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CLINICAL ARTICLE

Associations between uterine fibroids and obstetric outcomes in twin pregnancies

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ABSTRACT

Objective: To examine potential associations between the presence of fibroids and obstetric outcomes in twin pregnancies. *Methods:* A prospective cohort study compared obstetric outcomes between individuals with twin pregnancies who did and did not have fibroids. Patients were considered for inclusion if they underwent first-trimester ultrasonography examination, and went on to deliver at the Beijing Obstetrics and Gynecology Hospital between September 1, 2012 and December 31, 2014. Participants were grouped based on the presence or absence of fibroids and baseline demographics, fibroid characteristics, and obstetric outcomes were recorded and compared between the two groups. *Results:* In total, 153 patients with twin pregnancies were recruited; 51 had fibroids and 102 did not. Patients in the fibroid group demonstrated a higher maternal age ($P < 0.001$), higher pre-pregnancy body mass index ($P = 0.01$), and higher rate of assisted reproductive technology use ($P = 0.04$). The presence of fibroids was not associated with any change in obstetric outcomes, and obstetric outcomes were unaffected by the number, size, location, and type of fibroids (all $P > 0.05$). *Conclusion:* Fibroids were not a risk factor for any adverse obstetric outcomes among patients with twin pregnancies.

1. Introduction

Uterine fibroids are the most commonly recorded benign tumors of the female reproductive system, affecting 20%–60% of women of reproductive age [1,2]. However, the true prevalence of fibroids is likely much higher owing to most fibroids being asymptomatic [3]. Fibroid incidence increases with age, approaching 70%–80% by the time individuals reach 50 years of age [4].

Fibroids are known to occur in 0.1%–10.7% of pregnant women and this incidence increases as with women choose to delay pregnancy until later in life [2,5–7]. Fibroids have been reported to be associated with 10%–40% of prepartum complications in patients who are pregnant [6]. Fibroids have been associated with abdominal pain, spontaneous abortion, changes in fetal position, placental abruption, premature rupture of membranes, cesarean deliveries, postpartum hemorrhage, preterm delivery, and low birth weight infants [3,6,8].

The incidence of twin pregnancies has increased in recent years [9,10] and the rate of fibroids in twin pregnancies has been estimated to be 2.3% [11]. Although a large number of studies have investigated the influence of uterine fibroids on obstetric outcomes, few studies have included twin pregnancies. Consequently, following a fibroid diagnosis in a patient with a twin pregnancy, it is challenging for doctors to provide patient-specific clinical advice and treatment. The aim of the present study was to investigate whether obstetric outcomes of twin pregnancies were affected by whether patients had been diagnosed with fibroids, and to evaluate any effect of different fibroid characteristics on obstetric outcomes in twin pregnancies. Furthermore, changes in fibroids during pregnancy were recorded.

2. Materials and methods

The present prospective cohort study enrolled patients aged 20–45 years who attended first-trimester ultrasonography examination for a twin gestation at the Beijing Obstetrics and Gynecology Hospital, China, between September 1, 2012 and December 31, 2014. Patients were included if they underwent both subsequent prenatal care and delivery at the study institution within the study period. Patients were excluded if they had a history of cesarean delivery, myomectomy, or uterine septum resection, or had been diagnosed with uterine malformation, uterine adenomyosis (uterine adenomyoma), cardiovascular or cerebrovascular diseases, diabetes mellitus, renal insufficiency, hematopoietic system diseases, or any other serious condition. Patients with at least one fibroid measuring above 1 cm in diameter were included in the fibroid group and all other participants were included in a control group. Following the identification of the number of participants meeting the inclusion criteria, participants were excluded from the

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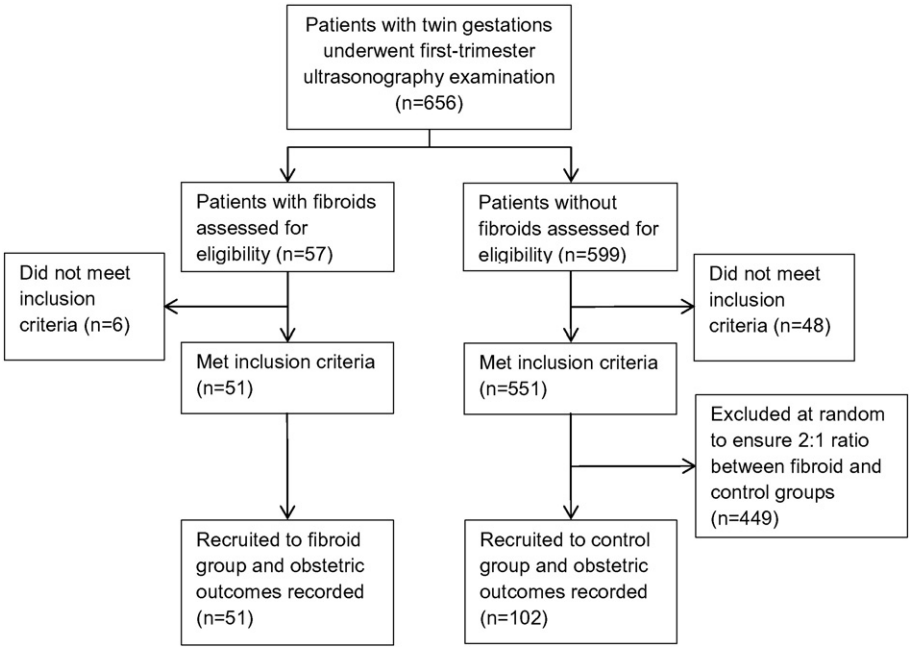

Fig. 1. Flow of participants evaluated for obstetric outcomes.

control group at random until a 2:1 ratio was established between the size of the control and experimental groups. The study protocol was approved by the Beijing Obstetrics and Gynecology Hospital Institutional Ethics Committee, and written informed consent was obtained from all participants.

Following enrollment, patient history and demographic data were recorded. All patients underwent routine ultrasonography examination at least three times during pregnancy (at 11–14 weeks, 22–24 weeks, and 28–32 weeks of pregnancy), except in cases of spontaneous or induced abortions; ultrasonography examinations were performed by expert obstetric and gynecologic sonographers at the study institution, and patients and their attending physicians were asked to report any obstetric outcomes and adverse events. During ultrasonography examinations, fibroid characteristics, including size, number, location, and type, were recorded and the 11–14-week measurements were used as reference values.

Details of obstetric events and outcomes were also recorded, including threatened spontaneous abortion (vaginal bleeding occurring at <28 weeks of pregnancy), premature rupture of membranes, placental abruption, placenta previa, polyhydramnios (amniotic fluid volume >7 cm or amniotic fluid index >20 cm), oligohydramnios (amniotic fluid volume <2 cm or amniotic fluid index <5 cm), any admission to a healthcare facility for abdominal pain, mode of delivery (vaginal delivery/cesarean delivery), pregnancy outcome (spontaneous/induced abortion, premature delivery [delivery at 28–36^{+6} weeks of pregnancy], or delivery at 37–42 weeks of pregnancy), estimated blood loss (bleeding volume within 24 hours of delivery), postpartum hemorrhage (estimated blood loss ≥1000 mL for cesarean deliveries or ≥500 mL for vaginal deliveries), postpartum blood transfusion, puerperal fever (patient temperature ≥38 °C), and duration of hospital admission. Further, neonatal outcomes including length and weight at delivery, 1-, 5-, and 10-minute Apgar scores, and any congenital anomalies were documented.

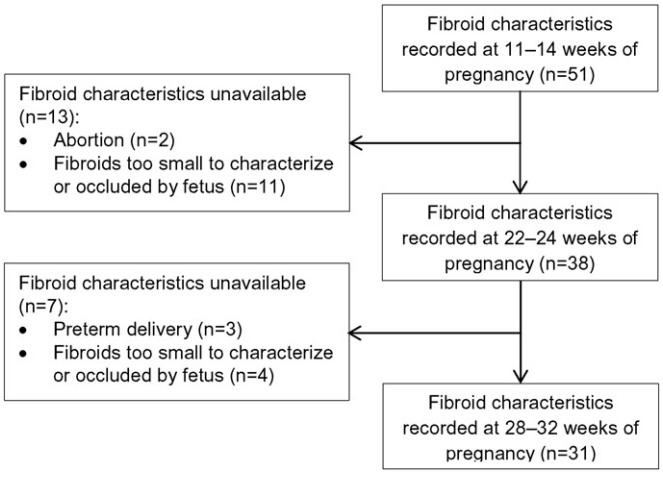

Fig. 2. Flow of participants undergoing ultrasonography examinations to evaluate fibroid characteristics.

Table 1
Demographic characteristics.[a]

Variable	Fibroid group (n = 51)	Control group (n = 102)	*P* value
Age, y	34.90 ± 4.17	31.29 ± 3.52	<0.001
Pre-pregnancy body mass index[b]	22.77 ± 3.64	21.11 ± 2.51	0.005
Menstrual history			
Duration of complete menstrual cycle, d	30.59 ± 4.01	33.55 ± 16.90	0.460
Duration of menstrual period, d	5.73 ± 1.04	5.46 ± 1.22	0.221
Pregnancy history			
Gravidity	1.73 ± 1.13	1.82 ± 1.01	0.368
Parity	0.20 ± 0.14	0.07 ± 0.29	0.273
No. of prenatal examinations attended	8.96 ± 2.40	9.03 ± 2.61	0.873
Method of conception			0.039
Natural conception	18 (35)	54 (53)	
Conception using assisted reproductive technology	33 (65)	48 (47)	
Ethnicity			0.908
Han ethnicity	47 (92)	96 (94)	
Non-Han ethnicity	4 (8)	6 (6)	
Smoker	0	1 (1)	>0.99
Drinker	1 (2)	0	0.333

[a] Values are given as mean ± SD or number (percentage), unless indicated otherwise.
[b] Calculated as weight in kilograms divided by the square of height in meters.