Study on fertility status of patients with uterine fibroids for fertility needs after microwave ablation

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Abstract

Objective: To study the pregnancy and its prognosis and explore influence factors on pregnancy after Uterine fibroids (UFs) treatment by microwave ablation (MWA). Design:A prospective observational study. Setting: Department of Interventional Ultrasound in a single centre in China. Population: Patient of UFs with fertility desiring. Methods: Each patient with fertility desiring underwent MWA for UFs from August 2010 to September 2020 was interviewed regularly. Main Outcome Measures: Pregnancy situation and outcomes, multiple factors affecting pregnancy. Results:81 women were enrolled in the study. Among them, there were 45 patients with 50 pregnancies. The pregnancy rate was 55.56% (45/81), and the median conception time was 18 months (1–60 months). Natural and artificially assisted pregnancy rates were 48.15% (39/81) and 7.41% (6/81), respectively. The number of pregnancies that ended in spontaneous and induced abortion were 11 and 9, respectively. And 25 pregnancies resulted in deliveries, with 1 of patients having two deliveries. Cesarean sections were performed by 76% (19/25) of the gravida, and 24% (6/25) opted for a vaginal delivery. All the 25 newborns survived and were in good health at the end of the follow-up. 1 case had placental abruptions at 26 weeks gestation, while the others had no serious complications during the perinatal period. For UFs patients with fertility requirements, the patient's age, history of spontaneous abortion and fibroid types are relevant factors affecting pregnancy after MWA. Conclusions: MWA could be considered a promising clinical treatment for women with UFs and plans for future pregnancy.

Introduction

Uterine fibroids (UFs) are the most common benign tumors in female reproductive system of childbearing age. It is reported that the prevalence rate is $20^{\circ}40\%$, and the incidence rate is higher in infertility patients^[1]. Among patients seeking reproductive assistance, up to 27% of patients have UFs^[2]. As an independent risk factor, the incidence of infertility caused by UFs is 1 $^{\circ}$ 3%, and the incidence of recurrent abortion is $7\%^{[3]}$. UFs also affect the smooth progress of assisted reproduction technology (ART) ^[1]. Therefore, for patients with symptomatic UFs for fertility requirements, the treatment of UFs is one of the positive measures to improve fertility.

At present, the standard treatment for patients with UFs who have fertility requirements is myomectomy ^[4]. The reproductive function of patients after surgery can be preserved to the greatest extent, but the overall trauma to the uterus is large. It takes more than 1 ~ 2 years for the uterine to repair after operation, and the scar at the uterine incision may increase the risk of uterine rupture during pregnancy^[5].

Microwave ablation (MWA) therapy for UFs is a safe and effective minimally invasive treatment developed in the past ten years, and has been widely used in clinical practice in China^[6, 7]. After treatment, the UFs were confirmed significantly shrinked, and the estrogen level in serum had no significant change. Some patients conceive spontaneously after treatment, suggesting that this method may improve infertility caused by UFs^[8, 9].

Based on the previous research, this study prospectively observed the pregnancy status and outcomes of patients with symptomatic UFs and fertility requirements after an ultrasound (US) guidance MWA treatment, and investigated the impact of the treatment on pregnancy and its prognosis, as well as the related factors affecting successful pregnancy after treatment.

Materials and Methods

1. Patients

Patients with UFs seeking treatment due to fertility requirements in the Interventional Ultrasound Department of the first medical center of the PLA General Hospital from August 2010 to September 2020.

2. MWA treatment

1 or 2 microwave antennas were placed inside the UFs by US-guidance percutaneous puncture, microwave output energy was set at (50 or 60) W, and then, started MWA therapy for UFs (Fig.1). For patients with sexual life, a hysterosalpingography catheter (Fig.2) was inserted into the uterine cavity 5 minutes before treatment to identify the position of endometrium during treatment; when ablating FIGO 0–4 UFs, cool normal saline was injected into the uterine cavity to form water isolation to prevent heat damage to the endometrium.

3. Data collection and follow-up

Before treatment: pelvic magnetic resonance imaging (MRI) and US examination were performed to record the position and volume of the uterus, and the number, location and volume of UFs. On the basis of FIGO classification^[10, 11], according to the relationship between UFs and myometrium, endometrium and serous layer, UFs were classified into submucosal fibroids, intramural fibroids and subserosal fibroids^[10]. The patient's age, body mass index, marital status, fertility history (pregnancy and parity, history of spontaneous abortion, history of induced abortion, history of spontaneous delivery, history of caesarean section and history of assisted reproduction and future fertility plan) were recorded. All patients completed uterine fibroid symptoms and health-related quality of life (UFS-QOL) score to evaluate symptom severity scale (SSS) and health-related quality of life score (HQOL).

After treatment: the ablation rate of UFs was evaluated by enhanced MRI within 3 days; the volume of uterus and UFs were evaluated by US 3, 6, 9 and 12 months after MWA, and the reduction rate of uterus and UFs were calculated. The time and mode of conception, pregnancy outcome and perinatal adverse events were followed up. According to the follow-up results, the patients were divided into pregnancy group and non-pregnancy group.

4. Statistical analysis

All data was processed by SPSS 22.0 statistical software. Descriptive research is adopted, and the measurement data in line with normal distribution were expressed as mean \pm standard deviation (?x+-s); the measurement data of non-normal distribution were expressed by median; the counting data were expressed by (n, %); Logistic regression analysis was used in multivariate analysis. P < 0.05 indicated statistical difference.

Results

1. Follow up results

This study included 604 patients of childbearing age with symptomatic UFs who underwent percutaneous MWA. All were diagnosed as UFs by pelvic MRI and US. Among the 604 cases, there were 166 cases of fertility requests, 114 of which had not given birth, The remaining 52 cases of reproductive requests had been given birth, and 154 patients were successfully followed up, of which 73 cases were excluded. The details of the excluded patients are shown in the flowchart (Fig. 3). Finally, 81 cases entered the statistical analysis. The deadline for follow-up was January 31, 2021, and the median follow-up time was 64 months (4–124 months).

2. General condition of the patients

After MWA, there were 45 cases in the pregnant group and 36 cases in the non-pregnant group. Compared with the non-pregnant group, the pregnant group was younger (34.89+-4.62 years vs. 38.14+-5.39 years, P <0.05), more history of gestation (30% vs. 15%, P <0.05), more spontaneous abortion history (12% vs. 2%, P <0.05) and poorer infertility history (4% vs. 14%, P <0.05). The other clinical baseline characteristics were no significant differences (P>0.05) (shown in Table 1).

3. Pregnancies after MWA treatment

45 patients had 50 successful pregnancies, of which 39 patients had 42 (84%) natural conceptions, and 3 patients experienced 2 pregnancies. 6 patients underwent ART for 8 pregnancies (16%), of which 1 patient experienced 3 pregnancies. Among the 50 pregnancies, there were 11 spontaneous abortions and 9 artificial abortions. Among the 30 pregnancies of the remaining 29 patients, one premature infant did not survive due to placental abruption at 26 weeks of pregnancy, one case was lost after 13 weeks of pregnancy, and three cases were still pregnant at the cut-off point of follow-up. The remaining 24 patients have successfully delivered 25 times, including 6 cases of natural vaginal delivery 24% (6/25), 19 cases of cesarean section 76% (19/25), and the safe birth rate of babies is 100% (25/25). The median pregnancy time after treatment was 18 months (1–60 months) after MWA treatment, and the pregnancy rate was 55.56% (45/81). Among 81 patients, 18 cases were diagnosed as primary infertility before ablation treatment, and 4 cases (22.22%) were successfully pregnant after treatment. Among them, 2 cases were successfully delivered, and they all gave birth to healthy babies by cesarean section (1 case was conceived naturally, 1 case was conceived by ART), and the other 2 cases were spontaneous abortion after pregnancy. The detailed pregnancy situation is shown in Table 2.

4. Situation of the newborn

Among the 25 cases of successful delivery, 1 patient gave birth to two healthy babies at an interval of 7 months and 59 months after treatment. Among the 25 infants, 15 were boys and 10 were girls. By the end of the follow-up, the children had an average age of 45.24+-32.21months and were in good health.

5. Complications of pregnancy and childbirth

No pregnant patients after treatment had threatened abortion, uterine rupture, or other perinatal or postpartum complications except for 1 case of placental abruption at 26 weeks of gestation. No abnormality was found in the uterus of patients undergoing cesarean sections.

6. Multivariate logistic regression analysis of related factors affecting pregnancy after MWA treatment

The patient's age, history of gestation, history of spontaneous abortion, history of infertility, fibroids types are related to pregnancy after MWA treatment. Further multivariate logistic regression analysis showed that the patient's age, the history of spontaneous abortion, and the type of fibroids had statistically significant effects on pregnancy after treatment (P<0.05). (Table 3).

Discussion

It is a medical consensus that UFs have adverse effects on fertility^[12-14]. With the global fertility decline, it is still a problem to be solved to establish a minimally invasive, safe and effective treatment method that

can effectively improve the uterine pregnancy conditions and pregnancy outcomes of the patients with UFs.

The MWA treatment for UFs is a new minimally invasive treatment technology that has been applied to the clinic for more than ten years. Research reports show that this method has the advantages of minimally invasiveness, effectively making fibroids shrink or disappear on the basis of preserving the uterus, and no damage to ovarian function^[6, 8]. Our previous study found that many patients with symptomatic UFs had unplanned pregnancies and safe production after MWA^[9], suggesting that the MWA treatment for UFs may have no negative impact on the patient's reproductive function and may even improve the patient's reproductive function. Therefore, this paper makes a further systematic and prospective observational study.

Endometrial integrity and better receptivity are the basic conditions for pregnancy. In order to effectively protect the endometrium from thermal damage during MWA, for patients who already have sexual life, a hysterosalpingography catheter was inserted into the uterine cavity through the cervix 5 minutes before treatment, so as to identify the endometrium compressed and deformed by UFs during treatment. During the ablation of FIGO 0–4 UFs, cooling saline is injected into the uterine cavity through the catheter to form water isolation on the surface of the endometrium to protect the endometrium. The menstrual cycle and menstrual period of patients were normal after treatment, indicating that the protective measures were effective.

The subjects of this study were patients with fertility requirements, seeking treatment due to large UFs, bleeding, compression and other symptoms, which were in line with the clinical guidelines for the treatment for UFs of the International Society of Obstetrics and gynecology^[15]. Because this cohort of patients have fertility requirements after treatment, the follow-up observation of fertility status after treatment can better reflect the impact of this treatment technology on conception and continuous pregnancy.

In this study, the median follow-up time after treatment was 64 months (1–124 months), and the pregnancy rate after treatment was 55.56%, which was higher than the reported 38.3% after uterine artery embolization (UAE)^[16] and 53.6% 55.9% after surgical myomectomy^[17]. Among continuing pregnancy patients, sustained pregnancy and safe productivity were 96.2%(25/26), and the babies were all healthy, indicating that US-guided MWA therapy can be used for symptomatic UFs with fertility requirements. Among the 18 patients diagnosed as primary infertility before treatment, the successful pregnancy rate after treatment was 22.22%, and among the successful pregnancy patients, the successful delivery rate was 50%, suggesting that the reason of primary infertility could be UFs, the shrinkage of fibroids after MWA improved the fertility status of patients.

With respect to the appropriate pregnancy time after ablation treatment, the results of this study showed that 6% of the 50 pregnancies of 45 patients were pregnant within 3 months after treatment, of which 1 case became pregnant naturally 2 months after treatment and continued to pregnancy smoothly until fullterm delivery; 12% were pregnant 3 ~ 6 months after treatment, and 82% were pregnant 6 months after MWA treatment. This data has certain guiding significance for the preparation time of patients after MWA treatment. However, in respect of when it is safer for specific patients to become pregnant after treatment, personalized pregnancy guidance should be given according to the type, size and treatment effect of the patient's UFs. It is recommended that the patient be rechecked 3 months after treatment. If the shrinkage rate of UFs is [?]50%, the symptoms related to fibroids disappear, and the menstruction is normal, then pregnancy preparation can be considered. The average pregnancy preparation time of patients after MWA treatment was shorter than that after surgical myomectomy, and there was no uterine rupture in pregnancy cases, suggesting local tissue necrosis of UFs after MWA. MWA will not increase the risk of uterine rupture. Because the treatment was completed under the US-guidance and monitoring. during the treatment, the microwave thermal field can be effectively controlled in the UFs capsule, and the damage to the tissues outside the adjacent UFs was small. Therefore, there was no obvious damage to the elastic fibers and collagen fibers of the myometrium. After treatment, the volume of the UFs is significantly reduced [6, 7], but there is no scar formation in the tissues of the myometrium outside the UFs. The risk of collagen fiber hyperplasia is small, which can theoretically reduce the risk of uterine rupture during pregnancy caused by scars caused by UFs surgical myomectomy. For the elderly patients who urgently need to get pregnant as soon as possible, this treatment may be a more appropriate treatment option.

The determinants of delivery mode of pregnant women after MWA are not only obstetric disease factors, but also social and patient psychological factors. In this study, the cesarean section rate was 76%, which was only partly attributed to obstetric factors. Among the 19 cases of cesarean section, 1 case (5.3%) chose cesarean section because of breech position; 7 cases (36.8%) had a history of cesarean section;2 cases (10.5%) were conceived by ART, and the fetus was precious, cesarean section was strongly required to complete delivery;1 case (5.3%) has a history of 2 artificial abortions; 1 case (5.3%) refused to try vaginal delivery due to a history of ectopic pregnancy, fear of pain during delivery and delivery complications; and 7 cases (36.8%) opted for cesarean section because of the lack of confidence in natural childbirth at the older age of pregnant women. Therefore, the mode of delivery followed up in this study cannot accurately reflect the obstetric delivery state formed by the treatment of UFs. No uterine rupture occurred in all patients with continuous pregnancy and delivery, suggesting that it is safe for patients with UFs to conceive and give birth after microwave ablation treatment.

Although the relationship and mechanism between UFs and infertility are not completely clear, studies have shown that UFs at different locations have different effects on pregnancy. Submucosal fibroids of any size and intramural fibroids >4cm significantly impair patient fertility and in vitro fertilization results^[1]. Among the 45 pregnant patients in this study, there were 7 cases of submucosal fibroids, 15 cases of intramural fibroids, and 23 cases of subserosal fibroids. The average maximum diameter of fibroids was 5.87+-2.13cm (3-16.7cm), the ablation rate averaged 86.40+-7.49% (56.85-99.56%). After ablation of some submucosal or intramural UFs close to the fibroids, the coagulated and necrotic fibroids were discharged through vagina, the fibroids disappeared completely, and the uterus returned to normal size and shape, indicating that UFs were completely ablated, the endometrium was effectively protected under real-time US-guidance, and the pregnancy ability of patients can be unaffected or even effectively improved.

In this study, 1 pregnant patient had placental abruption. Because there are many factors related to the occurrence of placental abruption, even pregnant women without UFs can also have placental abruption. At present, there is no evidence that premature placental contractions are caused by MWA treatment. It also needs to be verified by researches with large sample sizes.

There are many factors affecting women's fertility. The success of pregnancy after MWA treatment of UFs is also related to many factors. This study found that there were significant differences in age, history of pregnancy, history of spontaneous abortion, history of infertility and type of fibroids between the pregnant group and the non-pregnant group after MWA treatment.

The OR value of the age of the pregnant group and the non-pregnant group was 0.858, indicating that the older the patients, the lower the pregnancy rate after MWA. The pregnancy rate of patients in the group <35 years old was significantly higher than that in the group [?]35 years old. The pregnancy outcome analysis of pregnant patients showed that after pregnancy, the spontaneous abortion rate was 22%, but the spontaneous abortion rate was only 13.33% for patients <35 years old, and 23.33% for patients [?]35 years old. This suggests that for patients with UFs who have not given birth, interventions should be taken as soon as possible. Previous studies believe that UFs that change the shape of uterine cavity and make endometrial deformation and abnormal contour have a greater impact on fertility, and surgery and other treatments can improve and correct this damage [18].

This study found that the pregnancy rate after MWA for UFs close to the serosal layer was higher than that close to the mucosal layer. This may be due to the changes in the morphology of the uterine cavity caused by submucosal fibroids, changes in the receptivity of the endometrium, and the influence of the intrauterine environment^[2], which also verifies the previous study research that submucosal fibroids has a negative impact on fertility, and the existence of subseroal fibroids has little or no impact on fertility^[1]. Among patients with UFs with a history of spontaneous abortion, the pregnancy rate after the MWA treatment was higher than that without a history of spontaneous abortion, and they could give birth smoothly and successfully. It is suggested that these patients have their own fertility conditions and ability, and the occurrence of spontaneous

abortion might be closely related to UFs. After MWA treatment, the fertility disorders related to fibroids can be lifted or disappeared, which provides good conditions for smooth conception and delivery. It is also consistent with the fact that fibroids increase perinatal risks such as spontaneous abortion^[4]. Although this study showed more optimistic results, the prospective comparation study of pregnancy status of MWA and UAE, as well as MWA and myomectomy is still worthy of further research, in order to obtain objective research data and guide doctors to give individualized and accurate treatment suggestions according to the requirements and specific conditions of the patients.

Conclusion

Patients with symptomatic UFs have a higher pregnancy rate after MWA treatment, and the interval between preparations for pregnancy is shorter than myomectomy. For patients who are infertile due to UFs and plan to pregnant as soon as possible, the MWA therapy can be used as an alternative safe minimally invasive treatment method. Vaginal delivery appeared to be feasible and safe after MWA. For patients with infertility and adverse pregnancy history caused by UFs, the MWA treatment could improve the uterine conditions, and it is possible to increase the natural conception rate and the ART conception rate. For the patients with UFs and wanting to be pregnancy earlier treatment is important.

Disclosure of interests

No potential conflict of interest was reported by the author(s).

Contribution to authorship

Lin Xiao Liang: data acquisition, analysis and interpretation, writing up of the article and final approval of the version to be published.

Dong Xue Juan: participated in the procedure of MWA treatment, final approval of the version to be published.

Zhang Bing Song: data interpretation, writing up of the article and final approval of the version to be published.

Liu Rui: data acquisition, final approval of the version to be published.

Yu Jie, Liu Fang Yi, Liang Ping, Yu Xiao Ling: participated in the procedure of MWA treatment and final approval of the version to be published.

Zhang Jing, Han Zhi Yu: responsible for the initial concept, the procedure of MWA treatment, participated in manuscript writing and final review of the manuscript.

Details of ethics approval

This study was approved by the Ethics Committee of PLA General Hospital. Written informed consent for all procedures was obtained from each participant.

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Table 1. Comparison of general conditions of groups before and after MWA treatment for fibroids

Variables	Variables	Preganncy group (n=45)	Non-pregnancy group (n=36)	Non-pregnancy group (n=36)	P-values
Age, years BMI, kg/m ²	Age, years BMI, kg/m ²	34.89 ± 4.62 22.63 ± 3.21	38.14 ± 5.39 23.19 ± 4.11	38.14 ± 5.39 23.19 ± 4.11	0.005* 0.487
Hb (g/L) CA125 (U/ml)	$\begin{array}{c} \mathrm{Hb} \; (\mathrm{g/L}) \\ \mathrm{CA125} \; (\mathrm{U/ml}) \end{array}$	$120.96 \pm 16.42 \\ 20.17 \pm 15.10$	$116.83 \pm 17.34 \\ 44.23 \pm 99.95$	$116.83 \pm 17.34 \\ 44.23 \pm 99.95$	$0.277 \\ 0.170$

37i-11	17:-11	Preganncy group	Non-pregnancy	Non-pregnancy	D1
Variables	Variables	(n=45)	group (n=36)	group (n=36)	P-values
CA199 (U/ml)	CA199 (U/ml)	11.41 ± 6.18	13.91 ± 16.48	13.91 ± 16.48	0.349
E2	E2	445 ± 270.40	413.90 ± 205.96	413.90 ± 205.96	0.568
FSH	FSH	5.77 ± 3.96	5.82 ± 4.37	5.82 ± 4.37	0.956
History of	History of	30(66.67)	15(41.67)	15(41.67)	0.024*
gestation (n,	gestation (n,				
%) History of	%) History of	20(44.44)	11(30.56)	11(30.56)	0.201
childbirth	childbirth	20(44.44)	11(30.30)	11(30.90)	0.201
Adverse	Adverse	Adverse	Adverse	Adverse	
pregnancy	pregnancy	pregnancy	pregnancy	pregnancy	
history (n, %)	history (n, %)	history (n, %)	history (n, %)	history (n, %)	
Spontaneous	Spontaneous	12(26.67)	2(5.56)	2(5.56)	0.013*
abortion(n, %)	abortion(n, %)	12(20.01)	2(0.00)	2(0.00)	0.010
Infertility (n,	Infertility (n,	4(8.89)	14(38.89)	14(38.89)	0.001*
%)	%)	` /	, ,	` /	
Ectopic	Ectopic	4(8.89)	0(0)	0(0)	0.067
gestation (n,	gestation (n,	,	· /	· /	
%)	%)				
History of	History of	22(48.89)	11(30.56)	11(30.56)	0.095
pelvic/abdomen	pelvic/abdomen				
surgery (n, %)	surgery $(n, \%)$				
Uterine	Uterine				0.506
position	position				
anteposition	anteposition	36(80)	30(80)	30(80)	
median	median	4(80)	1(80)	1(80)	
posterial	posterial	5(80)	5(80)	5(80)	0.0004
Classification	Classification	45	36	36	0.003*
of fibroids (n,	of fibroids (n,				
%)	%)	7(15 50)	F(12.00)	T(12.00)	
Submucosal Intramural	Submucosal Intramural	7(15.56) $15(33.33)$	5(13.89)	5(13.89)	
Subserosal	Subserosal	23(51.11)	$25(69.44) \\ 6(16.67)$	25(69.44) $6(16.67)$	
Diameter of	Diameter of	5.87 ± 2.13	5.74 ± 1.71	5.74 ± 1.71	0.297
the main	the main	0.07±2.10	0.741.71	0.14±1.11	0.231
fibroids (cm)	fibroids (cm)				
Average	Average				0.687
number of	number of				0.00.
fibroids (n, %)	fibroids (n, %)				
Single	27(60)	27(60)	20(55.56)		
Multiple	18(40)	18(40)	16(44.44)		
Uterine	218.70 ± 143.42	218.70 ± 143.42	264.89 ± 169.17	0.187	0.187
volume (cm^3)					
Fibroid	$110.85 {\pm} 123.04$	$110.85 {\pm} 123.04$	113.92 ± 74.36	0.896	0.896
volume (cm^3)					
Ablation rate	86.40 ± 7.49	86.40 ± 7.49	84.08 ± 9.61	0.225	0.225
Fibroid	85.44 ± 13.27	85.44 ± 13.27	81.80 ± 12.26	0.208	0.208
shrinkage rate	0 = = 1 1 2 = 1	0===140=1	40.05.1.0.==	0.000	0.000
Uterine	37.75 ± 12.71	37.75 ± 12.71	42.05 ± 8.77	0.088	0.088
shrinkage rate					

Variables	Variables	Preganncy group (n=45)	Non-pregnancy group (n=36)	Non-pregnancy group (n=36)	P-values
SSS HRQL	25.74 ± 8.65 62.78 ± 10.38	25.74 ± 8.65 62.78 ± 10.38	25.31 ± 10.32 60.82 ± 9.88	0.842 0.393	0.842 0.393

Differences at p<0.05 were statistically significant. BMI, body mass index; Hb, hemoglobin; CA125, carbohydrate antigen 125; CA199, carbohydrate antigen199; E2, estradiol; FSH, follicle-stimulating hormone; SSS, symptom severity scale; HRQL, health related quality of life score.

Table 2 Pregnancy situation after MWA treatment

Variables	n	n	Percent (%)
Number of pregnancies	Number of pregnancies	50	
Number of fetuses	Number of fetuses	25	
Conceive after MWA (month)	Conceive after MWA (month)	18 months(1-60months)	?;?
3	[?]3	3	6
3–6	3–6	6	12
>6	>6	41	82
Pregnancy way	Pregnancy way		
Natural conception	Natural conception	42	84
Assisted reproduction	Assisted reproduction	8	16
Outcomes of pregnancy	Outcomes of pregnancy	Outcomes of pregnancy	Outcomes of pregnancy
Spontaneous abortion	Spontaneous abortion	11	22
Legally induced abortion	Legally induced abortion	9	18
Delivery	Delivery	25	50
Pregnancies in progress	Pregnancies in progress	3	6
Premature delivery	Premature delivery	1	2
Loss to follow-up	Loss to follow-up	1	2
Delivery approaches	Delivery approaches		
Cesarean section	Cesarean section	19	76
Vaginal delivery	Vaginal delivery	6	24

Table 3 Multivariate analysis results of factors related to pregnancy after treatment

Variables	0R-values(95%CI)	P-values
Age, years	0.858(0.760-0.968)	0.013*
History of gestation	1.383(0.371-5.158)	0.629
Spontaneous abortion	9.803(1.470-65.355)	0.018*
infertility	0.286(0.058-1.410)	0.124
Classification of fibroids	$0.331(0.057 - 1.935)^{a}/0.106(0.028 - 0.398)^{b}$	0.220/0.001*

Differences at p<0.05 were statistically significant.

a intramural fibroids VS Subserosal fibroids

b Submucosal fibroids VS Subserosal fibroids

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 $\label{locx} Table.docx available at https://authorea.com/users/481822/articles/568674-study-onfertility-status-of-patients-with-uterine-fibroids-for-fertility-needs-after-microwave-ablation$

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 $\label{lem:figure.docx} Figure.docx \quad available \quad at \quad \text{https://authorea.com/users/481822/articles/568674-study-onfertility-status-of-patients-with-uterine-fibroids-for-fertility-needs-after-microwave-ablation}$