# Retrospective Evaluation of the Effects of the Old and New FIGO Staging System on Outcomes of the Endometrium Cancer Treatment

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## *Abstract*

**Objective:** The objective of our study was to compare survival rates using the International Federation of Gynecology and Obstetrics (FIGO) staging system from 1988 versus the one from 2009 in patients with endometrial cancer who underwent surgery and received postoperative radiotherapy.

**Methods:** A total of 297 patients with endometrial cancer admitted to our department between 1988 and 2008 were enrolled into our study. All 297 patients were staged according to both the 1988 and 2009 FIGO staging systems. We compared survival curves using the Kaplan–Meier method.

**Results:** The median age was 58 years. Histopathologically, all patients had endometrioid carcinoma. The median follow-up time was 69 months. The proportion of Stage I disease increased from 55.9% to 66.7%. There was no remarkable difference between the survival curves of the old Stage IA and the new one (p=0.338). However, the difference between the old and new Stages IB was significant (p=0.025). There was no remarkable survival difference between the old Stages IA and IB. In addition, Stage IIA and IIB patients had similar survival rates. When the patients with the old FIGO Stage I disease were reclassified, the 5-year overall survival rates for Stages IA and IB were 89.9% and 74.3%, respectively. Stage II disease decreased because 40.5% of Stage II patients migrated to new Stage I. Stage IIIC of the FIGO 1988 was recategorized as IIIC1 (n=25) or IIIC2 (n=12). The 5-year overall survival rate was 61.8% for Stage IIIC1, and 33.3% for Stage IIIC2, with a significant difference (p=0.025).

**Conclusion:** We found that the new FIGO 2009 staging system was highly prognostic compared with the FIGO 1988 system.

**Keywords:** Endometrial cancer, FIGO, staging system, postoperative radiotherapy, survival rate

## *Endometrium Kanserinde Eski ve Yeni FIGO Evrelemesinin Tedavi Sonuçları Üzerine Etkilerinin Retrospektif Olarak İrdelenmesi*

## *Öz*

**Amaç:** Çalışmamızın amacı, ameliyat sonrası radyoterapi alan endometriyum kanseri hastalarında FIGO evreleme sistemine 1988 ile 2009'a göre sağkalım oranlarını karşılaştırmaktı.

**Yöntemler:** Çalışmamıza 1988-2008 yılları arasında kliniğimize başvuran endometriyum kanserli toplam 297 hasta alındı. Bu 297 hastanın tamamı 1988 ve 2009 FIGO evreleme sistemlerine göre evrelendi. Sağkalım eğrileri Kaplan-Meier yöntemi kullanılarak karşılaştırıldı.

**Bulgular:** Hastaların ortalama yaşı 58 idi. Histopatolojik olarak tüm hastalarda endometrioid karsinom vardı. Ortalama takip süresi 69 aydı. Evre I hastalığı oranı % 55.9'dan % 66.7'ye yükseldiği görüldü. Eski evre IA ile yenisi arasındaki yaşam eğrileri arasında belirgin bir fark yoktu (p=0.338). Ancak eski ve yeni evre IB arasındaki fark anlamlıydı (p=0.025). Eski evre IA ve IB arasında belirgin bir sağkalım farkı yoktu. Ek olarak, evre IIA ve IIB hastaları benzer sağkalım eğrilerine sahipti. Eski FIGO evre I hastalığı olan hastalar yeniden sınıflandırıldığında, evre IA ve IB'de 5 yıllık genel sağkalım oranları sırasıyla %89.9 ve %74.3 idi. Evre II hasta sayısının, hastaların %40,5'inin yeni evre I'e aktarılması nedeniyle azaldığı görüldü. FIGO 1988'nin IIIC evresi IIIC1 (n=25) veya IIIC2 (n=12) olarak yeniden kategorize edildi. Beş yıllık genel sağkalım oranı evre IIIC1 için %61.8, evre IIIC2 için %33.3 idi ve anlamlı bir sağkalım farkı vardı (p=0.025).

**Sonuç:** Çalışmamızda, yeni FIGO 2009 evreleme sisteminin FIGO 1988 sistemine göre oldukça prognostik olduğunu bulduk.

**Anahtar Sözcükler:** Endometrial karsinom, FIGO, evreleme sistemi, ameliyat sonrası radyoterapi, sağkalım

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Staging, in short, can be defined as determining the extent of the disease spread in patients with cancer. A complete and accurate staging during the initial diagnosis gives an idea of the prognosis. It also plays an important role in the selection of the most appropriate treatment. Endometrial cancer staging has

been developed under the leadership of the International Federation of Gynecology and Obstetrics (FIGO) over the years. FIGO adopted the clinical staging in 1971, made a surgical-pathological staging in 1988, and the recent developments were made in 2009 [1-5]. In our study, we retrospectively compared the new FIGO staging system with the old one regarding the outcomes and survival rates of the patients with endometrial cancer treated with postoperative radiotherapy.

## Material and Methods

We conducted the study in our Department of Radiation Oncology between 1998 and 2008. A total of 302 patients with endometrial cancer were enrolled. We excluded 5 of them because of non-endometrioid histopathologic diagnosis. Histopathologically, all patients had endometrioid carcinoma. Patients were referred to our clinic from different centers postoperatively. Postoperative treatments were determined according to the stage and risk groups and applied as per our clinical protocols [6]. Pelvic radiotherapy was planned as the standard four-fields box technique. External pelvic radiotherapy total dose (45–50.4 Gy) was applied as the conventional daily fraction dose of 1.8 Gy. For intravaginal irradiation, double ovoid or cylindrical applicators were used. The total dose was calculated at the depth of 0.5 cm from the vaginal mucosa. The doses of brachytherapy were 15 Gy in three fractions in patients who underwent pelvic irradiation, and 21 Gy in three fractions in patients who underwent only brachytherapy. For para-aortic irradiation, the total dose was 45 Gy. The fraction dose was 1.5–1.8 Gy. Patients were followed every 3 months during the first 2 years after the treatment, then every 6 months during the following 3 years, and then once a year after the 5th year. All 297 patients were staged according to both the 1988 and 2009 FIGO staging systems. We compared the survival curves using the Kaplan–Meier method. We used athe log-rank test and accepted p-values <0.05 as statistically significant.

**Table 1.** Characteristics of patients and used treatment algorithms

| Variable | Subgroup | n | % |
|---|---|---|---|
| Age | <60 years | 174 | 58.6 |
| | ≥60 years | 123 | 41.4 |
| Grade | I | 145 | 48.8 |
| | II | 118 | 39.7 |
| | III | 29 | 9.8 |
| | X* | 5 | 1.7 |
| Myometrial invasion | <1/2 | 118 | 39.7 |
| | ≥1/2 | 179 | 60.3 |
| Node positivity | Only pelvic | 25 | 8.4 |
| | Pelvic+para-aortic | 11 | 3.7 |
| | Only para-aortic | 1 | 0.3 |
| Type of hysterectomy | I** | 137 | 46.1 |
| | II*** | 60 | 20.2 |
| | III**** | 100 | 33.7 |
| Radiotherapy | Only EPRT | 11 | 3.7 |
| | EPRT+BT | 209 | 70.4 |
| | Only BT | 65 | 21.9 |
| | EPRT+PaRT+BT | 12 | 4 |

BT: Brachytherapy; EPRT: External pelvic radiotherapy; PaRT: Para-aortic radiotherapy
*Grade X for the grade that cannot be evaluated
**Total abdominal hysterectomy and bilateral salpingo-oophorectomy
***Total abdominal hysterectomy and bilateral salpingo-oophorectomy and pelvic and/or para-aortic lymph node dissection
****Total abdominal hysterectomy and bilateral salpingo-oophorectomy and pelvic and/or para-aortic lymph node dissection and peritoneal washing cytology

## Results

The median age of patients was 58 years (mean, 58.6±8.9 years; 95% confidence interval [CI], 57.6–59.6). Most of the patients (48.8%) had Grade 1 tumor. Characteristics of patients are presented in Table 1. The median follow-up time was 69 months (mean, 72.8±38.5 months; 95% CI, 68.5–77.2). The total number of patients and 5-year overall survival rates (%) according to the new FIGO staging system were as follows: Stage IA 85 (89.9%), IB 113 (74.3%), II 42 (72.1%), IIIA 19 (62.2%), IIIB 0 (-), IIIC1 25 (61.8%), IIIC2 12 (33.3%), IVA 0 (-), and IVB 1 (0%) patients (Table 2).

The distribution of the patients according to the old and new FIGO staging system revealed that the majority of cases in the new Stage IA came from the old Stage IB (Table 3). Twenty-eight patients with old Stage II changed to Stages IA (n=12; 42.9%) and IB (n=16; 57.1%). A total of 37 patients in Stage IIIC were recategorized as Stage IIIC1 (n=25; 67.6%) and Stage IIIC2 (n=12; 32.4%) (Table 3). These 12 patients were in IIIC2 due to the para-aortic lymph node involvement. Eleven (91.7%) of them had also the pelvic lymph node positivity, while 1 (8.3%) of them had none. Stage IIIA (n=5/24) with affirmative peritoneal cytology only was reclassified as IB (n=4) or II (n=1). Stage IIIA (n=19) was recategorized as IIIA. There were no patients in Stage IVA, but 1 patient was in IVB due to the pubic

**Table 2.** Distribution of patients according to FIGO 1988 and 2009

| | | FIGO 2009 | | FIGO 2009 | |
|---|---|---|---|---|---|
| **Stage** | | **n** | **(%)** | **n** | **(%)** |
| I | | 166 | (55.9) | 198 | (66.7) |
| | A | 4 | (1.4) | 85 | (28.6) |
| | B | 69 | (23.2) | 113 | (38.1) |
| | C | 93 | (31.3) | - | - |
| II | | 69 | (23.2) | 42 | (14.1) |
| | A | 28 | (9.4) | - | - |
| | B | 41 | (13.8) | - | - |
| III | | 61 | (20.6) | 56 | (18.9) |
| | A | 24 | (8.1) | 19 | (6.4) |
| | B | 0 | (0) | 0 | (0) |
| | C | 37 | (12.5) | - | - |
| | C1 | - | - | 25 | (8.4) |
| | C2 | - | - | 12 | (4.1) |
| IV | | 1 | (0.3) | 1 | (0.3) |
| | A | 0 | (0) | 0 | (0) |
| | B | 1 | (0.3) | 1 | (0.3) |
| TOTAL | | 297 | (100) | 297 | (100) |

bone metastasis, who was also recategorized to Stage IVB. All patient staging changes are demonstrated in Table 3.

The 5-year overall survival rates of patients according to both staging systems are summarized in Table 4. Overall, the proportion of Stage I disease increased from 55.9% to 66.7% by 2009 staging. There was no remarkable difference between the survival curves of the old Stage IA and the new one (p=0.338; 100% and 89.9%, respectively) (Figure 1). The difference between the old and new Stage IB was significant (p=0.025; 91% and 74.3%, respectively) (Figure 2). There was no

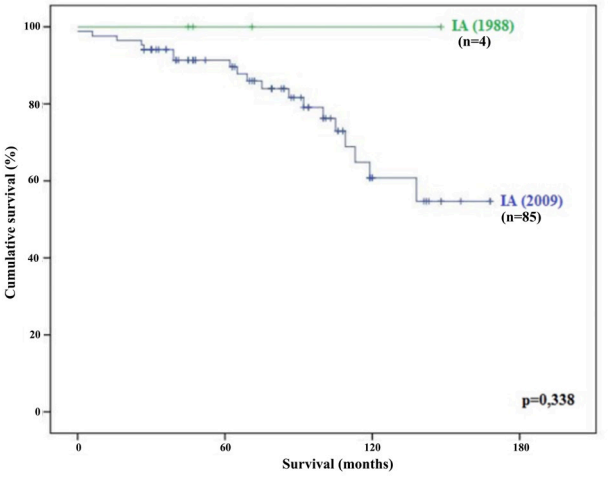


**Figure 1.** Kaplan–meier overall survival rates of patients in stage IA of FIGO 1988 and 2009

**Table 3.** Rearrangement of patients between FIGO 1988 and 2009

| | | FIGO 2009 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **IA** | **IB** | **II** | **IIIA** | **IIIC1** | **IIIC2** | **IVA** | **IVB** | **Total** |
| FIGO 1988 | | | | | | | | | | |
| | IA | 4 | - | - | - | - | - | - | - | 4 |
| | IB | 69 | - | - | - | - | - | - | - | 69 |
| | IC | - | 93 | - | - | - | - | - | - | 93 |
| | IIA | 12 | 16 | - | - | - | - | - | - | 28 |
| | IIB | - | - | 41 | - | - | - | - | - | 41 |
| | IIIA | - | 4 | 1 | 19 | - | - | - | - | 24 |
| | IIIB | - | - | - | - | - | - | - | - | 0 |
| | IIIC | - | - | - | - | 25 | 12 | - | - | 37 |
| | IVA | - | - | - | - | - | - | - | - | 0 |
| | IVB | - | - | - | - | - | - | - | 1 | 1 |
| | Total | 85 | 113 | 42 | 19 | 25 | 12 | 0 | 1 | 297 |

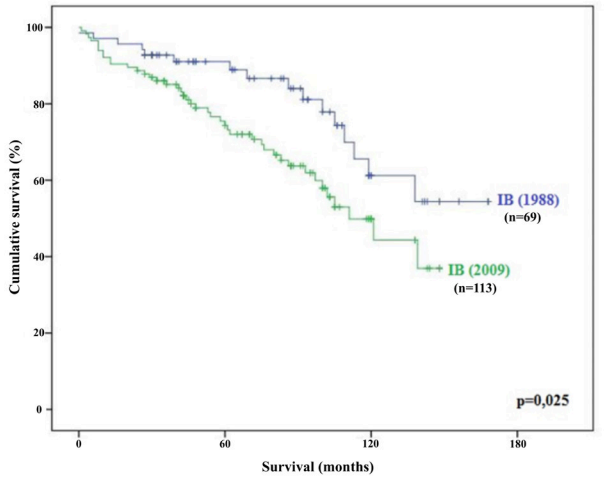


**Figure 2.** Kaplan–meier overall survival rates of patients in stage IB of FIGO 1988 and 2009

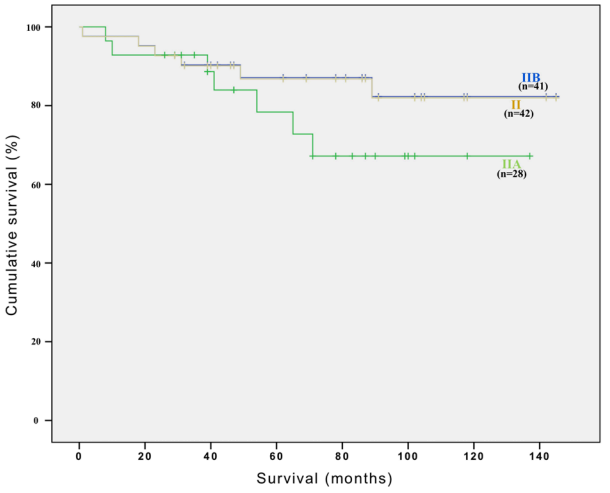


**Figure 3.** Kaplan–meier overall survival rates of patients in stages IIA and IIB of FIGO 1988 and stage II of FIGO 2009

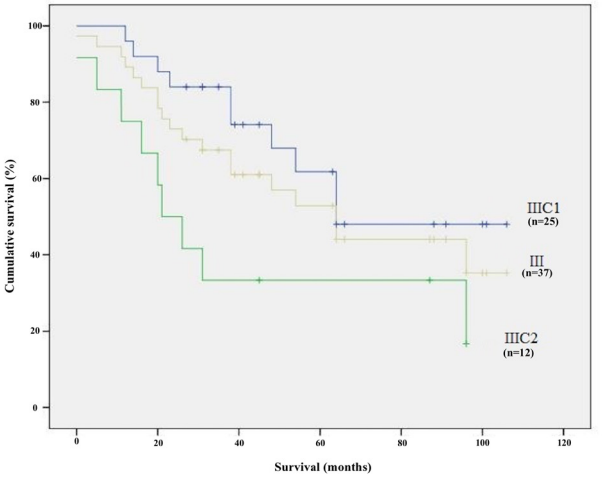


**Figure 4.** Kaplan–meier overall survival rates of patients in stages III C1 and III C2 of FIGO 2009 and stage IIIC of FIGO 1988

remarkable survival difference between the old Stages IA and IB. In addition, Stages IIA and IIB had similar survival rates (Figure 3). When the patients with the old FIGO Stage I disease were reclassified, the 5-year overall survival rates for Stages IA and IB were 89.9% and 74.3%, respectively. The 5-year survival rate was 61.8% for IIIC1 and 33.3% for IIIC2. There was a significant difference between the survival curves of these two groups (p=0.025) (Figure 4).

## Discussion

A multidisciplinary approach is vital in the management of oncologic diseases. All team members of the oncology team use a common language with the help of the staging systems. As part of the dynamism of oncology, the changing and evolving treatment options make the development of staging systems vital. In 1980, Aalders and colleagues researched the contribution of radiotherapy in the early-stage endometrial cancer. They investigated the adjuvant treatment and grade selection, as well as some prognostic factors, based on the depth of myometrial invasion [7]. As a result, FIGO began to use a new clinical-surgical-pathological staging system [8]. New parameters included the depth of myometrial invasion, peritoneal cytology, and lymph node, cervical, and adnexial invasions [9, 10]. During over 20 years, the FIGO 1988 staging system was eval-

**Table 4.** Results of 5-year kaplan–meier overall survival rates of FIGO staging systems 1988 and 2009

| | | FIGO 1988 | | FIGO 2009 | |
|---|---|---|---|---|---|
| **Stage** | | **(n/total)*** | **%** | **(n/total)*** | **%** |
| I | A | (4/4) | 100 | (77/85) | 89.9 |
| | B | (63/69) | 91 | (88/113) | 74.3 |
| | C | (73/93) | 76.7 | - | - |
| II | | - | - | (30/42) | 72.1 |
| | A | (22/28) | 75.2 | - | - |
| | B | (31/41) | 71.9 | - | - |
| III | A | (16/24) | 63.8 | (13/19) | 62.2 |
| | B | 0 | 0 | 0 | 0 |
| | C | (21/37) | 52.9 | - | - |
| | C1 | - | - | (17/25) | 61.8 |
| | C2 | - | - | (4/12) | 33.3 |
| IV | A | 0 | 0 | 0 | 0 |
| | B | (0/1) | 0 | (0/1) | 0 |

*Survivors/total number of patients

uated for the accuracy and usefulness. The 1988 FIGO staging system was re-adopted in 2009. This system used new data of local and general survival factors, the results of survival analyses, and the treatment results [1-5, 10]. Four important changes in staging of endometrial cancer have been made as a result of annual reports and published studies [11-15]. According to these major changes, stages that were previously classified as IA and IB were combined as IA, and Stage IC was regrouped as Stage IB. After the 23rd annual report of FIGO, data of 42,000 cases were reviewed for staging. They found the 5-year survival rates for Stages IA Grade 1, IA Grade 2, IB Grade 1, and IB Grade 2 as 93.4%, 91.6%, 91.3%, and 93.4%, respectively. They found no significant difference between these groups [5, 16, 17]. Sharyn and colleagues found in their study that patients with the FIGO 1988 Stages IA and IB had 5-year survival rates of 89% and 91%, respectively [18]. They also found similar results for Stages IA and IB Grade 3 subgroups (Stage $IA_{1988}$ Grade 3, 80%; Stage $IB_{1988}$ Grade 3, 81%) [18]. According to the analyses of these subgroups, the FIGO 1988 Stages IA and IB were merged under the name Stage IA in FIGO 2009. In our study, 5-year survival rates for Stages IA and IB were 100% and 91%, respectively. The reason for the dissimilarity of these results compared with the literature came from the small number of patients classified as Stage IA in our study (4 cases). The Postoperative Radiation Therapy in Endometrial Carcinoma trial reported 5-year survival rates for patients with Stages IB G2, IB G3, IC G1, IC G2, and IC G3 disease as 86%, 74%, 83%, 85%, and 58%, respectively [19]. Therefore, it is important to keep in mind that prognoses can differ dramatically across subgroups within Stage I.

According to the FIGO 1988, Stage II disease was divided into two subtypes: $IIA_{1988}$, with the tumor limited to the cervical glands, and $IIB_{1988}$, with the cervical stromal tissue invasion. However, there were controversial opinions about the prognostic value of glandular involvement [18]. The subgroup analysis showed a worse prognosis in $IIB_{1988}$, and it found similar prognosis in Stages I and IIA. These data also showed that the glandular involvement had less of a prognostic value when compared with the depth of myometrial invasion and grading [14, 20]. In the light of these results, the endocervical stromal invasion was named as Stage II. In our study, 5-year survival rates for Stages IIA and IIB was 75.2% and 71.9%, respectively. The survival rates for Stages $IC_{1988}$ and $IIA_{1988}$ did not differ significantly (p=0.862), and they were consistent with the literature. Stage $IIIA_{1988}$ consisted of a heterogeneous group such as adnexial and/or serosal involvement and abdominal lavage positivity (ALP). The rate of ALP in Stage I or II ranged between 3% and 30% [20]. Recent studies showed that ALP (FIGO 1988 Stage IIIA) is not an independent prognostic risk factor and that it had similar results with Stage IA [21-25]. In our study, there were only 5 patients who were in Stage IIIA with ALP alone. All these patients were treated with both internal and external radiation therapy. Four them were Stage $IB_{2009}$, and 1 of them was Stage $II_{2009}$. A total number of 19 patients with adnexial and/or serosa involvement were Stage $IIIA_{2009}$. When comparing the 5-year survival rates, there was no significant difference between the Stage $IIIA_{1988}$ and $IIIA_{2009}$ groups. Although the new FIGO staging system does not contain ALP as staging criteria, surgical pathology reports are thought to be necessary, because it is still accepted as an independent risk factor. These records will also be valuable for data collection for further researches. Lymphatic invasion in endometrial cancer first occurs in pelvic lymph nodes (PeLN), and then para-aortic lymph nodes (PaLN). The PaLN involvement without PeLN is rare. Studies showed very different effects of PeLN and PaLN in endometrial cancer on the prognosis and survival. Previous studies showed that the 5-year survival rate of patients with PeLN was 70%–80%, while for those with Plan, it was 30%–40% [26-28]. Patients with PeLN metastases alone have a better prognosis than those with both PeLN and PaLN metastases [29-33]. Because of the difference in 5-year survival rates of PeLN and PaLN, the patients were classified in different subgroups in the FIGO 2009 staging system. PeLN was staged as IIIC1 and PaLN staged as IIIC2 (whether positive or negative pelvic lymph node). In our study, we found a significant difference in between survival rates of stages IIIC1 and IIIC2 in accordance with the literature (p=0.025). Separate evaluations of the group of PeLN and Plan, in accordance with the FIGO 2009 staging system, will change our clinical further approaches in the assessment of patients for treatment and survival. The necessity of different treatment modalities for stage IIIC2 should be considered.

Although the endometrial cancer is the most common gynecologic cancer, optimal treatment is still controversial. This is based on the presence of a large number of prognostic factors that affect the biological behavior of the tumor. Especially the early-stage endometrial cancer recurrence remains unexplained. Researchers try to find new prognostic factors and markers. Today, oncogenes, and ploidy effects on molecular markers, are still under investigation. This type of research will lead to the emergence of gene-specific therapies. An ideal staging system helps to avoid unnecessary adjuvant therapy by guiding the clinician in the selection of the treatment. This will minimize the overtreatment and toxicity. A good staging system should be consisted of three main features: validity, re-

liability, and practicality. By using such a staging system, clinicians can make treatment plans and evaluate the results of treatment. It also brings a standard in sharing the information between health care centers. Oncology is a dynamic branch of science. Staging systems must be continuously revised in the light of these changes. For this reason, to keep pace with scientific development, updated staging systems are mandatory. A new FIGO staging system that was introduced in 2009 had high prognostic features in the prediction of endometrial cancer survival. Furthermore, multi-center studies are going to show us more clearly its real reliability in the prediction of survival.

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