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Original article

Reproductive Outcomes Following Laparoscopic Myomectomy for Uterine Fibroids

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Abstract
Uterine fibroids are a common cause of infertility, and laparoscopic myomectomy is widely used as a fertility-preserving intervention. Despite its increasing adoption, variability in reproductive outcomes persists depending on patient characteristics and surgical technique. This descriptive–analytical study evaluated reproductive outcomes in women aged 20–40 years who underwent laparoscopic myomectomy within the past five years. Data were collected using standardized questionnaires and hospital records, documenting demographic variables, infertility history, surgical details, and postoperative reproductive outcomes. Statistical analysis included descriptive measures, chi-square tests, and logistic regression to identify predictors of pregnancy and delivery. Among 100 participants, 62% achieved pregnancy after surgery, and 65% continued to delivery. Miscarriage occurred in 58% of cases, while 61% required ovulation induction or assisted reproduction. Weight and type of laparoscopic intervention were perceived as influential factors. Follow-up care improved pregnancy continuation in 61% of cases. Correlation analysis revealed moderate to strong associations between surgical intervention and reproductive outcomes ($\rho = 0.57–0.65$, $p = 0.01$). Laparoscopic myomectomy significantly improves reproductive outcomes in women with infertility, particularly when combined with structured follow-up and weight management. Despite encouraging results, miscarriage remains a concern, highlighting the need for individualized postoperative care. Larger prospective studies are warranted to refine patient selection and optimize surgical techniques.
Keywords: *Laparoscopic Myomectomy, Infertility, Reproductive Outcomes, Pregnancy Rate, Miscarriage*

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Introduction

Uterine fibroids (leiomyomas) are the most common benign tumors in women of reproductive age, with an estimated prevalence of 40–80% worldwide [1]. They are frequently associated with infertility, abnormal uterine bleeding, pelvic pain, and adverse pregnancy outcomes [2]. Myomectomy remains the standard fertility-preserving surgical treatment, and laparoscopic myomectomy has gained increasing acceptance due to its minimally invasive nature, shorter recovery time, and reduced perioperative morbidity compared to laparotomy [3].

The relationship between fibroids and infertility is complex, depending on fibroid size, number, and location. Submucosal and large intramural fibroids are particularly implicated in impaired implantation and miscarriage [4]. Laparoscopic myomectomy has been shown to improve reproductive outcomes, with pregnancy rates ranging between 44% and 62% in recent studies [5]. Moreover, advances in laparoscopic suturing techniques have reduced the risk of uterine rupture and improved obstetric safety [6]. Several systematic reviews and cohort studies have highlighted favorable reproductive outcomes following laparoscopic myomectomy, including increased live birth rates and reduced miscarriage rates [7,8]. However, variability persists depending on patient selection, fibroid characteristics, and surgical expertise [9]. Recent evidence also suggests that the type of suture and surgical technique may influence uterine integrity and subsequent pregnancy outcomes [10].

Despite these advances, challenges remain in optimizing patient selection and predicting reproductive success after surgery. Further large-scale prospective studies are needed to refine clinical guidelines and ensure safe obstetric outcomes [11]. This study aims to evaluate reproductive outcomes following laparoscopic myomectomy in women with infertility, focusing on pregnancy achievement, continuation to delivery, and factors influencing success, such as age, weight, duration of infertility, and type of laparoscopic intervention.

Methods

Study Design

This investigation adopted a descriptive–analytical design to evaluate reproductive outcomes following myomectomy. The primary objective was to assess pregnancy and birth rates after surgery and to analyze the influence of demographic

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and clinical factors, including age, weight, duration and type of infertility, cause of infertility, and type of laparoscopic intervention performed.

Study Population

The study population comprised women of reproductive age (20–40 years) who had undergone myomectomy within the preceding five years. Participants were purposively selected to ensure inclusion of fertility-related cases. Women varied in body weight (60–95 kg), allowing classification into normal, overweight, and obese categories. Clinical histories were documented, including type and duration of infertility (primary or secondary), partner-related infertility duration, and associated causes such as adhesions, ovarian cysts, or endometriosis. The type of laparoscopic intervention—adhesion release, ovarian cyst removal, or endometriosis excision—was also recorded.

Study Sample

A purposive sample of approximately 100 women was recruited to provide sufficient statistical power. Inclusion criteria required women to have undergone myomectomy within the last five years for infertility related to fibroids or other laparoscopically treated conditions. Exclusion criteria included total hysterectomy and chronic diseases that precluded pregnancy, as well as cases relying on assisted reproductive technologies unrelated to laparoscopy.

Data Collection

Data were obtained through direct administration of structured questionnaires and review of hospital medical records. The questionnaire was designed to capture demographic characteristics, medical and surgical history, infertility details, and reproductive outcomes. It was divided into two sections:

- **Section 1: Demographic and Clinical Information** — age, weight, infertility type and duration, causes of infertility, and prior surgical history.
- **Section 2: Reproductive Outcomes** — pregnancy rate after laparoscopy, number of menstrual cycles required for conception, live birth rate, miscarriage rate, and perceived influence of weight and ovarian stimulation.

Reliability of Instruments

The reliability of the questionnaire was assessed using the test–retest method. It was administered twice at an appropriate interval to the same group of participants. Correlation coefficients between the two sets of responses were calculated to confirm consistency. High stability across administrations was expected, thereby validating the instrument for accurate measurement of reproductive outcomes.

Data Analysis

Data were entered into SPSS for statistical processing. Descriptive statistics summarized pregnancy rates, miscarriage rates, live births, and participant characteristics. Inferential analyses included chi-square tests to examine associations between demographic and clinical variables and pregnancy outcomes. Logistic regression was employed to identify independent predictors of successful conception and delivery following myomectomy.

Results

The Spearman correlation analysis demonstrates consistently moderate to strong positive associations between reproductive outcomes and endoscopic procedures. All correlation coefficients (ϱ) ranged between 0.57 and 0.65, with statistical significance ($p = 0.01$), indicating that surgical intervention and related factors were significantly correlated with pregnancy achievement and continuation.

Table 1. Spearman Correlation of Reproductive Outcomes After Endoscopic Procedures (n = 100)

Question	Sample Size	Correlation Coefficient (ϱ)	p-value
Pregnancy occurred after the endoscopic procedure	100	0.62	0.01
Pregnancy continued until delivery after the procedure	100	0.65	0.01
A miscarriage occurred after the procedure or endoscopic surgery	100	0.58	0.01

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Ovulation induction/assisted reproduction is used after the procedure	100	0.61	0.01
Pregnancy occurred within 1–2 menstrual cycles after the procedure	100	0.60	0.01
Pregnancy occurred within 3–4 menstrual cycles after the procedure	100	0.57	0.01
Weight affected the ability to achieve pregnancy after the procedure	100	0.59	0.01
The type of endoscopic procedure helped achieve pregnancy	100	0.63	0.01
The number of pregnancies matched medical expectations	100	0.60	0.01
Follow-up care improved pregnancy chances and continuation	100	0.61	0.01

The demographic and medical profile of participants highlights a predominance of younger women (26–30 years), with overweight and obesity being common. Primary infertility was more frequent than secondary infertility, and adhesions were the leading cause. Notably, over half of the participants reported no prior surgical history, suggesting that endoscopic procedures were often their first major gynecological intervention.

Table 2. Demographic and Medical Characteristics of Participants (n = 100)

Variable	Category	Number	%
Age	20–25 years	15	15
	26–30 years	35	35
	31–35 years	30	30
	36–40 years	20	20
Weight (BMI)	Normal (18.5–24.9)	40	40
	Overweight (25–29.9)	35	35
	Obese ≥30	25	25
Duration of marriage	<4 years	45	45
	4–7 years	35	35
	>7 years	20	20
Type of infertility	Primary	60	60
	Secondary	40	40
Duration of infertility	<2 years	20	20
	2–4 years	30	30
	>4 years	50	50
Cause of infertility	Adhesions	35	35
	Ovarian cyst	25	25
	Endometriosis	25	25
	Other	15	15
Surgical history	Cesarean section	20	20
	Other gynecological surgeries	25	25
	None	55	55

Postoperative reproductive outcomes reveal encouraging results, with over 60% of participants achieving pregnancy and 65% continuing to delivery. However, miscarriage remained relatively frequent (58%), underscoring the need for vigilant follow-up. Assisted reproduction was required in a substantial proportion (61%), and weight as well as type of procedure were perceived as influential factors. These findings emphasize both the benefits and limitations of endoscopic surgery in infertility management.

Table 3. Reproductive Outcomes After Endoscopic Surgery (n = 100)

Question	Yes	%	Sometimes	%	No	%	Total
Pregnancy occurred after the endoscopic procedure	62	62	25	25	13	13	100
Pregnancy continued until delivery after the procedure	65	65	20	20	15	15	100
Miscarriage occurred after the procedure or endoscopic surgery	58	58	25	25	17	17	100
Ovulation induction/assisted reproduction used after procedure	61	61	22	22	17	17	100

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Pregnancy occurred within 1–2 menstrual cycles after the procedure	60	60	25	25	15	15	100
Pregnancy occurred within 3–4 menstrual cycles after the procedure	57	57	28	28	15	15	100
Weight affected the ability to achieve pregnancy after the procedure	59	59	25	25	16	16	100
The type of endoscopic procedure helped achieve pregnancy	63	63	22	22	15	15	100
The number of pregnancies matched medical expectations	60	60	25	25	15	15	100
Follow-up care improved pregnancy chances and continuation	61	61	24	24	15	15	100

Discussion

The present study highlights the significant role of laparoscopic myomectomy in improving reproductive outcomes among women with infertility. The findings demonstrated that more than 60% of participants achieved pregnancy after surgery, with 65% continuing to delivery. These results are consistent with recent evidence showing that laparoscopic myomectomy enhances fertility potential by restoring uterine anatomy and improving implantation rates [12].

The miscarriage rate observed in this study (58%) underscores the importance of careful postoperative monitoring. Although laparoscopic myomectomy reduces miscarriage risk compared to untreated fibroids, residual uterine scarring and altered endometrial receptivity may still contribute to adverse outcomes [13]. This aligns with recent meta-analyses reporting variable miscarriage rates after myomectomy, influenced by fibroid location and surgical technique [14].

Weight and body mass index (BMI) were perceived as influential factors in fertility outcomes. Obesity is well recognized as a negative predictor of spontaneous conception and assisted reproduction success [15]. In this study, nearly 59% of women reported weight-related effects on pregnancy, supporting prior findings that lifestyle modification and weight management should be integrated into infertility care [16].

The type of laparoscopic intervention also played a role in reproductive success. Adhesion lysis, ovarian cyst removal, and endometriosis excision were associated with improved pregnancy rates, consistent with reports that addressing coexisting pelvic pathology enhances fertility outcomes [17]. Endometriosis, in particular, remains a major contributor to infertility, and laparoscopic excision has been shown to improve spontaneous conception rates [18].

Follow-up care after surgery was reported to improve pregnancy continuation in 61% of cases. This finding emphasizes the importance of structured postoperative management, including hormonal support, ovulation induction, and close monitoring of uterine healing. Recent studies have highlighted that individualized follow-up protocols can optimize reproductive outcomes and reduce complications [19].

While the results are encouraging, limitations must be acknowledged. The study was restricted to women undergoing myomectomy, excluding those treated with medical or alternative therapies. The follow-up period was relatively short, and reliance on self-reported data may introduce bias. Furthermore, external factors such as partner fertility and use of assisted reproductive technologies could not be fully controlled. These limitations mirror challenges reported in other observational studies [20]. Future prospective trials with larger cohorts and longer follow-up are warranted to refine patient selection criteria and optimize surgical techniques [21].

Several limitations should be acknowledged. First, the study focused exclusively on women undergoing myomectomy, excluding those treated with medical or alternative therapies, which may limit generalizability. Second, the follow-up period was restricted to two years, potentially underestimating long-term reproductive outcomes. Third, reliance on self-reported data introduces recall bias, particularly regarding pregnancy history and lifestyle factors.

Conclusion

This study demonstrates that laparoscopic myomectomy is an effective fertility-preserving intervention for women with infertility related to uterine fibroids and associated pelvic pathology. More than 60% of participants achieved pregnancy after surgery, with 65% continuing to delivery, underscoring the clinical value of minimally invasive approaches in reproductive medicine. The findings highlight the importance of patient selection, weight management, and structured postoperative follow-up in optimizing outcomes. While miscarriage rates remain a concern, the overall reproductive success supports laparoscopic myomectomy as a cornerstone in infertility management. Future prospective studies with larger cohorts and extended follow-up are warranted to refine surgical techniques and enhance predictive models for reproductive success [22,23].

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Conflict of Interest

The authors declare no conflict of interest. The study was conducted independently, without financial or institutional bias, and all data were collected and analyzed objectively to ensure scientific integrity.

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