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RESEARCH ARTICLE

Comparison of Laparoscopic and Open Myomectomy in a Tertiary Hospital: A Retrospective Cohort Study

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ABSTRACT

Objective: Uterine fibroids have two common symptoms: pelvic pain and irregular uterine bleeding. Surgical treatment should be applied in cases where medical treatment fails or cannot be applied. Myomectomy can be performed hysteroscopically, laparoscopically, robotically, or laparotomically. This retrospective study aims to compare the results of laparoscopic and laparotomic myomectomy cases performed in our clinic.

Materials and Methods: A total of 168 patients who underwent 84 laparoscopic and 84 open myomectomies were included in the study. Demographic characteristics (mean age, parity, BMI), indications for myomectomy, duration of operation, complications, pain VAS score, estimated blood loss hospital stay, and the number and diameter of myomas were compared. Before surgery, each patient gave their signed informed consent. SPSS for Windows 24 (SPSS Inc. Chicago, IL) was utilized. The significance threshold of 0.05 was accepted.

Results: The mean operative time in the LM group was significantly longer than in the OM group (p=0.002). The hemoglobin drop was significantly lower in the LM group than in the OM group (p=0.005). The length of hospital stay was significantly different in the laparoscopic myomectomy group (p=0.012). Postoperative VAS scores were significantly different in the LM group (p=0.00).

Conclusion: In selected cases, compared to open myomectomy, laparoscopic myomectomy resulted in less loss of blood, a brief stay in the hospital, and less pelvic pain.

Keywords: Clinical results, laparoscopy, myomectomy, open surgery

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INTRODUCTION

Uterine fibroids are the most common type of pelvic tumor. It originates from either the uterine smooth muscle or the muscular layer of the arteries. The prevalence of this condition is clinically recognized in 50–70% of women during their lifetimes.[1] Uterine fibroids often do not cause any symptoms and do not require surgery. Typical indications encompass discomfort in the pelvic region and sporadic bleeding from the uterus.[2] The most prevalent causes of hysterectomy are uterine myoma and its associated complications.[3] The condition can lead to infertility, recurrent miscarriages, preterm birth, and urinary incontinence.[4–6] The primary diagnostic technique for uterine fibroids is transabdominal and transvaginal ultrasonography, which exhibits a sensitivity ranging from 90% to 99%. The text is referenced by number.[7] Fibroids are categorized into three groups based on their location within the uterus: subserosal (extending beyond the uterus), intramural (located within the myometrium), and submucous (protruding into the uterine cavity). Uterine fibroids have been categorized into eight subgroups by the International Federation of Obstetrics and Gynecology (FIGO), based on the position of the uterine wall.[8] A study was conducted to determine the location subgroup of the myoma based on these stage criteria. Surgical intervention is indicated when medical treatment becomes ineffective or infeasible. Hysterectomy offers a conclusive resolution.[9] There are various procedures available for myomectomy, including hysteroscopic, laparoscopic, robotic, or laparotomic approaches.[10] Hysteroscopic excision is the optimal choice for treating type 0 and type 1 submucosal fibroids.[11] The se-

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lection of the myomectomy procedure is determined by various aspects, including the position, dimensions, and quantity of leiomyomas, as well as the proficiency of the medical staff. Although laparoscopic myomectomy is frequently favored over open myomectomy, these characteristics still contribute to the determination of the most appropriate method.[12]

The choice of myomectomy technique is influenced by factors such as the location, size, and number of leiomyomas, as well as the expertise of the medical team. While laparoscopic myomectomy is often preferred over open myomectomy, these factors still play a role in determining the most suitable approach.[12]

This retrospective study aims to compare the results of laparoscopic and laparotomic myomectomy cases performed in our clinic.

MATERIALS and METHODS

The study involved a total of 168 participants who underwent either laparoscopic or open myomectomies at Kanuni Training and Research Hospital from 2016 to 2022. Specifically, there were 84 cases of laparoscopic myomectomy and 84 cases of open myomectomy. The subjects were categorized into two groups: laparoscopic myomectomy (LM) and open myomectomy (OM) groups. A retrospective comparison was conducted on the case results. The study recorded several case data, including the average age, parity, body mass index (BMI), history of previous abdominal surgery, subsequent procedures conducted, justifications for myomectomy, duration of operation, and the number and width of myomas. Comparison was made between intraoperative and postoperative complications, visual analog score (VAS), anticipated blood loss, and hospital stay. The expected amount of blood loss was calculated by subtracting the hemoglobin levels before and after the surgery. Hemoglobin levels were assessed before surgery and again 24 hours post-surgery. The surgical duration refers to the interval from the initial umbilical incision to the subsequent removal of the major trocar. The diameter of the myoma was assessed using a tape measure in the pathology laboratory after the surgery. The duration of the patient's hospitalization was calculated based on the period between the day of the procedure and the day of discharge. Before the operation, and six hours post-operation, all patients were administered 1 gram of cefazolin intravenously. An injection of 0.4 ml of Enoxaparin was administered subcutaneously 8 hours before the procedure to prevent thromboembolism. The treatment was delivered daily until the patient was discharged. All patients had their Foley catheter removed 12 hours post-operation without any issues. Patients who did not experience any difficulties with bowel movements or urination were discharged following the surgery. All operations were conducted by the same skilled crew.

Myomectomy Inclusion Criteria

Female patients who underwent laparoscopic or laparotomy myomectomy for benign reasons had a single subserosal or at least half subserosal intramural myoma less than 10 cm or had three or fewer myomas not exceeding 4 cm and had complete records included in the study.[13]

Exclusion Criteria

Patients who underwent hysteroscopic or transvaginal myomectomy, those with malignancies that were either suspected or proven, and those whose records contained insufficient information were also removed from the study.

Surgical Technique

The same surgical team performed all of the procedures under general anesthesia and in the dorsal lithotomy position. Each patient had a Foley catheter inserted into their bladders and an orogastric tube inserted into their stomachs.

Laparoscopic Myomectomy

After a 5 mm vertical incision, the umbilicus was raised using laundry clamps. A Veress needle was used to establish a pneumoperitoneum (14 mmHg pressure) before inserting a 10-mm trocar. The main trocar was put at the midline of the umbilicus and the xiphoid division, generally known as the Lee-Huang location, in persons who had previous abdominal surgery and were suspected of having periumbilical adhesions. To gain access to the avascular lower quadrants of the abdomen, the second and third incisions were made 3 cm medial to the right and left anterior superior iliac spines, respectively. The incisions were then inserted with 5-mm trocars. A third 5-mm trocar was put in the midline of the suprapubic area, six cm above the pubic symphysis. The transverse incision was done using monopolar needle cautery until the myoma capsule became accessible. The fibroid was removed from the uterus using a tenaculum, and the uterus was evaluated for additional fibroids. The uterine reconstruction was sutured with 1–0 polydioxanone sutures, leaving no gaps. If the suture got into the uterine cavity during enucleation, a 3–0 vicryl (Polyglactin 910, Ethicon, SpA) suture was used to fix the hole.

Open Myomectomy Technique

The transverse incision was created using monopolar needle cautery until it reached the myoma capsule. The fibroid was removed from the uterus with a tenaculum, and the uterus was evaluated for additional fibroids. The uterine recon-

Table 1. Demographic and clinical features of participants

Demographic features	LM (n=84)			OM (n=84)			p
	n	%	Mean±SD	n	%	Mean±SD	
Age (year)			36.56±3.32			37.81±3.13	0.634
Parity (number)			1.91±1.72			2.06±1.61	0.059
BMI (kg/m^2)			27.76±1.28			29.02±1.16	0.061
The mean number of leiomyoma			3.00±0.91			3.00±2.42	0.082
The mean diameter of leiomyoma (mm)			68.00±1.62			69.00±2.02	0.071
Location of fibroids							
Fundus	24	28.57		42	50.00		0.001*
Anterior	15	17.85		20	23.80		0.235
Posterior	38	45.23		13	15.47		0.001*
Lateral	7	8.33		9	10.71		0.346
Indication							
Abnormal uterine bleeding	44	52.389		52	61.90		0.435
Infertility	22	26.19		12	14.28		0.001*
Pelvic pain	14	16.66		16	19.04		0.273
Urinary complaints	4	4.76		4	4.76		0.502

*: Statistically significant. LM: Laparoscopic myomectomy; OM: Open myomectomy; SD: Standard deviation; BMI: body mass index

struction was sutured with 1–0 polydioxanone sutures without leaving any gaps. When the uterine cavity was damaged during enucleation, a 3–0 vicryl (Polyglactin 910, Ethicon, SpA) suture was used to close the hole.

Informed Consent

As the study was retrospective, patient acceptance was not required to participate in the trial or publish the results. Before surgery, each patient gave their signed, informed consent.

Ethics Approval

The ethics committee of the Kanuni Sultan Süleyman Training and Research Hospital gave its approval to this study, which complied with the 2013 revision of the Declaration of Helsinki (Application No. KAEK/2023.04.53).

Statistical Analysis

The software SPSS for Windows 24 (SPSS Inc., Chicago, IL) was used. Numbers and percentages were used to depict categorical measurements, and the mean and standard deviation were used to summarize continuous measurements. The chi-square test statistic was used to compare categorical variables. The t-test statistic for independent samples was established to compare continuous data between independent groups. The 0.05 significance level was accepted.

RESULTS

Our clinic performed a total of 168 myomectomy surgeries from 2016 to 2022. A total of 84 patients (50%) underwent laparoscopic myomectomy, whereas the remaining 84 cases (50%) underwent open myomectomy.

Table 1 displays the precise locations of fibroids. The LM and OM groups exhibited similarities in terms of average age, parity, history of abdominal surgery, average number, and average size of fibroids. Laparoscopic surgery was more commonly preferred in infertile patients and there was a significant difference (p=0.001). A significantly higher number of laparoscopic surgeries were conducted for posteriorly situated leiomyomas (p=0.001). The open myomectomy procedure was preferred for leiomyomas located in the fundus, with a statistically significant p-value of 0.001. The surgery results are shown in Table 2. The average duration of operations in the LM group was significantly longer compared to the OM group (128.85±36.47 and 79.18±.12.23 min., respectively; (p=0.002). The mean hospitalization duration for the two groups was 2.25±0.80 and 3.82±1.20 days, respectively. There was a significant difference between the groups, with the LM group having a shorter hospital stay (p=0.012). The decrease in hemoglobin levels was significantly smaller in the LM group (9.11±2.02 and 8.20±1.79 mg/dL, (p=0.005)

Table 2. Results of operations

	LM (n=84)			OM (n=84)			p
	n	%	Mean±SD	n	%	Mean±SD	
Duration of operation (min)			128.85±36.47			79.00±18.12	0.002*
Hospital stay (d)			2.25±0.80			3.82±1.20	0.012*
Pre-operative hemoglobin(gr/dL)			10.31±1.80			10.24±1.92	0.067
Post-operative hemoglobin (gr/dL)			9.21±2.02			8.00±1.79	0.005*
Post-operative VAS pain score			3.40±0.62			5.82±1.64	0.001*
Blood transfusion	2.00	0.02		7.00	0.08		0.002*
Febrile morbidity	1.00	0.01		5.00	0.06		0.022*
Conversion to laparotomy	1.00	0.01		0.00	0.00		0.063
Ileus	1.00	0.01		1.00	0.01		0.966
Relaparotomy	1.00	0.01		2.00	0.02		0.245
Pregnancy rate in one year after surgery	5.00	33.33		4.00	30.77		0.494

*: Statistically significant. d: Day; min: Minute; gr: Gram; dL: Deciliter; VAS: visual analog score

compared to the OM group. The number of patients requiring blood transfusions was significantly different between the LM group (two patients) and the OM group (seven patients), with a p-value of 0.002. There was a notable disparity in VAS pain levels at the 24th postoperative hour between laparoscopic and open myomectomy. The VAS scores for the two groups were 3.40±0.62 and 5.82±1.64, respectively. These scores showed a significant difference (p=0.001).

DISCUSSION

This study conducted a comparison between the outcomes of laparoscopic myomectomy and open myomectomy techniques. The laparoscopic myomectomy technique resulted in reduced blood loss and a shorter duration of hospitalization. Furthermore, there was a notable disparity in laparoscopic myomectomy regarding VAS pain scores 24 hours after the surgery. However, the laparoscopic myomectomy approach required a longer amount of time to complete the procedure. A 2009 meta-analysis and prospective randomized trial compared laparoscopic myomectomy and open myomectomy. These studies found that although the surgery time was greater for laparoscopic myomectomy, there was less drop in hemoglobin compared to open myomectomy.[14,15] We discovered in this study that the hemoglobin decline was reduced, but the duration of the operation was extended compared to open myomectomy. Technological developments in laparoscopic instruments and major improvements in surgical materials, including knot-free sutures, have made laparoscopic myomectomy easier and more feasible Numerous studies have demonstrated that laparoscopic myomectomy has a lower febrile morbidity than open myomectomy.[16–18] Recovery after laparoscopic procedures is substantially faster than that of laparotomies because peritoneal macrophage activity is maintained at a high level and inflammatory cytokines are reduced.[19–21] Less discomfort was felt by women who underwent laparoscopic myomectomy than by those who had open myomectomy in the sixth and 48th hours after surgery. At 48 hours after laparoscopic myomectomy, the mean VAS pain score for women is approximately 3 to 1 point lower on a scale of 0 to 10.[22–24] The study found that the Visual Analog Scale (VAS) values were considerably reduced in the LM group after 24 hours. A greater risk of uterine perforation is associated with laparoscopic myomectomy following myomectomy during pregnancy.[25–27] Contrary to the findings of other studies, uterine rupture does not differ between pregnancies that have undergone myomectomy and those that have not.[28,29] Pregnancy-related uterine perforation follow-up myomectomy was not feasible due to the retrospective nature of our study and the short-term follow-up period. It was discovered that minimally invasive approaches resulted in a higher rate of spontaneous pregnancies following myomectomy; therefore, these should be performed initially.[30,31] In this study regarding pregnancy rates, no statistically significant difference could be identified. By utilizing a morcelator during laparoscopic myomectomy, an unforeseeable risk of leiomyosarcoma of 0.06% is introduced. Utilizing a closed endobag for morcellation is advised to decrease the risk of dissemination during the procedure.[32]

Leiomyosarcoma was not identified in any of the cases included in this investigation. It has been reported that the incidence of severe complications following laparoscopic myomectomy ranges from 3.5% to 10%.[33,34] The complication rates in our study were 17.85% in the OM group and 7.14% in the LM group. Laparoscopic myomectomy may encounter technical challenges due to the quantity, location, and dimensions of leiomyomas.[35] It is stated that OM should be preferred to LM when four or more serious or intramural leiomyomas or leiomyomas larger than 10 cm need to be removed from the abdominal cavity.[36]

Even though posterior myomas require more time-consuming surgery, laparoscopic myomectomy is a better surgical option than laparotomic myomectomy when carried out by skilled surgeons in a limited number of carefully selected cases in terms of the location, size, and number of leiomyomas that have been identified.

Limitations

The primary limitation of the study is the substantial variation in the number and size of myomas between groups that underwent myomectomy. The additional limitations are the single hospital data and its retrospective nature

CONCLUSION

Laparoscopic myomectomy was associated with reduced blood loss, a shorter hospital stay, and lessened distress in specific cases when compared to open myomectomy.

Disclosures

Ethics Committee Approval: The study was approved by the İstanbul University of Health Sciences Kanuni Sultan Süleyman Training and Research Hospital Clinical Research Ethics Committee (No: 2023.04.53, Date: 03/05/2023).

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