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Effect of the new FIGO 2023 staging system on stage distribution and adjuvant therapies in endometrial cancer: A retrospective cohort study

Endometriyum kanserinde yeni FIGO 2023 evreleme sisteminin evre dağılımı ve adjuvan tedavilere etkisi: Retrospektif kohort çalışması

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Abstract

Objective: The 2023 update of the International Federation of Gynecology and Obstetrics (FIGO) staging system introduced significant changes in the classification of endometrial cancer by incorporating key pathological and molecular features. This study aimed to evaluate the impact of the revised FIGO 2023 staging system on stage distribution and adjuvant treatment decisions in patients undergoing surgical management of this malignancy.

Materials and Methods: This retrospective study included 220 patients who underwent surgical staging for endometrial cancer between January 2018 and December 2025. All patients were initially staged using the FIGO 2009 classification. Cases were subsequently reclassified according to the FIGO 2023 staging criteria, using the algorithm proposed for settings in which routine molecular classification is unavailable. The McNemar test was used to compare stage categories between the two staging systems, and the Wilcoxon signed-rank test was applied to evaluate the impact of stage migration on adjuvant treatment recommendations.

Results: Stage migration occurred in 12.7% of patients (28/220) following the application of the FIGO 2023 criteria, predominantly due to upstaging. The most common factor associated with stage reclassification was substantial lymphovascular space invasion (LVSI). The proportion of patients managed with observation alone significantly decreased from 44.5% to 32.7% ($p<0.001$), while the use of pelvic radiotherapy increased from 19.1% to 28.2% ($p=0.004$). Similarly, the proportion of patients receiving combined chemoradiotherapy significantly increased from 11.8% to 17.3% ($p=0.012$).

Conclusion: The implementation of the FIGO 2023 staging system has resulted in clinically meaningful stage migration and significantly impacted adjuvant treatment strategies. In particular, the recognition of substantial LVSI as a defining feature of stage IIC disease has led to more intensive adjuvant therapy in a subset of patients previously categorized as low risk.

Keywords: Endometrial cancer, FIGO 2023, staging system, lymphovascular space invasion, adjuvant therapy, stage migration

Öz

Amaç: Uluslararası Jinekoloji ve Obstetrik Federasyonu (FIGO) evreleme sisteminin 2023 güncellemesi, endometriyum kanserinin sınıflandırılmasında temel patolojik ve moleküler özellikleri içerecek şekilde önemli değişiklikler getirmiştir. Bu çalışmanın amacı, revize edilen FIGO 2023 evreleme sisteminin cerrahi tedavi uygulanan endometriyum kanseri hastalarında evre dağılımı ve adjuvan tedavi kararları üzerindeki etkisini değerlendirmektir.

Gereç ve Yöntemler: Bu retrospektif çalışmaya Ocak 2018 ile Aralık 2025 tarihleri arasında endometriyum kanseri nedeniyle cerrahi evreleme uygulanan hastalar dahil edilmiştir (n=220). Tüm hastalar başlangıçta FIGO 2009 sınıflamasına göre evrelendirilmiştir. Bu çalışmanın amacı doğrultusunda

PRECIS: Application of the International Federation of Gynecology and Obstetrics 2023 criteria causes significant stage migration, primarily driven by substantial lymphovascular space invasion, which leads to more intensive adjuvant radiotherapy and chemoradiotherapy recommendations.

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olgular daha sonra, rutin moleküler sınıflandırmanın yapılamadığı durumlar için önerilen algoritma kullanılarak FIGO 2023 evreleme kriterlerine göre yeniden sınıflandırılmıştır. İki evreleme sistemi arasındaki evre kategorilerini karşılaştırmak için McNemar testi, evre değişiminin adjuvan tedavi önerileri üzerindeki etkisini değerlendirmek için ise Wilcoxon işaretli sıralar testi kullanılmıştır.

Bulgular: FIGO 2023 kriterlerinin uygulanması sonrasında hastaların %12,7'sinde (28/220) evre değişimi saptanmış olup bu değişim çoğunlukla evre yükselmesi şeklinde gerçekleşmiştir. Evre yeniden sınıflandırmasına yol açan en sık faktör substantif lenfovasküler alan invazyonu (LVSI) olmuştur. Yalnızca gözlem ile takip edilen hasta oranı %44,5'ten %32,7'ye düşerken (p<0.001), pelvik radyoterapi uygulanan hasta oranı %19,1'den %28,2'ye yükselmiştir (p=0.004). Benzer şekilde kombine kemoradyoterapi uygulanan hasta oranı da %11,8'den %17,3'e artmıştır (p=0.012).

Sonuç: FIGO 2023 evreleme sisteminin uygulanması klinik olarak anlamlı evre değişimine yol açmış ve adjuvan tedavi stratejileri üzerinde önemli bir etki oluşturmuştur. Özellikle substantif LVSI evre IIC hastalığın tanımlayıcı bir özelliği olarak kabul edilmesi, daha önce düşük riskli olarak değerlendirilen bazı hastalarda daha yoğun adjuvan tedavi uygulanmasına neden olmuştur.

Anahtar Kelimeler: Endometriyum kanseri, FIGO 2023, evreleme sistemi, lenfovasküler alan invazyonu, adjuvan tedavi, evre değişimi

Introduction

Uterine body cancer, the most common gynecologic malignancy in developed countries, is rising in incidence worldwide, primarily as a consequence of prolonged life expectancy and escalating rates of obesity[1,2]. Accurate staging is essential for predicting prognosis and guiding postoperative treatment strategies[3].

The International Federation of Gynecology and Obstetrics (FIGO) staging system has historically been the primary classification method for endometrial cancer. The 2009 FIGO revision introduced important changes, including the simplification of stage I disease and an increased emphasis on surgical-pathological findings[4]. However, over time, molecular characterization and a deeper understanding of prognostic pathological factors have revealed the limitations of staging systems based solely on the anatomical extent of disease[5,6].

Based on recently published studies, further assessment of factors such as molecular classification, lymphovascular space invasion, and histological subtype has shown significant prognostic value in patients with endometrial cancer[7,8]. Molecular classification based on The Cancer Genome Atlas has further refined these risk stratification models by identifying specific subgroups associated with distinct prognoses[9]. These advances have greatly influenced modern clinical practice and risk assessment strategies.

The latest update of the FIGO staging system, published in 2023, emphasizes this comprehensive understanding of tumor biology. The new system incorporates molecular classification and refines pathological criteria, acknowledging substantial lymphovascular space invasion and aggressive histologic features as crucial prognostic factors[10]. Significantly, FIGO also provided an alternative staging algorithm for settings where routine molecular testing is unavailable, allowing the revised classification system with its updated criteria for assigning nodal status to be applied more widely across the globe[11].

Stage migration of patients previously staged according to the FIGO 2009 criteria may be observed following the introduction of the FIGO 2023 staging system. Such reclassification directly affects postoperative treatment decisions and changes the indications for both radiotherapy and chemotherapy[12-14]. Although these significant changes have occurred, there is still limited real-world evidence assessing the clinical utility of the FIGO 2023 staging system. It is critical for clinicians managing endometrial cancer to understand how this revised classification influences stage distribution and treatment planning. The objective of the current study was to investigate stage migration after the implementation of the FIGO 2023 criteria and to evaluate its consequences on postoperative therapy decisions in a surgically staged cohort diagnosed with endometrial cancer.

Materials and Methods

Study Design and Patient Population

This study was conducted at the University of Health Sciences Türkiye, Diyarbakır Gazi Yaşargil Training and Research Hospital, which is a tertiary referral center for gynecologic oncology. The Clinical Research Ethics Committee of University of Health Sciences Türkiye, Diyarbakır Gazi Yaşargil Training and Research Hospital approved the study protocol (approval number: 63, date: 12.02.2026). The study was performed in accordance with the principles of the Declaration of Helsinki.

We performed a retrospective analysis of the medical records of patients who underwent surgical staging for endometrial cancer between January 2018 and December 2025. A total of 220 patients with histologically confirmed endometrial carcinoma met the inclusion criteria and were evaluated in the final analysis. Patients with incomplete pathological data or insufficient information for precise staging were excluded from the study. The overall study population along with the process of stage reclassification is detailed in Figure 1.

All patients were staged according to the FIGO 2009 staging system at the time of initial treatment, which served as the baseline clinical classification throughout the study period.

Reclassification per the 2023 FIGO Staging System

All cases were reviewed according to the FIGO 2023 staging system this study. Due to the lack of routine molecular testing at our institution during the study period, staging reassessment was performed using the alternative algorithm proposed by FIGO for settings where molecular classification cannot be routinely conducted[6]. During this reassessment,

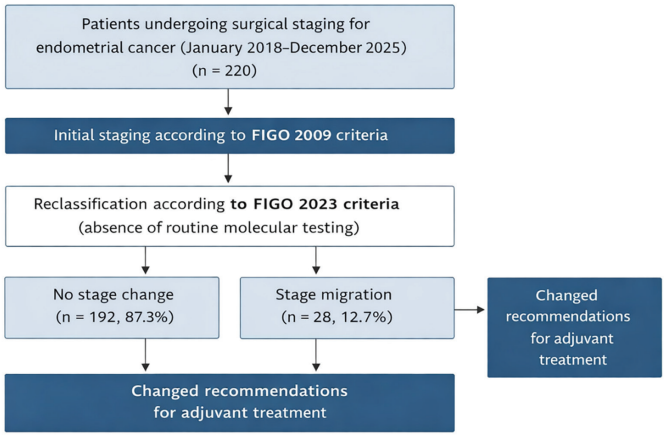

Figure 1. Flow diagram of patient selection and stage reclassification according to the FIGO 2023 staging system. Flow diagram illustrating the study population and stage reclassification process. A total of 220 patients who underwent surgical staging for endometrial cancer between January 2018 and December 2025 were initially staged according to the FIGO 2009 criteria. All cases were subsequently reclassified using the FIGO 2023 staging system in the absence of routine molecular classification. Stage migration occurred in 28 patients (12.7%), while 192 patients (87.3%) showed no change in stage. Reclassification influenced recommendations for adjuvant treatment in a subset of patients

FIGO: International Federation of Gynecology and Obstetrics

critical pathological parameters were evaluated according to the updated staging guidelines. These parameters included histological subtype, tumor grade, depth of myometrial invasion, cervical stromal involvement, lymphovascular space invasion, lymph node involvement, and distant metastases. Notably, substantial lymphovascular space invasion is a key feature that delineates stage IIC disease in the updated FIGO 2023 classification. Stage reassignment adhered strictly to the FIGO 2023 staging guidelines, and all pathology reports were evaluated according to predefined criteria.

Demographic and clinicopathological data were extracted from the institutional electronic medical records. Variables examined included age, body mass index (BMI), histological subtype, tumor grade, depth of myometrial invasion, lymphovascular space invasion, and lymph node involvement. Adjuvant management strategies were classified into four categories: observation alone, vaginal brachytherapy, pelvic external beam radiotherapy (with or without vaginal brachytherapy), and combined chemoradiotherapy. Treatment decisions were obtained from the documented postoperative management plans in the patients' medical records.

Statistical Analysis

Continuous variables were expressed as mean ± standard deviation, and categorical variables as frequencies and percentages. Cross-tabulation analysis was used to evaluate the stage distribution according to the FIGO 2009 and FIGO 2023 systems. To evaluate the effect of stage reclassification on management decisions, paired comparisons of treatment approaches based on the FIGO 2009 and FIGO 2023 staging systems were conducted using the McNemar test or the Wilcoxon signed-rank test, as appropriate. Statistical significance was defined as a two-sided p-value of less than 0.05. SPSS software version 25.0 was used to conduct all statistical analyses.

Table 1. Baseline clinicopathological characteristics of patients (n=220)

Parameter	n (%)	Mean ± SD
Age (years)		62.4±9.1
Body mass index (kg/m²)		32.8±6.4
Histological type		
Endometrioid	182 (82.7%)	
Non-endometrioid (serous, clear cell, carcinosarcoma)	38 (17.3%)	
Tumor grade (endometrioid tumors, n=182)		
Grade 1	96 (52.7%)	
Grade 2	58 (31.9%)	
Grade 3	28 (15.4%)	
Myometrial invasion		
<50%	142 (64.5%)	
≥50%	78 (35.5%)	
Lymphovascular space invasion (LVSI)		
Negative	165 (75.0%)	
Focal	20 (9.1%)	
Substantial	35 (15.9%)	

Values are presented as mean ± SD or n (%), unless otherwise specified
SD: Standard deviation

Results

A cohort of 220 patients was evaluated in this study. The mean age of the study population was 62.4±9.1 years, and the mean BMI was 32.8±6.4 kilograms per square meter. In total, 182 patients, representing 82.7% of the cohort, had confirmed endometrioid histology, whereas 38 patients, representing 17.3%, exhibited non-endometrioid histological subtypes, including serous carcinoma, clear cell carcinoma, and carcinosarcoma. Among the 182 patients with endometrioid tumors, 154 (84.6%) had grade 1 or grade 2 disease and 28 (15.4%) had grade 3 disease. Myometrial invasion of 50 percent or greater was identified in 78 patients (35.5%), and substantial lymphovascular space invasion was detected in 35 patients (15.9%).

Stage Migration for FIGO 2009 and FIGO 2023

The distribution of the disease stages, adjusted to the FIGO 2009 and FIGO 2023 criteria, is summarized in Table 2. Application of the FIGO 2023 staging criteria revealed that stage migration occurred in 28 patients representing 12.7% of the cohort; all were upstaged. The overall pattern of stage reclassification, including the proportions of upstaged and unchanged cases, is detailed in Table 4. Stage changes were most frequent among patients initially classified as stage I under the FIGO 2009 system. Of 154 patients initially staged as FIGO 2009 stage I, application of the FIGO 2023 criteria resulted in stage migration in 22 patients (14.3%). The primary driver for this shift was the presence of substantial lymphovascular space invasion, which reclassified these individuals into stage IIC under the updated staging system.

Impact on Adjuvant Treatment Decisions

The consequences of stage reclassification on adjuvant treatment strategies are summarized in Table 3. Following the implementation of the FIGO 2023 staging system, the percentage of patients managed with observation alone declined significantly compared with the FIGO 2009 staging-based treatment strategy, dropping from 44.5% to 32.7% with a p-value less than 0.001. Conversely, the use of vaginal brachytherapy alone remained statistically unchanged under the new staging method. The proportion of patients treated with pelvic external-beam radiotherapy, with or without vaginal brachytherapy, rose significantly from 19.1% to 28.2%, with a p-value equal to 0.004. Likewise, the percentage of patients receiving combined chemoradiotherapy significantly increased from 11.8% to 17.3%, with a p-value of 0.012.

Discussion

Given the clinical relevance of accurate staging in oncology, this study evaluated the impact of the recently introduced FIGO 2023 staging system by exploring stage distribution and postoperative treatment strategies in patients with endometrial carcinoma. Our findings demonstrate that the implementation of the updated staging criteria produces clinically significant stage migration and alters adjuvant therapy recommendations for a select group of patients. Stage migration following the 2023 diagnostic criteria was observed in 12.7% of our cohort, which is highly consistent with rates reported in early studies assessing the adoption of the FIGO 2023 framework[15,16]. Crucially, all migration events corresponded to upstaging, indicating that the revised system may have greater sensitivity for identifying patients with high-risk disease features.

A key finding from our investigation was the prominent influence of the FIGO 2023 revision on patients who were initially diagnosed with stage I disease according to the FIGO 2009 criteria, among whom the bulk of stage migrations occurred. This shift was primarily driven by the reclassification of stage I disease as stage IIC due to substantial lymphovascular space invasion, a histological

Table 2. Comparison of stage distribution according to the FIGO 2009 and FIGO 2023 staging systems in patients with endometrial cancer (n=220)

FIGO 2009 stage	FIGO 2023 Stage I	FIGO 2023 Stage II	FIGO 2023 Stage III	FIGO 2023 Stage IV	Total
Stage I	132	14[a]	8[b]	0	154
Stage II	0	18	4[c]	0	22
Stage III	0	0	36	2[d]	38
Stage IV	0	0	0	6	6
Total	132	32	48	8	220

[a] Patients with stage IA-IB disease according to FIGO 2009 who were reclassified as stage IIC due to substantial lymphovascular space invasion (LVSI) according to the FIGO 2023 criteria
[b] Patients with aggressive histologic features or high-grade tumors reclassified into a higher stage according to FIGO 2023
[c] Patients initially classified as FIGO 2009 stage II who were reassigned to stage III due to updated lymph node involvement criteria
[d] Patients reclassified as stage IV according to revised definitions of distant metastatic disease in FIGO 2023
FIGO: International Federation of Gynecology and Obstetrics

Table 3. Impact of FIGO 2023 reclassification on adjuvant treatment strategies in patients with endometrial cancer (n=220)

Adjuvant treatment strategy	FIGO 2009 based n (%)	FIGO 2023 based n (%)	p-value
Observation only	98 (44.5%)	72 (32.7%)	<0.001
Vaginal brachytherapy (VBT)	54 (24.5%)	48 (21.8%)	0.312
Pelvic external beam radiotherapy (EBRT ± VBT)	42 (19.1%)	62 (28.2%)	0.004
Combined chemoradiotherapy	26 (11.8%)	38 (17.3%)	0.012

Changes in treatment strategy after reclassification were analyzed using the McNemar test. A p value <0.05 was considered statistically significant
EBRT: External beam radiation therapy, FIGO: International Federation of Gynecology and Obstetrics

Table 4. Stage migration after application of the FIGO 2023 staging system

Migration pattern	n (%)
No stage change	192 (87.3%)
Upstaging	28 (12.7%)
Downstaging	0

FIGO: International Federation of Gynecology and Obstetrics

feature that confers stage IIC status under the new guidelines. Many of these patients would have been categorized as low or intermediate risk under the older 2009 system. By accurately identifying this subgroup at elevated risk of recurrence, the updated classification enables patients likely to benefit from more aggressive adjuvant regimens to receive appropriate therapy.

One of the most consequential modifications implemented by the FIGO 2023 staging system is the formal inclusion of substantial lymphovascular space invasion as a defining criterion for stage IIC disease[10]. Lymphovascular space invasion has long been recognized as a potent prognostic factor in endometrial cancer, correlating strongly with lymph node metastasis, disease recurrence, and compromised survival outcomes[17,18]. Previous literature has demonstrated that patients with extensive lymphovascular space invasion experience clinical outcomes comparable to those with nodal involvement[19]. The high rate of stage migration in our cohort was primarily attributable to the presence of substantial lymphovascular space invasion, corroborating established observations. Consequently, the reclassification of these individuals from stage I under the FIGO 2009 criteria to stage IIC under the revised system had statistically and clinically meaningful effects on postoperative management.

Because treatment strategies in endometrial cancer are strictly dictated by stage and risk grouping, shifts in staging automatically reshape therapeutic recommendations[20,21]. Our data demonstrated a notable decline in observation protocols, with a concurrent increase in the use of pelvic radiotherapy and combined chemoradiotherapy after implementation of the FIGO 2023 staging system. These findings suggest that the updated staging framework provides more granular data regarding which patients stand to benefit from adjuvant management.

A major hallmark of the FIGO 2023 revision is the integration of newly characterized molecular classifications within the context of staging. These molecular subgroups, specifically POLE mutated and p53 abnormal tumors, carry profound prognostic value and have heavily advanced our understanding of endometrial cancer biology[9,22]. Nevertheless, routine molecular testing remains unavailable in many clinical settings globally. The current study utilized the alternative non-molecular staging algorithm, which accurately mirrored the clinical reality of numerous institutions worldwide. Ultimately, our findings suggest that the updated FIGO 2023 staging system refines risk stratification, even in the absence of molecular testing, by optimizing the utility of conventional pathological parameters such as lymphovascular space invasion and tumor histology. This approach ensures the early recognition of high-risk patients who would otherwise be misclassified as low-risk by purely anatomical staging systems.

In the broader clinical context, our results align well with established guidelines and historical landmark trials. The optimization of adjuvant therapy based on risk factors such as tumor grade and extension has been a cornerstone of gynecological oncology, as emphasized by classic consensus statements and clinical guidelines[3,23]. Historically, international multicenter trials like ASTEC and early PORTEC studies successfully defined the boundaries of observation versus localized interventions like vaginal brachytherapy or external beam radiotherapy in early stage diseases[24-26]. Furthermore, contemporary evidence suggests that while clinical staging guides current treatments, the transition toward personalized oncology through comprehensive molecular testing and advanced genomic profiling will ultimately dictate future selection strategies for both chemotherapy and radiation[27,28]. The integration of such risk stratification models into daily practice remains essential to prevent both overtreatment and recurrence[29].

Study Limitations

Several limitations of this study must be acknowledged. First, the retrospective design of the study carries an inherent risk of selection bias. Second, the data were gathered from a single tertiary referral center, which may limit the generalizability of our findings to other clinical settings. Third, routine molecular classification was unavailable during the study period, so staging relied on the alternative FIGO 2023 algorithm designed for non-molecular contexts. The integration of comprehensive molecular data could offer more refined risk stratification. Finally, long-term survival data were not evaluated in the current analysis. Prospective multicenter studies integrating both molecular staging and long-term survival analyses are warranted to fully validate the clinical utility of the updated FIGO staging system.

Conclusion

This study provides clinical validation of the FIGO 2023 staging system for patients with endometrial cancer, demonstrating clinically meaningful stage migration that directly impacts postoperative treatment strategies in a subset of this population. The integration of critical pathological parameters, particularly substantial lymphovascular space invasion, refines risk stratification and facilitates tailored patient management.

Ethics

Ethics Committee Approval: The Clinical Research Ethics Committee of University of Health Sciences Türkiye, Diyarbakır Gazi Yaşargil Training and Research Hospital approved the study protocol (approval number: 63, date: 12.02.2026).
Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: A.D.E., Concept: K.A., Design: A.D.E., Data Collection or Processing: K.A., Analysis or Interpretation: K.A., Literature Search: A.D.E., Writing: K.A.
Conflict of Interest: No conflict of interest was declared by the authors.
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