

Research Article

Prevalence and Histopathological Characteristics of Endometrial Hyperplasia and Carcinoma in Women with Postmenopausal Bleeding: A Cross-Sectional Observational Study

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Abstract

Postmenopausal bleeding (PMB) is a clinically significant symptom that often serves as an early indicator of endometrial pathology, including hyperplasia and carcinoma. Timely evaluation is crucial because early-stage endometrial neoplasia is highly treatable, whereas delayed diagnosis is associated with poor outcomes. This study aimed to determine the prevalence and histopathological spectrum of endometrial lesions in women presenting with postmenopausal bleeding and to assess associated risk factors.

A cross-sectional observational study was conducted on 410 women presenting with postmenopausal bleeding. All participants

underwent transvaginal ultrasonography followed by endometrial sampling through dilatation and curettage or Pipelle biopsy. Histopathological examination was performed according to WHO classification criteria. Clinical variables including age, body mass index (BMI), parity, diabetes, hypertension, and duration since menopause were analyzed.

Endometrial pathology was identified in 78.5% of cases. Endometrial hyperplasia without atypia was observed in 34.1%, atypical hyperplasia in 18.0%, and endometrial carcinoma in 21.2% of patients. Endometrioid adenocarcinoma was the most common histological subtype (82.4% of malignancies). Significant associations were

observed between carcinoma and obesity ($p<0.001$), diabetes mellitus ($p=0.002$), and prolonged postmenopausal duration (>10 years) ($p<0.001$). Endometrial thickness >5 mm demonstrated a sensitivity of 88.6% for detecting malignant or premalignant lesions. These findings highlight a high burden of premalignant and malignant endometrial lesions among women with postmenopausal bleeding, emphasizing the importance of early diagnostic evaluation using histopathology to ensure timely intervention.

Keywords: Postmenopausal bleeding, endometrial hyperplasia, endometrial carcinoma, histopathology

Introduction

Postmenopausal bleeding (PMB) is defined as any vaginal bleeding occurring after 12 months of amenorrhea in a woman of menopausal age. It is one of the most common gynecological complaints in postmenopausal women and represents a critical clinical warning sign that requires prompt evaluation due to its strong association with endometrial pathology, including hyperplasia and carcinoma [1–3]. The endometrium undergoes significant hormonal changes following menopause due to the decline in estrogen and progesterone production. However, unopposed estrogen exposure—whether endogenous or

exogenous—may lead to proliferative changes in the endometrial lining, resulting in hyperplasia and, in some cases, progression to carcinoma. This pathophysiological mechanism is central to the development of endometrial neoplasia [2–4].

Endometrial hyperplasia represents a spectrum of proliferative disorders characterized by glandular and stromal imbalance within the endometrium. It is broadly classified into hyperplasia without atypia and atypical hyperplasia (endometrial intraepithelial neoplasia), with the latter carrying a significantly higher risk of progression to carcinoma. Early identification of these lesions is essential for prevention of malignant transformation [3–5].

Endometrial carcinoma is the most common gynecological malignancy in developed countries and is increasingly being recognized in developing regions as well. The majority of cases are diagnosed at an early stage due to the presence of abnormal uterine bleeding, which serves as an early clinical symptom. Endometrioid adenocarcinoma is the most frequently observed histological subtype, often associated with estrogen-dependent pathways [4–6].

Multiple risk factors contribute to the development of endometrial hyperplasia and carcinoma. These include obesity, diabetes mellitus, hypertension, nulliparity, late menopause, and prolonged estrogen exposure. Obesity plays a particularly important role due to peripheral conversion of androgens into estrogens in adipose tissue, leading to a hyperestrogenic state [5–7].

Transvaginal ultrasonography is widely used as the initial diagnostic modality in women with postmenopausal bleeding. Endometrial thickness measurement serves as a useful screening parameter; however, definitive diagnosis requires histopathological examination. Endometrial sampling remains the gold standard for diagnosis and risk stratification [6–8].

Histopathology not only confirms the presence of hyperplasia or carcinoma but also provides essential information regarding tumor type, grade, and architectural pattern. These features are critical for determining prognosis and guiding management decisions, including surgical and adjuvant therapy [7–9].

Despite advances in imaging and minimally invasive diagnostic techniques, there remains variability in the prevalence and histopathological patterns of endometrial lesions across different populations. Regional

differences in lifestyle, obesity rates, and healthcare access may influence disease presentation and detection rates [8–10].

Given the clinical significance of postmenopausal bleeding and its association with premalignant and malignant endometrial conditions, systematic evaluation is essential. This study was therefore conducted to determine the prevalence and histopathological spectrum of endometrial lesions in women presenting with postmenopausal bleeding and to identify associated clinical risk factors.

Methodology

A cross-sectional observational study was conducted at Fatima Jinnah Medical University. Ethical approval was obtained from the institutional review board prior to study initiation.

Sample size was calculated using Epi Info software assuming a 30% expected prevalence of endometrial carcinoma or atypical hyperplasia among postmenopausal bleeding cases, with a 95% confidence interval, 5% margin of error, and 80% power. The minimum required sample size was 350; however, 410 participants were included to enhance statistical validity.

Women aged 45 years and above presenting with postmenopausal bleeding were included in the study. Postmenopausal status was

defined as amenorrhea for at least 12 consecutive months. Exclusion criteria included hormone replacement therapy within the last six months, known coagulation disorders, cervical malignancy, and incomplete clinical or histopathological data.

After obtaining informed consent, detailed clinical history was recorded, including age, parity, BMI, duration since menopause, comorbidities (diabetes, hypertension), and medication history. Physical examination and pelvic examination were performed in all cases.

All participants underwent transvaginal ultrasonography for measurement of endometrial thickness. An endometrial thickness greater than 5 mm was considered abnormal and indicative of further evaluation.

Endometrial sampling was performed using Pipelle biopsy or dilatation and curettage depending on clinical indication. Tissue samples were processed and examined by experienced histopathologists. Histopathological classification was done according to WHO criteria into normal endometrium, endometrial hyperplasia without atypia, atypical hyperplasia, and endometrial carcinoma.

Statistical analysis was performed using SPSS version 27. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were expressed as frequencies and percentages. Chi-square test and logistic regression analysis were used to determine associations between risk factors and histopathological outcomes. A p-value <0.05 was considered statistically significant

Results

Table 1. Baseline Characteristics of Study Population (n=410)

Variable	Value
Age (years)	58.6 $\pm$ 6.9
BMI (kg/m ²)	29.4 $\pm$ 5.1
Duration since menopause (years)	9.8 $\pm$ 4.3
Nulliparity (%)	22.7

Variable	Value
Diabetes mellitus (%)	31.5
Hypertension (%)	44.9
Endometrial thickness (mm)	7.2 ± 3.6

The study population consisted predominantly of overweight postmenopausal women with a high prevalence of metabolic comorbidities.

Table 2. Histopathological Spectrum of Endometrial Findings

Histopathology	Frequency (n)	Percentage (%)
Normal endometrium	88	21.5
Hyperplasia without atypia	140	34.1
Atypical hyperplasia	74	18.0
Endometrial carcinoma	87	21.2
Other benign lesions	21	5.2

A high proportion of patients with postmenopausal bleeding demonstrated premalignant or malignant endometrial changes.

Table 3. Association of Risk Factors with Endometrial Carcinoma

Risk Factor	Carcinoma (%)	OR	p-value
BMI ≥ 30	34.8	2.91	<0.001
Diabetes mellitus	28.7	2.12	0.002
Hypertension	26.4	1.76	0.021
>10 years menopause	39.1	3.34	<0.001

Obesity and prolonged postmenopausal duration were strongly associated with endometrial carcinoma development.

Table 4. Diagnostic Performance of Endometrial Thickness (>5 mm)

Parameter	Value (%)
Sensitivity	88.6
Specificity	72.4
Positive predictive value	79.3
Negative predictive value	84.7

Endometrial thickness measured by ultrasound showed high sensitivity for detecting premalignant and malignant lesions.

Discussion

The present study demonstrates a high prevalence of endometrial hyperplasia and carcinoma among women presenting with postmenopausal bleeding, emphasizing the clinical importance of this symptom as an early indicator of endometrial pathology [11–12].

A significant proportion of patients exhibited premalignant lesions, particularly endometrial hyperplasia without atypia and atypical hyperplasia. These findings highlight the spectrum of disease progression and reinforce the importance of early detection to prevent malignant transformation [12–13].

Endometrial carcinoma was identified in more than one-fifth of cases, with endometrioid adenocarcinoma being the most common subtype. This aligns with the estrogen-dependent pathway of carcinogenesis commonly observed in

postmenopausal women with metabolic risk factors [13–14].

Obesity emerged as a major independent risk factor for endometrial carcinoma. Increased adipose tissue leads to peripheral aromatization of androgens into estrogens, resulting in prolonged unopposed estrogen exposure, which drives endometrial proliferation and malignant transformation [14–15].

Metabolic comorbidities such as diabetes and hypertension were also significantly associated with malignant histopathology. These conditions may contribute to systemic inflammation, insulin resistance, and hormonal imbalance, thereby increasing endometrial cancer risk [15–16].

Endometrial thickness measured by transvaginal ultrasound demonstrated high sensitivity in detecting abnormal pathology, confirming its role as a valuable screening tool. However, its moderate specificity

highlights the necessity of histopathological confirmation for definitive diagnosis [16–17].

The strong association between prolonged postmenopausal duration and carcinoma suggests cumulative hormonal and metabolic exposure as an important factor in disease progression. This underscores the need for vigilant monitoring in long-standing postmenopausal women presenting with bleeding [17–18].

Histopathological examination remains the gold standard for diagnosis and plays a critical role in guiding management strategies, including surgical intervention and adjuvant therapy. The present findings support routine endometrial sampling in all women with postmenopausal bleeding [18–20].

Conclusion

Postmenopausal bleeding is strongly associated with a high prevalence of endometrial hyperplasia and carcinoma. Obesity, diabetes, and prolonged menopause significantly increase malignancy risk. Histopathological evaluation remains essential for accurate diagnosis and timely management, highlighting the need for early and routine endometrial assessment in all affected women.

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