TÜRK JİNEKOLOJİK ONKOLOJİ DERGİSİ
2026, VOL. 26 NO. 1, 25-30
https://doi.org.10.59215/trsgo.1913433

ORIGINAL ARTICLE/ORİJİNAL MAKALE

Conversion from Laparoscopy to Laparotomy in Endometrial Cancer Surgery: A 10-Year Retrospective Analysis of Intraoperative Factors in a Tertiary Center

Endometriyal Kanser Cerrahisinde Laparoskopiden Laparotomiye Geçiş: Tersiyer Bir Merkezde İntraoperatif Faktörlerin 10 Yıllık Retrospektif Analizi

Müge Ateş Tıkız[1] Okan Efe[1] Elif Iltar[1] Fatma Ceren Güner[2]
Hasan Aykut Tuncer[1] Selen Doğan[1] Tayup Şimşek[1]

[1]Division of Gynecologic Oncology, Department of Gynecology and Obstetrics, Akdeniz University, Antalya, Turkiye
[2]Clinic of Gynecologic Oncology, Isparta City Hospital, Ministry of Health, Isparta, Turkiye

ABSTRACT

Background: Minimally invasive surgery (MIS) is the standard approach for surgical staging in endometrial cancer (EC), offering reduced blood loss, lower perioperative morbidity, and shorter hospital stay compared with laparotomy. Despite these advantages, intraoperative conversion to open surgery remains a clinically significant event that may compromise the benefits of MIS and reflect underlying surgical or disease-related challenges. This study aimed to evaluate the incidence and intraoperative factors associated with conversion in a tertiary referral center.

Methods: This retrospective cohort study included 181 patients with histologically confirmed EC who underwent planned laparoscopic surgical staging between January 2015 and December 2024. Conversion was defined as any unplanned transition from laparoscopy to laparotomy. Demographic, clinical, and intraoperative variables were analyzed, and factors associated with conversion were explored.

Results: The overall conversion rate was 7.2% (n = 13), consistent with previously reported rates in the literature. The leading cause of conversion was intraoperative hemorrhage (30.8%), followed by advanced disease or unexpected metastatic spread (23.1%), technical difficulties including dense adhesions (23.1%), and anesthesia-related complications such as respiratory intolerance (23.1%). Patients requiring conversion had significantly higher body mass index (BMI) values compared with those who completed laparoscopy ($p < 0.05$). Advanced FIGO stage and increased intraoperative complexity appeared to be associated with conversion.

Conclusions: Conversion is primarily driven by intraoperative challenges related to bleeding, disease extent, and patient-specific factors such as obesity. Importantly, conversion should be regarded as a safety-oriented clinical decision aimed at optimizing surgical and oncologic outcomes rather than a surgical failure.

Keywords: Conversion to laparotomy, Endometrial cancer, Intraoperative factors, Laparoscopy

ÖZET

Amaç: Minimal invaziv cerrahi (MİC), endometriyal kanserde cerrahi evreleme için standart yaklaşım olup laparotomiye kıyasla daha az kan kaybı, daha düşük perioperatif morbidite ve daha kısa hastanede kalış süresi sağlamaktadır. Bununla birlikte, intraoperatif olarak açık cerrahiye geçiş, MİC'in avantajlarını azaltabilecek ve altta yatan cerrahi ya da hastalığa bağlı zorlukları yansıtan klinik açıdan önemli bir durumdur. Bu çalışmanın amacı, tersiyer bir merkezde konversiyon sıklığını ve intraoperatif ilişkili faktörleri değerlendirmektir.

Yöntem: Bu retrospektif kohort çalışmaya, Ocak 2015 – Aralık 2024 tarihleri arasında laparoskopik cerrahi evreleme planlanan, histolojik olarak doğrulanmış 181 endometriyal kanser hastası dahil edildi. Konversiyon, laparoskopiden laparotomiye plansız geçiş olarak tanımlandı. Demografik, klinik ve intraoperatif veriler analiz edildi ve konversiyon ile ilişkili faktörler araştırıldı.

Bulgular: Toplam konversiyon oranı %7,2 (n = 13) olarak saptandı ve literatürle uyumlu bulundu. En sık konversiyon nedeni intraoperatif kanama (%30,8) olup bunu ileri evre hastalık veya beklenmeyen metastatik yayılım (%23,1), yoğun adezyonlar gibi teknik zorluklar (%23,1) ve anesteziye bağlı komplikasyonlar (%23,1) izledi. Konversiyon gelişen hastalarda vücut kitle indeksi (VKİ) anlamlı derecede daha yüksek bulundu ($p < 0,05$). İleri FIGO evresi ve artmış intraoperatif kompleksite de konversiyon ile ilişkili görünmektedir.

Sonuç: Laparoskopik cerrahi endometriyal kanser evrelemesinde güvenli ve etkili bir yöntemdir. Konversiyon çoğunlukla kanama, hastalık yaygınlığı ve obezite gibi hasta faktörlerine bağlı intraoperatif zorluklardan kaynaklanmaktadır. Konversiyon, cerrahi başarısızlık olarak değil, hasta güvenliği ve optimal onkolojik sonuçlar için alınan klinik bir karar olarak değerlendirilmelidir.

Anahtr Kelimeler: Laparotomiye konversiyon, Endometriyal kanser, İntraoperatif faktörler, Laparoskopi

ARTICLE HISTORY
Recieved 20.03.2026
Accepted 22.04.2026

Correspondence: Müge Ateş Tıkız, Division of Gynecologic Oncology, Department of Gynecology and Obstetrics, Akdeniz University, 07070 Antalya, Turkey. E-mail: muge_ates@hotmail.com

Cite this Article: Tıkız MA, Efe O, Iltar E, Güner FC, Tuncer HA, Dogan S, Şimşek T. Conversion from Laparoscopy to Laparotomy in Endometrial Cancer Surgery: A 10-Year Retrospective Analysis of Intraoperative Factors in a Tertiary Center. The Turkish Journal of Gynecologic Oncology 2026;26(1):25-30.

INTRODUCTION

Endometrial cancer (EC) is the most prevalent gynecologic malignancy in developed nations, with its incidence steadily rising due to the global epidemic of obesity and metabolic syndromes (1,2). Surgical staging is the cornerstone of EC management, providing critical prognostic data that guides adjuvant treatment decisions, such as chemotherapy and radiation (3).

Over the last two decades, the surgical paradigm has shifted from traditional laparotomy to minimally invasive surgery (MIS). High-level evidence from landmark randomized controlled trials, notably the GOG-LAP2 and LACE trials, has established that MIS offers oncologic outcomes equivalent to open surgery (4,5). Furthermore, MIS provides significant perioperative benefits, including reduced intraoperative blood loss, lower rates of surgical site infections, shorter hospital stays, and faster return to daily activities (6,7). This approach is particularly advantageous for obese patients, as it minimizes wound complications and postoperative morbidity associated with large abdominal incisions (7,8).

Despite these advantages, the inability to complete the procedure laparoscopically—necessitating an intraoperative conversion to laparotomy—remains a significant clinical challenge. Conversion rates reported in the literature vary widely, ranging from 3.4% to as high as 25%, depending on the study population and surgical complexity (4,9). Conversion should not be viewed as a surgical failure but as a prudent, safety-driven decision aimed at ensuring oncologic adequacy and protecting the patient from complications (5,10).

Previous research has identified several preoperative risk factor for conversion, such as morbid obesity (BMI ≥40 kg/m²), advanced patient age, and increased uterine weight (specifically >250g) (9,11). However, the impact of real-time intraoperative factors—such as respiratory intolerance to the Trendelenburg position, dense pelvic adhesions, and unexpected metastatic spread—remains less clearly defined in current literature (9,12,13). Furthermore, there is a need for more data from high-volume tertiary referral centers, where the management of complex cases may yield different determinants for conversion (9,14).

Therefore, this study aimed to evaluate the incidence of conversion from laparoscopy to laparotomy and to systematically analyze the intraoperative factors associated with conversion in patients undergoing surgical staging for EC over a 10-year period in a tertiary care center.

MATERIALS AND METHODS

Study Design and Population

This retrospective cohort study was conducted at a tertiary gynecologic oncology center and included 181 consecutive patients with histologically confirmed endometrial cancer (EC) scheduled for laparoscopic surgical staging between January 2015 and December 2024. The study was approved by the institutional ethics committee (Approval No: 29.05.2025/533) and followed the principles of the Declaration of Helsinki.

Inclusion and Exclusion Criteria

The study included women with biopsy-proven EC who were initially planned for minimally invasive surgical staging. Exclusion criteria consisted of patients with incomplete clinical or perioperative records, those who underwent primary laparotomy, and patients whose surgeries were initiated with a robotic platform to maintain consistency in the laparoscopic

cohort.

Data Collection

Clinical, demographic, and perioperative data were systematically retrieved from electronic medical records and operative reports. Demographic variables included age and body mass index (BMI). Clinical data encompassed medical history, history of prior abdominal surgery, and preoperative laboratory values. Intraoperative findings such as estimated blood loss (EBL), operative time, and uterine weight (≥250 g) were also recorded.

Outcome Measure

The primary outcome was intraoperative conversion from laparoscopy to laparotomy, defined as any unplanned transition to an open surgical approach after the initiation of laparoscopy. Indications for conversion—including unexpected metastatic spread, extensive adhesions, or anesthesia-related complications—were analyzed descriptively.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics (Version 26, IBM Corp., Armonk, NY, USA). Continuous variables were assessed for normality using appropriate methods. Parametric data were analyzed using the Student's t-test, while non-parametric data were analyzed using the Mann–Whitney U test. Categorical variables were compared using the Pearson chi-square test or Fisher's exact test, as appropriate. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 181 patients were included in the analysis. The mean age was 62.4 ± 8.2 years, and the mean BMI was 32.1 ± 4.5 kg/m².

Conversion to laparotomy occurred in 13 patients, corresponding to a rate of 7.2%. Patients in the conversion group had higher BMI values compared with those who completed laparoscopic surgery, whereas no statistically significant difference was observed in age distribution between the groups.

The distribution of reasons for conversion is summarized in **Table 1 (Figure 1)**. The majority of conversions were attributed to surgery-related causes (10/13, 76.9%), while anesthesia-related causes accounted for 23.1% (3/13). Intraoperative bleeding with difficulty in achieving hemostasis was the most common reason for conversion (4/13, 30.8%). Advanced-stage disease or intraoperatively detected malignant spread was observed in three cases (23.1%). Technical difficulties, defined as intraoperative challenges such as dense adhesions, limited visualization, or anatomical variations that hindered safe laparoscopic progression, were observed in three patients (23.1%).

Table 1. Reasons for conversion from laparoscopy to laparotomy in patients with endometrial cancer

Reason for Conversion	n	%
Intraoperative hemorrhage	4	30.8
Advanced disease / metastatic spread	3	23.1
Technical difficulties (adhesions)	3	23.1
Anesthesia-related complications	3	23.1
Total	**13**	**100**

Anesthesia-related causes were observed in three patients (23.1%), all associated with

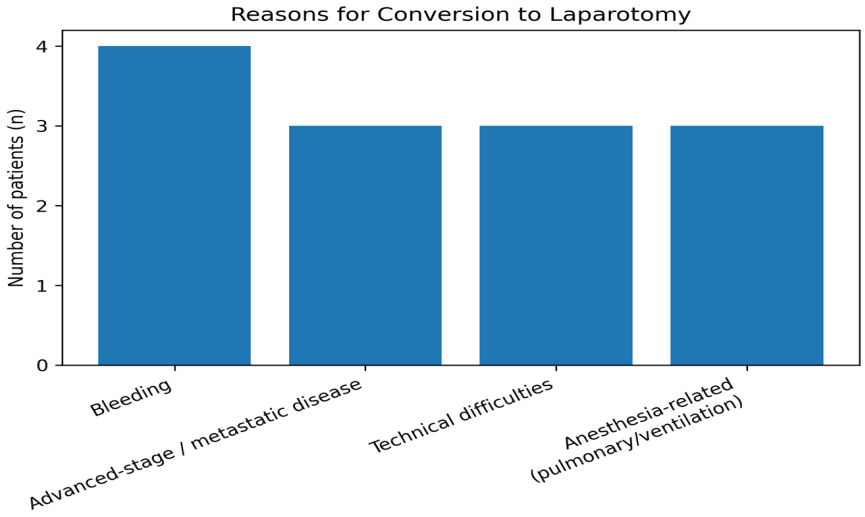

Figure 1. Reasons for conversion from laparoscopy to laparotomy in patients with endometrial cancer (n = 13)

pulmonary complications or ventilation difficulties.

DISCUSSION

In this 10-year single-center cohort, the conversion rate from laparoscopy to laparotomy was 7.2%. This rate is consistent with contemporary reports, including pooled estimates of approximately 6% in recent meta-analyses (4), and significantly lower than the 25.8% reported in the landmark GOG-LAP2 trial (7,16). This decline likely reflects substantial improvements in surgical expertise, optimized perioperative management, and advancements in minimally invasive techniques and instrumentation over time.

Patients requiring conversion demonstrated higher BMI values compared with those who completed laparoscopic surgery; however, this finding should be interpreted with caution given the limited number of events and the descriptive nature of the analysis. Increased BMI may reflect a higher likelihood of intraoperative challenges, such as limited visualization or reduced instrument maneuverability, rather than serving as a direct cause of conversion. Therefore, preoperative factors such as obesity should be considered indirect contributors that may predispose patients to intraoperative difficulties, rather than independent determinants of conversion. Increased visceral adiposity can obscure critical anatomical landmarks, limit visualization, and impair instrument maneuverability, thereby escalating surgical complexity (7). Literature suggests that for every unit increase in BMI, the risk of conversion to laparotomy rises by approximately 20% (4).

Intraoperative hemorrhage emerged as the leading indication for conversion (30.8%). Bleeding, particularly during retroperitoneal dissection or lymphadenectomy, can rapidly compromise the visual field, making safe continuation difficult and necessitating prompt conversion to ensure adequate hemostasis and patient safety (16). In this context, surgical complexity, defined as intraoperative conditions such as extensive adhesions, advanced disease burden, and intraoperative bleeding that increase procedural difficulty and impair safe laparoscopic progression, plays a critical role in conversion decisions. Therefore, conversion

A key contribution of the present study is the emphasis on intraoperative determinants. While prior research has largely focused on preoperative predictors, our findings highlight the importance of real-time intraoperative assessment. From a clinical perspective, an integrative risk assessment framework incorporating both preoperative factors (e.g., BMI, disease extent, surgical history) and intraoperative findings (e.g., bleeding, adhesions, ventilation challenges) may facilitate timely and safety-oriented decisions (7,13). Conceptualizing a dynamic scoring model—where intraoperative findings continuously update the risk—may help define the optimal point at which conversion becomes the safer surgical strategy.

Limitations

This study has several limitations. First, its retrospective design introduces potential selection bias and limits the ability to establish causal relationships. Second, the relatively small number of conversion events (n = 13) restricts statistical power and limits the ability to perform robust multivariable analyses. Third, as a single-center study, the findings—particularly regarding specific intraoperative triggers—may not be fully generalizable to other institutions with different surgical volumes or technical settings. Nevertheless, the extended 10-year study period provides valuable real-world insights into the intraoperative determinants of conversion in a specialized tertiary care setting.

CONCLUSİON

Laparoscopic surgery remains a safe and effective approach for surgical staging in endometrial cancer, characterized by a low conversion rate that aligns with contemporary literature. Our findings indicate that conversion is primarily associated with intraoperative challenges—such as hemorrhage, disease extent, and anesthesia-related factors—which may not always be fully anticipated by preoperative risk assessment alone.

These results underscore the importance of a dynamic and integrative intraoperative decision-making approach. Our findings suggest that structured, risk-based strategies—continuously updated with real-time surgical findings—may support timely conversion decisions. Viewing conversion as a proactive safety measure rather than a complication is essential to preserve oncologic adequacy and optimize patient outcomes in minimally invasive gynecologic oncology.

ACKNOWLEDGEMENT

Ethics Committee Approval

The study was approved by the institutional ethics committee (Approval No: 29.05.2025/533) and followed the principles of the Declaration of Helsinki.

Author Contributions:

MAT, OE,EI, FCG, HAT, SD, TŞ : Conception and design, writing the article, acquisition of data, statistical analysis, acquisition of data, editing the article, conception and design, editing the article, statistical analysis, critical revision of the manuscript, control/supervision, All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Conflict of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

Funding

The authors did not receive support from any organization for the submitted work.

Data Availability

Data are available from the lead authors with the permission of Afyonkarahisar State Hospital, Afyonkarahisar, Turkiye.

REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):209-49.
2. Mahdy H, Vadakekut ES, Crotzer D. Endometrial cancer. [Updated 2024 Apr 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026.
3. Koh WJ, Abu-Rustum NR, Bean S, et al. Uterine neoplasms, version 1.2018, NCCN clinical practice guidelines in oncology. J Natl Compr Canc Netw. 2018;16(2):170-99.
4. Walker JL, Piedmonte MR, Spirtos NM, et al. Laparoscopy compared with laparotomy for comprehensive surgical staging of uterine cancer: Gynecologic Oncology Group Study LAP2. J Clin Oncol. 2009;27(32):5331-6.
5. Janda M, Gebski V, Brand A, et al. Quality of life after total laparoscopic hysterectomy versus total abdominal hysterectomy for stage I endometrial cancer (LACE): a randomised trial. Lancet Oncol. 2010;11(8):772-80.
6. Kim SI, Park DC, Lee SJ, et al. Minimally invasive surgery for patients with advanced stage endometrial cancer. Int J Med Sci. 2021;18(5):1153-8.
7. Yousif A, Ngo J, Abdel-Gadir D, Rocconi RP, et al. Conversion from minimally invasive surgical approaches to open surgery among patients with endometrial cancer in the SGO Clinical Outcomes Registry. Ann Surg Oncol. 2025;32(5):3458-64.
8. Cusimano MC, Simpson AN, Dossa F, et al. Laparoscopic and robotic hysterectomy in endometrial cancer patients with obesity: a systematic review and meta-analysis of conversions and complications. Am J Obstet Gynecol. 2019;221(5):410-28.e19.
9. Matsuo K, Jung CE, Hom MS, et al. Predictive factor of conversion to laparotomy in minimally invasive surgical staging for endometrial cancer. Int J Gynecol Cancer. 2016;26(2):290-300.
10. Dinoi G, Tarantino V, Bizzarri N, et al. Robotic-assisted versus conventional laparoscopic surgery in the management of obese patients with early endometrial cancer in the sentinel lymph node era: a randomized controlled study (RObese). Int J Gynecol Cancer. 2024;34(5):773-6.
11. Lamersdorf L, Tahmasbi Rad M, Karn T, et al. Predictive factors for conversion to laparotomy in women undergoing laparoscopic hysterectomy: a re-evaluation of clinicopathological factors in the era of minimally invasive gynaecology. Facts Views Vis Obgyn. 2024;16(2):185-93.
12. Jones N, Fleming ND, Nick AM, et al. Conversion from robotic surgery to laparotomy: a case-control study evaluating risk factors for conversion. Gynecol Oncol. 2014;134(2):238-42.
13. Kaya AC, Radosa MP, Zimmermann JSM, et al. Intraoperative and postoperative complications of gynecological laparoscopic interventions: incidence and risk factors. Arch Gynecol Obstet. 2021;304(5):1259-69.
14. Palomba S, Ghezzi F, Falbo A, et al. Laparoscopic versus abdominal approach to endometrial cancer: a 10-year retrospective multicenter analysis. Int J Gynecol Cancer. 2012;22(3):425-33.
15. Uwins C, Patel H, Prakash Bhandoria G, et al. Laparoscopic and Robotic Surgery for Endometrial and Cervical Cancer. Clin Oncol (R Coll Radiol). 2021;33(9):e372-82.
16. Luo Q, Wang Y, Zhang X. Conversion to laparotomy during laparoscopic hysterectomy: a meta-analysis of prevalence and key risk factors. Front Surg. 2025;12:1522022