Total Laparoscopic Hysterectomy Versus Total Abdominal Hysterectomy in the Treatment of Patients with Early Stage Endometrial Cancer

Elsherpiny WY[1], Ghazaly MM[1], Abo Elagha AS[2], Moussa HR[1]

[1] Surgery Department, Faculty of Medicine, Tanta University
[2] Obstetrics and Gynecology Department, Faculty of Medicine, Tanta University.

Abstract:

Background: The most prevalent gynecological cancer is endometrial carcinoma. Research has demonstrated that laparoscopic total hysterectomy, bilateral salpingo-oophorectomy, and dissection of pelvic lymph nodes were superior to laparotomy in terms of shorter hospital stays and lower intraoperative blood loss. Objective: The purpose of this retrospective study was to compare the oncological and surgical outcomes of total laparoscopic versus open abdominal hysterectomy for the treatment of early endometrial carcinoma. It also sought to report on overall survival rates and long-term recurrence.

Methods: Data of sixty patients who underwent hysterectomy for early endometrial cancer was obtained. They were split into two comparable groups: thirty patients underwent open abdominal hysterectomy treatment in the first group (Group 1), and thirty patients underwent laparoscopic surgery in the second group (Group 2).

Results: The laparoscopy group had a mean operation time that was longer than the laparotomy group, and this difference was statistically significant ($p< 0.001$). Patients treated with laparotomy had considerably higher rates of postoperative surgical site infection ($p < 0.007$) than patients treated with laparoscopic surgery. More favorable outcomes from laparoscopic surgery included shorter hospital stays ($p < 0.001$). Each group had the same rate of recurrence. The disease-free interval and overall survival did not differ statistically significantly between the two groups.

Conclusions: When it comes to managing early endometrial carcinoma, laparoscopic hysterectomy is a reliable and safe option to laparotomy. It offers far superior surgical outcomes and less postoperative complications, even if both methods have results that are almost identical from an oncological standpoint.

Keywords: Endometrial carcinoma, Laparoscopy, Laparotomy, Hysterectomy, Surgical outcome.

Received: 6 April 2025
Accepted: 4 May 2025

Authors Information:
Waleed Yusif Elsherpiny
Surgery Department, Faculty of Medicine, Tanta University
email: emanahmed982@gmail.com

Mohamed Mahmoud Ghazaly
Surgery Department, Faculty of Medicine, Tanta University
email: Mohamed.ghazaly@med.tanta.edu.eg

Ahmed Salah Abo Elagha
Obstetrics and Gynecology Department, Faculty of Medicine, Tanta University
email: Abo_elagha@hotmail.com

Hossam Ramadan Moussa
Surgery Department, Faculty of Medicine, Tanta University
email: Hossam.ramdan2019@gmail.com

Corresponding Author:
Waleed Yusif Elsherpiny
Surgery Department, Faculty of Medicine, Tanta University
email: emanahmed982@gmail.com

Introduction:

With a peak prevalence between the ages of 55 and 65, endometrial cancer ranks third among cancers that affect women in Western countries, accounting for 6-9% of their cancer cases. 90% of endometrial cancer patients are above 50, making it a cancer primarily affecting the elderly. Obese women experience a higher incidence rate; 70% of patients have a high body mass index (BMI >25), and 50% also have co-morbid conditions such diabetes and heart disease. The majority of patients (75%) had a stage I diagnosis. Patients with early-stage endometrial cancer have historically received total abdominal hysterectomy, bilateral salpingo-oophorectomy, and/or lymph node dissection via a vertical midline incision as standard care. Although TAH is a recognized effective treatment, it is quite intrusive, clearly scarring, and linked to negative results such as blood loss, wound complications, and incisional hernias [1, 2].

Comparing laparoscopic hysterectomy to open abdominal hysterectomy, like other minimally invasive surgeries, it has been demonstrated that the former results in reduced morbidity, including less blood loss, a shorter hospital stay, a quicker return to regular activities, and a decreased rate of surgical site infection [3]. The first study detailing the use of laparoscopy in

the treatment of endometrial cancer was published in 1992 by Childers and Surwit [4]. The uterus, fallopian tubes, ovaries, and resected lymph nodes are removed via the vagina in a laparoscopic procedure. Moreover, the vaginal cuff is sutured laparoscopically, negating the necessity for a vaginal operation. There are certain benefits of total laparoscopy over laparoscopy-assisted procedure; in addition to allowing for the simple removal of the uterus and adnexa, even in cases where the uterus is fixed and the vagina is narrow, it also saves the extra time required to switch from a laparoscopic to a vaginal approach [5].

The aim of this retrospective study is to report long-term recurrence and overall survival rates, and to compare the surgical and oncological outcomes between open total abdominal hysterectomy and total laparoscopic hysterectomy in the treatment of early endometrial carcinoma.

Patients and Methods:

Study design and settings: This research was a retrospective cohort study carried out from January 2020 to January 2024 at Tanta University, Egypt in the departments of general surgery and obstetrics and gynaecology.

Patients: In this study, the records of sixty patients from both Departments who had hysterectomy for endometrial cancer were examined. The inclusion criteria were: (a) all tumours were GI-II; (b) early stage endometrial cancer, FIGO stage 1. A history of lower midline abdominal surgery, extra uterine extension, systemic infections, contraindications to general anaesthesia, a large uterus larger than 14 weeks, and severe cardiorespiratory embarrassment were the exclusion criteria. Patient allocation: patients were allocated into two groups. Thirty patients underwent open abdominal hysterectomy in group 1 and thirty underwent laparoscopic hysterectomy in group 2.

Collected data CBC, blood biochemistry with coagulation profile, liver and kidney functions, transvaginal ultrasonography, pelvic magnetic resonance imaging, chest X-ray, and findings from routine laboratory testing are all part of the preoperative workup. Preoperative tumour marker CA125, fractional curettage biopsy, and preoperative metastatic work-up to rule out either regional or systemic extrauterine disease.

Number of lymph nodes that were resected, the amount of blood lost, the length of the procedure, and other surgical data were all reviewed and recorded. For each patient, the peritoneal wash cytology results were collected.

Recurrences were noted and categorised according to the initial recurrence site. From the time endometrial cancer was first diagnosed to the time of death from any cause, the overall survival was calculated.

For the first year, follow-ups were scheduled for every three months, then every six months. First visit was at one month.

Statistical methods: Data were registered as mean ± standard deviation (SD). Numbers and percentages were used to characterize discrete data. Data analysis was done with chi square and student-t tests of SPSS program. A result of $P<0.05$ was considered statistically significant. Survival data were estimated using Kaplan–Meier curves.

Results:

Files of sixty patients with early endometrial cancer that have been operated upon during the period between January 2020 and January 2024, were reviewed; both in surgical oncology unit, department of general surgery and obstetrics and gynecology department at Tanta university hospitals. All patients were diagnosed with early-stage endometrial carcinoma. Thirty patients (Group 1) had an open abdominal hysterectomy, and thirty more patients (Group 2) had a laparoscopic hysterectomy. Both groups' mean age, body mass index (BMI), and parity were comparable, and there was no discernible statistical difference. Table (1)

Group 2, undergoing laparoscopy had a considerably longer mean operation time. (120 ±20.45 minutes versus 90.5±12.5 minutes for laparotomy, $p< 0.001$). There was no significant difference in the estimated blood loss between the two groups (180.75± 25.4) versus (150.5±22.66) $P=0.623$. None of the patients in either group had any vascular, ureteric, bladder, or bowel injuries. Two of the patients in the group undergoing laparoscopic surgery required a laparotomy; the first one had uncontrollable bleeding during securing the uterine artery, and the second had significant pelvic adhesions. Less lymph nodes were retrieved from patients undergoing laparoscopic surgery than from those undergoing laparotomy (16.8 ± 8.7 vs. 18.7 ± 9.8; $p = 0.018$). Table (2)

Patients treated with laparotomy had a significantly higher rate of postoperative surgical site infections ($n = 5$ vs. $n = 1$; $p < 0.007$) than patients treated with laparoscopic surgery. Two patients (6.6%) in the open group and one patient (3.3%) in the laparoscopic group both experienced chest infections. Only one case (3.3%) of pulmonary embolism occurred in the laparotomy group compared to two occurrences (6.6%) in the laparoscopy group. There was no development of post-operative deep vein thrombosis or incisional hernia in either the laparotomy or laparoscopic groups. The incidence of postoperative urinary tract infection was 3 (10%) cases per group, with no significant difference between the two groups. Three cases (10%) of the laparoscopy group and five cases (16.6%) of the laparotomy group both developed postoperative pyrexia ($p= 0.964$). Comparable numbers of lymphoedema (6 cases in the laparotomy group versus 5 cases in the laparoscopy group) were observed in both groups ($p = 1.000$). No deaths were noted for either the laparotomy or laparoscopic surgery groups. Table (3)

When compared to the group that had a laparotomy, patients who had laparoscopic surgery reported much lower pain scores ($p < 0.001$). Better results from laparoscopic surgery included shorter hospital stays ($p < 0.001$), Patients who underwent laparoscopic hysterectomy experienced a mean hospitalization time

that was significantly less than that of patients who received abdominal hysterectomy (3.44 ± 1.01) days versus 6.12 ± 7.31, p = 0.003). Patients who underwent laparoscopic surgery were able to resume normal activities faster than those who underwent open hysterectomy, and this difference was statistically significant (8.57 ± 1.64 versus 21.74 ± 5.93 and p = 0.001). Table (4)

For patients in both groups, the average follow-up length ranged from 8 to 56 months, with a mean of 28.5 months. With just one case in each group, the recurrence rate was comparable. The disease-free interval did not differ significantly between the two groups, and neither did the overall survival, which were 86.7% in the group that had laparotomy surgery and 90% in the group that had laparoscopic surgery. Table (5)

Photo (1 and 2) pelvic lymphadenectomy (group 1)

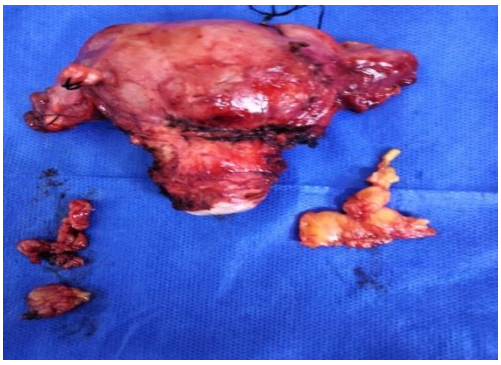

Photo (3 and 4) the specimen of TAH with BSO and pelvic lymphadenectomy (group 1)

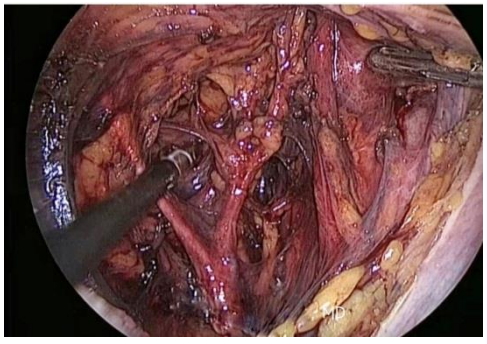

Photo (5) Laparoscopic dissection of the ureter and uterine artery at its origin

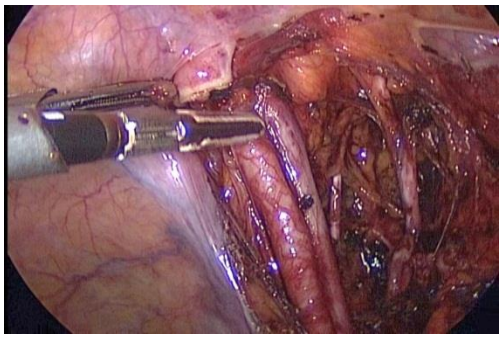

Photo (6) laparoscopic pelvic lymphadenectomy

Photo (7) the specimen of TLH with BSO and pelvic lymphadenectomy (group 2)

Recurrence rate was insignificantly different between both groups. Recurrence rate was 1 (3.33%) in Laparotomy group and 1 (3.33%) in Laparoscopy group.

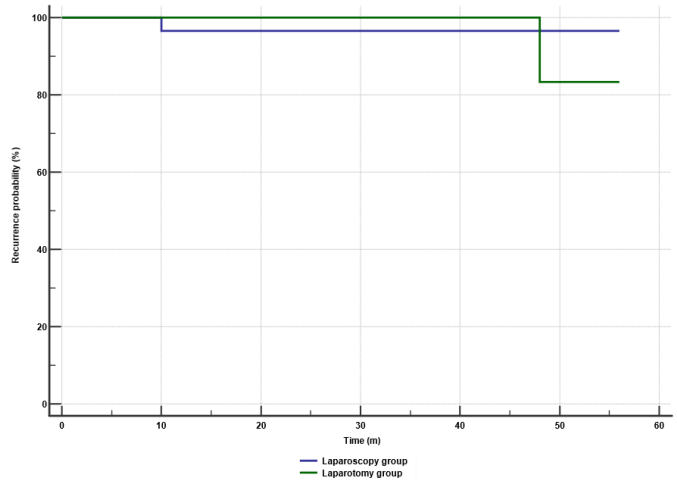

Figure 1: Kaplan Meier recurrence analysis of the studied groups

Overall survival rate was insignificantly different between both groups. Mortality rate was 4 (13.3%) in Laparotomy group and 3 (10%) in Laparoscopy group.

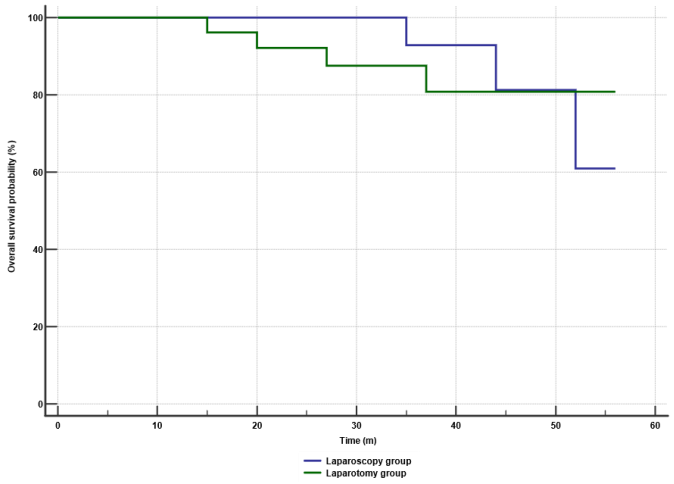

Figure 2: Kaplan Meier overall survival analysis of the studied groups

Table (1): Pre-operative data of the patients

	Laparotomy group 1 (n=30)	**Laparoscopy group 2 (n=30)**	**P value**	**significance**
Age (Mean ± SD)	51 ± 6	52.8 ± 7	0.945	Non-Significant
BMI (Mean ± SD)	30.5 ± 3	32.8 ± 2.8	0.638	Non-Significant
Parity (Mean ± SD)	4 ± 1.6	3.5 ± 1.7	0.852	Non-Significant

Table (2): The operative data of both groups

	Laparotomy group 1 (n=30)	**Laparoscopy group 2 (n=30)**	**P value**	**significance**
Operative time /minute				significant
Mean ±SD	90.5±12.5	120 ±20.45	0.001	
Range	70-120	110 – 180		
Blood loss/ ml				
Mean ±SD	180.75±25.4	150.5±22.66	0.623	Non significant
Range	50 – 450	50 – 400		
Bladder injury	non	non	1.000	Non significant
Bowel injury	non	non	1.000	Non significant
Ureteric injury	non	non	1.000	Non significant
Vascular injury	non	non	1.000	Non significant
Conversion to laparotomy	------	2 (6.6%)	0.478	Non significant
Number of retrieved lymph nodes				
Mean± SD	19.7± 9.8			
Range	10-38	16.8± 8.7	0.018	significant
		9- 35		

Table (3): Post-operative complications.

	Laparotomy group 1 (n=30)	**Laparoscopy group 2 (n=30)**	**P value**	**Significance**
Wound infection	5 (16.6%)	1 (3.3%)	0.007	Significant
Chest infection	2 (6.6%)	1 (3.3%)	0.844	Non-significant
Pulmonary embolism	1 (3.3%)	2 (6.6%)	0.835	Non-significant
Deep vein thrombosis	non	non	1.000	Non-significant
Incisional hernia	non	non	1.000	N0n significant
Urinary tract infection	3 (10%)	3 (10%)	1.000	N0n significant
Postoperative fever	5 (16.6%)	3 (10%)	0.964	N0n significant
lymphedema	6 (20%)	5 (16.6%)	1.000	N0n significant

Table (4): Post-operative surgical outcome

	Laparotomy group 1 (n=30)	**Laparoscopy group 2 (n=30)**	**P value**	**significance**
Post-operative pain score (in first 3 days)				
Mean ±SD			**0.001**	Significant
Range	**7.19 ± 1.02**	**2.13 ± 0.45**		
	5-10	**2-7**		
Hospital stay				
Mean ±SD	**6.12 ± 7.31**	**3.44 ± 1.01**	**0.003**	Significant
Range	**5 – 21**	**2 – 6**		
Return to normal life				
Mean ±SD	**21.74 ± 5.93**	**8.57 ± 1.64**		
Range	**15 – 40**	**8 – 14**	**0.001**	Significant

Table (5); Follow up, recurrence, disease-free survival and overall survival

	Laparotomy group 1 (n=30)	**Laparoscopy group 2 (n=30)**	**P value**	**significance**
Mean follow up (months)	28.5 (8-56)	28.5 (8-56)	1.000	Non-significant
Recurrence rate	1 (3.3%)	1 (3.3%)	1.000	Non-significant
Disease- free interval	12	10	0.812	Non-significant
Overall survival rate	86.7 %	90 %	0.445	Non-significant

Discussion:

One of the most popular gynecologic procedures that gynecologists/oncology surgeons do is the hysterectomy, which can be used to treat both benign and malignant conditions. Hysterectomy can be performed using a variety of techniques, such as abdominal, laparoscopic, or vaginal, and the selection amongst them is still debatable. Even though the majority of research support the use of laparoscopic method, abdominal hysterectomy is still much more common than laparoscopic hysterectomy. Reduced blood loss, reduced pain during surgery, a shorter hospital stay, a quicker recovery period, and an earlier return to normal activities are all benefits of laparoscopic hysterectomy [7, 8]. Laparoscopic surgery has a lengthy learning curve, but as one gains experience, the procedure takes less time. [8, 9, 10, 11, 12]

The average age, body mass index (BMI), and parity of the two groups were comparable, according to our research, and there was no statistically significant difference. This is consistent with what has been documented by Fathy et al [12] and Kristen et al [13].

In our research, the average duration of the procedure was considerably greater for the laparoscopy group (120 ±20.45 minutes) as opposed to the laparotomy group (90.5 ±12.5 minutes; p<0.001). While several studies [8, 9, 11, and 12] have reported similar findings to ours, some, like Seracchioli et al. [14] have not shown a statistically significant difference in the amount of time required for surgery between the laparoscopic and open groups. On the other hand, laparoscopy took less time than open abdominal hysterectomy, according to Lu Q [15], Sesti et al. [16], and Mallick et al. [17].

According to the current study, there was no discernible difference in the estimated blood loss between the groups that had laparotomy (180.75± 25.4) as compared to laparoscopy group (150.5±22.66) P=0.623. Seracchioli et al. [14] Çelik et al. [18] and Ribeiro et al. [19] have reported similar results. However, a study by Lowell et al. found that laparoscopy was linked to higher estimated blood loss than open hysterectomy [20] Although it was not statistically significant, it was discovered in other studies by Santi et al. [21], Ruan et al. [22], O'Hanlan et

al. [23] and Candiani et al. [24] that intraoperative blood loss in laparoscopic hysterectomy was smaller than that of abdominal hysterectomy.

No patient in either group in the current study had any ureteric, vascular, colon, or bladder injuries. Mallick et al. [17] found that the incidence of intraoperative complications were considerably lower in the group undergoing laparoscopic hysterectomy (1.9% vs. 7.0% in the group undergoing open hysterectomy) (P= 0.029). Comparably low rates of complications were also observed in the laparoscopic group by Santi et al. [21] and Ruan et al. [22].

Two patients (6.6%) who had undergone laparoscopic surgery in the current study had to have a laparotomy; one had uncontrollable bleeding during securing the uterine artery, and the other had significant pelvic adhesions. Similar findings with an 8% conversion rate were reported by Fathy et al. [12]. According to Santi et al. [21] there was no obesity-related conversion. Bleeding was the reason for the conversion of five patients. Conversion was carried out in a single case following the discovery of intraperitoneal tumour spread. Ruan et al. [22] stated that the primary reasons for conversion were the anaesthetic complication of severe intraoperative bronchospasm, bleeding pedicle, dense adhesions, or the failure to deliver the uterus.

Less lymph nodes were resected from patients undergoing laparoscopic surgery in the current study (16.8 ± 8.7 vs. 18.7 ± 9.8; p = 0.018) than from patients undergoing laparotomy. Ruan et al. [22] observed similar outcomes, with 27.3 ± 10.7 in the open group and 24.7 ± 9.6 in the laparoscopic group. But according to Santi et al. [21] and Lu Q et al. [15], there were noticeably more lymph nodes recovered by the laparoscopic approach compared to the open approach.

The present study found that patients treated with laparotomy had a significantly higher postoperative surgical site infection rate (n = 5 vs. n = 1; p < 0.007). Two patients (6.6%) in the open group and one patient (3.3%) in the laparoscopic group both experienced chest infections. Only one case (3.3%) of pulmonary embolism occurred in the laparotomy group compared to two occurrences (6.6%) in the laparoscopy group. There was no development of post-operative deep vein thrombosis or incisional hernia in either the laparotomy or laparoscopic groups. The incidence of postoperative urinary tract infection was 3 (10%) cases per group, with no significant difference between the two groups. Three cases (10%) of the laparoscopy group and five cases (16.6%) of the laparotomy group both suffered postoperative pyrexia (p= 0.964). Comparable numbers of lymphoedema occurred in the two groups (6 cases in laparotomy versus 5 in laparoscopy group). For both laparotomy and laparoscopic surgery groups, no mortality was recorded.

When comparing post-operative sequelae, Fathy et al. (12) found a significant difference between the two groups, with a higher prevalence of wound infection and delayed intestinal motility following open hysterectomy. Additionally, patients who had open hysterectomy experienced a significant frequency of postoperative problems, according to Kristen B et al. (2013). These side effects included atrial flutter, back pain, momentary low saturation, urinary symptoms, cervical stump issues, fever (unknown cause), and urinary tract infection. Major problems were not reported by Santi et al. [21]. One patient had obturator nerve paralysis following a laparoscopy; this patient fully recovered after three months. Following a laparoscopy, a second patient developed a symptomatic lymphocele that necessitated laparoscopic marsupialization following three failed attempts at ultrasonographically guided drainage. However, according to Ruan et al. [22] laparoscopy was on par with, if not better than, laparotomy in terms of intraoperative and postoperative complications. Additionally, the laparoscopic group experienced a significant reduction in estimated blood loss and surgical site infection, which was probably due to smaller abdominal wall incisions. Lymphoedema, wound disintegration, vault haemorrhage, haemorrhage, seroma, lymphocyst, postoperative fever, limb paralysis, sepsis, incisional hernia, limb paraesthesia, vein damage, and bowel leakage were among these problems.

In the current study, patients who had laparoscopic surgery reported far lower pain scores than the group who had laparotomies (p < 0.001). Reduced length of stay was another benefit of laparoscopic surgery (p < 0.001). Patients who had a laparoscopic hysterectomy also returned to normal daily activities more quickly (8.57 ± 1.64 versus 21.74 ± 5.93 and p = 0.001). Mean hospitalization time was significantly shorter for these patients (3.44 ± 1.01) days versus 6.12 ± 7.31, p = 0.003). Our findings were corroborated by comparable findings published by Fathy et al. [12], who reported hospital stays ranging from 1.5 to 5 days for the laparoscopy group and 5-31 days for the laparotomy group. Additionally, there was a significant difference in postoperative pain between the two groups, with the laparoscopy group experiencing less pain and returning to normal daily activities more quickly (6-11 days as opposed to 15-39 days). These results are also in line with those of Ruan et al. [22] who observed that the laparotomy group had a mean length of stay of 7.0 ± 6.2 days, while the laparoscopy group had a mean length of stay of 4.7 ± 2.5 days. They also found a significant difference in postoperative pain between the two groups, with the laparotomy group experiencing more pain than the other. In Lu Q et al.'s study from 2015, the median length of hospital stay for those undergoing laparoscopy was 3 days, while it was 6 days for those undergoing laparotomy (P 0.01). A six-day hospital stay was recorded by Eisenhauer et al. [25] and was ascribed to the postoperative pathway at the time of the study, which included prolonged use of a Foley catheter and dietary restrictions.

The follow-up time in the current study ranged from 8 to 56 months, with a mean of 28.5 months. Each group had a single case of recurrence; both cases had local pelvic recurrence that was managed by surgical removal of the recurrent mass followed by radio chemotherapy. The disease-free interval did not differ

statistically significantly between the two groups, and neither did the overall survival, which were 86.7% in the group that had laparotomy surgery and 90% in the group that had laparoscopic surgery.

According to Kalogiannidis et al. [26], the laparoscopy group had a mean follow-up of 51 (12–144) months, while the laparotomy group had a mean follow-up of 52 (9–120) months. Recurrence occurred in 6 cases in the laparoscopy group and 16 cases in the laparotomy group, with a survival rate of 93% in the laparoscopy group and 86% in the laparotomy group. Malzoni et al. [27] reported a follow up of 38.2 (2–81) months in both groups. Recurrences occurred in 7 cases in the laparoscopy group and 9 cases in the laparotomy group, with a survival rate of 93.2% in the laparoscopy group and 91.1% in the laparotomy group. According to Lu Q et al. [15], both groups had a mean follow-up of 68 (2–153) months. Recurrences occurred in 7 cases in the laparoscopy group and 6 cases in the laparotomy group, with a survival rate of 94% in the laparoscopy group and 90.1% in the laparotomy group. Other studies, including Ruan et al. [22] Chu et al. [28] Kyrgiou et al. [29] and Zullo et al. [30], found no difference in the two groups' rates of carcinoma recurrence, that laparoscopy produced comparable oncological outcomes to laparotomy, and that neither approach compromised the standard of care.

In conclusion, TLH is safe, practical, and associated with few intraoperative and postoperative problems in the management of early stages of endometrial cancer. Additionally, TLH has lower hospital stays and postoperative pain scores than AH. There was not a significant distinction between TLH and AH's recurrence rate.

Acknowledgments: The authors would like to thank residents of surgery and obstetrics and gynecology department and registration secretary for their help and support.

Ethics: This study was approved by Tanta University ethical committee.

Data Sharing Statement: authors agree to share participant data, when required anytime, by contacting the corresponding author.

Funding: There is no funding to report.

Disclosure: All authors declare no conflict of interest

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