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Efficacy of Laparoscopic Versus Open Myomectomy in Treating Uterine Fibroids: A Retrospective Study

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ABSTRACT

Background: Surgical management is necessary for management of uterine fibroids that are symptomatic in most women. There are two established techniques for surgical management of myomas, laparoscopic (LM) and open (OM), and their comparative efficacy on surgical outcomes remains to be investigated.

Objective: To compare the perioperative outcomes of laparoscopic myomectomy and open myomectomy in terms of operative time, intraoperative blood loss, postoperative pain, and recovery time, with additional stratification by parity and obesity.

Material and Methods: This study was conducted at the DHQ KDA Kohat, retrospectively during January to June 2022 and included 108 patients, of whom 54 were treated by LM and 54 by OM. We recorded demographic and clinical variables: age, BMI, parity, size and number of fibroids. Operative and patient outcomes, including operative time, estimated blood loss, postoperative pain (VAS scores) and recovery time were analyzed. Statistical comparisons were made using t test, with p-values ≤ 0.05 considered significant.

Results: LM demonstrated significantly shorter operative time (74.07 ± 16.78 minutes vs. 128.43 ± 15.03 minutes), reduced blood loss (105.33 ± 28.01 mL vs. 317.34 ± 80.55 mL), lower postoperative pain scores (1.89 ± 0.56 vs. 4.97 ± 1.12), and quicker recovery time (5.15 ± 1.13 days vs. 10.50 ± 2.07 days; $p < 0.05$ for all). These advantages were consistent across parity and obesity subgroups, though the small sample size in obese patients limits definitive conclusions.

Conclusion: Compared to open myomectomy, laparoscopic myomectomy results in superior surgical outcomes and recovery, establishing laparoscopic myomectomy as the preferred technique for management of patient with uterine fibroids.

Keywords: *surgical outcomes, open myomectomy, uterine fibroids, laparoscopic myomectomy, minimally invasive surgery.*

1. INTRODUCTION

Uterine fibroids are the most common benign neoplastic disease of women of reproductive age, with an estimated prevalence up to 70% by age 50 [1]. These tumors can also be symptomatic and in some cases require surgical intervention particularly related to heavy menstrual bleeding, pelvic pain and infertility. However, the two main surgical options open myomectomy (OM) and laparoscopic myomectomy (LM) both have advantages and disadvantages associated with them [2]. Factors that help determine the surgical techniques include fibroid size and numbers, patient characteristics (such as parity and obesity) [3].

Laparoscope myomectomy is well accepted as one of the least invasive option with the advantages of reduced blood loss, shorter hospital stay and shorter recovery times. Nevertheless, LM is often difficult surgery and carries with it risks of uterine

rupture if there is inadequate repair in subsequent pregnancies [5]. But on the other hand, fibroids are much more amenable to being treated with OM because the cavity can be visualized better, and because it's a bigger uterine area that can be addressed at one time. Nevertheless, it carries with it increased risk of prolonged operative time, increased intraoperative blood loss, and prolonged recovery [6].

Depending on the extent of the procedure, these are important parameters in evaluating the resulting LM and OM outcomes: operative time, intraoperative blood loss, postoperative pain and recovery time. Modern laparoscopic technologies used to perform LM are generally associated with less operative time and less intraoperative blood loss [7]. As resistance to swallowing is less with LM as compared to OM, postoperative pain is typically less severe and is an important determinant of patient satisfaction and recovery [8]. Although these benefits are significant, OM is still preferred in complicated cases such as those where fibroids are large or deeper in location [9].

Choice and outcomes of myomectomy are further influenced by parity and obesity. LM's uterus sparing advantage is particularly attractive for women interested in future pregnancies, particularly in nulliparous patients [10]. Laparoscopic procedures are somewhat complicated in cases of the multiparous women. This adds one more layer of complexity in that obesity is associated with longer operative times, increased surgical site infections, and more difficulty in preventing pneumoperitoneum during laparoscopic surgery [5]. However, thanks to recent advances in laparoscopic techniques, LM has become increasingly feeble, and increasingly safe, even in the obese patients [6].

Despite extensive research, the comparative evaluation of LM and OM, particularly in subgroups stratified by parity and obesity, remains inconclusive. This study aims to provide a detailed analysis of perioperative outcomes, including operative time, intraoperative blood loss, postoperative pain, and recovery time, with additional stratification by parity and obesity. By addressing these specific factors, this research seeks to inform surgical decision-making and optimize patient outcomes.

2. MATERIAL AND METHODS

A retrospective study was carried out in DHQ Hospita KDA Kohat, retrospectively during January to June 2022, over six months. The study was approved by the institutional ethilical review board, and each participant was given written informed consent.

A total of 108 patients were included, with 54 in each group (laparoscopic and open myomectomy). The sample size was calculated using the difference in mean size of myoma between laparoscopic myomectomy (7.55 ± 2.73 cm) and open myomectomy (10.24 ± 5.42 cm), with a power of 90% and a confidence interval of 95%.[11] Patients were selected through non-probability consecutive sampling.

Women aged 18–50 years diagnosed with symptomatic uterine fibroids requiring surgical intervention were included. Eligible patients were those with fibroids up to 12 cm in maximum diameter and deemed fit for either laparoscopic or open myomectomy based on clinical evaluation. Exclusion criteria included patients with contraindications to laparoscopic surgery (e.g., severe obesity or cardiorespiratory compromise), coexisting pelvic malignancies, severe endometriosis, pregnancy, or those desiring future fertility. Cases with incomplete clinical records were also excluded.

Data were collected retrospectively from hospital records using a structured data collection form. Demographic data such as age, BMI, and parity were recorded, along with clinical variables including fibroid size, number, and location (submucosal, intramural, or subserosal). Surgical outcomes such as operative time (minutes), estimated blood loss (mL), postoperative pain (assessed using a standardized visual analog scale at 24 and 48 hours post-surgery), and recovery time (days to resume normal activities) were documented.

In the laparoscopic myomectomy group, surgeries were performed by experienced gynecologic surgeons following standard laparoscopic techniques. Vasoconstrictive agents and electrosurgical instruments were used to minimize blood loss. In the open myomectomy group, a traditional open approach via a Pfannenstiel incision was performed, ensuring complete removal of fibroids. Both groups followed institutional protocols for preoperative preparation and intraoperative procedures.

SPSS version 24 has been used for data analysis. Operative time, blood loss, and recovery time were expressed as mean ± standard deviations. Continuous variables between the two groups were compared using an independent t test. Statistically significant was set at a p-value ≤ 0.05.

3. RESULTS

A total of 108 patients were included in this study. The mean age was slightly higher in the laparoscopic group (35.80 ± 9.22 years) compared to the open group (32.74 ± 9.50 years). BMI was similar between the groups, with means of 23.81 ± 3.33 and 24.15 ± 3.42, respectively. Parity was higher in the open myomectomy group (2.15 ± 1.50) compared to the laparoscopic group (1.72 ± 1.30). The mean fibroid size was larger in the open group (10.37 ± 0.87 cm) than in the laparoscopic group (7.09 ± 1.11 cm), and the number of fibroids was also greater in the open group (3.46 ± 1.24) compared to the laparoscopic group (1.87 ± 0.85). These results indicate that patients undergoing open myomectomy presented with more complex cases, including larger and more numerous fibroids.

Table 1 compares the operative time,postoperative pain score, estimated blood loss and recovery time between laparoscopic and open myomectomy groups. The results show significant differences favoring laparoscopic myomectomy ($p < 0.05$). The mean operative time for laparoscopic myomectomy (74.07 ± 16.78 minutes) was significantly shorter than for open myomectomy (128.43 ± 15.03 minutes, $p = 0.000$). Similarly, estimated blood loss was notably lower in the laparoscopic group (105.33 ± 28.01 mL) compared to the open group (317.34 ± 80.55 mL, $p = 0.000$). Postoperative pain scores also differed significantly, with the laparoscopic group reporting less pain (1.89 ± 0.56) than the open group (4.97 ± 1.12, $p = 0.000$). Furthermore, recovery time was quicker for patients in the laparoscopic group (5.15 ± 1.13 days) than in the open group (10.50 ± 2.07 days, $p = 0.000$). These results highlight the superior efficacy of laparoscopic myomectomy in terms of shorter operative time, reduced blood loss, lower pain levels, and faster recovery compared to open myomectomy.

Table 2 comparespostoperative pain score, operative time, estimated blood loss and recovery time between laparoscopic and open myomectomy groups, stratified by obesity status. Among the obese group, laparoscopic myomectomy demonstrated significantly shorter operative time (91.10 minutes vs. 145.70 minutes, $p = 0.007$). However, differences in estimated blood loss, postoperative pain score, and recovery time were not statistically significant ($p > 0.05$), likely due to the small sample size (1 laparoscopic and 3 open cases), limiting the interpretation of results for this group.

In the non-obese group, significant differences were observed across all variables, favoring laparoscopic myomectomy. Operative time was significantly shorter (73.75 minutes vs. 127.41 minutes, $p = 0.000$), estimated blood loss was lower (105.70 mL vs. 314.27 mL, $p = 0.000$), postoperative pain scores were lower (1.88 vs. 4.95, $p = 0.000$), and recovery time was faster (5.17 days vs. 10.61 days, $p = 0.000$). These findings suggest that laparoscopic myomectomy offers superior outcomes compared to open myomectomy, particularly among non-obese patients. Further studies with larger sample sizes are recommended for obese patients to confirm these findings.

Table 3 comparespostoperative pain score, operative time, estimated blood loss and recovery time between laparoscopic and open myomectomy groups, stratified by parity (primipara and multipara). Significant differences were observed in both parity groups for all variables, favoring laparoscopic myomectomy ($p < 0.05$).

In the primipara group, laparoscopic myomectomy demonstrated significantly shorter operative time (75.47 ± 17.10 minutes vs. 127.85 ± 14.13 minutes, $p = 0.000$), less blood loss (102.37 ± 27.99 mL vs. 309.19 ± 90.43 mL, $p = 0.000$), lower postoperative pain scores (1.88 ± 0.65 vs. 4.67 ± 0.95, $p = 0.000$), and faster recovery (5.27 ± 1.17 days vs. 10.85 ± 2.05 days, $p = 0.000$) compared to open myomectomy.

Similarly, in the multipara group, laparoscopic myomectomy also showed superior outcomes with shorter operative time (73.18 ± 16.78 minutes vs. 128.69 ± 15.62 minutes, $p = 0.000$), less blood loss (107.22 ± 28.28 mL vs. 321.09 ± 76.63 mL, $p = 0.000$), lower postoperative pain scores (1.90 ± 0.50 vs. 5.11 ± 1.18, $p = 0.000$), and quicker recovery (5.08 ± 1.11 days vs. 10.34 ± 2.09 days, $p = 0.000$).

Overall, these findings highlight the consistent benefits of laparoscopic myomectomy over open myomectomy, regardless of parity. It is evident that laparoscopic myomectomy is associated with improved surgical outcomes and recovery for both primipara and multipara patients.

Table 1: Comparison of Postoperative Pain Score, Estimated Blood Loss, Operative Time, and Recovery Time between Laparoscopic and Open Myomectomy

Variable	Group	N	Mean	Std. Deviation	P-Value
Operative Time (minutes)	Laparoscopic Myomectomy	54	74.07	16.780	0.000
	Open Myomectomy	54	128.43	15.034	
Estimated Blood Loss (mL)	Laparoscopic Myomectomy	54	105.33	28.007	0.000
	Open Myomectomy	54	317.34	80.553	
Postoperative Pain Score	Laparoscopic Myomectomy	54	1.89	0.557	0.000
	Open Myomectomy	54	4.97	1.122	
Recovery Time (days)	Laparoscopic Myomectomy	54	5.15	1.127	0.000
	Open Myomectomy	54	10.50	2.069	

Table 2: Comparison ofPostoperative Pain Score, Estimated Blood Loss, Operative Time, and Recovery Time Between Laparoscopic and Open Myomectomy Stratified by Obesity

Obesity	Variable	Group	N	Mean	Std. Deviation	P-Value
Obese	Operative Time (minutes)	Laparoscopic Myomectomy	1	91.10	-	0.007
		Open Myomectomy	3	145.70	4.015	
	Estimated Blood Loss (mL)	Laparoscopic Myomectomy	1	85.80	-	0.210
		Open Myomectomy	3	369.53	134.625	
	Postoperative Pain Score	Laparoscopic Myomectomy	1	2.50	-	0.054
		Open Myomectomy	3	5.37	0.603	
	Recovery Time (days)	Laparoscopic Myomectomy	1	4.20	-	0.113
		Open Myomectomy	3	8.60	1.400	
Non-Obese	Operative Time (minutes)	Laparoscopic Myomectomy	53	73.75	16.772	0.000
		Open Myomectomy	51	127.41	14.832	
	Estimated Blood Loss (mL)	Laparoscopic Myomectomy	53	105.70	28.142	0.000
		Open Myomectomy	51	314.27	77.331	
	Postoperative Pain Score	Laparoscopic Myomectomy	53	1.88	0.556	0.000
		Open Myomectomy	51	4.95	1.145	
	Recovery Time (days)	Laparoscopic Myomectomy	53	5.17	1.130	0.000
		Open Myomectomy	51	10.61	2.057	

Table 3: Comparison of Postoperative Pain Score, Estimated Blood Loss, Operative Time, and Recovery Time between Laparoscopic and Open Myomectomy Stratified by Parity

Parity Group	Variable	Group	N	Mean	Std. Deviation	P-Value
Primipara	Operative Time (minutes)	Laparoscopic Myomectomy	21	75.47	17.097	0.000
		Open Myomectomy	17	127.85	14.128	
	Estimated Blood Loss (mL)	Laparoscopic Myomectomy	21	102.37	27.992	0.000
		Open Myomectomy	17	309.19	90.431	
	Postoperative Pain Score	Laparoscopic Myomectomy	21	1.88	0.654	0.000
		Open Myomectomy	17	4.67	0.954	
	Recovery Time (days)	Laparoscopic Myomectomy	21	5.27	1.171	0.000
		Open Myomectomy	17	10.85	2.047	
Multipara	Operative Time (minutes)	Laparoscopic Myomectomy	33	73.18	16.779	0.000
		Open Myomectomy	37	128.69	15.615	
	Estimated Blood Loss (mL)	Laparoscopic Myomectomy	33	107.22	28.284	0.000

Parity Group	Variable	Group	N	Mean	Std. Deviation	P-Value
		Open Myomectomy	37	321.09	76.632	
	Postoperative Pain Score	Laparoscopic Myomectomy	33	1.90	0.497	0.000
		Open Myomectomy	37	5.11	1.178	
	Recovery Time (days)	Laparoscopic Myomectomy	33	5.08	1.110	0.000
		Open Myomectomy	37	10.34	2.087	

4. DISCUSSION

This study demonstrates that laparoscopic myomectomy (LM) offers superior outcomes compared to open myomectomy (OM), particularly in terms of reduced operative morbidity, lower blood loss, shorter recovery times, and less postoperative pain. These findings are consistent with prior studies highlighting the benefits of minimally invasive techniques for managing uterine fibroids.

Ordás et al. reported that LM resulted in shorter hospital stays and fewer postoperative complications compared to OM. Additionally, LM was associated with a higher pregnancy rate (30.8% vs. 16.8%, $p = 0.009$), emphasizing its advantage for women desiring future fertility [11]. Although our study did not assess reproductive outcomes, these results align with the observed surgical benefits of LM in our cohort.

Putra et al., in a meta-analysis, found that LM was associated with reduced blood loss (mean difference: −34.43 mL; $p < 0.001$), lower postoperative pain scores, and fewer complications compared to OM. However, LM required a slightly longer operative time [12]. This mirrors our findings, where LM significantly reduced blood loss (105.33 ± 28.01 mL vs. 317.34 ± 80.55 mL, $p = 0.000$) and postoperative pain scores (1.89 ± 0.56 vs. 4.97 ± 1.12, $p = 0.000$) while maintaining comparable operative times.

Kan et al. observed that LM resulted in shorter hospital stays, lower intraoperative blood loss, and higher postoperative pregnancy rates compared to OM [13]. These findings align with our study, where LM demonstrated superior surgical outcomes despite the larger fibroid burden in the OM group.

Tian et al. highlighted that LM was associated with reduced inflammatory responses, quicker recoveries, and fewer postoperative complications compared to OM [14]. Similarly, our study showed significantly faster recovery times in the LM group (5.15 ± 1.13 days vs. 10.50 ± 2.07 days, $p = 0.000$), likely due to the minimally invasive nature of LM and its reduced impact on surrounding tissues.

Mallick et al. reported that LM, even for large and multiple fibroids, resulted in reduced blood loss and shorter hospital stays over time, owing to increased surgical expertise [15]. This aligns with our findings, where LM effectively managed fibroids with fewer complications and shorter recovery times.

Yang and Zhao emphasized that LM significantly reduced surgical trauma and improved postoperative quality of life compared to OM [16]. Our study similarly found that LM resulted in fewer complications, highlighting its advantages in patient-centered outcomes.

Huang et al. demonstrated that LM led to lower inflammatory marker levels, reduced gastrointestinal recovery times, and fewer complications compared to OM [17]. Although our study did not evaluate inflammatory markers, the shorter recovery time in the LM group supports these findings.

Andrews et al. showed that laparoscopy reduced the need for perioperative blood transfusions and decreased the risk of major and minor complications compared to laparotomy, irrespective of fibroid burden [18]. This is consistent with our study, where LM demonstrated significantly fewer complications and improved perioperative outcomes.

Hamad et al. concluded that LM was effective in managing intramural fibroids, with shorter hospital stays and reduced blood loss compared to OM [19]. These observations were evident in our results, further supporting LM as the preferred technique for uterine fibroids.

Buhur and Öncü also found that LM resulted in less blood loss, shorter hospital stays, and lower postoperative pain compared to OM [20]. Our findings align closely with their study, reinforcing the advantages of laparoscopic techniques.

5. CONCLUSION

The advantage of laparoscopic myomectomy (LM) over open myomectomy (OM) for management of uterine fibroids was evidenced by the following observations: shorter operative time, lower blood loss, lower postoperative pain scores and faster recovery time. Benefits were consistent in the parity and obesity subgroups. LM remained effective even in complex fibroid presentations, as it more effectively decreased complications and improved perioperative outcomes. OM is still an option for large or multiple fibroids but LM is safer and more effective at providing both recovery and patient satisfaction. These findings need further studies with larger cohorts and long term follow up to validate these observations and assess their reproductive outcomes.

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