 23.0 software was used for analysis. Descriptive statistics, like frequencies and percentages, characterized endometrial patterns and myometrial lesions in hysterectomy specimens. Continuous variables, including age, were presented as mean and standard deviation, while categorical variables were shown as counts and percentages. Inferential statistics utilized tests like chi-square or

Fisher's exact test for associations, with a significance level of 0.05.

RESULTS

A substantial concentration of myometrial lesions was observed in the 45-49 age group, constituting 45.0% of cases (Table 1). Clinical manifestations vary, with menorrhagia emerging as the predominant symptom, affecting 59.5% of patients (Table 2).

Clinical diagnoses closely align with hysterectomy findings, emphasizing the accuracy of preoperative assessments. Fibroid uterus is identified in 76.0% of cases, establishing its prominence in the spectrum of myometrial lesions. Adenomyosis and combined lesions are also recognized, providing a comprehensive understanding of the clinical landscape. (Table 3)

Abdominal hysterectomy emerges as the primary surgical approach (42.50%), highlighting its significance in managing myometrial lesions. The histopathological examination elucidates the nature of myometrial lesions, with leiomyoma being the most prevalent, constituting 78.0% of cases (Figure1, Figure2). Adenomyoma is identified in 22.0% of specimens, providing insights into the spectrum of histological patterns. Encouragingly, no cases of malignancy are reported, reassuringly confirming the benign nature of the studied lesions. (Table 4), however imaging analysis reveals that 60.0% of patients present with a single lesion, predominantly intramural leiomyoma (52.50%). This emphasizes the challenges in distinguishing lesion types through imaging alone. On microscopic examination 30 out of the 200 leiomyomatous uteri showed secondary or degenerative changes within the leiomyoma (Figure 3).

Figure 1: Cut section of uterus showing intramural leiomyoma

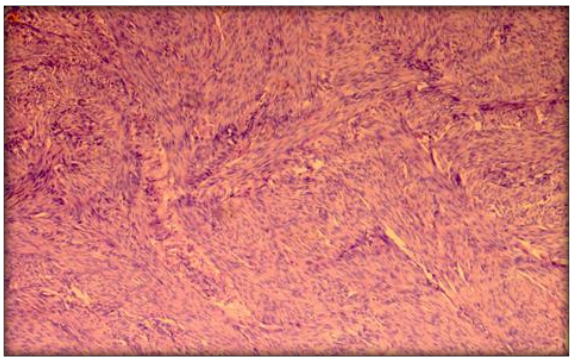

Figure 2: Classical leiomyoma showing interlacing bundles and fascicles of smooth muscles, H&E, 4x

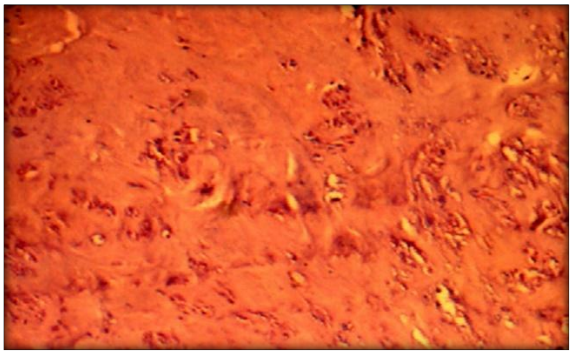

Figure 3: Leiomyoma showing diffuse hyaline change (arrow), H&E,4x

Table 1: Age Distribution in Myometrial Lesions

Age (years)	No of Cases	Percentage
25-29	2	1.00%
30-34	5	2.50%
35-39	31	15.50%
40-44	71	35.50%
45-49	91	45.50%
Total	200	100.00%

Table 2: Presenting clinical complaints

Symptoms	Number of cases	Percentage
Menorrhagia	119	59.50%
Dysmenorrhea	67	33.50%
Irregular period	14	7.00%
Total	200	100.00%

Table 3: Clinical Diagnosis

Clinical indication	Number of cases	Percentage
Abnormal uterine bleeding	31	15.50
Leiomyoma	152	76.00
Adenomyosis	17	8.50
Total	200	100.00

Table 4: Histomorphological distribution of myometrial lesions

Myometrial lesion	Number of cases	Percentage (%)
Leiomyoma (Figure1, Figure 2)	156	78.0
Adenomyosis	87	43.5
Leiomyoma with Adenomyosis	44	22.0
Total	200	100.00

In the present study,156 cases of leiomyoma, 42.3% were with secretory phase endometrium. But adenomyosis showed endometrial changes including both proliferative phase (35.6%) and secretory phase (34.5%), Simple hyperplasia without atypia was seen in adenomyosis (28.7%) and leiomyoma (22.5%). (Table 5)

Table 5: Association of Endometrial changes with myometrial lesions

Endometrial Changes	Leiomyoma	%	Adenomyosis	%	Leiomyoma with Adenomyosis	%
Proliferative phase	54	34.6	31	35.6	13	29.5
Secretory phase	66	42.3	30	34.5	17	38.6
S H without atypia	35	22.5	25	28.7	14	31.8
C H without atypia	1	0.6	1	1.2	0	0
Total	156	100	87	100	44	100
Chi square	2.3335		3.4144		3.1503	
p value	0.5061		0.332 0		0.369 0	

p value is not less than 0.05 was considered to be statistically nonsignificant

DISCUSSION

The aim of this study was to investigate the histopathological characteristics and distribution of myometrial lesions in hysterectomy specimens, with particular attention to associated endometrial changes across different age groups. Based on the objectives, the study sought to examine the histopathological features of both the endometrium and myometrial lesions and to assess their distribution patterns. The results indicated a notable age-related variation in endometrial changes. The study demonstrated that the secretory phase was predominant in patients aged 45-49 years, accounting for 48.8% of cases, while the proliferative phase was more frequent in the 40-44 years age group (48.6%). This was in concordance with the results of the study conducted by Leath CA et. Al,[5] and Zaino RJ et. al.[7] Simple hyperplasia without atypia (SHA) was most common in the 45-49 age group, with a frequency of 52.2% and this was similar with results of a study conducted by Awan FN et. Al,[9] A statistically significant association ($p = 0.030$) was found between the proliferative phase and age, particularly in the 40-44 age group, indicating that age influences the occurrence of different endometrial changes, this was also in concordance with the study conducted by Leath CA et. Al,[5] However, for other endometrial changes, including SHA and CHA, no significant age-related association was observed ($p > 0.05$), these results were supported by the result of a study conducted by Sharma R et. Al,[10] 4 of 6 When analyzing the relationship between endometrial changes and myometrial lesions, the study revealed that the secretory phase was the most common endometrial change in patients with leiomyomas (42.3%), adenomyosis (34.5%), and coexisting leiomyoma with adenomyosis (38.6%). These results were close to the results if the study done by Mehar F et. al.[11] SHA was more prevalent in adenomyosis cases (28.7%) and those with both leiomyoma and adenomyosis (31.8%). These results are approved by studies conducted by Sharma M et. Al,[12] and Malhotra G et. Al,[13] While CHA remained rare across all lesion types. Despite these observations, no statistically significant association was found between endometrial changes and the presence of specific myometrial lesions, as indicated by p-values exceeding 0.05 across all comparisons. This is in concordance with results of study conducted by Bhattacharya D et. Al,[14] and Baig MS et al,[15] The study also examined the prevalence of myometrial lesions in different age groups. As observed in the study, the highest incidence of myometrial lesions occurred in the 45-49 age group (45.5%), followed by the 40-44 age group (35.5%), this is supported by the results of the study conducted by Choudhury S et. al,[16] This trend reflects the higher prevalence of myometrial lesions in older reproductive-age women. Leiomyomas were the most common myometrial lesion, particularly in the 45-49 age group (43.0%), while adenomyosis was more frequent in the same age group (55.2%), this was also observed in the study conducted by Kaur P et. Al,[17] The current study shows that intramural leiomyomas were the most common type, particularly in patients aged 45-49 years (64 cases), this was also seen in the observations of a study conducted by Adedayo O et. al.[18]

CONCLUSION

This study enhances understanding of myometrial lesions, spotlighting their epidemiology, clinical implications, and diagnostic challenges. While exploring personalized medicine potential, it suggests avenues for future research. Yet, limitations, like retrospective data and diagnostic variations, exist. Future studies should adopt standardized, prospective approaches. Despite these constraints, the research provides vital insights into histopathological features, prevalence, age-related distribution, and associated endometrial changes. Emphasizing the need for thorough preoperative

screening and histopathological evaluation, it guides optimal management. The vision for personalized medicine hints at a transformative approach to myometrial lesion management, promising improved patient outcomes

Limitations

The study has certain limitations that should be considered. Firstly, it is confined to a single institution, and this restricted scope may impact the generalizability of the findings beyond the specific setting. Additionally, the retrospective nature of the research, relying on existing medical records, introduces the possibility of biases in the data. Moreover, the study's exclusive focus on hysterectomy specimens may not provide a comprehensive representation of cases managed through conservative approaches. These limitations should be acknowledged when interpreting the results and drawing broader conclusions.

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