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The impact of laparoscopic myomectomy on fertility and obstetric outcome in comparison with abdominal myomectomy

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Abstract

Background: Leiomyomas, commonly known as uterine fibroids, represent a prevalent and clinically significant pathology within the gynecological domain, impacting approximately 70% of the female population before menopause. These benign myometrial neoplasms are implicated in different clinical presentations such as menorrhagia, dysmenorrhea, and increased urinary frequency, which compromise the quality of life.

Objective: The purpose of this study was to compare the efficacy of laparoscopic myomectomy (LM) versus abdominal myomectomy (AM) in infertile patients, in restoring fertility, and to evaluate the obstetric outcomes.

Methods: The cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology, Anwer Khan Medical College Hospital, Dhaka, from January 2023 to December 2023. A total of 80 patients of reproductive age, with anamnesis of infertility, underwent myomectomy because of the presence of at least one large myoma (diameter ≥5 cm). Patients were randomly selected for treatment by LM ($n = 38$) or AM ($n = 42$). The questionnaire was pre-tested, corrected, and finalized. Data were collected by face-to-face interviews and analyzed by appropriate computer-based programming software, Statistical Package for the Social Sciences, version 24.

Results: The total number of myomata was 2.93 ± 1.51 and 2.69 ± 1.89. The number of large myomata was 1.05 ± 0.32 and 1.23 ± 0.41. The size of large myomata was 7.12 ± 2.41 cm and 7.62 ± 2.23 cm. Subserosal myomata were 8 (21.05%) and 11 (26.19%), intramural myomata were 31 (81.57%) and 38 (90.47%), respectively. All patients underwent LM antibiotic prophylaxis (ampicillin 2 g i.m.). The post-operative hospital stay was significantly longer after AM inasmuch as both techniques were used in cases of laparoconversion ($n = 2$), they were not included in the statistical analysis of fertility. A total of 34 patients in group 1 and 37 patients in group 2 tried to become pregnant after surgery. In group 1, there were 17 deliveries. Vaginal delivery occurred in 5 (29.4%) women, whereas 11 (64.7%) underwent cesarean section. Moreover, two cases of preterm delivery (at 34 and 35 weeks) and three cases of fetal distress during labor required a cesarean section.

Conclusion: This study shows that LM has well-known benefits, such as a shorter hospital stay and better post-operative outcome, and may produce comparable results to laparotomic myomectomy in terms of restoring fertility and pregnancy success.

Keywords: Abdominal myomectomy, fertility outcome, laparoscopic myomectomy, obstetric outcome

Introduction

The most prevalent kind of pelvic tumor in women is uterine leiomyoma. About 70–80% of people will be at risk in their lifetime.[1] This tumor affects 20–50% of females who are of reproductive age.[2] On the other hand, the number of women bearing children has drastically changed.

In Western nations, women are typically older when they become pregnant. Reproductive technology advancements have made it possible for elder women to conceive. Furthermore, many people have been able to receive a myoma diagnosis and undergo a myomectomy because of advancements in medical technology, including ultrasonography, magnetic resonance imaging, and laparoscopic instruments. The size of the tumor and the intensity of the symptoms have determined the criteria for uterine myoma surgery during the last few decades.

Although myomectomy has emerged as a viable option for patients who want to keep their uterus, hysterectomy has historically been the final operation. Laparoscopic myomectomy (LM) is becoming more popular due to advancements in laparoscopic suturing methods and equipment. Myomectomy is currently carried out in patients who have recurrent pregnancy loss or infertility, despite the fact that the connection between leiomyomas and infertility is still debatable.[3] Gynecologists and obstetricians must therefore treat more pregnant women with these tumors or who are undergoing treatment for them.

Uterine leiomyoma can be treated in a number of ways, such as with surgery or medication. Due to its minimum invasiveness, LM may be done on a limited number of females. Female patients with larger myomas or many myomas may undergo abdominal myomectomy (AM); the surgical treatment chosen will rely on a number of criteria, such as the patients' medical history, the myoma features, and the treating physician's level of surgical experience. In the majority of LM instances, laparoscopic forceps are used to create repair sutures for the uterine myometrium inside the abdominal cavity. The suture technique utilized in LM is more challenging than that employed in AM since repair sutures are created directly in AM situations. In addition, the operator's skill determines the technique.

Methodology

The cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology, Anwer Khan Medical College Hospital, Dhaka, from January 2023 to December 2023. A total of 80 patients of reproductive age, with anamnesis of infertility, underwent myomectomy because of the presence of at least one large myoma (diameter ≥5 cm). Patients were randomly selected for treatment by LM ($n = 38$) or AM ($n = 42$). Patients who matched the inclusion and exclusion criteria were approached for participation in the study. Patients who were not willing to give consent were excluded. Purposive sampling was done according to the availability of the patients who fulfilled the selection criteria. The face-to-face interview was done to collect data with a semi-structured questionnaire. After collection, the data were checked and cleaned, followed by editing, compiling, coding, and categorizing according to the objectives and variables to detect errors and to maintain consistency, relevancy, and quality control. Statistical evaluation of the results used to be obtained through the use of a window-based computer software program devised with Statistical Packages for Social Sciences-24.

Results

Table 1 shows that the mean age of the study subjects was 35.00 ± 3.32 and 33.61 ± 4.82 years in the LM and AM groups, respectively. The mean infertility period was 42.05 ± 18.32 and 44.51 ± 21.31 months. The total number of myomata was 2.93 ± 1.51 and 2.69 ± 1.89. The number of large myomata was 1.05 ± 0.32 and 1.23 ± 0.41. The size of large myomata was 7.12 ± 2.41 and 7.62 ± 2.23 cm. Subserosal myomata were 8 (21.05%) and 11 (26.19%), intramural myomata were 31 (81.57%) and 38 (90.47%), respectively.

Table 2 shows that the operative time is slightly but not significantly lower in the group of patients who underwent AM. The average drop in hemoglobin was significantly higher in group 2. Two cases of blood transfusions were reported after laparotomy, and none after laparoscopy. All patients underwent LM antibiotic prophylaxis (ampicillin 2 g i.m.). Antibiotic therapy was carried out postoperatively only in cases of febrile morbidity (>38°C).

Table 1: Distribution of the patients according to patient's characteristics, number, size, and location of myomata (*n*=80)

Variables	Laparoscopic myomectomy (*n*=38)	Abdominal myomectomy (*n*=42)
Age (years)	35.00±3.32	33.61±4.82
Infertility period (months)	42.05±18.32	44.51±21.31
Total number of myomata	2.93±1.51	2.69±1.89
Number of large myomata	1.05±0.32	1.23±0.41
Size of large myomata (cm)	7.12±2.41	7.62±2.23
Location		
Subserosal (%)	8 (21.05)	11 (26.19)
Intramural (%)	31 (81.57)	38 (90.47)
Reaching uterine cavity (%)	1 (2.63)	3 (6.25)

Table 2: Distribution of the patients according to perioperative variables (*n*=80)

Variables	Laparoscopic myomectomy (*n*=38)	Abdominal myomectomy (*n*=42)
Mean operative time	98.73±39.44	86.65±28.81
Post-operative outcome		
Average drop in Hb	1.24±1.19	2.13±1.37
Transfusions (%)	0	2
Fever >38°C	6 (15.8%)	14 (29.2%)
Average hospital stay (h)	77.81±36.09	151.70±24.60

14 (29.2%) patients in group 2 and 6 (15.8%) patients in group 1 ($P < 0.05$) needed antibiotic therapy. The post-operative hospital stay was significantly longer after AM.

Table 3 shows that, after the waiting period of 6 months necessary for uterine scar repair, all patients were followed up for almost 1 year (mean: 30.7 ± 19.5 months, group 1; 33.7 ±15.9 months, group 2), to evaluate their pregnancy rate. Three patients in group 1 and four in group 2 were lost from our study for evaluation of future fertility.

Table 3: Distribution of the patients according to obstetric outcome (*n*=80)

Variables	Laparoscopic myomectomy (*n*=34)	Abdominal myomectomy (*n*=37)
Pregnancy rate (%)	24 (70.6)	27 (72.9)
Abortion rate (%)	4 (16.7)	3 (11.1)
Ongoing pregnancy	2	1
Ectopic pregnancy	1	0
Deliveries	17	23
Preterm deliveries (%)	1 (5.9)	2 (8.6)
Vaginal deliveries (%)	5 (29.4)	4 (10.8)
Cesarean sections (%)	11 (64.7)	17 (73.9)
Uterine rupture	0	0

Inasmuch as both techniques were used in cases of laparoconversion ($n = 2$), they were not included in the statistical analysis of fertility. A total of 34 patients in group 1 and 37 patients in group 2 tried to become pregnant after surgery. In group 1, there were 17 deliveries. Vaginal delivery occurred in 5 (29.4%) women, whereas 11 (64.7%) underwent cesarean section. Fourteen cesarean sections were carried out between the 38th and 39th week of gestation due to the patient's history of a uterine scar (five of these had undergone a previous cesarean section). Moreover, two cases of preterm delivery (at 34 and 35 weeks) and three cases of fetal distress during labor required a cesarean section.

Discussion

Myomectomy is routinely done on patients who are infertile or have experienced repeated pregnancy loss, even though the guidelines for this treatment have typically changed over the past few decades based on the size of the tumor and the intensity of symptoms. Leiomyomas increase the risk of miscarriage and make it harder to conceive, especially if they interfere with the endometrium. Subserosal myomas, on the other hand, have no effect on fertility.[4] It is debatable whether intramural myomas that do not cause uterine cavity distortion contribute to infertility.

According to Casini *et al.*,[5] removing myomas before conception may increase the likelihood of getting pregnant and keeping it up.

The cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology, Anwer Khan Medical College Hospital, Dhaka, from January 2024 to December 2024. A total of 80 patients of reproductive age, with anamnesis of infertility, underwent myomectomy because of the presence of at least one large myoma (diameter ≥5 cm). Patients were randomly selected for treatment by LM (n = 38) or AM (n = 42).

In this study, the mean age of the study subjects was 35.00 ± 3.32 and 33.61 ± 4.82 years in the LM and AM groups, respectively. The mean infertility period was 42.05 ± 18.32 and 44.51 ± 21.31 months. The total number of myomata was 2.93 ± 1.51 and 2.69 ± 1.89. The number of large myomata was 1.05 ± 0.32 and 1.23 ± 0.41. The size of large myomata was 7.12 ± 2.41 and 7.62 ± 2.23 cm. Subserosal myomata were 8 (21.05%) and 11 (26.19%), intramural myomata were 31 (81.57%) and 38 (90.47%), respectively. The operative time is slightly but not significantly lower in the group of patients who underwent AM. The average drop in hemoglobin was significantly higher in group 2. Two cases of blood transfusions were reported after laparotomy, and none after laparoscopy. All patients underwent LM antibiotic prophylaxis (ampicillin 2 g i.m.). Antibiotic therapy was carried out postoperatively only in cases of febrile morbidity (>38°C). About 14 (29.2%) patients in group 2 and 6 (15.8%) patients in group 1 ($P < 0.05$) needed antibiotic therapy. The post-operative hospital stay was significantly longer after AM. After the waiting period of 6 months necessary for uterine scar repair, all patients were followed up for almost 1 year (mean: 30.7 ± 19.5 months, group 1; 33.7 ± 15.9 months, group 2), to evaluate their pregnancy rate. Three patients in group 1 and four in group 2 were lost from our study for evaluation of future fertility. Inasmuch as both techniques were used in cases of laparoconversion (n = 2), they were not included in the statistical analysis of fertility. A total of 34 patients in group 1 and 37 patients in group 2 tried to become pregnant after surgery. In group 1, there were 17 deliveries. Vaginal delivery occurred in 5 (29.4%) women, whereas 11 (64.7%) underwent cesarean section. Fourteen cesarean sections were carried out between the 38th and 39th week of gestation due to the patient's history of a uterine scar (five of these had undergone a previous cesarean section). Moreover, two cases of preterm delivery (at 34 and 35 weeks) and three cases of fetal distress during labor required a cesarean section.

Despite the paucity of statistical power in this investigation, the conception rate was significantly higher for females with cavity-distorting myomas who had myomectomy than for those who did not (relative risk [RR]: 2.03, 95% confidence interval [CI]: 1.08–3.83). The risk of miscarriage was not significantly lower in females who had myomectomy than in those who did not (38.5 vs. 50%: RR: 0.77, 95% CI: 0.36–1.66).

The best course of action for pregnant women who have myomectomy is still up for debate.

Uterine rupture is among these pregnant women's most dangerous side effects. Even women who have had a previous subserosal myomectomy may experience uterine rupture.[6] In these situations, electrical devices are employed to mend the wound and stop bleeding; sutures are not used to fix the myometrial abnormalities. The third trimester is when the majority of uterine ruptures following LM take place.[7] One percent of uterine ruptures have been linked to LM, according to reports.[8] Hurst *et al.*[9] examined 21 distinct studies with 626 patients who were pregnant after LM.

Only one uterine rupture case was reported. These studies all emphasize how uncommon uterine rupture is after LM. On the other hand, between 0.24 and 5.3% of uterine ruptures are attributable to AM.[10] The uterine scars of pregnant women who experienced LM or AM during a planned CS were assessed by Cobellis *et al.*[11] According to their

findings, uterine scars following AM did not thin laterally, despite the fact that those following LM did. They came to the conclusion that these thinned myometria may be caused by an electrical device without sutures. In the current series, one to four layers of sutures were used to repair all myometrial defects following myomectomy. In addition, this correction for the myometrial abnormalities was one of the indications for VBALM and VBAAM. Despite the small sample size, there were no uterine rupture cases among the current patients.

After a myomectomy, it is challenging to ascertain the delivery method. Delivery after AM was reported by Obed and Omigbodum.[12] Among the 421 pregnant women with AM, 61% gave birth vaginally. In addition, according to some authors, patients with LM had successful VD rates of 58–79.2% and trial of labor rates of 66.1–72, respectively.[8,13,14] In the current cases, the successful rate of VD following LM was 93%, and the trial of labor rate was 31.3. They were 35.1% and 95% after AM, respectively. Compared to earlier studies, the current series exhibited a greater success rate of VD and a lower trial of labor rate. The fact that most patients were not eager to have a vaginal delivery could be one explanation for the low percentage of labor trials. On the other hand, the indications for VD following myomectomy, such as full repair of the myometrial defect and no deep defect reaching the endometrium, may be the cause of the high success rate of VD. Due to labor arrest, vaginal labor failed in just two of the present cases.

Studies that compare the prenatal outcomes of LM and AM are scarce. Perinatal outcomes, such as the rates of emergency cesarean sections, extended labor, preterm delivery, pregnancy-induced hypertension, placental abnormalities, poor Apgar score, and postpartum hemorrhage, did not differ significantly, according to the current study. Perinatal outcomes following LM and AM were reported by Seracchioli *et al.*[15] They contrasted 59 patients who had AM with 56 people who had LM. Preterm delivery (7.4 vs. 5%), abortion rate (12.1 vs. 20%), pregnancy rate (55.9% after LM, 53.6% after AM), and usage of CS (77.8 vs. 65%) did not significantly differ between the two groups. The LM group received 20 deliveries, whereas the AM group received 27. Six (22.2%) patients who had AM and 7 (35%) patients who had LM experienced VD. There were no instances of uterine rupture during either childbirth or pregnancy. The perinatal results following LM were reported by Dubuisson *et al.*[8] Perinatal mortality, low Apgar score, and preterm labor rates were 1.0%, 6.9%, and 14.0%, respectively. These figures align with the present findings.

Conclusion

This study shows that LM has well-known benefits, such as a shorter hospital stay and better post-operative outcome, and may produce comparable results to laparotomic myomectomy in terms of restoring fertility and pregnancy success. We believe that LM is no longer a contentious procedure and that it may be carried out in many situations, even when there are very large myomata.

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