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Laparoscopic Versus Open Myomectomy For Uterine Fibroids: A Study Of Intraoperative And Postoperative Outcomes

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ABSTRACT

Introduction: Uterine fibroids, also known as leiomyomas, are benign neoplasms originating from smooth muscle tissue of the uterus. They are found in about 30% of women of reproductive age. In majority of cases uterine fibroids are asymptomatic.

OBJECTIVE

Our objective was to evaluate the benefits, complications, and obstetric outcomes of laparoscopic myomectomy (LM) compared to abdominal myomectomy (AM).

METHOD

We conducted a retrospective cohort study at Index Medical College and Hospital, Indore, including cases of LM and AM performed, with a total of 234 myomectomies analyzed (131 AMs [55.98%] and 103 LMs [44.02%]). Data were collected from hospital records. Exclusion criteria comprised postmenopausal status, a history of primary ovarian insufficiency or tubal factor infertility, and the presence of uterine masses suspected of malignancy. Statistical analysis was done using SPSS 21.0 woth p value <0.05 considered as significant.

RESULT

LM was associated with longer operative times ($p < 0.05$) but shorter hospital stays ($p < 0.05$). There were no significant differences in intraoperative and postoperative complication rates between the two groups. The subsequent pregnancy rate was higher in the LM group, with a vaginal delivery rate of about 70% and no reported cases of uterine rupture.

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CONCLUSION

LM can be considered a safe and appropriate surgical technique for women of childbearing age as an alternative to AM. However, LM requires longer surgical times and should be conducted by highly skilled and experienced surgical teams. The delivery method for patients with prior myomectomy should be individually determined, but vaginal delivery after LM is generally safe.

Keywords: Leiomyoma, Laparoscopy, Myomectomy, Obstetric Outcome, Uterus.

INTRODUCTION

Uterine fibroids, also known as leiomyomas, are benign tumors originating from smooth muscle tissue of the uterus. These neoplasms are present in 20%–40% of women of reproductive age. Despite their prevalence, uterine fibroids are often asymptomatic, with only 40% of cases showing symptoms. Common symptoms include heavy vaginal bleeding (leading to anemia), pelvic pain, dysmenorrhea, reduced quality of life, and reproductive issues. The manifestation of symptoms largely depends on the fibroids' composition, size, location, and number [4-6].

Advancements in cultural and social domains, along with the trend of delayed childbearing, have spurred the evolution and refinement of myomectomy, which was first introduced in the 1970s. For patients desiring to preserve fertility, myomectomy serves as an alternative to hysterectomy [1].

The introduction of minimally invasive techniques has notably enhanced short-term outcomes in major gynecologic surgeries, including myomectomy, by facilitating quicker recovery and reducing pain and postoperative complications. Nevertheless, the criteria for patient selection and surgical approach remain contentious [7,8].

Leiomyomas can negatively impact obstetrical outcomes, leading to decreased fertility, increased pregnancy loss, and complications during pregnancy. The mode of delivery for these patients is debated, as many obstetricians recommend elective caesarean sections for patients with a history of myomectomy, especially if the uterine cavity was breached during surgery, despite insufficient evidence supporting this practice [9,10].

Ultrasonography (USG) remains the primary imaging modality for diagnosing leiomyomas. To standardize terminology, the International Federation of Gynecology and Obstetrics (FIGO) developed the PALM-COEIN classification system. This system categorizes abnormal uterine bleeding (AUB) causes as follows: Polyp, Adenomyosis, Leiomyoma, Malignancy and hyperplasia, Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, and Not yet classified [11]. Below is the image of the types of leiomyomas depending on location.

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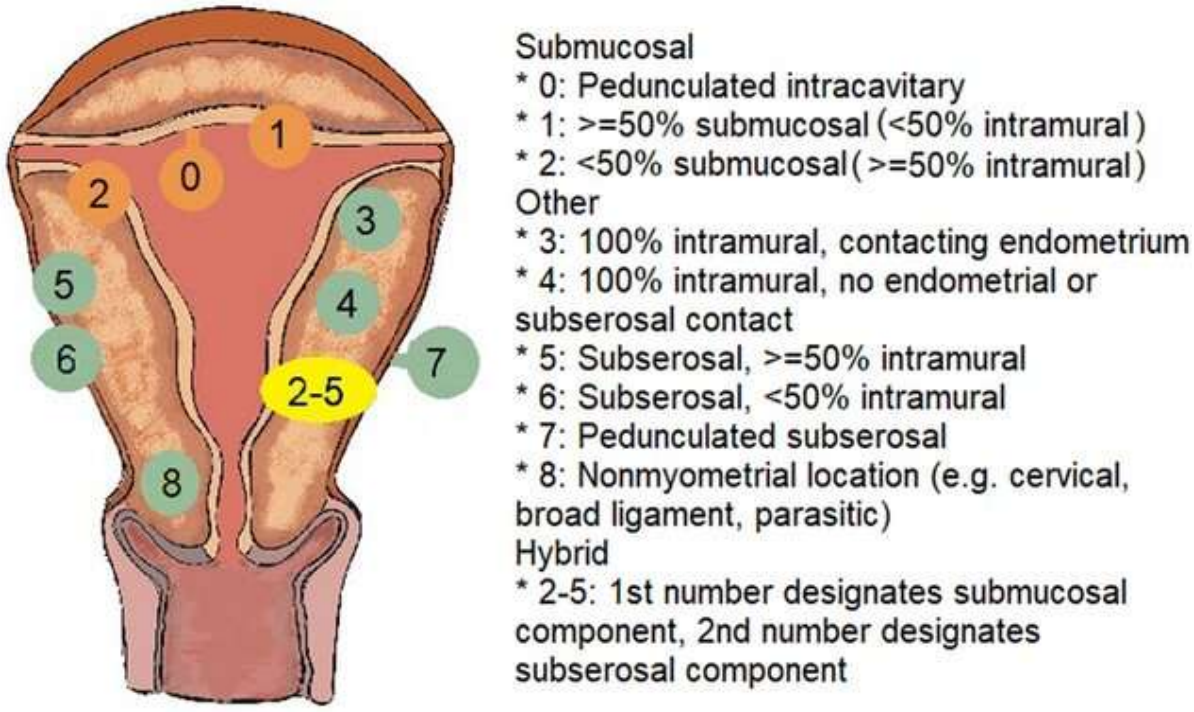

A retrospective review analyzed 31 infertile patients who underwent laparoscopic myomectomy (LM). Data on socio-demographic characteristics, including age, body mass index, duration and type of infertility, marital status, and parity, were collected. Clinical data such as the number of miscarriages, uterine size, and the site, size, and number of fibroids were also documented. The data showed that women with primary infertility tend to have larger fibroids and a higher number of fibroids per person. In contrast, those with secondary infertility are more likely to have fibroids located in subserous sites [12] as shown in below image.

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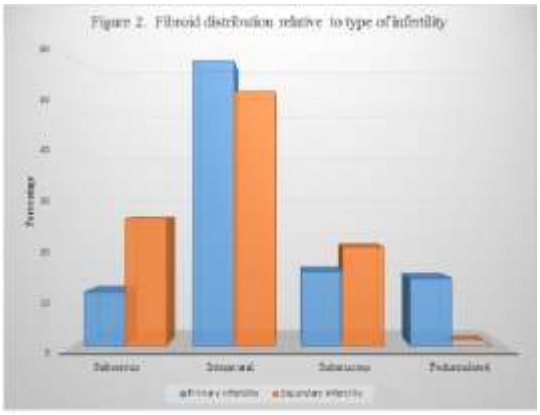

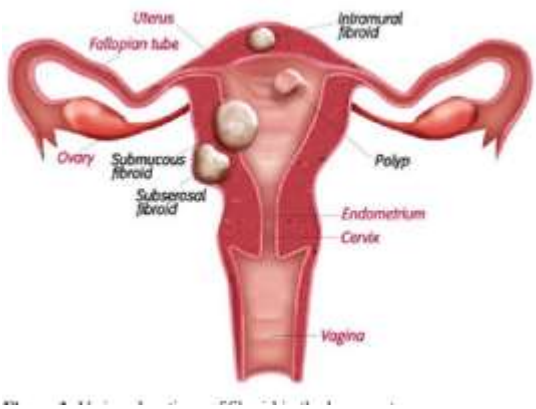

OBJECTIVE

Consequently, the primary objective of this study was to compare the surgical and obstetrical outcomes of laparoscopic myomectomy (LM) versus open abdominal myomectomy (AM), with the aim of establishing criteria for selecting the most suitable surgical approach.

MATERIAL AND METHODS

This retrospective study encompassed all patients who underwent laparoscopic myomectomy (LM) or open abdominal myomectomy (AM) at Index Medical College Hospital and Research Centre, Indore, India. The study included patients aged 21_45years, diagnosed via ultrasound with at least one myoma having a mean diameter of ≥3 cm, ultrasound findings as primary indications for myomectomy. .

Patients were categorized into LM and AM groups based on the surgical approach.

Inclusion Criteria:

- Age between 21 and 45 years
- History of infertility
- Diagnosis confirmed by ultrasound, with at least one myoma having a mean diameter of 3 cm or more
- Presence of associated clinical features such as heavy menstrual bleeding and pelvic pain

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Exclusion Criteria:

- History of primary ovarian insufficiency
- Tubal factor infertility
- Presence of uterine masses suspected of malignancy

Preoperative data collection included age, body mass index, surgical indication, preoperative hemoglobin levels, history of previous myomectomy, total number of myomas, and the diameter and location of the largest myoma as determined by ultrasound. A comprehensive preoperative ultrasound examination was performed in all cases, with fibroids classified according to the International Federation of Gynecology and Obstetrics (FIGO) system [13]. Surgical details, hospital stay duration, histological findings, and intraoperative and postoperative complications were documented and compared using the classification system [14]. Recurrence rates were also analyzed. Additionally, pregnancy rates, conception methods, types of delivery, and delivery outcomes were investigated.

The statistical analysis was conducted using SPSS version 21.0. Quantitative variables are presented as mean and standard deviation, while qualitative variables are given as absolute numbers and percentages. Student's t-test was used to analyze quantitative variables between two groups, and chi-squared test and Fisher's exact test were used for qualitative variables. A p-value <0.05 was considered statistically significant for all analyses..

RESULTS

Table 1: Baseline characteristics of study groups

Characteristic	LM (n=103)	AM (n=131)	Total (n=234)	P value
Age (years)	35.59 ± 5.24	36.61 ± 4.66	36.10 ± 4.95	0.07
BMI (kg/m2)	23.52 ± 4.40	23.09 ± 4.56	23.30 ± 4.53	0.15
Preoperative Hb (g/dl)	13.21 ± 1.22	13.08 ± 1.29	13.15 ± 1.25	0.97
Indication				
Several vaginal bleeding (%)	32 (13.68)	46 (19.66)	78 (33.33)	-
Abnormal growing (%)	29 (12.39)	31 (13.25)	60 (25.64)	-
Pelvic pain (%)	23 (9.83)	29 (12.39)	52 (22.22)	-
Infertility (%)	19 (8.12)	25 (10.68)	44 (18.80)	-

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Table 2: USG characteristics of leiomyoma in study patients

Characteristic	LM (n=103)	AM (n=131)
Number of myomas	1.61 ± 1.49	1.95 ± 2.11
Largest size of myoma (in cm)	6.87 ± 2.18	8.56 ± 2.59
Type of the largest myoma		
Pedunculated	14 (5.98)	9 (3.85)
Subserous	25 (10.68)	28 (11.97)
Subserous-intramural	22 (9.40)	26 (11.11)
Intramural	41 (17.52)	64 (27.35)
Intramural-submucous	1 (0.43)	4 (1.71)
Location of the largest myoma		
Anterior	24 (10.26)	31 (13.25)
Posterior	45 (19.23)	48 (20.51)
Fundus	15 (6.41)	21 (8.97)
Right	7 (2.99)	15 (6.41)
Left	8 (3.42)	11 (4.70)
Other	4 (1.71)	5 (2.14)
FIGO type of the largest myoma		
2	0 (0.00)	3 (1.28)
3	3 (1.28)	5 (2.14)
4	25 (10.68)	18 (7.69)
5	29 (12.39)	49 (20.94)
6	34 (14.53)	48 (20.51)
7	12 (5.13)	8 (3.42)

Table 3: Surgical details of the operated cases

Characteristic	LM (n=103)	AM (n=131)	P Value
Number of myomas removed	1.68 ± 1.43	3.23 ± 2.74	<0.05
Size of the largest myoma removed (in cm)	7.98 ± 2.86	9.73 ± 5.15	<0.05
Operating time (in minutes)	140.01 ± 60.6	89.95 ± 35.6	<0.05
sHospital stay (in days)	4.35 ± 2.0	5.77 ± 1.18	<0.05

Table 4: Comparison of complications between the two study groups

Complications	LM (n=103)	AM (n=131)	P Value
Intraoperative complications	6 (2.56)	9 (3.85)	0.06
Organ injury	3 (1.28)	5 (2.14)	0.59
Estimated blood loss >1,000 ml	3 (1.28)	4 (1.71)	0.61
Postoperative complications	16 (6.84)	27 (11.54)	0.35
Grade 1	3 (1.28)	4 (1.71)	

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Grade 2	10 (4.27)	16 (6.84)	
Grade 3	2 (0.85)	4 (1.71)	
Grade 3a	0 (0.00)	0 (0.00)	
Grade 3b	1 (0.43)	3 (1.28)	
Grade 4	0 (0.00)	0 (0.00)	

Table 5: Comparison of subsequent pregnancy outcomes between the two study groups

Outcome	LM (n=103)	AM (n=131)	Total	P Value
Pregnancy rate	33 (32.04)	21 (16.03)	54 (23.08)	<0.05
Conception method				
Spontaneous pregnancy	24 (10.26)	12 (5.13)	36 (15.38)	0.18
ART (including IVF or AI)	9 (3.85)	9 (3.85)	18 (7.69)	
Pregnancy outcome				
Miscarriage	3 (1.28)	1 (0.43)	5 (2.14)	0.65
Intrauterine fetal death	1 (0.43)	1 (0.43)	1 (0.43)	
Full-term delivery	29 (12.39)	19 (8.12)	48 (20.51)	
Type of delivery				
Vaginal	16 (6.84)	5 (2.14)	21 (8.97)	0.07
Cesarean	17 (7.26)	16 (6.84)	33 (14.10)	
Elective CS	9 (3.85)	12 (5.13)	21 (8.97)	<0.05

DISCUSSION

In our study cohort, the preoperative characteristics of women who underwent LM and open AM were comparable. There was a statistically significant association between the surgeon's experience and the preference for a laparoscopic approach. The surgeon's expertise remained a crucial factor in the success of LM [15,16]. Consequently, we observed no significant correlation between the type of myoma and the chosen surgical approach, attributing this to the adeptness of skilled surgeons in managing diverse myoma types. As a result, there was no notable variance in estimated blood loss between these groups. Despite the surgeon's proficiency, LM necessitated longer operative durations, consistent with previous findings [17,18].

Regarding intraoperative and postoperative complications, no statistical disparities were noted between the two groups, consistent with existing literature [17]. Our investigation revealed a shorter mean hospital stay for the LM cohort compared to the AM group, in agreement with prior research [17, 19, 20], thus affirming the substantial benefit of laparoscopic procedures. Additionally, a recent meta-analysis [21] comparing transvaginal retrieval and port-site specimen retrieval post-LM exhibited comparable outcomes concerning intraoperative complications, hospital stay, and operative time. Concerning transvaginal specimen extraction following LM, a comprehensive case series by Laganá et al. [22] demonstrated an increment in operative time, intraoperative blood loss, and hospital stay with increasing fibroid weight.

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Numerous studies have indicated similar cumulative pregnancy and live birth rates between women treated via LM and AM [23,24]. Our findings revealed a notably higher pregnancy rate post-LM, which was statistically significant. These results align with other studies reporting elevated pregnancy rates post-LM, potentially attributed to reduced postoperative adhesion occurrence [9, 16]. However, speculating on the causal relationship between increased pregnancy rates post-LM and AM remains challenging. Multiple studies have shown pregnancy rate increases of up to 70% post-myomectomy [9], influenced by various mechanisms such as uterine cavity distortion, myometrial contractility alterations, and tube-ovary anatomical changes [25].

Regarding delivery outcomes, the elective caesarean section rate was higher in the AM cohort than in the LM group. The primary reason for scheduling caesarean sections in our study was to access the uterine cavity and perform multiple myomectomies, aiming to prevent uterine rupture during labor. These outcomes are consistent with Gambacorti-Passerini et al.'s findings [10], reporting a higher scheduled caesarean rate in their AM group (75% vs. 46.7% in the LM group), predominantly due to prior myomectomy. Surprisingly, a recent meta-analysis by Claeys et al. [26] indicated a higher rate of elective caesarean sections with LM, contrasting our results and previous findings.

Notably, our series had no instances of uterine rupture, a significant obstetric risk for women with prior myomectomy. Uterine rupture is infrequent (0.47%–1%) and challenging to predict [10, 15, 27].

CONCLUSION

Laparoscopic myomectomy (LM) can be regarded as a safe and appropriate alternative to abdominal myomectomy (AM) for women of reproductive age. However, LM necessitates longer surgical times and should be conducted by highly skilled and experienced surgical teams. Careful patient selection should be based on a preoperative ultrasound evaluation of the size and number of myomas. The mode of delivery for patients with a prior myomectomy should be determined individually, but vaginal delivery post-LM is considered a safe option, with uterine rupture being an exceedingly rare complication.

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