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## SURGICAL AND ONCOLOGICAL OUTCOMES IN WOMEN WITH ENDOMETRIAL CANCER TREATED VIA MINIMALLY INVASIVE SURGERY – A SINGLE-CENTER STUDY IN LOW-INCOME COUNTRY

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This single-center study's main objectives were to analyze, especially in low-income countries the perioperative complications following minimally invasive surgery for uterine cancer, as well as the overall survival and recurrence rate. A retrospective analysis of the medical records of 117 patients with endometrial cancer who underwent laparoscopic and laparotomic operations was conducted. There were 95 endometrial cancer patients who had laparoscopic pelvic lymph node dissection and hysterectomy. The study excluded 22 women who had undergone laparotomic hysterectomy with dissection of the pelvic and aortic lymph nodes. There was no conversion from laparoscopy to laparotomy during the surgical process. A shorter hospital stay ( $\leq 4$  days) was 74 (77.9 %). The longest observation duration was 77 months. The recurrence was recorded in twelve patients (12.6 %). During the follow-up period, survival data were gathered, and they revealed 83 (87.4 %) patients alive. So, laparoscopy demonstrates positive outcomes in the treatment of uterine-confined endometrial carcinoma.

**Key words:** uterine cancer, endometrial carcinoma, laparoscopy, laparotomy, perioperative complications.

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## ХІРУРГІЧНІ ТА ОНКОЛОГІЧНІ РЕЗУЛЬТАТИ МАЛОІНВАЗИВНИХ ОПЕРАТИВНИХ ВТРУЧАНЬ У ЖІНОК З РАКОМ ЕНДОМЕТРІЇ – ОДНОЦЕНТРОВЕ ДОСЛІДЖЕННЯ У КРАЇНІ З НИЗЬКИМ ДОХОДОМ

Основною метою цього одноцентрового дослідження були аналіз, періопераційних ускладнень після малоінвазивної хірургії раку матки, а також загальної виживання та частоти рецидивів, в особливості, у країнах з низьким рівнем доходу. Було проведено ретроспективний аналіз медичних карток 117 пацієток з раком ендометрію, які перенесли лапароскопічні та лапаротомні операції. 95 пацієткам з раком ендометрію було виконано лапароскопічну тазову лімфаденектомію та гістеректомію. 22 жінки перенесли лапаротомічну гістеректомію з диссекцією тазових та аортальних лімфатичних вузлів. Конверсії з лапароскопії на лапаротомію в ході хірургічного процесу не було. Найкоротший термін госпіталізації ( $\leq 4$  дні) був у 74 (77,9 %) випадках. Найтриваліший термін спостереження становив 77 місяців. Рецидив зафіксовано у дванадцяти пацієток (12,6 %). Протягом періоду спостереження було зібрано дані про виживання, які виявили, що 83 (87,4 %) пацієтки вижили. Таким чином, лапароскопія демонструє позитивні результати лікування ендометріальної карциноми, обмеженої маткою.

**Ключові слова:** рак матки, ендометріальна карцинома, лапароскопія, лапаротомія, періопераційні ускладнення.

Open laparotomy has historically been used for full surgical staging of endometrial carcinoma (EC) [2]. This procedure includes total abdominal hysterectomy (TAH), bilateral salpingo-oophorectomy (BSO), bilateral pelvic lymph node dissection (BPLND), and peritoneal cytology [3]. Traditionally, patients underwent exploratory laparotomy through a midline incision. Surgical techniques for endometrial carcinoma have changed over time [5, 12]. Furthermore, different institutions and periods have changed how retroperitoneal lymph node evaluation is done. Laparoscopic surgery (LPS) is becoming a more appealing option to traditional methods for treating gynecologic malignancies, particularly endometrial tumors, due to its advantages. Laparoscopic surgery is gradually taking the place of laparotomy as the standard method of treating endometrial cancer. Numerous studies have demonstrated that laparoscopic surgery may be preferred to open surgery since it has decreased risk of adhesions following surgery, a shorter duration of hospitalization, reduced problems following surgery, less discomfort, and improved quality of life as a result of a quicker recovery [2, 3, 11]. Obesity, hypertension, and diabetes are common co-morbidities among endometrial cancer patients. Patients undergoing abdominal surgery are consequently at a higher risk of complications [8]. Laparoscopic procedures overcome the drawbacks mentioned before. The laparoscopic method is not considered to alter the incidence of recurrences or the overall survival, even though long-term risks of recurrence and survival following using uterine manipulator for endometrial cancer are not detailed reported. By using a uterine manipulator, cranial traction on the uterus is ensured, leading to an easy and more comfortable surgery [12]. Due to direct contact with the tumor in the endometrial cavity and the potential for malignant cells to spread, the use of an intrauterine manipulator has been criticized for possibly worsening oncologic outcomes [6, 7, 9].

This single-center study's main objectives were to analyze the perioperative complications following minimally invasive surgery (MIS) for endometrial cancer in a group of 95 women, as well as the overall survival and recurrence rate.

**The purpose** of the study was to analyze, especially in low-income countries, the perioperative complications following minimally invasive surgery for uterine cancer, as well as the overall survival and recurrence rate.

**Materials and methods.** This retrospective investigation was performed at the Department of Oncology at Azerbaijan Medical University. A retrospective review of the records of 117 patients with endometrial cancer who had surgery between 2018 and 2024 was carried out. The study's inclusion criteria included cases with both endometrioid and non-endometrioid histological types of cancer, patients with histological grades I–III, and patients having their pelvic and periaortic lymph nodes assessed. 117 patients had laparoscopic (LPS) and laparotomic (LPT) procedures performed. Preoperatively, the doctor or the patient decides between LPS and LPT approaches based on the patient's parameters and preferences. There were 95 (n=95) endometrial cancer patients who had pelvic lymph node dissection and LPS hysterectomy. The study excluded 22 women (n=22) who had undergone LPT hysterectomy with dissection of the pelvic and aortic lymph nodes.

Table 1

**Clinicopathological and Survival Outcomes**

Parameters	Laparoscopy (n=95)
Age (years)	
≤50	9 (9.5 %)
>50	86 (90.5 %)
Menopausal Status	
Premenopausal	11 (11.6 %)
Postmenopausal	84 (88.4 %)
BMI (kg/m <sup>2</sup> )	
≤30	26 (27.4 %)
>30	69 (72.6 %)
Operation time in minutes	
≤120 minutes	30 (31.6 %)
>120 minutes	65 (68.4 %)
Pelvic lymphadenectomy n (%)	
	92 (96.9 %)
Para-aortic lymphadenectomy n (%)	
	0
FIGO stages (n)	
IA	45 (47.4 %)
IB	43 (45.3 %)
II	0 (0.0 %)
IIIA	2 (2.1 %)
IIIC1	4 (5.7 %)
IIIC2	0 (0.0 %)
IVB	1 (1.1 %)
Days of hospital stay	
≤4 days	74 (77.9 %)
>4 days	21 (22.1 %)
Perioperative complication (n)	
Febrile morbidity	1
Ureteral fistula	1
Haemorrhage	0
External iliac artery injury	1
Conversion to laparotomy	0
Recurrence n (%)	
No	83 (87.4 %)
Yes	12 (12.6 %)
Survival	
Alive	83 (87.4 %)
Death	12 (12.6 %)

A gynecological oncology expert performed the entire surgical operation. Every person received TH and BSO. Moreover, 92 patients had pelvic lymphadenectomy (PLND) procedures. PLND involves the removal of lymphatic tissues around external and common iliac vessels and from the obturator fossa. The updated FIGO staging systems of 2009 and 2023 were used to classify patients with EC [4].

Evaluations were performed on the patients' clinical and pathological features, age, histological type, grade, myometrial invasion status, tumor size, lymphovascular space invasion (LVSI), ovaries and cervix involvement, and lymphatic metastases.

SPSS (Statistical Package for Social Sciences) 20 for Windows (IBM SPSS Inc., Chicago, IL) was used for the statistical evaluation. The Kolmogorov-Smirnov test assessed whether the measured data conformed to a normal distribution. The variables' n and percentage values were provided. Categorical data were compared using Fisher's Exact Test. The study employed logistic regression analysis to ascertain the impact of the participants' parameters on survival and recurrence. Statistical analysis results were deemed significant if the p-value was less than 0.05.

**Results of the study and their discussion.** The study included 95 women with endometrial carcinoma who had laparoscopic hysterectomy at the Department of Oncology of Azerbaijan Medical University from 2018 to 2024. 95 patients were treated via minimally invasive surgery and observed for endometrial cancer as long as the study period lasted. 25 (26.3 %) of women had grade I, 38 (40.0 %) had grade II, and 30 (31.6 %) had grade III endometrioid endometrial tumors. Tumor grade of 2 patients was unknown. The most common surgical procedure was laparoscopic hysterectomy+BSO+BPLND in ninety-two (96.9 %) patients. Tables display all demographic, clinical, and histopathological characteristics (Tables 1, 2).

Table 2

**Histological features in patients with endometrial carcinoma**

Parameters	Laparoscopy (n=95)
Tumor histology n (%)	
Endometrioid	90 (94.7 %)
Others	5 (5.3 %)
Grade (n)	
1 (Well differentiated)	25 (26.3 %)
2 (Moderately differentiated)	38 (40.0 %)
3 (Poorly or undifferentiated)	30 (31.6 %)
4 (Undifferentiated)	2 (2.1 %)
Primary Tumor Size (Cm)	
≤2 cm	41 (43.2 %)
>2 cm	54 (56.8 %)
Myometrial Invasion (MI)	
No	12 (12.6 %)
≤50%	40 (42.1 %)
>50%	43 (45.3 %)
Lymphovascular Space Invasion	
No	36 (37.9 %)
Yes	59 (62.1 %)
Adnexal Involvement	
No	92 (96.8 %)
Yes	3 (3.2 %)
Cervical Involvement	
No	94 (98.9 %)
Yes	1 (1.1 %)
Retroperitoneal Lymph Node Metastasis	
No	89 (93.7 %)
Yes	6 (6.3 %)
Adjuvant treatment	
No	29 (30.5 %)
Yes	66 (69.5 %)
Adjuvant treatment methods	
Pelvic Radiotherapy	1 (1.5 %)
Pelvic RT+Brachytherapy	21 (31.8 %)
Pelvic RT+Brachytherapy+chemotherapy	8 (12.1 %)
Brachytherapy	31 (47.0 %)
Pelvic RT+ chemotherapy	0 (0.0 %)
Chemotherapy	5 (7.6 %)

Premenopausal and postmenopausal women were 11 (11.6 %) and 84 (88.4 %), respectively. 69 (72.6 %) of the patients had a body mass index (BMI)>30. Of the patients, 88 (92.7 %) had FIGO stage I

tumors, and 57 (56.6 %) had tumors larger than 2 cm. Of the patients, myometrial invasion  $\leq 50$  % in 40 (42.1 %), myometrial invasion  $>50$  % in 43 (45.3 %), and only 12 (12.6 %) did not have myometrial invasion. Six patients (6.3 %) had lymph node metastases, 59 patients (62.1 %) had LVSI, 3 patients (3.2 %) had adnexal involvement, 1 patient (1.1%) had cervical involvement. There was no conversion from laparoscopy to laparotomy during the surgical process.

The duration of the procedure over 120 minutes in laparoscopy was in 65 (68.4 %). Additionally, a shorter hospital stay ( $\leq 4$  days) was in 74 (77.9 %). In the study population, the most extended observation duration was 77 months. The recurrence was recorded in twelve patients (12.6 %). During the follow-up period, survival data were gathered, revealing 83 (87.4 %) patients alive.

The study's findings showed that laparoscopic procedures have adequate efficacy, safety, and survival rates in patients with uterine-confined endometrial cancer (Fig. 1).

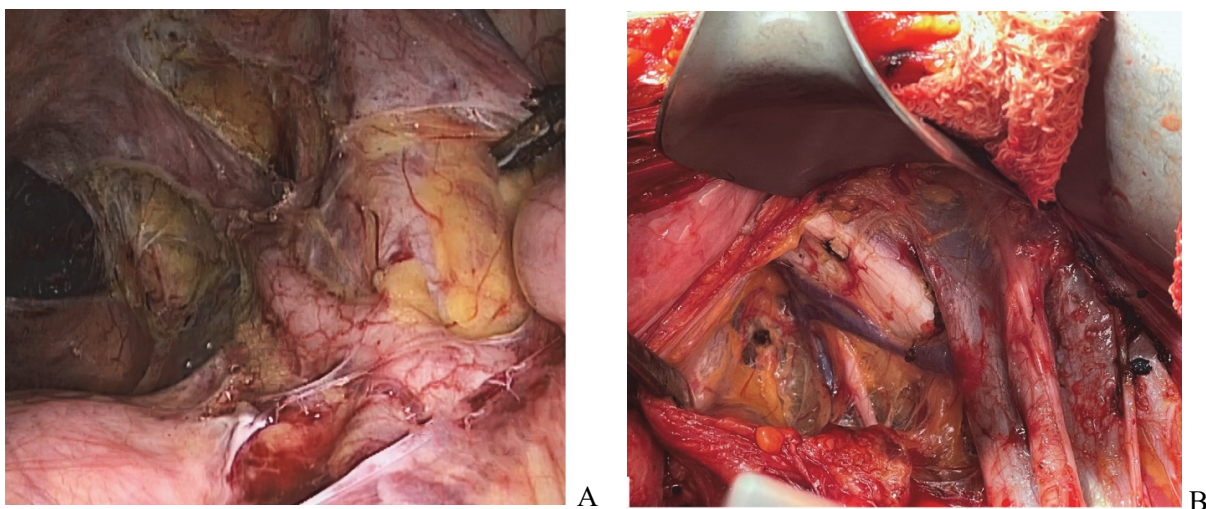


Fig. 1. Appearance of right ureter after laparoscopic pelvic lymph node dissection (A). Appearance of completed pelvic lymphadenectomy after open surgery (B).

For obese women, laparoscopy should be the first option to decrease the incidence of wound infections (Fig.2).

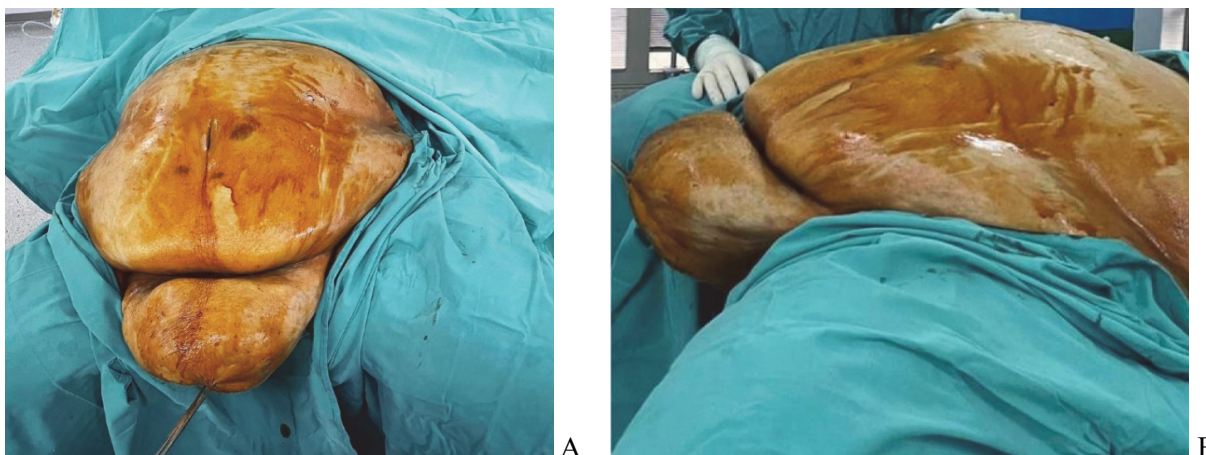


Fig. 2. Positioning of the morbidly obese patient for laparoscopic surgery. Front view (A), side view (B).

This study also demonstrated the benefits of MIS for postoperative recovery. Less ileus, less bleeding risk, and fewer surgical infections were observed in the patients who had undergone laparoscopic surgery. Even though the procedure took somewhat longer, this led to the patients' early hospital discharge. The mean duration of the operation in the other study was  $171.48 \pm 94$  minutes in the LSC group and  $176.32 \pm 84$  minutes in the LAP group ( $p=0.335$ ) [2]. Our study results are similar to two prominent randomized controlled trials. Studies that have already been performed on the use of laparoscopy in patients with EC have found that the treatment can be done minimally invasively and that recovery is quicker than with open procedures. Because of the advantages of minimally invasive techniques, laparoscopy is employed more frequently in gynecologic oncology [3]. After an adequate level of experience is reached, a patient's high BMI should not be considered an obstacle. As we noted earlier, for obese women, laparoscopy should be the first option. While there is a continuing discussion over doing lymph node



dissection for early-stage EC, all research patients underwent pelvic lymph node dissection. The number of retroperitoneal lymph nodes removed from patients in our study was similar to records in the literature, and it was also adequate for staging [4]. As said in the current study's complication rates, patients who underwent laparoscopy showed lower rates of febrile morbidity, ileus, and urinary tract infections. Laparoscopy was linked to a noticeably decreased rate of postoperative complications based on randomized controlled trials that assessed the perioperative complications [1, 10].

There are several restrictions on our study. The study's first drawback is that its population is heterogeneous, and it is retrospective in nature. Modifications in surgical methods could have impacted results during the course of the 6-year study. The study's modest sample size and single-center design constitute its second drawback. Additional restrictions on the patient population include excluding patients who cannot be reached by phone from the study and incomplete records found in files scanned in the hospital registration system. Therefore, greater sample sizes and multicenter, randomized controlled investigations should validate the findings of this investigation. Further research is necessary to evaluate the initial experiences of surgeons using minimally invasive surgery in gynecologic oncology, especially for young surgeons in underdeveloped countries, even though meta-analyses and randomized control trials have been performed to evaluate the benefits of laparoscopic surgery in the management of endometrial carcinoma.

### Conclusion

According to our study, laparoscopy plays an important role in the treatment of uterine-confined endometrial carcinoma for surgeons who have experience with commencing gynecologic cancer surgery. In these cases, laparoscopic surgery may be conducted with a comparable level of lymph node dissection to laparotomy, shorter hospital stays, and fewer postoperative infections. Although it is essential to confirm the results of our study with prospective randomized controlled studies, our results can be a valuable reference in clinical settings. MIS should be encouraged in treating endometrial cancer nowadays in all low-income countries.

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