



A Comparative Cohort Study of Laparoscopy Versus Laparotomy for the Treatment of Iranian Endometrial Cancer Patients

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Abstract

Background: In recent decades, laparoscopy and robotic surgery are mostly used for the treatment of endometrial cancer. Laparoscopic surgery's popularity has grown due to rapid postoperative recovery and reduced post-surgical morbidity and complications compared with open surgery.

Objectives: This study aimed to compare laparoscopic surgery and laparotomy in terms of their advantages and disadvantages for treating early-stage endometrial cancer in a population of Iranian patients in a referral center of gynecology.

Methods: In this cohort study at Imam Hossein Medical Center in Tehran, Iran, from 2019 to 2022, early-stage endometrial cancer patients were included. Advanced disease, patients with medical comorbidity not suitable for laparoscopy, previous surgery for endometrial cancer, and prior chemotherapy or radiotherapy for treatment of the endometrial cancer were excluded from the study. The study compared two groups regarding operative findings, including FIGO stage, grade, postoperative complications, and hospitalization days.

Results: The study included 17 patients in the laparoscopic group with a mean age of 56 (+12.5) years old and 44 patients in the laparotomy group with a mean age of 57 (+10.2) years old. Two groups were well-matched in terms of Body Mass Index and menopausal status. The median intraoperative blood loss was significantly less in the laparoscopic group (200 mL versus 500 mL, $P = 0.001$). Four (23.5%) patients in the laparoscopic group needed intraoperative blood transfusion versus 22 (50.0%) in the laparotomy group, $P = 0.061$. Hospital stay days were shorter in the laparoscopic group, with a median of three versus six days ($P < 0.001$).

Conclusions: In conclusion, the minimally invasive operation caused less blood loss, hospital stay, and blood transfusion in comparison to laparotomy in Iranian endometrial cancer patients, confirming the preferred method of laparoscopy in these patients.

Keywords: Endometrial cancer, Laparotomy, Laparoscopy

1. Background

Endometrial cancer ranks as the 14th leading cause of cancer-related mortality in women and the sixth in terms of prevalence (1). Endometrial carcinoma generally has a favorable prognosis. Compared to other female cancers and endometrial cancers, the mortality-to-incidence ratio is lower than in order cervical (0.55),

ovarian (0.63), and breast cancer (0.32). However, Obesity is a condition that usually exists with endometrial carcinoma, and as a result, there are comorbidities such as HTN, pulmonary disease, and DM in these patients. As a result, these conditions can cause problems such as abdominal wall infection, increased blood loss, incomplete staging, and increased surgical time in these patients (2, 3). Various surgical methods,

including conventional laparoscopy, robotic-assisted, and laparotomy are methods that can be used as surgery (4-6). Laparoscopy and robotic surgery are the preferred methods for treating endometrial cancer in recent decades (2, 7, 8). Several studies have been done in this field and demonstrated the benefits of laparoscopic surgery over laparotomy. Better postoperative quality of life, accelerating postoperative recovery, pain reduction, and reduced surgical morbidity are some advantages of the laparoscopic technique (2, 9, 10). This study compares laparoscopic surgery and laparotomy in terms of the advantages and disadvantages of the treatment of early-stage endometrial cancer in Iranian patients at a referral center of gynecology.

2. Methods

In this cohort study which conducted at Imam Hossein Medical Center in Tehran, Iran, from 2019 to 2022, early-stage (1 and 2) endometrial cancer patients were observed and followed in two groups of laparoscopic surgery and laparotomy after operation. Exclusion criteria were as follows: Advanced diseases (stages 3 and 4), patients with medical comorbidity unsuitable for laparoscopy, previous surgery for endometrial cancer, and prior chemotherapy or radiotherapy for treatment of endometrial cancer. We compared the patients and the operation's characteristics between the two study groups, including Maternal age, menopausal status, BMI, parity, comorbidity, previous abdominal operation, operation time, intraoperative blood loss, and operative site blood transfusion. Also, we compared the two study groups regarding pathological results, including myometrial invasion, pelvic LN, omental, parametrial, ovarian, lymphovascular, and cervical involvement. Finally, we compared two study groups regarding operative findings, including The International Federation of Gynecology and Obstetrics (FIGO) staging system, depth of myometrial invasion, and lymph node numbers including dissected and involved pelvic, and paraaortic nodes, postoperative complication, and hospital stay.

2.1. Statistical Analysis

We analyzed the data using Software Package for the Social Sciences (SPSS), version 19.0. An independent *t*-test was used for normal variations, and all of the variables were presented as mean and standard deviation (mean $\pm$ SD). The chi-square test or Fisher exact test was used to compare dichotomous variables. The significant level was set at 0.05.

3. Results

The study included 17 patients in the laparoscopic group (mean age of approximately 56 years old) and 44 patients in the laparotomy group (mean age of approximately 57 years old). Two groups were matched in terms of menopausal status, BMI, parity, comorbidity, and previous abdominal surgery (Table 1).

Table 1. Comparison of Patients and Operation Characteristics Between Two Study Groups

Variables	Laparoscopy (n = 17)	Laparotomy (n = 44)	P-Values
Maternal age (y)	55.9 (+12.5)	57.1 (+10.2)	0.687
BMI	31.7 (+5.1)	30.2 (+6.1)	0.436
Menopause	12 (70.6)	34 (77.3)	0.741
Parity	2 (0-9)	3 (0-10)	0.096
Comorbidity	12 (70.6)	38 (86.4)	0.263
Menopause	12 (70.6)	34 (77.3)	0.741
Previous abdominal operation	4 (23.5)	21 (47.7)	0.085
Intra-operative blood loss (mL)	200 (100-700)	500 (100-1300)	0.001
During operation BT	4 (23.5)	22 (50.0)	0.061

Abbreviations: BMI, Body Mass Index; BT, blood transfusion.

^a Data are shown as mean (+ SD) median (min-max.), or frequency (%).

In the laparoscopic group, the median intraoperative blood loss was significantly less in terms of statistics (200 mL versus 500 mL, $P = 0.001$). A blood transfusion was necessary for four (23.5%) patients in the laparoscopic group versus 22 (50%) in the laparotomy group during the operation ($P = 0.061$) (Table 1).

As shown in Table 2, pathologic results were matched between the two study groups.

Table 2. Comparison of Pathologic Results Between Two Study Groups

Variables	Laparoscopy (n = 17)	Laparotomy (n = 44)	P-Values
Myometrial involvement	11 (64.7)	29 (65.9)	0.929
Pelvic LN involvement	2 (11.8)	3 (6.8)	0.612
Omental involvement	2 (11.8)	3 (6.8)	0.612
Parametrial involvement	1 (5.9)	1 (2.3)	0.483
Ovarian involvement	2 (11.8)	6 (13.6)	1
Lymphovascular involvement	3 (17.6)	6 (13.6)	0.699
Cervical involvement	0	6 (13.6)	0.173

^a Data are shown as frequency (%).

Close to 53% of the laparoscopy and 50.0% of the laparotomy group had FIGO grade I, $P = 0.212$. The majority of the two groups (82.4% and 75.0%, respectively) were categorized as early-stage disease, $P =$

0.738. The median (range) of PLND (pelvic lymph node dissection) in the laparoscopy group was 16 (2 - 34), and in the laparotomy group was 17.5 (4 - 37), $P = 0.138$. In the laparoscopic group, dissected para-aortic lymph nodes number was significantly less than in the laparotomy group, with a median of zero and 2, respectively, $P < 0.001$, [Table 3](#).

Table 3. Comparison of Operative Findings Between Two Study Groups

Variables	Laparoscopy (n = 17)	Laparotomy (n = 44)	P-Values
FIGO grade			0.212
I	9 (52.9)	21 (50.0)	
II	6 (35.3)	8 (19.0)	
III	2 (11.8)	13 (31.0)	
Stage			0.738
I/II	14 (82.4)	33 (75.0)	
III	3 (17.6)	11 (25.0)	
Myometrial involvement percent	50 (30 - 100)	50 (10 - 90)	0.443
Dissected pelvic lymph node number	16 (2 - 34)	17.5 (4 - 37)	0.138
Pelvic-involved lymph node number	0 (0 - 8)	0 (0 - 16)	0.202
Dissected para-aortic lymph node number	0 (0 - 2)	2 (0 - 12)	< 0.001
Para-aortic involved lymph node number	0 (0 - 0)	0 (0 - 0)	1
Post operation complication	1 (5.9)	9 (20.5)	0.257
Hospitalization days	3 (3 - 14)	6 (4 - 15)	< 0.001

^a Data are shown as frequency (%) or median (min-max).

Dyspnea was the only post-operation complication was seen in one (5.9%) patient in the laparoscopic group. Nine (20.5%) cases in the laparotomy group encountered some post-operation complications, including dysuria, deep vein thrombosis, nausea and vomiting, serum creatinine rising, tachycardia and pleural thickness, tachycardia and tachypnea, tachycardia and fever, and loss of consciousness. Although the laparoscopic group experienced fewer post-operation complications, the difference was not statistically significant, $P = 0.257$.

Hospitalization days were shorter in the laparoscopy group than the laparotomy group, with a median of three versus six days, respectively ($P < 0.001$) [Table 3](#).

4. Discussion

Laparoscopy in endometrial cancer exhibits fewer complications in comparison with laparotomy (11-15). In a meta-analysis that was performed on eight RCTs, intraoperative complications were the same in both laparoscopy and laparotomy methods in the treatment of endometrial cancer. However, in the same study,

investigation of postoperative complications, the blood loss in laparoscopy was less than in laparotomy in the treatment of endometrial cancer (2). A cohort study on endometrial cancer showed that intraoperative blood loss was less in the laparoscopic ($174.2 \text{ mL} \pm 229.6 \text{ mL}$) than in the laparotomy group ($234.4 \text{ mL} \pm 178.2 \text{ mL}$) (16). In a meta-analysis study, Longke Ran et al. compared laparoscopy and laparotomy in endometrial cancer and found that the volume of blood loss was significantly lower in the laparoscopic group (17). In the present study, the amount of bleeding was significantly less in the laparoscopy group (mean blood loss of 200 mL (100 - 700) than in the laparotomy group (mean blood loss of 500 mL (100 - 1300)). Regarding the amount of blood transfusion in the current study, it was less in the laparoscopy group, but it was not significant, and this might be due to the number of samples ([Table 1](#)). Meta-analysis of eight RCTs, assessing 3894 participants, showed no significant difference between laparoscopy and laparotomy groups regarding blood transfusion in endometrial cancer patients (1). Another study compared laparoscopy and laparotomy methods in endometrial cancer treatment and found that the number of blood transfusions required was significantly lower in the laparoscopic group (17).

Shorter hospital stay and recovery can be considered among the known advantages of laparoscopy. In a study, Urunsak et al. showed that the mean postoperative hospital stay was significantly shorter in the laparoscopy group (4). In a study, Vardar et al. showed that postoperative hospitalization stay was lower in laparoscopy than Laparotomy for all types of endometrial cancer including low, intermediate, and high-risk (18). In the present study, in the laparoscopy group compared to the laparotomy group, hospitalization days were significantly less, and this issue can significantly affect the costs imposed on the patients and the return of the patients to their routine life ([Table 3](#)).

In a study, Chiou et al. showed that the three robotic, laparoscopy and laparotomy groups did not differ significantly in terms of lymph node removal and their number, and this issue facilitates staging (16). Other studies showed similar results in terms of the percentage of women who underwent lymphadenectomy and the number of lymph nodes removed (2). The current study also showed that lymphadenectomy could be performed well by laparoscopy, and the number of removed lymph nodes was sufficient, including a mean of 16 (2 - 34) lymph nodes in the laparoscopy group and a mean of 17.5 (4 - 37) in the laparotomy group ([Table 3](#)). As a result,

laparoscopy does not create any restrictions for lymphadenectomy.

In the current study, the complications after surgery were less, but it was not significant. However, in some studies, laparoscopy has been associated with fewer surgical complications compared to laparotomy in the treatment of endometrial cancer (6.5% versus 0; $p=0.038$). However, in clinical trials, no significant difference in terms of surgical complications has been reported so far in the comparison of the two groups of laparoscopy and laparotomy in the treatment of endometrial cancer (2). In a study, 146 patients with endometrial cancer were compared and found that significantly lower postoperative complications were considered in the laparoscopy compared to laparotomy groups in the treatment of endometrial cancer. Lower postoperative complications, lower cost, and shorter hospital stay and recovery are some well-known favors of laparoscopic surgery compared to laparotomy in endometrial cancer treatment (4).

Regarding the comparison of the length of surgery, the available findings are contradictory, so in some studies, the length of surgery is longer in laparoscopy, and in others, it is longer in laparotomy. However, it should be noted that when the surgeon is on his/her learning curve, laparoscopic surgery takes longer. When the surgeon passes his/her learning curve, the duration of laparoscopy can be equal to or even less than laparotomy. So in a case-control study, Licerio Miguel et al. observed increased surgery time for laparoscopy (194.7 min versus 165.6 min; $P < 0.001$) (2). In a study, Vardar et al. showed that Laparoscopic lymphadenectomies had a longer operation time than Laparotomy (18). A retrospective cohort study showed that the operation time was reduced in the laparoscopic group compared with the laparotomy group in the treatment of endometrial cancer (respectively 178.6 min $\pm$ 58.7 min and 195.3 min $\pm$ 67.0 min) (16). In another retrospective study, the operation Surgery in the laparoscopic group took less time than the laparotomy group (laparotomy: 96.0 $\pm$ 32.6 laparoscopy: 89.5 $\pm$ 41.1) (4).

4.1. Conclusions

In conclusion, the minimally invasive operation caused less blood loss, shorter hospital stays, and fewer blood transfusions compared to laparotomy in Iranian endometrial cancer patients, confirming the preferred method of laparoscopy in these patients.

Footnotes

Authors' Contribution: All authors participated in gathering the data and review of the manuscript.

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