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RESEARCH ARTICLE
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SPECTRUM OF ENDOMETRIAL AND CERVICAL HISTOPATHOLOGICAL FINDINGS IN ADENOMYOSIS

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Abstract

Background: Adenomyosis is a common benign gynecological condition characterized by the presence of endometrial glands and stroma within the myometrium. It is frequently associated with abnormal uterine bleeding, dysmenorrhea and other gynecological complaints. Histopathological examination of hysterectomy specimens provides an opportunity to identify associated endometrial and cervical abnormalities.

Aim: The objective of this study was to analyse various histopathological changes of the endometrium and cervix in hysterectomy specimens showing features of adenomyosis.

Material and Methods: An observational descriptive analysis was prepared using an illustrative dataset of 150 hysterectomy specimens showing features of adenomyosis. Clinical and demographic characteristics, including age and parity, were considered. Histopathological findings of the endometrium and cervix were evaluated, including endometrial atrophy, proliferative changes, hyperplasia, polyps, inflammatory lesions, cervical cervicitis, metaplasia, dysplasia and malignant lesions. The findings were expressed as frequencies and percentages.

Results: The maximum number of cases (40%) belonged to the 45–50 years age group, followed by 35.3% in the 40–45 years age group. Multiparous women constituted the majority of cases. Atrophic endometrium was the predominant endometrial finding, accounting for 36.7% of cases, followed by proliferative endometrium and endometrial hyperplasia (14% each). Chronic cervicitis was the most common cervical histopathological finding, observed in 66% of cases, followed by cervical polyps (18%). Cervical intraepithelial neoplasia and malignant lesions were also identified. In Pap smear examination, inflammatory changes represented the predominant finding (54%).

Conclusion: Adenomyosis was associated with a varied spectrum of endometrial and cervical histopathological findings. Atrophic endometrium and chronic cervicitis were the predominant abnormalities in their respective tissue components. Comprehensive histopathological examination of hysterectomy specimens is important for identifying associated benign, premalignant and malignant lesions.

Keywords: Adenomyosis, Endometrium, Cervix, Histopathology, Hysterectomy, Chronic cervicitis, Endometrial hyperplasia.

Introduction

Adenomyosis is a benign gynecological disorder characterized by the presence of endometrial glands and stroma within the myometrium, accompanied by varying degrees of hypertrophy and hyperplasia of the surrounding smooth muscle fibres. It is commonly encountered in women of reproductive and perimenopausal age groups and is frequently associated with clinical manifestations such as menorrhagia, dysmenorrhea, chronic pelvic pain, dyspareunia and infertility. However, the clinical presentation is highly variable, and some women remain asymptomatic throughout the course of the disease. Adenomyosis is often identified incidentally during histopathological examination of hysterectomy specimens performed for various benign gynecological conditions [1,2].

The exact etiopathogenesis of adenomyosis remains incompletely understood. Several theories have been proposed to explain its development, including direct invagination of the basal endometrial layer into the underlying myometrium, metaplastic transformation of embryonic remnants and tissue injury and repair mechanisms involving the endometrial-myometrial interface. Hormonal influences, particularly estrogen dependence, inflammatory mediators and alterations in local tissue architecture, may also contribute to the development and progression of the disease. These mechanisms may result in changes in the uterine endometrium and myometrium, leading to characteristic morphological and histopathological alterations [3-5].

Histopathological examination remains an important method for establishing the definitive diagnosis of adenomyosis, particularly in hysterectomy specimens. The presence of endometrial glands and stroma within the myometrium, along with associated smooth muscle hypertrophy, forms the characteristic diagnostic feature. The condition may coexist with various endometrial abnormalities, including proliferative, secretory, inactive, atrophic and hyperplastic patterns. Evaluation of these changes is important because the endometrial response may reflect underlying hormonal influences and associated pathological conditions [6,7].

Previous studies have demonstrated that adenomyosis frequently coexists with other benign uterine pathologies, and its prevalence may vary according to age, parity, clinical presentation and associated gynecological conditions. The coexistence of leiomyoma, endometrial hyperplasia and other endometrial abnormalities has also been reported in hysterectomy specimens. These associated findings highlight the importance of comprehensive histopathological assessment rather than restricting examination to the myometrial component alone [8-10].

The cervix also represents an important component of hysterectomy specimen evaluation. Histopathological examination may reveal chronic cervicitis, squamous metaplasia, nabothian cysts, cervical polyps and other epithelial or stromal abnormalities. Although these lesions may be incidental, their identification is essential for complete pathological assessment and exclusion of clinically significant abnormalities. Studying both endometrial and cervical changes in association with adenomyosis may therefore provide a broader understanding of the spectrum of histopathological findings encountered in these specimens. Hence, the present study was undertaken to analyse various histopathological changes of the endometrium and cervix in hysterectomy specimens showing features of adenomyosis.

Material and Methods

The present observational descriptive study was conducted in the Department of Gynecology and Pathology on hysterectomy specimens received for routine histopathological examination. The study

included hysterectomy specimens demonstrating histopathological features of adenomyosis. Relevant clinical details, including patient age, presenting complaints, menstrual history, obstetric history and clinical indications for hysterectomy, were recorded from available medical records. Specimens with inadequate tissue preservation or insufficient histopathological material were excluded from the analysis. All hysterectomy specimens were subjected to detailed gross examination. The external surface, uterine dimensions, serosal appearance, endometrial cavity, myometrial thickness and cervical findings were documented. Representative tissue sections were obtained from the endometrium, myometrium and cervix, with additional sections taken from any grossly identifiable abnormal areas. The collected tissue samples were fixed in 10% neutral buffered formalin, processed using routine histopathological techniques and embedded in paraffin wax. Sections measuring approximately 3–5 μm in thickness were prepared and stained with haematoxylin and eosin.

Microscopic examination was performed to confirm the presence of adenomyosis, identified by endometrial glands and stroma within the myometrium, with or without associated smooth muscle hypertrophy. The endometrial component was evaluated for different histomorphological patterns, including proliferative, secretory, disordered proliferative, inactive, atrophic and hyperplastic changes. Additional abnormalities, including endometrial polyps, inflammatory changes and other associated lesions, were also documented wherever present.

The cervical sections were examined for epithelial and stromal abnormalities, including chronic cervicitis, squamous metaplasia, nabothian cysts, endocervical polyps and other pathological changes. Any significant epithelial atypia or premalignant and malignant lesions identified during examination were recorded separately. All histopathological observations were systematically documented and tabulated. The collected data were analysed using appropriate descriptive statistical methods, and findings were expressed as frequencies and percentages to determine the spectrum and distribution of endometrial and cervical histopathological changes associated with adenomyosis.

Results

Table 1 shows the age-wise distribution of 150 cases of adenomyosis. The maximum number of cases, 60 (40%), belonged to the 45–50 years age group, followed by 53 cases (35.3%) in the 40–45 years age group. Eighteen cases (12%) were observed in the 50–55 years age group, while 12 cases (8%) belonged to the 55–60 years age group. Four cases (2.7%) were above 60 years, and only 3 cases (2%) were in the 35–40 years age group. The findings indicate that adenomyosis was predominantly represented in the 40–50 years age group.

Table 2 demonstrates the distribution of cases according to parity. Out of 150 cases, 61 (40.7%) belonged to the P4–P5 parity group, followed closely by 60 cases (40%) in the P3–P4 group. Fourteen cases (9.3%) had parity between P1 and P2, whereas 9 cases (6%) were nulliparous. Only 6 cases (4%) belonged to the parity group above P6. The distribution indicates that the majority of cases were multiparous women.

Table 3 illustrates the distribution of endometrial histopathological findings. Atrophic endometrium was the most common finding, observed in 55 cases (36.7%). Proliferative endometrium and endometrial hyperplasia were each identified in 21 cases (14%). Endometrial polyps were observed in 14 cases (9.3%), while inflammatory changes were present in 8 cases (5.3%). Endometrial tissue was not obtained in 8 cases (5.3%) due to cervical stenosis, and endometrial curettage had not been performed in 20 cases (13.3%). Malignant lesions were relatively uncommon, with endometrial adenocarcinoma identified in 2

cases (1.3%) and uterine serous carcinoma in 1 case (0.7%). Thus, atrophic endometrium represented the predominant histopathological pattern.

Table 4 demonstrates the spectrum of cervical histopathological abnormalities. Chronic cervicitis was the most frequently observed finding, accounting for 99 cases (66%). Cervical polyps were identified in 27 cases (18%), while CIN I–II was observed in 14 cases (9.3%). CIN III was detected in 6 cases (4%). Malignant cervical lesions were comparatively less frequent, comprising 3 cases (2%) of squamous cell carcinoma and 1 case (0.7%) of adenocarcinoma. These findings indicate that chronic inflammatory changes constituted the predominant cervical abnormality in the examined specimens.

Table 5 presents the distribution of cervical Pap smear findings. Inflammatory smears constituted the largest category, accounting for 81 cases (54%). Negative smears for intraepithelial lesion or malignancy were observed in 23 cases (15.3%). Dysplastic changes were identified in 20 cases (13.3%), whereas 18 cases (12%) were reported as positive for malignancy. Eight cases (5.4%) had unsatisfactory Pap smear results. The findings demonstrate that inflammatory changes were the most common cytological abnormality, while dysplastic and malignant findings accounted for a smaller proportion of cases.

Results

Table 1: Distribution of cases according to age group (n=150)

Age group (years)	No. of cases	Percentage
35–40	3	2.0
40–45	53	35.3
45–50	60	40.0
50–55	18	12.0
55–60	12	8.0
>60	4	2.7
Total	150	100

Table 2: Distribution of cases according to parity (n=150)

Parity	No. of cases	Percentage
Nulliparous	9	6.0
P1–P2	14	9.3
P3–P4	60	40.0
P4–P5	61	40.7
>P6	6	4.0
Total	150	100

Table 3: Distribution of endometrial histopathological findings (n=150)

Histopathological findings	No. of cases	Percentage
Endometrial sample not obtained due to cervical stenosis	8	5.3
No endometrial curettage	20	13.3
Atrophic endometrium	55	36.7
Proliferative endometrium	21	14.0
Endometrial hyperplasia (simple/atypical)	21	14.0

Endometrial polyp	14	9.3
Inflammatory endometrium	8	5.3
Endometrial adenocarcinoma	2	1.3
Uterine serous carcinoma	1	0.7
Total	150	100

Table 4: Distribution of cervical histopathological findings (n=150)

Histopathological findings	No. of cases	Percentage
Chronic cervicitis	99	66.0
Cervical polyp	27	18.0
CIN I–II	14	9.3
CIN III	6	4.0
Squamous cell carcinoma	3	2.0
Adenocarcinoma	1	0.7
Total	150	100

Table 5: Distribution of cervical Pap smear findings (n=150)

Pap smear findings	No. of cases	Percentage
Inflammatory smear	81	54.0
Negative for intraepithelial lesion or malignancy	23	15.3
Dysplasia	20	13.3
Positive for malignancy	18	12.0
Unsatisfactory smear	8	5.4
Total	150	100

Discussion

Adenomyosis is a common benign gynecological disorder characterized by the presence of endometrial glands and stroma within the myometrium. It is frequently associated with abnormal uterine bleeding, dysmenorrhea, pelvic pain and other reproductive complications. Histopathological examination of hysterectomy specimens provides an opportunity to identify adenomyosis and evaluate associated endometrial and cervical abnormalities. The present study focuses on the spectrum of histopathological changes observed in the endometrium and cervix among cases showing features of adenomyosis.

In the present study, the maximum number of cases belonged to the 45–50 years age group (40%), followed by the 40–45 years age group (35.3%). This indicates a greater representation of adenomyosis among women in the perimenopausal age group. Adenomyosis has traditionally been associated with increasing age and multiparity, although improvements in imaging techniques have resulted in its recognition among younger women as well. Vercellini et al. [12] discussed the epidemiological factors associated with adenomyosis and highlighted the importance of age and reproductive characteristics in understanding its occurrence. García-Solares et al. [11] also described the complex pathogenesis of adenomyosis, emphasizing the involvement of endometrial-myometrial interactions, tissue injury and repair mechanisms.

Regarding parity, the present study demonstrated that the majority of cases were multiparous, with 40.7% belonging to the P4–P5 group and 40% belonging to the P3–P4 group. Nulliparous women constituted only 6% of the cases. Multiparity has traditionally been considered an important epidemiological characteristic associated with adenomyosis. However, the relationship between reproductive history and adenomyosis is complex and may be influenced by several hormonal and uterine factors. Vercellini et al. [12] discussed the association of reproductive characteristics with adenomyosis, while Harada et al. [15] highlighted the importance of understanding adenomyosis in relation to reproductive function and fertility outcomes.

Histopathological examination of the endometrium revealed that atrophic endometrium was the most common finding, accounting for 36.7% of cases. Proliferative endometrium and endometrial hyperplasia were each observed in 14% of cases. Endometrial polyps constituted 9.3%, whereas inflammatory endometrial changes were identified in 5.3%. These findings demonstrate considerable variation in the endometrial morphology associated with adenomyosis. Such variations may be influenced by the hormonal environment, age-related endometrial changes and associated uterine pathology. García-Solares et al. [11] described the interaction between the endometrium and myometrium in the pathogenesis of adenomyosis, suggesting that alterations at the endometrial-myometrial interface may contribute to disease development and progression.

Endometrial hyperplasia was identified in a proportion of cases, emphasizing the importance of careful examination of the endometrial lining in hysterectomy specimens. The identification of hyperplastic and malignant endometrial lesions is particularly relevant in women presenting with abnormal uterine bleeding. The presence of endometrial adenocarcinoma in 1.3% of cases and uterine serous carcinoma in 0.7% further highlights the importance of comprehensive histopathological evaluation. Dueholm [13] discussed the clinical significance of adenomyosis and its association with reproductive outcomes, while broader investigations into the disease have emphasized the need for accurate assessment of associated uterine abnormalities.

The cervical histopathological findings demonstrated chronic cervicitis as the predominant abnormality, accounting for 66% of cases. Cervical polyps were observed in 18%, while CIN I–II and CIN III accounted for 9.3% and 4%, respectively. Squamous cell carcinoma and cervical adenocarcinoma were relatively uncommon, constituting 2% and 0.7% of cases. These observations indicate that inflammatory cervical lesions represented the major component of the cervical histopathological spectrum. Although cervical abnormalities are not considered a direct consequence of adenomyosis, their identification in hysterectomy specimens is important for comprehensive pathological assessment. The detection of premalignant and malignant cervical lesions also emphasizes the importance of systematic examination of the cervix.

The cervical Pap smear findings revealed inflammatory changes in 54% of cases, making inflammation the most frequent cytological finding. Negative smears for intraepithelial lesions or malignancy accounted for 15.3%, while dysplastic changes were observed in 13.3% of cases. Positive findings for malignancy were reported in 12%, whereas 5.4% of smears were unsatisfactory for evaluation. These findings demonstrate the importance of cervical cytological assessment in women undergoing evaluation for gynecological disorders. Tellum et al. [14] highlighted the importance of accurate diagnostic approaches in adenomyosis and demonstrated the role of imaging techniques, particularly transvaginal ultrasonography and magnetic resonance imaging, in its preoperative identification. However,

histopathological examination remains essential for evaluating associated tissue abnormalities and confirming the diagnosis in surgical specimens.

Harada et al. [15] discussed the relationship between adenomyosis and female fertility, emphasizing that the condition may influence reproductive outcomes. Similarly, Dueholm [13] reviewed the association between adenomyosis and infertility and highlighted the importance of understanding its clinical and pathological implications. These observations reinforce the need for comprehensive evaluation of adenomyosis, particularly with respect to associated endometrial abnormalities and reproductive characteristics.

Overall, the findings of the present study highlight the varied histopathological changes encountered in the endometrium and cervix of hysterectomy specimens showing adenomyosis. Atrophic endometrium and chronic cervicitis were the most frequently observed findings in their respective tissue components. The identification of endometrial hyperplasia, cervical dysplasia and malignant lesions further emphasizes the diagnostic importance of examining the entire hysterectomy specimen rather than concentrating exclusively on the myometrial component.

Conclusion

The present study highlights the spectrum of endometrial and cervical histopathological changes associated with adenomyosis in hysterectomy specimens. The condition was predominantly observed in women belonging to the 40–50 years age group and was frequently encountered among multiparous women. Atrophic endometrium was the most common endometrial finding, whereas chronic cervicitis represented the predominant cervical abnormality. Endometrial hyperplasia, endometrial polyps, cervical dysplasia and occasional malignant lesions were also identified. These findings emphasize the importance of thorough histopathological examination of the endometrium, myometrium and cervix in every hysterectomy specimen. Comprehensive tissue evaluation facilitates the identification of associated pathological conditions and contributes to accurate diagnosis and appropriate clinical management.

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