Research Article

Outcomes of Total Laparoscopic Hysterectomy Versus Total Abdominal Hysterectomy with Bilateral Salpingo-Oophorectomy in Endometrial Carcinoma

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Abstract
Objective: Management of endometrial carcinoma may involve total hysterectomy with bilateral salpingo-oophorectomy (TH-BSO), performed either laparoscopically or via laparotomy. This evaluation is crucial for assessing recovery and determining appropriate follow-up care in patients with endometrial cancer based on the ECOG Performance Status.
Methods: This retrospective cohort study examined data from patients who underwent THBSO at Dr. Hasan Sadikin Hospital in 2024. The primary outcome measured was ECOG performance status at one month and six months post-surgery. The analysis was conducted using the Mann-Whitney U test to compare ECOG scores between the laparoscopic and laparotomy groups.
Result: Of the 47 patients (28 laparotomies and 19 laparoscopies), the Mann-Whitney U test results for the ECOG score one month postoperatively showed no significant difference between patients who underwent THBSO with laparoscopic and laparotomy techniques ($p = 0.921$). However, the results of the 6-month postoperative ECOG score test indicated a significant difference between the two groups ($p = 0.026$), with better outcomes in the laparoscopic group.
Conclusion: ECOG performance status after laparoscopy in endometrial cancer cases was better than after laparotomy.

Keywords: ECOG; endometrial carcinoma; hysterectomy; laparoscopy; laparotomy

Luaran Histerektomi Laparoskopi Total dibandingkan Histerektomi Abdominal Total dengan Salpingo-Ooforektomi Bilateral pada Karsinoma Endometrium

Abstrak
Tujuan: Penatalaksanaan karsinoma endometrium dapat dilakukan dengan histerektomi total disertai salpingo-ooforektomi bilateral, yang dilakukan baik secara laparoskopi maupun melalui laparotomi. Penilaian ini penting untuk mengevaluasi proses pemulihan dan menentukan tata laksana tindak lanjut yang tepat pada pasien kanker endometrium berdasarkan ECOG Performance Status.
Metode: Studi kohort retrospektif ini menganalisis data pasien yang menjalani HTSOB di RSUP Dr. Hasan Sadikin pada tahun 2024. Luaran utama yang dinilai adalah ECOG performance status satu bulan dan enam bulan postoperatif. Analisis dilakukan menggunakan uji Mann-Whitney U untuk membandingkan skor ECOG antara kelompok laparoskopi dan laparotomi.
Hasil: Dari 47 pasien (28 laparotomi dan 19 laparoskopi), hasil uji Mann-Whitney U terhadap skor ECOG satu bulan postoperatif menunjukkan bahwa tidak terdapat perbedaan bermakna antara pasien yang menjalani HTSOB dengan teknik laparoskopi dan laparotomi ($p = 0.921$). Sedangkan hasil uji skor ECOG 6 bulan postoperatif menunjukkan bahwa terdapat perbedaan signifikan antara kedua kelompok ($p = 0.026$), dengan hasil lebih baik pada kelompok laparoskopi.
Kesimpulan: ECOG performance status pasca laparoskopi pada kasus kanker endometrium lebih baik daripada laparotomi.

Kata kunci: ECOG; karsinoma endometrium; histerektomi; laparoskopi; laparotomi

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Introduction

Endometrial carcinoma is a malignancy originating from the glandular epithelial lining of the endometrium and is the most common gynecologic cancer in developed countries. Most cases occur in older women, especially postmenopausal women, with the average age at diagnosis being about 60 years.[1] The most common clinical symptom is abnormal uterine bleeding, especially postmenopausal bleeding, which should be promptly assessed as a possible malignancy.[2] Globally, according to GLOBOCAN 2022, there were 420,368 new cases of endometrial carcinoma and 97,723 deaths from the disease. The highest incidence is observed in Northern Europe and North America, regions typically associated with higher rates of obesity and longer life expectancy. In developed countries, this cancer is the most common gynecologic malignancy, whereas in developing countries, it ranks third after cervical and ovarian cancers.[3]

Endometrial carcinoma is categorized into two main types based on its development. Type I (endometrioid) is closely linked to unopposed estrogen exposure and generally has a favorable outlook. Its primary risk factors include obesity, chronic anovulation (such as in PCOS), exogenous estrogen therapy without progestin, and complex atypical hyperplasia. Type II (non-endometrioid) is more aggressive, hormone-independent, and associated with genetic mutations like p53 and ERBB2.[4,5]

Diagnosis is determined using a multidisciplinary approach, including taking patient history for abnormal bleeding, transvaginal ultrasonography, endometrial biopsy, and advanced imaging like MRI to evaluate myometrial invasion. Confirmatory diagnosis is made through histopathological examination of endometrial tissue tissue.[6]

The primary treatment for patients with endometrial carcinoma is total hysterectomy with bilateral salpingo-oophorectomy (THBSO). In high-risk patients, this procedure may be combined with pelvic and para-aortic lymphadenectomy. The surgery can be performed via llaparoscopy (total laparoscopic hysterectomy), robotic-assisted approach, or vaginally (total vaginal hysrectomy). Currently, laparoscopy has increasingly become the preferred approach as a minimally invasive technique proven to provide favorable clinical outcomes with lower morbidity rates.[7,8]

Several benefits of the laparoscopic approach include a reduced risk of surgical site infection, decreased need for blood transfusion, lower risk of venous thromboembolism, shorter hospital stays, and lower overall treatment costs without compromising oncologic outcomes.[8] Additionally, laparoscopic surgery helps improve postoperative ECOG (Eastern Cooperative Oncology Group) performance status, a clinical measure used to assess patients' functional status and quality of life.[9]

However, in Indonesia, studies comparing the outcomes of total laparoscopic hysterectomy and total abdominal hysterectomy with bilateral salpingo-oophorectomy for endometrial carcinoma remain limited. Therefore, the authors aim to conduct a comparative analysis of both surgical techniques in patients with endometrial carcinoma, especially regarding ECOG performance status. This comparison is expected to provide valuable insights for researchers and serve as an evaluation tool to help advance laparoscopic THBSO techniques.

Method

This analytical observational study with a retrospective cohort design was conducted at Hasan Sadikin General Hospital, Bandung. Data were collected from the medical records of patients with endometrial carcinoma who

underwent total laparoscopic hysterectomy (TLH) or total abdominal hysterectomy (TAH) with bilateral salpingo-oophorectomy.

The study population included all patients diagnosed with endometrial carcinoma who underwent THBSO at Hasan Sadikin General Hospital. Samples were selected using a total sampling method, which involved including all patients who met the eligibility criteria within the specified study period. The final sample size was determined based on the number of eligible patients who underwent total laparoscopic hysterectomy with bilateral salpingo-oophorectomy (TLH-BSO) or total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) during the study timeframe. Inclusion criteria included patients diagnosed with endometrial carcinoma who underwent TLH-BSO or TAH-BSO. Complete medical records, including ECOG performance status at 1 and 6 months postoperatively, had to be available. Exclusion criteria included patients with incomplete medicalrecords, complications unrelated to the surgical procedure, or those who underwent procedures other than TLH-BSO or TAH-BSO. Data were collected from patient medical records. The primary variables were ECOG performance status at 1 and 6 months postoperatively.

The primary outcomes measured were the ECOG performance status at 1 and 6 months after TLH-BSO and TAH-BSO THBSO surgery. Statistical analysis was carried out using standard statistical software. Descriptive statistics described data distribution. Comparative analyses included the Chi-square Test or Fisher's Exact Test to examine the association between surgical approach (laparoscopy vs. laparotomy). The Mann-Whitney U Test was used to compare ECOG performance status at 1 and 6 months postoperatively between the two surgical groups.

This study received approval from the Health Research Ethics Committee at Hasan Sadikin General Hospital, Bandung, number DP.04.03/D.XIV.6.5/360/2025. Patient confidentiality was preserved, and all data were used exclusively for research purposes.

Results

This study examined the ECOG performance status at 1 and 6 months in 47 patients with endometrial carcinoma who underwent TLH-BSO or TAH-BSO at Dr. Hasan Sadikin General Hospital in 2024. A total of 28 patients (59.6%) underwent TAH-BSO, while 19 patients (40.4%) underwent TLH-BSO.

Of these 47 patients, twelve were excluded from further analysis. The demographic data showed most patients were postmenopausal (60%), with 40% premenopausal. The parity distribution indicated that most patients had parity 1 (40%), followed by parity 2 (20%) and parity 3 (8.6%). The age distribution revealed that most patients were in the 35–49 years age group (16 patients, 45.7%), followed by 9 patients (25.7%) in the 50–59 years group and eight patients (22.9%) aged over 60 years. The mean age of patients undergoing TAH-BSO was 52.26 years, while the mean age of those undergoing TLH-BSO was 48.31 years.

The age analysis showed no statistically significant difference between the TAH-BSO and TLH-BSO groups ($p = 0.304$), indicating that the patients in both groups were relatively similar in age. The analysis of menopausal status found that the distribution of menopausal status between TAH and TLH groups was not statistically significant (p-value = 0.678), suggesting no meaningful difference in menopausal status between the two groups. Similarly, parity analysis showed no significant difference in parity between the TAH and TLH groups (p-value = 0.218), indicating that parity was not significantly different between the surgical groups.

In the TAH-BSO group, the surgery

Table 1 Operative Duration Characteristics between TAH-BSO and TLH-BSO in Endometrial Cancer

Surgery Duration (minutes)	Total Abdominal Hysterectomy n (%)	Total Laparoscopi Hysterectomyn (%)
<90	2 (7.1)	0 (0)
90-119	4 (14.3)	0 (0)
120-149	7 (25)	3 (15.8)
150-179	10 (35.7)	2 (10.5)
≥180	5 (17.9)	14 (73.7)

Table 2 Comparison of Operative Duration between TLH and TAH in Endometrial Cancer

Variable		Total Abdominal Hysterectomy	Total laproscopic hysterectomy	*P-value*
Surgery duration (minutes) (n=47)	Mean	143.39	188.68	
	Median	150.00	180.00	
	Minimum	60	120	
	Maximum	300	300	0.125
	SD	48.990	49.324	

durations were more evenly spread across several time categories, with the highest percentage in the 150–179 minutes range (35.7%). This was followed by 120–149 minutes (25%), ≥180 minutes (17.9%), 90–119 minutes (14.3%), and less than 90 minutes (7.1%). In contrast, the TLH group showed a more concentrated distribution in longer durations, especially ≥180 minutes, which made up 73.7%. Other durations such as 120–149 minutes and 150–179 minutes accounted for only 15.8% and 10.5%, respectively, with no patients having surgeries shorter than 120 minutes.

The analysis of operative duration between TLH-BSO and TAH-BSO showed no statistically significant difference between the two procedures (p = 0.125). This suggests that the average operative times for both methods were not significantly different.

The distribution of blood loss showed differences between TLH-BSO and TAH-BSO. In the TLH-BSO group, 10 patients (52.6%) experienced blood loss of 100–199 mL, 4 patients (21%) had 500–799 mL, 2 patients (10.5%) had 200–299 mL, and 1 patient each (5.3%) experienced less than 100 mL, 300–499 mL, and 800 mL or more. In contrast, the TAH-BSO group tended to have higher blood loss. A total of 15 patients (53.6%) experienced blood loss of 500–799 mL, 5 patients (17.8%) had 300–499 mL, 5 patients (17.8%) had 800 mL or more, 2 patients (7.2%) had 200–299 mL, 1 patient (3.6%) had 100–199 mL, and none had less than 100 mL. These results suggest that laparotomy carries a higher risk of blood loss compared to laparoscopy, although statistical analysis indicated no significant difference (p = 0.056) between the two surgical methods.

Analysis shows that the distribution of patients according to postoperative endometrial cancer stage was fairly similar between the two surgical techniques. In the TAH group, most patients were in the early stages of cancer, with 32% in stage 1A and

Table 3 Comparison of Operative Duration between TAH-BSO and TLH-BSO in Endometrial Cancer

Variable		Total Abdominal Hysterectomy	Total Laparoscopic Hysterectomy	*P-value*
Blood loss during surgery (mL) (n=47)	Mean	580.36	270.474	0.056
	Median	500.00	180.00	
	Minimum	100	50	
	Maximum	1500	750	
	SD	318.950	228.922	

Table 4 ECOG Performance Score at 1 Month and 6 Months in The TLH-BSO and TAH-BSO Groups

ECOG Performance Score		Total Abdominal Hysterectomy n (%)	Total Laparoscopic Hysterectomy n (%)
1 month	0	1 (4)	0 (0)
	1	20 (71)	15 (80)
	2	3 (11)	1 (5)
	3	4 (14)	1 (5)
	4	0 (0)	1 (5)
	5	0 (0)	1 (5)
6 months	0	11 (40)	15 (79)
	1	15 (54)	2 (11)
	2	1 (3)	0 (0)
	3	1 (3)	1 (5)
	4	0 (0)	0 (0)
	5	0 (0)	1 (5)

37% in stage 1B. The number of patients decreased in the more advanced stages, with 16% in stage 2, 10% in stage 3, and 5% in stage 4. In the TLH group, the distribution was also mainly stage 1A and 1B, each accounting for 44%. In the advanced stages, the proportion dropped to 6% in stage 2, 6% in stage 3, and no patients in stage 4.

The analysis of postoperative staging between TAH-BSO and TLH-BSO procedures showed no statistically significant difference ($p = 0.640$). This similarity in distribution suggests that both surgical techniques were used on patients with comparable stages of endometrial cancer, with no differences in postoperative stage distribution.

The analysis comparing the risk of endometrial cancer recurrence showed that in the TLH-BSO group, most patients were in the low-risk category, with 10 patients (71%). In contrast, very few TLH-BSO patients were in the higher-risk categories: only two patients (14%) were in the high-intermediate or high-risk categories, and no patients were in the intermediate-risk category. Meanwhile, in the TAH-BSO group, patient distribution was more evenly distributed, with a significant proportion in higher-risk categories. High-risk patients accounted for 7

Table 5 Mann-Whitney U Test of ECOG Performance Score at 1 Month and 6 Months between TLH-BSO and TAH-BSO Groups

ECOG Score	N	Mean Rank	Sum of Rank	P-value
1 month	28	23.88	668.50	0.921
	19	24.18	459.50	
6 months	28	27.25	763.00	0.026
	19	19.21	365.00	

(41%), intermediate-risk patients for 3 (18%), and high-intermediate-risk patients for 4 (23%). Only 3 patients (18%) in this group were classified as low risk. The analysis showed a statistically significant difference in recurrence risk between the TAH-BSO and TLH-BSO groups ($p = 0.018$), indicating that recurrence risk differed significantly between the two surgical approaches. The Mann-Whitney U test showed no significant difference in ECOG performance score at 1 month postoperatively between the laparotomy and laparoscopy groups ($p = 0.921$). This indicates that functionally, patients' condition one month after surgery was similar between the two groups. Conversely, the Mann-Whitney U test showed a significant difference ($p = 0.026$) in ECOG performance score six months postoperatively between the laparotomy and laparoscopy groups.

This suggests that functionally, patients' condition six months after surgery was better in the laparoscopy group compared to the laparotomy group.

The analysis of the correlation between endometrial cancer stage and the ECOG performance status score at 6 months revealed a very weak relationship, with a Kendall's Tau correlation coefficient of 0.078. This value suggests an almost negligible association. The p-value for Kendall's test was 0.626, indicating that the relationship was not statistically significant. Therefore, these data do not provide enough evidence to support a meaningful correlation between cancer stage and ECOG score at 6 months.

Discussion

This study involved 47 patients (with complete data for 35 patients) who had endometrial carcinoma and underwent either laparoscopic or open total hysterectomy with bilateral salpingo-oophorectomy (THBSO). Most patients were aged 35–49 years, representing 16 patients (45.7%), followed by 9 patients (25.7%) aged 50–59 years, and 8 patients (22.9%) over 60 years. The mean age for those undergoing laparotomy was 52 years, while for laparoscopy it was 48.31 years. This suggests that most patients fell into the high-risk age group for endometrial cancer.[10] Age over 60 years increases the risk of endometrial cancer due to higher estrogen exposure after menopause without ovulation, prolonged hormonal exposure associated with late menopause, accumulation of genetic mutations in endometrial cells, and more frequent comorbidities in older adults.[10-12]

Menopausal status was present in 60% of patients, aligning with the epidemiology of endometrial cancer where menopause is a major risk factor due to estrogen–progesterone hormonal imbalance.[13] After menopause, progesterone production, which opposes estrogen, drops sharply, while estrogen can remain active, especially from peripheral sources such as adipose tissue. This leads to excessive stimulation of the endometrial lining, increasing the risk of cell proliferation and potential neoplastic transformation. Biologically, unopposed estrogen creates a hormonal environment that promotes excessive endometrial

growth, elevating the risk of hyperplasia and endometrial cancer. The literature supports that estrogen–progesterone imbalance after menopause, especially in women who have been menopausal for an extended period, has long been recognized as a key mechanism in the development of endometrial cancer.[14-17]

Parity distribution showed that most patients had a parity of one (40%), followed by two (20%) and three (8.6%). These findings support literature indicating that lower parity is associated with higher risk due to hormonal factors affecting endometrial proliferation.[18] This association can be explained by hormonal mechanisms in which progesterone during pregnancy plays a protective role against estrogen-driven endometrial proliferation. Pregnancy increases progesterone levels, balancing the mitogenic effect of estrogen on the endometrium, and temporarily halts menstrual cycles, meaning reduced exposure to unopposed estrogen. Conversely, women with low parity experience more frequent menstrual cycles, leading to prolonged exposure to estrogen without sufficient progesterone, which triggers abnormal endometrial proliferation with a risk of progressing to hyperplasia or cancer. Epidemiological studies and meta-analyses consistently report a reduced risk of endometrial cancer with increasing parity, underscoring the protective hormonal role of pregnancy.[19-20]

In the TAH-BSO group, the duration of surgery was more evenly spread across time intervals, with the highest percentage in the 120–149 minutes range (32%). Durations of 150–179 minutes and ≥180 minutes each made up 21%, while durations under 90 minutes and 90–119 minutes were smaller, at 10% and 16%, respectively. Conversely, in the TLH-BSO group, surgery durations were more concentrated in longer time ranges, with ≥180 minutes accounting for 69%. Durations of 120–149 minutes and 150–179 minutes were 19% and 12%, respectively, with no surgeries lasting less than 120 minutes.

Statistical analysis showed no significant difference in operative duration between TAH-BSO and TLH-BSO ($p = 0.261$), indicating that the average operative times were similar despite differences in distribution. TLH-BSO procedures tended to take longer in some cases, usually due to technical factors and the inherent nature of laparoscopy, such as the need for specialized instruments and more precise surgical techniques, especially when fine tissue manipulation and minimally invasive approaches are necessary. Other factors, like equipment availability, technology, and case complexity, may also influence laparoscopic duration. However, in this study, no significant difference was observed. This aligns with previous research reporting no significant difference in operative duration between laparotomy and laparoscopy, although laparoscopy may sometimes last longer. Li et al. (2023) found that the operative time for single-port versus conventional laparoscopic myomectomy was not significantly different.[21] Similarly, Lawrie et al. (2019) in a systematic review of ovarian cancer cases noted that although laparoscopic procedures tended to be longer, the difference was not statistically significant.[22] Therefore, these findings support the idea that, in the context of THBSO, the choice between laparotomy and laparoscopy can be made without concern for a significant difference in operative duration, although laparoscopy may occasionally take longer due to technical factors and surgeon experience.

This study also showed no significant difference in intraoperative blood loss between TAH-BSO and TLH-BSO, although 50% of laparoscopic cases had blood loss between 100–199 mL, compared to laparotomy where 42% of cases experienced 500–799 mL. This finding aligns with literature stating that laparoscopy, as a minimally invasive procedure, offers advantages in reducing tissue trauma and intraoperative bleeding.

In the study by Walker et al. (2009), patients undergoing laparoscopy for endometrial cancer had lower average blood loss compared to those undergoing laparotomy, although in this study the difference was not significant.[23] Additionally, the American College of Obstetricians and Gynecologists notes that one of the main advantages of laparoscopy is superior hemostatic control through enhanced operative visualization and more precise use of electrocautery energy.[24] From this analysis, it can be concluded that laparoscopy is superior in reducing the risk of intraoperative bleeding compared to laparotomy, which is an important consideration when selecting a surgical method, particularly in patients at high risk of bleeding complications.

Comparison of recurrence risk in endometrial cancer revealed that in the TLH-BSO group, most patients were in the low-risk category, with 10 patients (71%). Only two patients (14%) fell into the high-intermediate and high-risk categories, and none were in the intermediate-risk group. In contrast, the TAH-BSO group exhibited a more evenly distributed risk profile, with a substantial proportion in higher-risk categories. High-risk patients comprised 7 cases (41%), intermediate-risk 3 (18%), high-intermediate-risk 4 (23%), and low-risk 3 (18%). Statistical analysis indicated a significant difference in recurrence risk between TAH-BSO and TLH-BSO ($p = 0.018$), indicating a meaningful difference between the groups. In conclusion, laparoscopy seems to be more commonly chosen or more suitable for low-risk endometrial cancer patients, while laparotomy is more often performed in higher-risk patients. This aligns with clinical practices that consider disease risk when selecting the surgical technique.

ECOG scores assessing postoperative functional status provided valuable clinical insights. One month after surgery, most patients who underwent TLH-BSO had an ECOG score of 1 (80.0%), indicating normal or only slightly limited activity without the need for special care. In contrast, only 20% of patients who had a TAH-BSO achieved an ECOG score of 1, reflecting greater functional limitations and potentially longer recovery times in this group. At one month postoperatively, there was no significant difference between the two groups ($p = 0.921$), but at six months, a significant difference emerged ($p = 0.026$), favoring the TLH-BSO group. This finding aligns with Walker et al., who reported superior mid-term functional outcomes with laparoscopy.[25]

Functional status analysis using ECOG (Eastern Cooperative Oncology Group) was performed at one and six months postoperatively. At one month, no significant difference was observed between groups ($p = 0.921$). However, at six months, a statistically significant difference favored TLH-BSO ($p = 0.026$), with more patients achieving ECOG 0–1, indicating nearly normal activity, compared to TAH-BSO patients, who remained mainly at ECOG 2–3, reflecting limited function. This shows that although there is no difference during early recovery, TLH-BSO patients recover faster and better in the mid-term. Additionally, no correlation was found between endometrial cancer stage and ECOG performance status at six months.

Overall, this study highlights the benefits of TLH-BSO over TAH-BSO, including shorter operative times, less blood loss during surgery, and improved functional recovery within six months, as measured by ECOG performance status. The analysis of recurrence risk also offers clinical justification for choosing surgical methods in endometrial carcinoma patients.

Conclusion

In summary, TLH-BSO showed several important clinical benefits. Although operation time and intraoperative bleeding were not significantly different from TAH-BSO, TLH-

BSO resulted in better improvements in functional performance (ECOG). This study supports guidelines from NCCN and ACOG, which recommend laparoscopy as the main option for managing endometrial cancer, based on patient condition and disease stage.

Nevertheless, while this study found differences in ECOG performance status between TLH-BSO and TAH-BSO, no conclusions can yet be made about patient survival. Survival rates require longer follow-up, as they cannot be determined by a single variable. Additionally, of the 47 THBSO cases, only 35 were fully analyzable, highlighting the need for further research to determine whether ECOG performance status is more affected by the surgery type or disease stage, through longer-term studies.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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