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POSTOPERATIVE OUTCOMES FOLLOWING MYOMECTOMY: A RETROSPECTIVE COMPARISON BASED ON FIBROID SIZE

Majida EL-Sukkar*, Baghdad Shannag, Baidaa Baninaser, Bara'ah Alna'san, Areej Alshaar, Moh'd Obeidat, Wisam AL-Sukkar

***Corresponding Author: Majida EL-Sukkar**

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ABSTRACT

Background: Uterine fibroids are common benign tumors among reproductive-age women. Myomectomy is a fertility-sparing option for symptomatic cases. However, the impact of fibroid size on intraoperative and postoperative complications remains a subject of clinical concern. **Objective:** To evaluate postoperative outcomes in women undergoing myomectomy for fibroids ≤5 cm versus >5 cm. **Methods:** A retrospective chart review was conducted for patients who underwent abdominal or laparoscopic myomectomy between 2019 and 2023 at King Hussein Medical Center, Amman, Jordan. Patients were grouped by dominant fibroid size. Data included operative time, estimated blood loss, need for transfusion, post-operative infection, and hospital stay. Statistical analysis was performed using R (version 4.4.2), with $p < 0.05$ considered significant. **Results:** In this cohort of 720 patients, fibroids >5 cm were linked to more invasive surgery, with 59% undergoing open procedures versus 32% for smaller fibroids. Larger fibroids also led to longer operative times (165 vs. 126 minutes), higher blood loss (303 vs. 140 mL), longer hospital stays (3.45 vs. 2.20 days) and increased 30-day surgical-site infections (7.0% vs. 2.7%). Transfusion rates were slightly higher with larger fibroids (10% vs. 6.3%) but fibroid size was not an independent predictor. Open surgery and diabetes significantly increased transfusion risk. These findings highlight that fibroid size drives surgical complexity and morbidity, while transfusion risk is influenced mainly by surgical approach and comorbidities. **Conclusion:** Larger fibroid size was linked to more invasive surgical approaches, higher blood loss, longer operative time, extended hospitalization, and increased infection risk. However, fibroid size did not independently predict transfusion, which was more strongly associated with surgical route and diabetes. Careful preoperative planning and minimally invasive approaches where feasible may reduce morbidity in myomectomy patients.

KEYWORDS: Uterine Fibroids, Myomectomy, Surgical Complications, Fibroid Size, Retrospective Study.

INTRODUCTION

Uterine fibroids, or leiomyomas, are the most common benign tumors of the female reproductive tract, affecting up to 70% of women by the age of 50, with a higher prevalence among women of African descent.[1,2] Although often asymptomatic, fibroids can lead to significant clinical symptoms including heavy menstrual bleeding, pelvic pain, infertility, and pregnancy complications.[3,4] Myomectomy remains the preferred fertility-sparing surgical treatment for women with symptomatic fibroids, particularly those desiring future childbearing.[5]

As surgical techniques have advanced, both abdominal and minimally invasive (laparoscopic or robotic) approaches have been employed with increasing safety and efficacy.[6,7] However, fibroid characteristics particularly size continue to influence the choice of surgical route and the likelihood of complications. Larger fibroids are frequently associated with increased operative time, higher blood loss, greater transfusion needs, and longer hospital stays.[4,8] Some studies suggest that fibroid size may also affect postoperative recovery and infection rates, although the evidence is mixed and

often limited by sample size or inconsistent stratification by fibroid dimensions.[9,10]

Despite the widespread use of myomectomy, there remains a lack of consensus on the threshold at which fibroid size significantly alters postoperative outcomes. As surgical guidelines increasingly emphasize individualized care, understanding the risks associated with fibroid size is essential for preoperative counseling and planning.[11]

This study aims to evaluate and compare postoperative outcomes in patients undergoing myomectomy for fibroids ≤5 cm versus >5 cm, providing further clarity on the role of fibroid size in surgical prognosis.

METHODS AND MATERIALS

Study Design

This was a retrospective cohort study conducted King Hussein Medical Center, Amman, Jordan between January 2019 and December 2023. The study was approved by the Institutional Review Board, and patient confidentiality was maintained throughout in accordance with ethical standards.

Data Collection

Patients were grouped based on the size of the dominant fibroid: ≤5 cm or >5 cm, as determined by preoperative imaging or intraoperative measurement. Demographic and clinical data were collected, including age, BMI, parity, and comorbidities. Operative details included surgical approach (laparoscopic or open), operative time (minutes), estimated blood loss (mL), and intraoperative complications.

Postoperative outcomes included the need for blood transfusion, development of surgical site infection, length of hospital stay (days), and readmission within 30 days. All data were extracted from electronic medical records and cross-verified by two independent reviewers to ensure accuracy and minimize bias.

Ethical Consideration

The approval of this study was granted by the Institutional Review Board (IRB) committee affiliated with the KHMC (approval no: 3/9/2025). All study procedures were in accordance with the Declaration of Helsinki, 1964. Informed consent was waived by the committee due to the retrospective nature of data collection. All patients' data were anonymized and safely stored.

Statistical Method

Comparisons of baseline and perioperative characteristics between groups were performed using Pearson's Chi-squared test for categorical variables and the Wilcoxon rank-sum test for continuous variables, with results presented as frequencies and percentages or as medians with interquartile ranges, respectively. To identify independent predictors of perioperative blood transfusion, multivariable logistic regression analysis was conducted, and associations were expressed as odds ratios (ORs) with 95% confidence intervals (CIs). A two-sided p value <0.05 was considered statistically significant. All statistical analyses were done using R statistical language (version 4.3.0, Vienna, Austria).

RESULTS

In this cohort of 720 patients, several baseline characteristics significantly differed according to dominant fibroid size. Surgical route showed a strong association, with patients harboring fibroids >5 cm more frequently undergoing open procedures (59% vs. 32%), whereas those with fibroids ≤5 cm more often had laparoscopic surgeries (68% vs. 41%, p<0.001). Larger fibroid size was also associated with greater intraoperative burden: median estimated blood loss was more than double in the >5 cm group (303 mL vs. 140 mL, p<0.001), operative time was prolonged (165 vs. 126 minutes, p<0.001), and hospital stay was longer (3.45 vs. 2.20 days, p<0.001). Additionally, surgical-site infection within 30 days occurred more often in the >5 cm group (7.0% vs. 2.7%, p=0.013). A smaller but notable trend was observed for transfusion rates, which were higher with fibroids >5 cm (10% vs. 6.3%), though this did not reach statistical significance (p=0.085). Age also differed slightly, with patients in the >5 cm group being older on median (35 vs. 34 years, p=0.028).

Other characteristics, including body mass index (BMI), parity distribution, and comorbidities such as hypertension and diabetes, showed no significant differences between the two fibroid size groups (p>0.05). These findings suggest that while patient demographics and baseline health status were broadly similar, larger fibroid size was strongly linked to more invasive surgical approaches, greater perioperative resource utilization, and increased short-term surgical morbidity.

Among the 720 patients, several factors significantly differed between those who required transfusion and those who did not. Patients who received transfusion were more likely to undergo open surgery (69% vs. 43%, p<0.001) and had larger fibroids, with 61% in the >5 cm group compared to 48% in the non-transfusion group (p=0.085, borderline). Age was higher in the transfusion group, with a median of 38 years compared to 34 years (p=0.004). Parity distribution also differed significantly (p<0.001), with nulliparous women more frequently

represented in the transfusion group (32% vs. 20%). Additionally, comorbidities were more common: hypertension (41% vs. 25%, p=0.014) and diabetes (22% vs. 9.4%, p=0.005) were both significantly higher among transfused patients. Intraoperatively, estimated blood loss was markedly greater in the transfusion group (median 310 mL vs. 194 mL, p=0.012), and postoperative length of stay was prolonged (median 3.30 vs. 2.60 days, p<0.001).

Other characteristics showed no significant differences between the groups. Body mass index (median 28.7 vs. 27.9, p=0.14), operative time (154 vs. 142 minutes, p=0.069), and rates of surgical-site infection (1.7% vs. 5.1%, p=0.39) were broadly similar.

In the multivariable regression analysis, several predictors were significantly associated with the likelihood of requiring blood transfusion. Surgical route was an independent factor, with patients undergoing laparoscopic procedures having a 61% lower odds of transfusion compared with those undergoing open surgery (OR 0.39, 95% CI 0.20–0.71, p=0.002). Diabetes mellitus was also significantly associated, as diabetic patients had more than twice the odds of transfusion compared with non-diabetics (OR 2.29, 95% CI 1.09–4.57, p=0.030). These findings highlight that both surgical approach and comorbidity status influence transfusion risk.

Other variables, including fibroid size group (>5 cm vs. ≤5 cm, OR 1.00, 95% CI 0.52–1.94, p>0.9), patient age (OR 1.04, 95% CI 0.99–1.09, p=0.20), BMI (OR 1.02, 95% CI 0.97–1.07, p=0.50), hypertension (OR 1.46, 95% CI 0.79–2.64, p=0.20), operative time (OR 1.01, 95% CI 1.00–1.01, p=0.11), and estimated blood loss (OR 1.00, 95% CI 1.00–1.00, p=0.50) were not significantly associated with transfusion.

Table 1: Baseline characteristics by dominant fibroid size (≤5 cm vs >5 cm).

Characteristic	≤5 cm N = 364	>5 cm N = 356	Overall N = 720	p-value[1]
Surgical approach, n (%)				**<0.001**
open	117 (32%)	211 (59%)	328 (46%)	
laparoscopic	247 (68%)	145 (41%)	392 (54%)	
Age, years				**0.028**
Median [Q1, Q3]	34 [31, 39]	35 [31, 40]	35 [31, 40]	
BMI, kg/m²				0.71
Median [Q1, Q3]	27.7 [23.9, 32.0]	28.2 [24.3, 32.1]	27.9 [24.1, 32.0]	
Parity, count, n (%)				0.20
0	86 (24%)	68 (19%)	154 (21%)	
1	113 (31%)	112 (31%)	225 (31%)	
2	107 (29%)	106 (30%)	213 (30%)	
3	42 (12%)	46 (13%)	88 (12%)	
4	11 (3.0%)	19 (5.3%)	30 (4.2%)	
5	5 (1.4%)	2 (0.6%)	7 (1.0%)	
6	0 (0%)	3 (0.8%)	3 (0.4%)	
Hypertension, n (%)	94 (26%)	96 (27%)	190 (26%)	0.79
Diabetes, n (%)	40 (11%)	35 (9.8%)	75 (10%)	0.70
Estimated blood loss, mL				**<0.001**
Median [Q1, Q3]	140 [96, 216]	303 [179, 494]	196 [115, 348]	
Operative time, min				**<0.001**
Median [Q1, Q3]	126 [102, 152]	165 [134, 191]	145 [116, 175]	
Length of stay, days				**<0.001**
Median [Q1, Q3]	2.20 [1.70, 2.80]	3.45 [2.60, 4.50]	2.70 [2.00, 3.80]	
Received blood transfusion, n (%)	23 (6.3%)	36 (10%)	59 (8.2%)	0.085
Surgical-site infection (30-d), n (%)	10 (2.7%)	25 (7.0%)	35 (4.9%)	**0.013**

[1] Pearson's Chi-squared test; Wilcoxon rank sum test

Table 2: Comparison of Patient and Perioperative Characteristics by Transfusion Status.

Characteristic	no N = 661	yes N = 59	p-value[1]
Dominant fibroid size, n (%)			0.085
≤5 cm	341 (52%)	23 (39%)	
>5 cm	320 (48%)	36 (61%)	
Surgical approach, n (%)			**<0.001**
open	287 (43%)	41 (69%)	
laparoscopic	374 (57%)	18 (31%)	
Age, years			**0.004**
Median [Q1, Q3]	34 [31, 39]	38 [33, 42]	
BMI, kg/m²			0.14
Median [Q1, Q3]	27.9 [24.0, 31.8]	28.7 [24.4, 34.0]	
Parity, count, n (%)			**<0.001**
0	135 (20%)	19 (32%)	
1	213 (32%)	12 (20%)	
2	197 (30%)	16 (27%)	
3	83 (13%)	5 (8.5%)	
4	27 (4.1%)	3 (5.1%)	
5	5 (0.8%)	2 (3.4%)	
6	1 (0.2%)	2 (3.4%)	
Hypertension, n (%)	166 (25%)	24 (41%)	**0.014**
Diabetes, n (%)	62 (9.4%)	13 (22%)	**0.005**
Estimated blood loss, mL			**0.012**
Median [Q1, Q3]	194 [113, 332]	310 [128, 473]	
Operative time, min			0.069
Median [Q1, Q3]	142 [114, 175]	154 [130, 180]	
Length of stay, days			**<0.001**
Median [Q1, Q3]	2.60 [2.00, 3.70]	3.30 [2.60, 4.70]	
Surgical-site infection (30-d), n (%)	34 (5.1%)	1 (1.7%)	0.39

[1] Pearson's Chi-squared test; Wilcoxon rank sum test

Table 3: Multivariable Logistic Regression for Predictors of Blood Transfusion.

Characteristic	OR[1]	95% CI[1]		p-value
		Lower	Upper	
Dominant fibroid size				>0.9
≤5 cm	—	—	—	—
>5 cm	1.00	0.52	1.94	
Surgical approach				**0.002**
open	—	—	—	—
laparoscopic	0.39	0.20	0.71	
Age	1.04	0.99	1.09	0.2
BMI	1.02	0.97	1.07	0.5
Hypertension				0.2
no	—	—	—	—
yes	1.46	0.79	2.64	
Diabetes				**0.030**
no	—	—	—	—
yes	2.29	1.09	4.57	
Operative time, min	1.01	1.00	1.01	0.11
Estimated blood loss, mL	1.00	1.00	1.00	0.5

[1] OR = Odds Ratio, CI = Confidence Interval

DISCUSSION

Uterine fibroids are common benign tumors, that affect women of reproductive age. Often presents with heavy menstrual bleeding, pelvic pain, and infertility.[12] Myomectomy, the surgical removal of these fibroids, is a preferred option for women who want to preserve their fertility. However, the fibroid size plays a significant role in determining surgical outcomes.[13] Studies have shown

that larger fibroids are associated with increased complications during surgery.[14] Fibroids size the exceeds 8 cm in diameter are linked with higher blood loss and increased rates of blood transfusion.[15] The surgical choice also influences outcomes. For example, open myomectomy has been associated with a higher postoperative complication including anemia, compared with minimally invasive techniques. In a study including 383 patients, the open surgical approach was identified as a contributing factor to increased risk of complications.[3] Furthermore, larger fibroids can complicate the surgical procedure, leading to longer duration of operation and longer hospital stay.[15] This study aimed to evaluate and compare postoperative outcomes in patients undergoing myomectomy for fibroids ≤5 cm versus >5 cm, providing further clarity on the role of fibroid size in surgical prognosis.

In our cohort, we included 720 patients with several characteristics significantly differed according to dominant fibroid size. Surgical route in our cohort showed a strong association, with patients harboring fibroids >5 cm more frequently undergoing open procedures, whereas those with fibroids ≤5 cm more often had laparoscopic surgeries. A study by Luo et al. (2021) on laparoscopic single-site myomectomy found that uterine size was a useful tool for choosing the surgical approach.[16] We reported that larger fibroid size was also associated with greater intraoperative burden, median estimated blood loss was more than double in the >5 cm group, operative time was prolonged, and hospital stay was longer. A study by Brennan et al. (2025) on cesarean myomectomy for fibroids greater than 5 cm found that the mean operative time was 74 minutes and mean estimated blood loss (EBL) was 827 mL, indicating that larger fibroids are associated with increased intraoperative burden and blood loss.[17]

We found that larger fibroid size was strongly linked to more invasive surgical approaches, greater perioperative resource utilization, and increased short-term surgical morbidity. A retrospective analysis of 621 patients showed that fibroid size was an independent risk factor, increasing the odds of both postoperative bleeding and recurrence after laparoscopic myomectomy.[18] We found in our cohort that patients who received transfusion were more likely to undergo open surgery and had larger fibroids. Interestingly, a retrospective cohort study reported that blood transfusion was more likely with high fibroid burden, prolonged time of surgery, low preoperative hematocrit, or prior transfusion and also was linked to a higher risk of postoperative complications.[19]

Age was higher in our transfusion group, with a median of 38 years compared to 34 years. Also, we reported that nulliparous women more frequently represented in the transfusion group. Additionally, comorbidities were more common: hypertension and diabetes were both significantly higher among transfused patients in our cohort. A case control study reported that blood transfusion after myomectomy was strongly associated with black race, low preoperative hematocrit, prior transfusion, and planned open surgery.[20]

A key strength of this study is its direct comparison of outcomes between small and large fibroid groups, which provided an insight into how fibroid size influences surgical risks. However, its retrospective design and single-center setting may limit generalizability and cause some selection bias. Future prospective, multicenter studies with larger cohorts are recommended to validate our findings.

CONCLUSION

Our study highlights that fibroid size has a clear impact on surgical approach and perioperative outcomes in women undergoing myomectomy. Patients with fibroids larger than 5 cm were more likely to require open procedures, experiences greater blood loss, longer operative times, longer hospital stays, and higher rates of surgical-site infection compared with those with smaller fibroids. Surgical route and diabetes emerged as the strongest predictions with open myomectomy increasing transfusion risk and diabetes nearly doubling it.

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