

Laparoscopic Versus Laparotomic Myomectomy: A Retrospective Cohort Study

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ABSTRACT

Objective: Leiomyomas are the most common tumors of the female pelvis and uterus. Surgical excision of leiomyomas is still the most accepted treatment. This surgery can be done by laparotomy (LT) or minimally invasive approach. It is known that laparoscopy (LS) is superior to LT in terms of bleeding, postoperative pain control, and fast recovery. This study aims to report a 7-year single-center experience of patients who underwent myomectomy.

Materials and Methods: A total of 291 patients who underwent myomectomy, 61 in the LS and 230 in the LT were included in the study. Their clinical and operative data were searched retrospectively using patient files and hospital's database.

Results: The postoperative analgesic requirements of the patients were significantly higher in LT group than LS group. Hospital stay was longer in the LT group. Postoperative hemoglobin and hematocrit levels of the patients in the LT group were significantly lower ($p=0.010$). The endometrial cavity was entered more frequently into LT group ($p=0.004$).

Conclusion: Laparoscopic myomectomy was found to be superior to laparotomic myomectomy in terms of decrease in postoperative hemoglobin level, need for postoperative analgesia, and hospital stay. In addition, LS can be superior to LT about entering to endometrial cavity because of better visualization of endomyometrium.

Keywords: Laparoscopy, laparotomy, leiomyoma, myomectomy, surgery

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INTRODUCTION

Leiomyomas are the most common tumors of the female pelvis and uterus. The incidence is 20–25% among women, but this rate rises to 70–80% in studies conducted with histological and sonographic evaluation.^[1] Although leiomyomas are benign masses, they usually cause abnormal uterine bleeding, pelvic pain, or infertility. Therefore, patients with leiomyomas usually require treatment.

Although many medical treatment modalities have been evaluated for the treatment of leiomyomas, none of them were successful due to the failure or adverse effects of the drugs.^[2,3] Therefore, surgical excision of leiomyomas is still the most accepted treatment method. Since leiomyomas are

more common in women of reproductive age, myomectomy, a uterus-sparing method instead of hysterectomy, is a good choice for these patients.

Surgical practices have changed over the years, and minimally invasive or endoscopic methods have replaced traditional approaches. The laparoscopic procedure provides many advantages over laparotomic surgery; therefore, laparoscopy (LS) is widely used in all age groups today for both diagnosis and treatment. LS has also become a frequently preferred method in myomectomy.^[4,5]

This study aimed to compare patient characteristics and short-term results of myomectomies performed with laparotomic or laparoscopic methods over 7 years in the gynecology department of our tertiary referral center.



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MATERIALS and METHODS

Following the institutional ethics committee's approval (March, 21 2017–2017–560), patients who underwent laparoscopic and laparotomic myomectomy in the department of obstetrics and gynecology of a tertiary referral center between March 01, 2010, and March 01, 2017, were included in the study. The patients' data were collected retrospectively from the hospital's electronic database and medical records. The study was carried out according to the Helsinki Declaration.

Patients with a maximum number of four subserous or intramural leiomyomas that were >3 cm and <10 cm in size were included in the study. The patients who underwent myomectomy with the hysteroscopic or transvaginal method, operated on with the pre-diagnosis of adnexal mass and suspected malignancy, and underwent frozen section examination during the operation were excluded from the study. Demographic characteristics of the patients, indications for surgery, gross and histopathological features of leiomyomas, complications, duration of surgery, length of hospital stay, analgesic requirements, hemoglobin and hematocrit levels, and blood transfusion requirements were recorded. The findings were analyzed in two groups: LS and laparotomy (LT).

Statistical Analysis

The data were analyzed using Number Cruncher Statistical System 2007 Statistical Software (Utah, USA) package program. The independent t-test was used to compare paired groups, and the Chi-square test was used to compare qualitative data. Repeated measurements of multiple groups were analyzed with the paired t-test. The descriptive variables were presented as mean±SD and numbers (%). The results were evaluated at the significance level of $p < 0.05$.

RESULTS

Surgical myomectomy was performed in a total of 416 patients, 66 laparoscopies and 350 laparotomies, over 7 years in our hospital. Three of the patients who were operated on laparoscopically were excluded because the leiomyomas were smaller than 3 cm in size, and two of them were detected incidentally during endometriosis surgery. Of the patients who underwent laparotomic myomectomy, 73 were excluded because the size and number criteria could not be met. An addition of 40 patients were excluded due to the need of preoperative blood transfusion because of anemia, 6 cases because of vertical incision, and 1 patient due to warfarin usage. A final number of 61 patients in the LS group and 230 patients in the LT group were included in further evaluation.

The general characteristics of the patients are presented in Table 1. The mean age of the patients who underwent laparotomic myomectomy was significantly higher than those who underwent laparoscopic surgery ($p = 0.003$). The parity of patients who underwent laparotomic myomectomy was significantly higher than those who underwent laparoscopic myomectomy ($p < 0.001$). While laparoscopic surgery was preferred more frequently in nulliparous patients, laparotomic myomectomy was the choice in patients who delivered vaginally or by cesarean section ($p < 0.001$). While laparotomic myomectomy was applied more frequently in patients who had not had any previous abdominal surgeries or had been operated only once, laparoscopic myomectomy was more frequently preferred in patients who had 2 or more prior abdominal surgeries ($p = 0.045$). While significantly more laparotomic surgeries were performed in patients who underwent myomectomy due to abnormal uterine bleeding, pelvic pain, or compression, the laparoscopic method was preferred primarily in patients who underwent surgery for infertility ($p < 0.001$).

Gross and histopathological features of excised myomas are presented in Table 2. While laparotomic surgery was preferred more frequently in single myomas, the laparoscopic method was the choice in the presence of two or more myomas ($p = 0.023$). Substantially more laparoscopic surgery was performed in posteriorly located myomas ($p = 0.010$); however, there was no difference in terms of both methods in other locations ($p > 0.05$).

The postoperative results of the cases are presented in Table 3. The endometrial cavity was entered more frequently in laparotomic myomectomies ($p = 0.004$). Although the operation time was significantly shorter in laparotomic myomectomies, the postoperative analgesic requirements of the patients were significantly higher than in laparoscopic surgery, and the hospital stay was longer. While there was no difference between the two study groups in terms of hemoglobin and hematocrit levels in the preoperative period, the values of the patients who underwent laparotomic myomectomy in the postoperative period were significantly lower ($p = 0.010$).

Bleeding or widespread ecchymosis at the trocar entry sites was observed as a complication in three (4.92%) cases operated with the laparoscopic method. Complications at various levels were encountered in 14 (6.09%) of the patients who had undergone laparotomic myomectomy. Wound infection was observed in seven of these patients, the subcutaneous hematoma was observed in four patients, the intestinal injury was observed in two patients, and bladder injury was observed in one patient.

Table 1. General characteristics of the patients

	LS (n=61)		LT (n=230)		p
	n	%	n	%	
Age	38.52±7.07		40.94±5.19		0.003*
Parity	0.75±1.03		2.08±1.59		<0.001*
Birth way					
Nulliparous	33	58.93	43	19.20	<0.001*
Vaginal	18	32.14	142	63.39	
Cesarean	5	8.93	39	17.41	
Previous surgery					
None	38	76.00	167	72.61	0.045*
1	12	24.00	35	15.22	
2	0	0.00	20	8.70	
3	0	0.00	8	3.48	
Indications					
Abnormal bleeding	18	29.51	124	53.91	<0.001*
Infertilit	33	54.10	40	17.39	
Pelvic pain and compression	10	16.39	66	28.70	

*: p<0.05. LS: Laparoscopy; LT: Laparotomy

DISCUSSION

Today, laparoscopic surgery is the first choice in many gynecological procedures. It has already been shown that LS is superior to LT in terms of intraoperative bleeding, postoperative pain control, fast recovery, and duration of hospital stay.^[4] However, the learning curve of the LS technique is longer than the learning curve of conventional surgical methods.^[6] Although performing myomectomy using LS is an operation that is technically difficult and requires experience, currently with the technological developments in laparoscopic instruments, the use of sutures that do not require knots, and the availability of experienced surgeons it is performed more frequently.^[7]

Localization, size, and number of leiomyomas are among the factors that cause technical difficulties with laparoscopic myomectomy. Mais et al.^[8] stated that LT should be preferred instead of LS if more than four or larger than 6 cm leiomyomas need to be removed from the abdominal cavity .

Following laparoscopic myomectomy, less blood loss, less postoperative hemoglobin decrease, less postoperative pain, reduced use of analgesia, shorter hospital stay, and faster recovery are observed when compared to laparotomic myomectomy.^[9-14] Two meta-analyses conducted in 2009 and 2014 confirmed these findings.^[4,5] Similarly, according to the

results of our study, less postoperative analgesic requirement and shorter hospital stay were observed in patients in the LS group compared to the LT group. Furthermore, the mean postoperative hemoglobin and hematocrit levels of the patients were found to be significantly lower in the LT group than in the LS group.

Myomectomy was suggested as the best treatment method for women with infertility caused by leiomyomas and who have fertility wish.^[15,16] Additionally, the excision of large and multiple leiomyomas has been shown to increase the success of assisted reproductive techniques. Therefore, it is advocated that large leiomyomas should be removed even if they are asymptomatic. Additionally, myomectomy procedures have been reported as one of the high-risk surgeries for post-surgical adhesions.^[17] Post-surgical adhesion is a challenging factor leading to postsurgical complications or adverse symptoms such as bowel obstruction, chronic pelvic pain, infertility, or further operations. LS is considered to be associated with lower adhesion formation. Bulletti et al.^[17] reported that more adhesion occurred after LT than LS. Moreover, LS was suggested for myomectomy primarily when performed to preserve or restore fertility.^[17] It is thought that the level of surgical trauma and the surgeon's experience in LS are some of the factors affect-

Table 2. Gross and histopathologic characteristics of the excised myomas

	LS (n=61)		LT (n=230)		p
	n	%	n	%	
Size	6.35±1.86		6.63±1.64		0.244
Number					
1	40	65.57	191	83.04	0.023*
2	14	22.95	27	11.74	
3 and 4	7	11.48	12	5.22	
Type					
Intramural	50	81.97	197	86.03	0.306
Subserous	11	18.03	33	13.97	
Location					
Anterior	18	29.51	67	29.13	0.954
Posterior	31	50.82	76	33.04	0.010*
Fundus	21	34.4	101	43.91	0.182
Lateral	7	11.48	16	6.96	0.245
Intraligamentary	0	0.00	8	3.48	0.141
Pathology					
Degenerated leiomyoma	41	67.21	102	61.08	0.313
Leiomyoma	20	2.79	56	33.53	
Adenomyoma	0	0.00	5	2.99	
Cellular leiomyoma	0	0.00	4	2.40	

*: p<0.05. LS: Laparoscopy; LT: Laparotomy

Table 3. Postoperative short-term outcomes

	LS (n=61)		LT (n=230)		p
	n	%	n	%	
Complications	3	4.92	14	6.09	0.729
Blood transfusion	4	6.56	15	6.52	0.992
Entering the endometrial cavity	1	1.64	35	15.22	0.004*
Surgery time, minutes (mean±SD)	132.02±46.81		79.64±31.09		<0.001
Postoperative analgesia	3.25±1.68		5.04±1.56		<0.001
Hemoglobin, g/dL (mean±SD)					
Preoperative	12.44±1.54		12.03±1.59		0.067
Postoperative	10.22±1.44		9.66±1.52		0.010*
Hematocrit, % (mean±SD)					
Preoperative	38.4±3.99		37.44±4.12		0.105
Postoperative	32.02±4.07		30.33±4.08		0.004*
Hospital stay time, days (mean±SD)	1.62±0.84		2.54±0.85		<0.001

*: p<0.05. LS: Laparoscopy; LT: Laparotomy

ing post-surgical adhesion development.^[17,18] In our study, the laparoscopic method was preferred more frequently in patients with infertility.

Since laparoscopic myomectomy is challenging in terms of technique and learning curve, the operation takes a long time. It was also reported that the duration of laparoscopic procedures for myomectomy was significantly longer than with the LT approach.^[4,14] Furthermore, in our study, it was observed that the surgery time for the laparoscopic method was significantly longer than the LT method.

The results of our study showed that the endometrial cavity was entered at a higher rate in the LT group compared to the LS group. The possible reason for this event was that most cases in the LT group were operated on with an indication of abnormal uterine bleeding. Because most of the patients in the LS group were operated for infertility, LS provided a more detailed view and better evaluation of its proximity to the endometrial cavity, so less endometrial cavity penetration was observed in the LS group.

Palomba et al.^[11] stated that the overall complication rate was significantly higher than laparoscopic myomectomy in patients operated on with the mini-LT method. Additionally, in a meta-analysis that included studies comparing laparoscopic and laparotomic myomectomy operations, overall complications were less in the LS group.^[4] When we evaluated our study cohort in terms of complications, although there was no significant difference between the two groups quantitatively, the quality of complications in the LT group was more severe and required rehospitalization or prolonged therapy to treat.

The major limitation of our study was that it was open to bias since it was a retrospective study. Furthermore, because different surgeons performed the operations, different surgical techniques and experiences of surgeons might have affected the outcomes. Another limitation of the study is the unbalanced case numbers in each group.

CONCLUSION

In conclusion, laparoscopic myomectomy was found to be superior to laparotomic myomectomy in terms of unintentional entrance to the endometrial cavity, decrease in postoperative hemoglobin levels, need for postoperative analgesia, and duration of hospital stay. Although laparoscopic and laparotomic methods are similar in terms of the number of complications when evaluated qualitatively, minor complications that can be treated in a short time were encountered in laparoscopic myomectomy.

Disclosures

Ethics Committee Approval: The study was approved by the University of Health Sciences İstanbul Bağırcılar Training and Research Hospital Non-interventional Clinical Research ethics Ethics Committee (No: 2017-560, Date: 21/03/2017).

Informed Consent: Written informed consent was obtained from all patients.

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