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CLINICAL PROFILE OF PATIENTS WITH PATHOLOGICAL ENDOMETRIAL CHANGES ASSOCIATED WITH METABOLIC FACTORS

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The aim of the study was to characterize the clinical profile of women with pathological endometrial changes associated with metabolic disorders, with an emphasis on disease course, comorbidities, and risk determinants.

Materials and methods. The study was conducted at the Multidisciplinary Medical Center of Odesa National Medical University and included 103 women who were examined between 2023 and 2025. Based on clinical and morphological findings, patients were divided into five groups: simple endometrial hyperplasia (n = 39), atypical endometrial hyperplasia (n = 9), endometrial cancer (n = 25), polycystic ovary syndrome (PCOS; n = 16), and a control group of healthy women (n = 14). Diagnosis was verified histologically using biopsy or surgical specimens. Cancer staging was performed according to the 2023 FIGO classification. All patients underwent comprehensive clinical, laboratory, and instrumental evaluation.

Results. Mean body weight and body mass index (BMI) in patients with hyperplasia and endometrial cancer corresponded to class I obesity and were significantly higher than in controls ($p < 0.05$). In the PCOS group, BMI values corresponded to overweight with marked variability. Obesity was prevalent in most women with endometrial pathology. Abnormal uterine bleeding was the leading symptom (69.2–92 %), while pain and urinary or bowel dysfunction were more typical of malignant disease. Cardiovascular and endocrine comorbidities predominated. Ultrasonography revealed progressive endometrial thickening, structural heterogeneity, and increased vascularization associated with disease severity.

Conclusions. Endometrial pathology is strongly associated with obesity and metabolic disorders. Ultrasonographic findings demonstrate high diagnostic value. Modifiable risk factors, particularly obesity, play a significant role in disease progression, highlighting the need for early detection and multidisciplinary management.

Keywords: endometrium, hyperplasia, abnormal uterine bleeding, obesity, carcinoma.

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КЛІНІЧНИЙ ПРОФІЛЬ ПАЦІЄНТОК ІЗ ПАТОЛОГІЧНИМИ ЗМІНАМИ ЕНДОМЕТРІЯ У ВЗАЄМОЗВ'ЯЗКУ З МЕТАБОЛІЧНИМИ ФАКТОРАМИ

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Мета дослідження полягала у визначенні клінічного профілю пацієнток із патологічними змінами ендометрія на тлі метаболічних порушень для встановлення супутньої патології та факторів ризику. Обстежено 103 пацієнтки, розподілені на групи залежно від морфологічного діагнозу. Встановлено, що середній ІМТ та маса тіла достовірно вищі у всіх патологічних групах порівняно з контролем, найвищі показники – у пацієнток із раком ендометрія. Провідний симптом – аномальна маткова кровотеча. Найчастіше супутніми станами були серцево-судинні й ендокринні захворювання. Ультразвукові зміни корелювали зі ступенем проліферації ендометрія. Отримані дані підтверджують найбільш часту клінічну асоціацію ожиріння та метаболічних порушень із наявністю патології ендометрія та підкреслюють необхідність мультидисциплінарного й персоналізованого підходу до ведення пацієнток групи ризику.

Ключові слова: ендометрій, гіперплазія, аномальна маткова кровотеча, ожиріння, карцинома.

Introduction

Endometrial pathology, including hyperplastic processes and endometrial cancer, occupies a leading position in the structure of gynecological morbidity and female mortality worldwide [1]. Over recent decades, a persistent upward trend in the incidence of these conditions has been observed, largely associated with the increasing prevalence of obesity, metabolic syndrome, and endocrine disorders [2]. According to international studies, a BMI ≥ 30 kg/m² is one of the most powerful independent risk factors for the development of both endometrial hyperplasia and endometrial cancer, exceeding even age over 45 years in prognostic significance [3]. The combination of obesity with insulin resistance, diabetes mellitus, and a hyperestrogenic state creates a pathogenetic basis for proliferative changes of the endometrium and their potential malignant transformation [4]. In this context, comprehensive clinical assessment of patients with endometrial pathology – taking into account metabolic status, comorbid conditions, and specific features of the clinical course – becomes particularly important, serving as a foundation for risk stratification and the personalization of therapeutic strategies.

The aim of the study. To determine the clinical profile of women with pathological endometrial changes associated with metabolic disorders, to identify the most significant clinical and somatic characteristics related to different forms of endometrial pathology.

Materials and Methods

The study was conducted at the Multidisciplinary Medical Center of Odesa National Medical University during 2023–2025. A total of 103 inpatient and outpatient female patients were examined. Based on the examination results, the patients were divided into the following groups:

• **Group Ia** – women with histologically confirmed endometrial hyperplasia without atypia (n = 39), according to the WHO 2014 classification;

• **Group Ib** – women with atypical endometrial hyperplasia / endometrial intraepithelial neoplasia (EIN) (n = 9), according to the WHO 2014 classification;

• **Group II** – patients with endometrial cancer (n = 25), according to the 2023 FIGO classification;

• **Group III (comparison group)** – women with polycystic ovary syndrome (PCOS), diagnosed according to the Rotterdam criteria (n = 16);

• **Group IV (control group)** – clinically healthy women without endometrial pathology (n = 14).

For all groups, morphological verification of the diagnosis was performed by histological examination of endometrial biopsy specimens and surgical samples obtained during pipelle biopsy, hysteroscopy, or hysterectomy. Cancer staging was carried out in accordance with the FIGO classification (2023).

All enrolled patients underwent a comprehensive clinical and anamnestic assessment according to the study protocol. Anthropometric evaluation included measurement of body weight (kg) and height (m), followed by calculation of BMI using the standard formula:

$$\text{BMI} = \text{body weight (kg)} / \text{height}^2 \text{ (m}^2\text{)}.$$

Assessment of social status took into account age, level of education, marital status, and type of professional activity. Menstrual function was analyzed based on medical history data and included evaluation of age at menarche, regularity and duration of the menstrual cycle, volume of menstrual blood loss, as well as the presence and nature of menstrual disorders.

The examination protocol also included general clinical, laboratory, and instrumental investigations. Ultrasound examination was performed transabdominally and transvaginally during the first phase of the menstrual cycle (days 5–9) or on any day in postmenopausal women, in accordance with the objectives of the study.

The study was conducted in compliance with the principles of the Declaration of Helsinki of the World Medical Association, Ethical Principles for Medical Research Involving Human Subjects, approved by the Bioethics Committee (Protocol No. 18 dated December 6, 2023). Written informed consent was obtained from all participants prior to inclusion in the study.

Research results and their discussion

Analysis of age-related characteristics demonstrated that the mean age of patients in groups Ia, Ib, and IV was statistically comparable and was 47.6 years (95 % CI: 43.9–51.4), 47.0 years (95 % CI: 34.6–59.4), and 44.21 years (95 % CI: 35.0–53.4), respectively. In contrast, patients with endometrial cancer (group II) were significantly older, with a mean age of 60.1 years (95 % CI: 55.8–64.3), while women with polycystic ovary syndrome (PCOS, group III) were the youngest, with a mean age of 26.17 years (95 % CI: 19.6–32.8).

Anthropometric assessment revealed that the mean body weight in groups Ia, Ib, and II was 87.4 ± 11.6 kg, 89.1 ± 12.4 kg, and 85.6 ± 10.9 kg, respectively, which was significantly higher compared with the control group (72.3 ± 9.8 kg; $p < 0.05$). Mean height did not differ significantly between groups and ranged from 1.63 to 1.66 m.

The mean BMI values in groups Ia (31.8 ± 3.9 kg/m²), Ib (32.4 ± 4.1 kg/m²), and II (31.1 ± 3.7 kg/m²) corresponded to class I obesity and were significantly higher than in the control group (26.1 ± 3.2 kg/m²; $p < 0.05$). In women with PCOS, the mean BMI was 27.8 ± 4.6 kg/m², corresponding to the overweight category and characterized by pronounced interindividual variability.

Analysis of menstrual function showed that in group Ia, menarche at the age of 12–13 years was reported in 84.6 % of patients. A regular menstrual cycle was observed in 53.8 % of women, while 46.2 % had an irregular cycle. Menorrhagia was reported in 30.8 % of cases, dysmenorrhea in 43.6 %, and premenstrual syndrome (PMS) symptoms in 66.7 %.

In group Ib, menarche at 12–13 years occurred in 88.9 % of women. A regular menstrual cycle was maintained in 44.4 % of patients. Both menorrhagia and dysmenorrhea were reported in 44.4 % of cases, while PMS symptoms were present in 66.7 %.

In group II, menarche at 12–13 years was reported in 84.0 % of women. A regular menstrual cycle was observed in 64.0 % of patients; however, abnormal uterine bleeding predominated later in life. Menorrhagia was recorded in 24.0 % of cases, dysmenorrhea in 40.0 %, and PMS symptoms in 60.0 %.

In group III, a regular menstrual cycle was observed in only 37.5 % of patients, while 62.5 % had an irregular cycle. Menorrhagia was rare (6.3 %), whereas PMS symptoms were reported by 75.0 % of women.

In the control group (group IV), menarche at 12–13 years was observed in 78.6 % of women. A regular menstrual cycle was maintained in 85.7 % of patients; menorrhagia occurred in 7.1 %, and PMS symptoms were reported in 71.4 %.

Social status was assessed based on employment, marital status, educational level, and the presence of temporary or permanent absence from work.

In group Ia, most women were permanently employed. Employment sectors included services, trade, and the beauty industry (12 patients, 30.8 %), administrative and office work (10 patients, 25.6 %), healthcare and pharmaceutical fields (5 patients, 12.8 %), and education and science (4 patients, 10.3 %). Eight women (20.5 %) were temporarily unemployed or on leave. No pensioners were identified in this group. Higher education was reported in 27 patients (69.2 %), and 26 women (66.7 %) were married.

In group Ib, 7 patients (77.8 %) were employed, including 3 women (33.3 %) in the service sector, 2(22.2 %) in administrative and office positions, and 1(11.1 %) each in healthcare/pharmaceuticals and education/science. Two women (22.2 %) were temporarily unemployed; no pensioners were identified. Higher education was reported in 7 patients (77.8 %).

In group II, the proportion of women who were temporarily unemployed or retired was the highest (6 patients, 24.0 %). Among employed women, administrative and office work (6 patients, 24.0 %) and the service sector (7 patients, 28.0 %) predominated, while healthcare/pharmaceuticals and education/science employed 3 patients each (12.0 %). Pensioners accounted for 4 women (16.0 %) in this group. Higher education was reported in 16 patients (64.0 %), and 18 women (72.0 %) were married.

In group III, most patients were socially active; 2 women (12.5 %) were temporarily unemployed, and no pensioners were identified. Employment was most common in the service sector (6 patients, 37.5 %) and administrative and office work (4 patients, 25.0 %), while healthcare/pharmaceuticals and education/science employed 2 patients each (12.5 %). The majority of women had completed or incomplete higher education.

In group IV, 4 women (28.6 %) were temporarily unemployed or on leave, with no pensioners identified. Among employed participants, the service sector (5 women, 35.8 %) and administrative and office work (3 women, 21.4 %) predominated. Higher education was reported in 9 women (64.3 %).

The leading clinical symptom in patients with endometrial hyperplasia and endometrial cancer was abnormal uterine bleeding (AUB), which was observed in 69.2–92.0 % of cases. Pain syndrome and dysfunction of adjacent organs were more frequently reported in patients with malignant pathology. The distribution of clinical symptoms is presented in Table 1.

Analysis of comorbid conditions demonstrated a predominance of cardiovascular and endocrine disorders in groups with hyperplastic and malignant endometrial changes, with the highest prevalence observed among patients with endometrial cancer.

In groups Ia and II, cardiovascular diseases were identified in 14 patients (35.9 % and 56 %, respectively). In the control group, cardiovascular pathology was detected in 3 patients (21.4 %). No cardiovascular diseases were recorded in groups Ib and III.

Endocrine disorders included diabetes mellitus and thyroid dysfunction. In group Ia, diabetes mellitus was diagnosed in 2 women (5.1 %), while thyroid disorders were identified in 3 patients (7.7 %). In group II, diabetes mellitus was detected in 5 women (20 %), whereas thyroid dysfunction was observed in 1 case (4 %). In group Ib, 1 case of diabetes mellitus (11 %) was recorded. No additional endocrine disorders were registered among women with PCOS.

Gastrointestinal diseases and anemia were observed only sporadically, predominantly in patients with simple endometrial hyperplasia and endometrial cancer. The overall structure of comorbid conditions is presented in Figure 1.

Ultrasound examination revealed clear intergroup differences. Endometrial hyperplasia and endometrial cancer were characterized by increased M-echo thickness, structural heterogeneity of the endometrium, and altered

Table 1

The distribution of clinical symptoms

Symptoms	Ia	Ib	II	III
AUB	69.2 %	77.8 %	92 %	56.3 %
Pain syndrome	6 %	22 %	48 %	25 %
Dysfunction of adjacent organs	–	7 %	28 %	6.3 %
Watery discharge	–	9 %	20 %	12.5 %

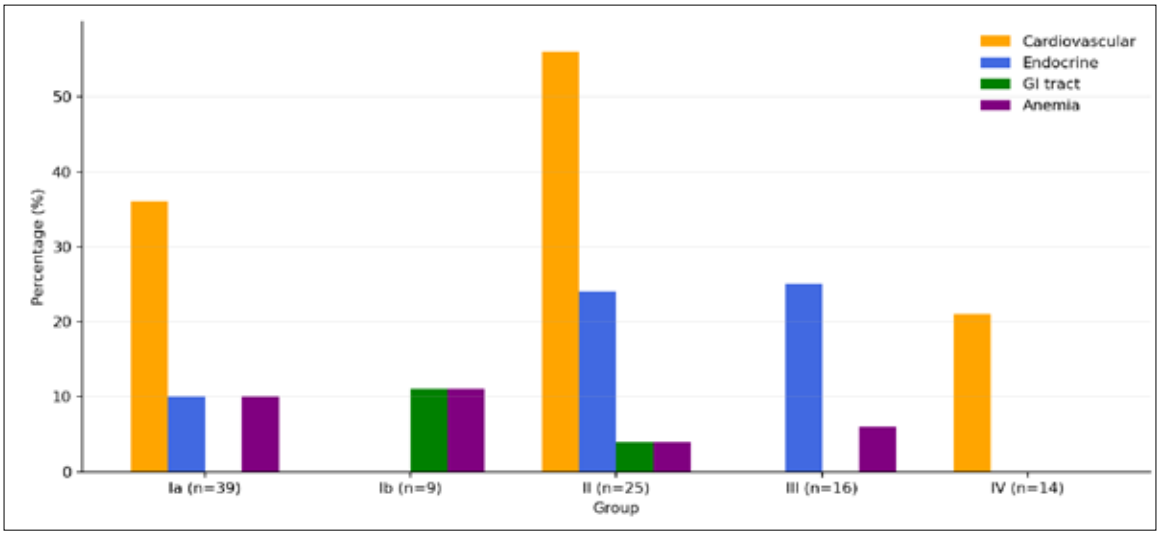

Fig. 1. Structure of comorbid conditions

vascularization, which correlated with the degree of proliferative activity. In women with PCOS, ovarian changes predominated with a relatively preserved endometrium, whereas in the control group the echographic pattern corresponded to the age-related norm.

A comparative characterization of the echographic features of the study groups is presented in Table 2.

The obtained results are consistent with current concepts of the pathogenesis of hyperplastic and malignant endometrial diseases as outlined in the ESGO, ESMO, and NCCN guidelines [5; 6; 7], which consider endometrial cancer a hormonally and metabolically associated disease, particularly in women with obesity and components of metabolic syndrome. According to the ESGO/ESTRO/ESP recommendations (2021–2023), excess body weight, insulin resistance, and diabetes mellitus are defined as key modifiable risk factors for the development of both endometrial hyperplasia and endometrial cancer. In our study, the mean BMI values in the hyperplasia and endometrial cancer groups corresponded to class I obesity, supporting the concept of a chronic hyperestrogenic environment driven by peripheral aromatization of androgens in adipose tissue as a central pathogenetic mechanism.

The NCCN guidelines (version 2024–2025) emphasize that in patients with endometrial pathology, obesity and diabetes mellitus not only increase disease risk but also worsen prognosis, affecting disease course, complication rates, and overall survival. The high prevalence of cardiovascular and endocrine comorbidity identified in our study, particularly in the endometrial cancer group, is fully consistent with these statements and highlights the need for mandatory cardiometabolic assessment of such patients already at the stage of primary diagnosis.

Importantly, the ESMO Clinical Practice Guidelines (2022–2024) consider abnormal uterine bleeding a key early clinical marker of endometrial pathology regardless of age, especially in women with obesity. In our study, abnormal uterine bleeding was the dominant symptom in most patients with hyperplasia and in more than 90 % of patients with endometrial cancer, supporting the appropriateness of a more aggressive diagnostic strategy in this category of women, including early hysteroscopy and morphological verification.

The ultrasound characteristics identified in our study (increased M-echo thickness, structural heterogeneity of the endometrium, and increased vascularization) are consistent with ESGO and NCCN recommendations, which underline the role of transvaginal ultrasound as the first-line risk stratification tool. At the same time, the guidelines stress that echographic features should not be considered in isolation and must be interpreted in conjunction with clinical and metabolic characteristics, which fully aligns with the concept of our study.

Particular attention should be paid to the group of patients with PCOS. According to ESMO and NCCN, PCOS is regarded as a condition associated with an increased risk of endometrial hyperplasia due to chronic anovulation and hyperestrogenism without adequate progesterone protection. Our findings demonstrating a predominance of ovarian changes with a relatively preserved endometrium in young patients with PCOS support the need for active surveillance in this group, with a focus on prevention of endometrial pathology.

Current ESGO/ESMO/NCCN recommendations also emphasize the transition from purely morphological to integrated clinicomolecular risk stratification. Although the present study primarily focused on clinical and metabolic profiles, the results confirm that these factors should serve as the foundation for subsequent molecular classification (POLE, MMRd, p53-abn, NSMP) and for selecting individualized treatment strategies.

Thus, the study findings not only agree with current international guidelines but also underscore their practical relevance in real-world clinical practice. A comprehensive assessment of clinical, metabolic, and echographic patient profiles enables optimization of early diagnosis, risk stratification, and personalized management of women

Table 2

Comparative characteristics of echographic features of the study groups

Feature	Ia	Ib	II	III	IV
Mean endometrial thickness (M-echo, mm)	12.9	12.1	11.6	9.8 ± 0.3	8.2 ± 1.1
Endometrial structure	Heterogeneous, microcystic changes (70 %)	Heterogeneous, increased echogenicity (100 %)	Heterogeneous, increased echogenicity (72 %)	Homogeneous	Homogeneous
Endometrial vascularization	Increased in 30 %	Increased in 50 %	Increased in 40 %	Reduced	Normal
Right ovary size (mm)	27 × 16 ± 14	26 × 15 ± 13	21 × 12 ± 11	35 × 26 ± 24	31 × 19 ± 17
Right ovary volume (cm^3)	3.2 ± 0.8	3.0 ± 0.8	1.6 ± 0.9	11.7 ± 3.2	4.8 ± 0.9
Left ovary size (mm)	26 × 15 ± 13	25 × 14 ± 12	23 × 13 ± 12	34 × 25 ± 23	30 × 18 ± 16
Left ovary volume (cm^3)	3.0 ± 0.7	2.7 ± 0.7	1.8 ± 1.0	11.0 ± 1.9	4.9 ± 0.8
Follicles	Dominant (55 %)	Single (37 %)	Absent	Multiple (24, 2–9 mm)	Normal
Additional findings	Fibroids (14,8 %), hydrosalpynx (5 %)	Subserous fibroids (33 %)	Hydrosalpinx (20 %)	Thickened capsule (100 %)	No pathology

with endometrial pathology, fully consistent with the modern paradigm of gynecologic oncology.

Conclusions

1. The clinical profile of patients with endometrial pathology is characterized by a high prevalence of obesity and cardiovascular and endocrine comorbidities.

2. Abnormal uterine bleeding is the leading clinical manifestation of hyperplastic and malignant endometrial changes.

3. Ultrasound features have high diagnostic value and correlate with the severity of the pathological process.

4. Modifiable risk factors, particularly obesity and metabolic disorders, play a key role in the progression of endometrial pathology.

5. Integration of clinical, morphological, metabolic, and instrumental data forms the basis of a personalized approach to the prevention, diagnosis, and treatment of endometrial diseases.

BIBLIOGRAPHY

1. Concin N, Matias-Guiu X, Vergote I, et al. ESGO/ESTRO/ESP guidelines for the management of patients with endometrial carcinoma. *International Journal of Gynecological Cancer*. 2021;31(1):12–39. Available from: https://doi.org/10.1136/ijgc-2020-002230.
2. Zhu B, Gu H, Mao Z, et al. Global burden of gynaecological cancers in 2022 and projections to 2050. *Journal of Global Health*. 2024;14:04155. Available from: https://doi.org/10.7189/jogh.14.04155.
3. Wen H, Deng G, Shi X, et al. Body mass index, weight change, and cancer prognosis: a meta-analysis and systematic review of 73 cohort studies. *ESMO Open*. 2024;9(3):102241. Available from: https://doi.org/10.1016/j.esmoop.2024.102241.
4. Harvey SV, Wentzensen N, Bertrand K, et al. Associations of life course obesity with endometrial cancer in the Epidemiology of Endometrial Cancer Consortium (E2C2). *International Journal of Epidemiology*. 2023;52(4):1086–1099. Available from: https://doi.org/10.1093/ije/dyad046.
5. Colombo N, Creutzberg C, Amant F, et al. ESMO–ESGO–ESTRO consensus conference on endometrial cancer: diagnosis, treatment and follow-up. *Annals of Oncology*. 2016;27(1):16–41. Available from: https://doi.org/10.1093/annonc/mdv484.
6. Oaknin A, Tinker AV, Gilbert L, et al. ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up of endometrial cancer. *Annals of Oncology*. 2022;33(9):860–877. Available from: https://doi.org/10.1016/j.annonc.2022.06.003.
7. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology: Uterine Neoplasms. Version 1.2025. Plymouth Meeting (PA): NCCN; 2025.

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