

Influence of Uterine Cavity Breach in Laparoscopic Myomectomy on the Risk of Obstetric Complications

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Abstract

Objectives: Prepregnancy myomectomy is effective for the treatment of infertility or prevention of obstetric complications and is usually performed with laparoscopy. However, pregnancies following myomectomy have risks of obstetric complications, especially in cases with uterine cavity breaches, but the evidence remains unclear. We investigated how uterine cavity breach in laparoscopic myomectomy influenced the occurrence of obstetric complications.

Patients and Methods: One hundred and eighty women who underwent a cesarean section from 2014 to 2020 in pregnancies following laparoscopic myomectomy were included. They were divided into two groups: 25 women in the uterine cavity breach group and 155 in the nonbreach group. Obstetric complications, including placenta accreta spectrum (PAS), uterine rupture, placental malposition, abruption placenta, preterm delivery, threatened premature labor, premature rupture of membranes, and massive intrapartum hemorrhage, were assessed.

Results: Multivariate analysis revealed that the frequency of PAS in the breach group (24.0%) was statistically significantly higher than in the nonbreach group (5.2%, $P < 0.05$).

Conclusion: This study demonstrated that women who experienced uterine cavity breach in laparoscopic myomectomy had an increased risk of PAS in subsequent pregnancies.

Keywords: Laparoscopic myomectomy, placenta accrete, uterine cavity breach

INTRODUCTION

Uterine myoma causes infertility, as well as various obstetric complications, such as degenerative pain, placental abruption, preterm delivery, and postpartum hemorrhage, depending on the location, size, and number of fibroids.^[1] Currently, laparoscopic myomectomy (LM) is chosen for its minimal invasiveness over laparotomy. To avoid those obstetric complications, LM is needed before pregnancy, especially in submucosal myoma cases. However, pregnancy after LM presents life-threatening risks, with uterine rupture as one of such severe complications. The incidence of uterine rupture during delivery was 1% among women who had LM before pregnancy.^[2]

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In LM of submucosal myoma, the uterine endometrium is sometimes broken, and the uterine cavity is opened. In such cases, obstetric risks such as placenta accreta spectrum (PAS) are believed to increase in subsequent pregnancies. However, studies demonstrating the incidence of PAS in women who had the uterine cavity breach were not retrieved on PubMed and Google Scholar repositories. Hereby, we investigated obstetric complications, including PAS, in women who underwent a cesarean section (CS) after LM. They were divided into two groups according to the presence or absence of uterine cavity breach in LM.

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PATIENTS AND METHODS

This was an observational cohort study conducted in Teine Keijinkai Hospital. The study included 180 women who had undergone LM from 2004 to 2020 and delivered by CS between 2014 and 2020. The following patient information was collected: age, number of enucleated myomas, the total weight of enucleated myomas, amount of hemorrhage, operative duration, and use of uterine manipulator for LM; and age, interval period from LM to CS, a history of other uterine surgeries, and use of artificial reproductive technology (ART) for CS. Obstetric complications, such as PAS, uterine rupture, placental malposition, abruption placenta, preterm delivery, threatened premature labor, premature rupture of membranes, and massive intrapartum hemorrhage, were assessed.

LM was performed under pneumoperitoneum in all cases. The myometrial layer was incised with an ultrasonic scalpel and sutured in one or more layers with multifilament or monofilament barbed thread. For wide uterine endometrium breaches, an intrauterine device or Foley catheter was inserted into the uterine cavity. PAS was defined as the condition in which the placenta could not be separated easily by the manual removal. Placental malposition included placenta previa and low-lying placenta. Threatened premature labor was defined as preterm uterine contraction requiring hospital admission and medications. Massive intrapartum hemorrhage was defined as more than 1500 g of blood loss during CS. These data were collected from the clinical records.

Women were divided into two groups according to the presence or absence of uterine cavity breach. Associations between the presence of uterine cavity breach and obstetric complications were analyzed by the Fisher's exact test. The factors with a significant difference were included in a multivariate analysis performed by the logistic regression analysis. The significant difference was set at $P < 0.05$.

This study was approved by the Institutional Review Board of Teine Keijinkai Hospital (2-019119-00).

RESULTS

The operation duration of LM in women with uterine cavity breach (median – 116 min) was significantly longer than in women with no breach (median – 96 min, $P < 0.01$) [Table 1]. Other clinical backgrounds were not associated with uterine cavity breach.

Among 180 women, 2 (1.1%) had uterine rupture and 14 (7.8%) had PAS. Two cases of uterine rupture were diagnosed before CS. All the cases of PAS were diagnosed with placenta accreta without placenta previa. Among 14 women with PAS, 3 required blood transfusion and none underwent hysterectomy. PAS occurred more frequently in women with uterine cavity breach (24.0%) compared with women with no breach (5.2%),

Table 1: Clinical backgrounds

	Uterine cavity breach (n=25)	No uterine cavity breach (n=155)	P
Backgrounds on LM			
Age (years) (range)	36 (21-45)	33 (23-43)	0.31
Number of enucleated fibroids (range)	2.5 (1-11)	3 (1-29)	0.81
Weight of fibroids (g) (range)	80 (2-712)	112 (0.2-932.9)	0.28
Amount of hemorrhage (g) (range)	30 (0-850)	30 (0-1200)	0.27
Duration of operation (min) (range)	116 (65-244)	96 (31-443)	0.0034
Use of uterine manipulator, n (%)	23 (92.0)	139 (89.7)	1
Backgrounds on CS			
Age (years) (range)	39 (28-46)	37 (26-45)	0.10
Interval period from LM (months) (range)	31 (11-142)	26 (9-115)	0.64
Previous surgery of the uterus, n (%)	7 (28.0)	46 (29.7)	1
ART pregnancy, n (%)	10 (40.0)	44 (28.4)	0.25

Values of continuous variables are median (range). LM: Laparoscopic myomectomy, CS: Cesarean section, ART: Artificial reproductive technology

$P < 0.01$). Multivariate analysis demonstrated that women with uterine cavity breach had a high risk for PAS (odds ratio, 5.1; 95% confidence interval 1.51–17.3; $P < 0.01$) [Table 2]. Other obstetric complications, including uterine rupture, placental malposition, abruption placenta, preterm delivery, threatened premature labor, premature rupture of membranes, or massive intrapartum hemorrhage, were not associated with uterine cavity breach.

DISCUSSION

PAS is classified into placenta accreta, increta, or percreta, and often causes life-threatening conditions because of massive bleeding loss during delivery. To save maternal life, a hysterectomy is often performed. A report showed that 93% of 109 women with placenta percreta underwent hysterectomy, and the incidence of maternal death was 7%.^[3] A meta-analysis reported that the prevalence of PAS was 0.17% in 5,719,992 deliveries.^[4] However, this number should increase with the rate of CSs. PAS occurred at a 0.08% rate in the 1980s and at 0.3% in the 2000s.^[5] The incidence of PAS was reported to be higher in pregnancy by ART than that by non-ART,^[6] which might influence the increase of PAS.

The present study for the first time demonstrated that breaching the uterine cavity in LM was associated with PAS in subsequent pregnancies. Several suggestions on the cause of PAS have been proposed. The primary defect of trophoblast function, basalis defect by the failure of normal decidualization, abnormal vascularization, and tissue oxygenation of the uterine scar are all believed to contribute to PAS.^[7] The FIGO guideline defines three categories of

Table 2: Obstetric complications

Obstetric complications	Uterine cavity breach (<i>n</i> =25), <i>n</i> (%)	No uterine cavity breach (<i>n</i> =155), <i>n</i> (%)	<i>P</i> by Fisher's exact test	OR	95% CI	<i>P</i> by logistic regression
PAS	6 (24.0)	8 (5.2)	0.0055	5.1	1.51-17.3	0.009
Uterine rupture	0	2 (1.3)	1			
Placental malposition	2 (8.0)	12 (7.7)	1			
Abruptio placenta	0	2 (1.3)	1			
Preterm delivery	4 (16.0)	11 (7.1)	0.23			
Threatened premature labor	0	5 (2.0)	1			
PROM	2 (8.3)	6 (3.9)	0.29			
Massive intrapartum hemorrhage	6 (24.0)	27 (17.5)	0.42			

OR: Odds ratio, CI: Confidence interval, PAS: Placenta accreta spectrum, PROM: Premature rupture of membranes

uterine pathologies: direct surgical scar, nonsurgical scar such as ART pregnancy, and uterine anomalies.^[8] Direct surgical scar includes cesarean delivery, dilatation and curettage, myomectomy, endometrial resection, and Asherman's syndrome. It is likely that uterine cavity breach in LM is involved in the direct surgical scars associated with PAS.

However, conclusions drawn from studies for associations between PAS and myomectomy before pregnancy have been inconsistent.^[9] Data from the UK Obstetric Surveillance System indicate the risk of PAS for patients with prior myomectomy increased significantly.^[10] A case report showed myomectomy might be related to PAS,^[11] whereas another concluded myomectomy had a low risk for PAS, as no PAS occurred among 176 pregnant women who received myomectomy.^[12] In another study, disruption of uterine endometrial cavity occurred in 3 of 82 women during LM, whereas PAS occurred in only 1. However, the relationship between the disruption of the endometrial cavity and PAS was not demonstrated.^[13] The cause-effect relationship between the opening of the uterine cavity in LM and the occurrence of PAS remains unclear.

We investigated the influence of uterine cavity breach on obstetric complications among women who underwent CS after LM. Uterine rupture was not associated with uterine cavity breach in LM, perhaps because we usually performed elective CS for pregnant women with a history of LM with informed consent. The incidence of PAS in the present study was higher compared with those in previous reports. That is presumably because the rate of pregnancy by ART was high in our institution.

CONCLUSION

Uterine cavity breach in LM might increase the risk of PAS. Further prospective cohort studies are required to evaluate the cause-effect relationships between the two disorders.

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Conflicts of interest

There are no conflicts of interest.

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